Drinking Water Quality in Northern Ireland, 2009

A Report by the Drinking Water Inspectorate for Northern Ireland

NIEA Northern Ireland Environment Agency
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Northern Ireland Environment Agency

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Foreword

I am pleased to present our annual report on the quality of drinking water in Northern Ireland. It covers the 2009 calendar year for both public and private water supplies.

It is satisfying to report the continuing upward trend in public drinking water quality compliance. This year, 99.79% of all tests carried out at water treatment works, service reservoirs and consumers' taps complied with the regulatory standards.

Looking at the five year trend for the period 2005 to 2009, the indicator which is used to compare drinking water quality at consumers' taps reports a significant increase from 99.02% in 2005 compared with 99.74% in 2009. This improvement reflects the substantial investment made to date by Northern Ireland Water Ltd (NI Water), especially in delivering the planned infrastructure improvement projects at water treatment works. Additional planned investment for treatment and distribution infrastructure is necessary for improved iron, lead, trihalomethane, aluminium and pesticide compliance.

NI Water must continue to be vigilant in carrying out its duty to provide safe clean drinking water. While overall statistics can be useful in providing information on trends or used as indicators from which comparisons can be made, high levels of compliance do not guarantee that events will not happen. In 2009, 55 events were reported, with 35 categorized as incidents. Of these 35, 43% were related to treatment difficulties. Mitigation of the risks of non-compliance at water treatment works is within NI Water's control. It is therefore essential that NI Water continues to address these problems to prevent recurrence of drinking water quality issues. To ensure that this is being properly addressed by NI Water, I feel that closer scrutiny of events is merited in future.

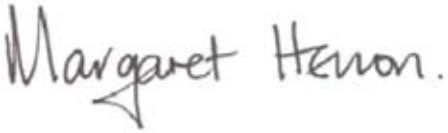
It is important for the Inspectorate to gain an understanding of the issues that consumers have about their water quality. We request information annually from NI Water relating to the number of contacts and expressions of concern made by consumers as an indication of the 'acceptability' of drinking water.

As with last year, the majority of this information related to the appearance of drinking water: 65.6% in 2009; and 63.1% in 2008. NI Water must continue to address these concerns raised if the public is to have confidence in its drinking water. Consumers will benefit as work to renovate water mains across Northern Ireland completes to deliver high quality drinking water.

Incorporation of a drinking water safety plan approach is an effective way of protecting human health and ensuring good water supply practice through: minimization of contamination of source waters; reduction or removal of contamination through effective treatment processes; and prevention of contamination of the distribution systems.

Planning for future investment needed to further safeguard the quality of our drinking water supplies was an intricate part of our work during 2009 as the water industry in Northern Ireland embarked on its first Price Control Process. We constructively engaged with other stakeholders to identify the key drinking water quality issues. Achieving compliance with drinking water quality standards will remain an important focus for setting priorities to safeguard public health. The improvements in drinking water quality that this will bring is to be welcomed.

I hope you find that this report is both an interesting and useful reference source on drinking water quality in Northern Ireland.



Margaret Herron
Chief Inspector of Drinking Water for Northern Ireland
September 2010

Executive Summary

This is the 14th report in a series published by the Drinking Water Inspectorate, acting in its regulatory role in matters relating to drinking water quality. The Inspectorate acts on behalf of the Department for Regional Development (DRD) in respect of public water supplies, and on behalf of the Department of the Environment (DoE) in relation to private water supplies.

Our report gives an independent commentary on our assessment of, and our checks on, the quality of drinking water provided by Northern Ireland Water Ltd (NI Water). Our report also provides details of the quality of the private water supplies for which we have regulatory responsibility.

Overall public drinking water quality, which includes results of tests carried out at water treatment works, service reservoirs and consumers' taps, continues to get better: 99.79% compliance in 2009 (99.69% in 2008). This continued improvement has been gained through the implementation of a variety of planned capital infrastructure projects. Further improvements are planned to achieve and sustain compliance with drinking water quality standards, notably for: iron, lead, trihalomethanes, aluminium and pesticides.

Compliance with microbiological standards is important as contraventions may indicate a breach in the integrity of the water supply system or a failure in the treatment process. Results confirm the general safety of drinking water supplies, with an overall high level of microbiological compliance (99.87%) being achieved in 2009.

Looking at overall drinking water quality at consumers' taps we use 'mean zonal compliance', an index which is calculated using 40 parameters from the regulatory sampling programme. In 2009, 12 parameters failed to achieve full compliance: trihalomethanes (THMs), iron, pesticides, aluminium, lead, bromate, manganese, turbidity, nickel, odour, taste, and *E. coli*.

Compared with last year, there has been a significant increase in the mean zonal compliance achieved at consumers' taps: 99.74% reported for 2009; and 99.49% for 2008. This is mainly attributed to improved compliance for THMs as the 'Alpha Project', which upgraded water treatment facilities at five major water treatment works supplying 50 per cent of Northern Ireland's drinking water, completed.

We continue to use appropriate regulatory mechanisms (such as authorised departures and enforcement notices) to target issues of non-compliance with drinking water quality standards. These regulatory processes place a requirement upon NI Water to undertake necessary remedial measures. During 2009, 26 THM and two pesticide (MCPA) Authorised Departures were in place. Remedial action in relation to 'Enforcement' was in place to improve compliance for aluminium and THMs. The necessary remedial measures are either currently being implemented or have now been put in place by NI Water. Additionally, pesticides need to be prevented from entering our water sources. We encourage the ongoing work between NI Water and the Northern Ireland Environment Agency to protect our water sources as part of a catchment management strategy.

Not withstanding the high quality of water reported this year, we report that 55 events that potentially affected drinking water quality were notified to the Inspectorate during 2009: we categorized 35 as incidents and 20 as non-incidents. Of the 35 incidents, 43% per cent related to treatment difficulties and 20 per cent were related to inadequate disinfection, with the remaining 37 per cent caused by other factors. Mitigation of the risks of non-compliance at water treatment works is within NI Water's control. To secure the continuous provision of safe clean drinking water, robust operational and maintenance practices need to be applied at every stage of water supply.

For private water supplies, overall compliance in 2009 is 96.96%; a marginal improvement on 2008 (96.80%). We continue to work with private water supply owners and the local councils to make improvements to these supplies.

Meeting Future Challenges

We will continue to work through partnership engagement with other regulators as the first 'Price Control Business Planning Process' is progressed for NI Water. Constructive working relationships continue to be developed with: NI Water; the Northern Ireland Authority for Utility Regulation (NIAUR) for 'economic regulation'; the Department for Regional Development for 'drinking water policy and stakeholder business'; the Northern Ireland Environment Agency for 'environmental regulation'; and the Consumer Council for Northern Ireland (CCNI) for 'customer representation'. We will continue in our role to help ensure the supply of safe drinking water by monitoring quality, providing advice, taking enforcement on contraventions and focusing on infrastructure investment, where necessary.

Recent changes to the Regulations for both public and private water supplies provide formal frameworks for risk assessment within which actual and potential hazards arising in the water supply chain, from 'source to tap', can be identified. These changes are an important part of continuing to further safeguard consumers who are served by both public and private water supplies. This development incorporates the drinking water safety plan approach to water supply practice recommended by the World Health Organization.

For public water supplies this means that NI Water is required to submit risk assessment reports by December 2010. These regulatory developments will allow NI Water to incorporate a more risk-based approach in securing and maintaining a high level of safe drinking water. Detailed assessment of every risk assessment to verify the methodology and adequacy of the control measures in place to mitigate risks will commence later on this year. For private water supplies this means risk assessments have to be completed by June 2011.

Looking forwards we have a specific challenge in meeting the stricter European drinking water standard for lead (10 µg/l) in 2013. NI Water has been working towards this for several years now following the introduction of enhanced water treatment (addition of orthophosphate) at all major works since 2004. While there has been an improving trend in overall compliance with the current 25 µg/l standard (99.13% in 2009; 94.92% in 2004) over the last five years, we note that there is still a significant amount of work required to comply with the 10 µg/l standard (97.39% in 2009). While effective water treatment is an important factor in achieving compliance, it alone cannot secure safe drinking water for all. We welcome the collaborative work that is ongoing with NI Water, the district councils, health professionals and other interested stakeholders to reduce consumer exposure to lead in drinking water, particularly, where lead pipe work and fittings remain in older buildings.

Introduction

The Drinking Water Inspectorate for Northern Ireland (the 'Inspectorate') is a business unit within the Northern Ireland Environment Agency, part of the Department of the Environment. It is one of the United Kingdom's regional regulatory bodies which have statutory duties in terms of drinking water quality. Our duties apply to both public and private water supplies.

A public water supply is one provided by Northern Ireland Water Ltd (NI Water) for the purposes of drinking, washing and cooking or food production. Public water is supplied to approximately 99 per cent of the population here.

A private water supply is any supply of water provided for the purposes of drinking, washing and cooking or food production, other than by NI Water.

Our Responsibilities

Our role is to assess compliance with the Drinking Water Quality Regulations and to provide independent reassurance that human health is safeguarded through the provision of safe drinking water in Northern Ireland.

We publish an annual report on drinking water quality in Northern Ireland. The report is presented in five parts and covers: water quality information for public water supplies; district council information; protection of public water supplies; information on private water supplies; and drinking water quality standards.

The Regulatory Framework

The regulatory framework for water supplies in Northern Ireland is 'The Water and Sewerage Services (Northern Ireland) Order 2006'. NI Water began to operate as a government-owned company from 1 April 2007, and is the sole public supplier of water in Northern Ireland.

We are a statutory appointee, acting on behalf of the Department for Regional Development in respect of public water supplies, and on behalf of the Department of the Environment in relation to private water supplies. The Order also confers enforcement powers on us in matters arising with both public and private water supplies.

Our regulatory responsibilities for public drinking water supplies are contained in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 [as amended in 2009 and 2010] and for private water supplies, in The Private Water Supplies Regulations (Northern Ireland) 2009 [as amended in 2010]. Additional legislation was made in 2010, The Water Supply (Domestic Distribution Systems) Regulations (Northern Ireland) 2010, which give us specific responsibility to ensure that appropriate remedial action is carried out in public distribution systems.

The original and revised versions of legislation pertaining to drinking water quality may be accessed at:

www.legislation.gov.uk/

Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009;

The Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2010; and

The Private Water Supplies (Amendment) Regulations (Northern Ireland) 2010.

Contacts with Other Organizations

The Inspectorate, in support of its role, has regular contact with health authorities, district councils, government departments, and other UK and EU Drinking Water Quality Regulators.

Working relationships with the Northern Ireland Authority for Utility Regulation and the Consumer Council for Northern Ireland continue to be developed in conjunction with DRD's Water Policy Division and DoE's Policy and Natural Resources Division.

Medical advice is obtained from the Chief Medical Officer from the Department of Health, Social Services and Public Safety (DHSSPS). We liaise with the Chief Environmental Health Officer (also from DHSSPS) on relevant health matters. We also communicate with the Public Health Agency and the Food Standards Agency. Regular contact with Environmental Health Officers in district councils continues in connection with both public and private drinking water quality matters.

We liaise closely with the other UK Regulators and operate in this respect with a publicly available 'Memorandum of Understanding' which can be viewed at: www.ni-environment.gov.uk/uk_regulators_mou_updated_february_2009.pdf

The Water Directorate (WD) within the Department of Environment, Food and Rural Affairs (DEFRA) has a seat on the EU Drinking Water Directive Article 12 Committee and the Drinking Water Inspectorate for England and Wales attends as the 'Technical Adviser' to the WD. Currently the UK has one additional place at the Article 12 Meeting. This place is available to the Drinking Water Quality Regulator in Scotland and the Chief Inspector of Drinking Water for Northern Ireland on a rotational basis.

We have regular contact with member states of the European Union through a European Drinking Water Regulators' Forum.

Part 1
Public Drinking Water Supplies

Part 1
Public Drinking Water Supplies

In this part of the report we give an overview of the quality of drinking water supplied by Northern Ireland Water Ltd (NI Water).

We also provide our assessment of NI Water's performance during 2009 in its duty to deliver drinking water to its consumers.

Northern Ireland Water Ltd (NI Water) is a government-owned company with responsibility for supplying and distributing water throughout Northern Ireland. Table 1.1 below illustrates some figures about the company.

Table 1.1: NI Water Figures

NI Water Assets	
Number of water treatment works (WTWs)	36
Number of service reservoirs (SRs)	340
Number of water supply zones (WSZs)	60
Length of mains pipe (km)	26,000
Water Supplied	
Water supplied (Ml/day)	633
% from surface sources (impounding reservoirs) Ml/day	49
% from surface sources (rivers and loughs) Ml/day	49
% from ground sources (boreholes) Ml/day	2
Population Served	
Northern Ireland population estimate (million)	1.79
% population supplied by NI Water	99
Properties connected to the public water supply (thousand)	802
Number of district councils	26
Number of health authorities	4

Water Sources

In Northern Ireland, water supplies are mostly obtained from surface water (approximately 98 per cent), with the remainder being groundwater sources. Water from all these sources is treated and distributed through approximately 26,000 kilometres of water mains. A higher percentage of the Northern Ireland population, as compared with Great Britain, lives in rural areas. The average length of water main per head of population connected to the public supply in Northern Ireland is estimated at 14.6 metres compared with 6.2 metres in England and Wales, and 9.0 metres in Scotland.

Water source has an important impact on the properties of a drinking water supply, such as taste, hardness, acidity (pH) and mineral content.

The predominantly surface water sources in Northern Ireland contain naturally occurring organic materials which need to be removed by water treatment processes.

In Northern Ireland, private water supplies are also used by a small percentage of the population (less than one per cent). We provide information on the regulation of private water supplies in Part 4 of this report.

Drinking Water Quality Testing

Throughout 2009, NI Water sampled drinking water across Northern Ireland to test for compliance with the standards in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007, as amended. The Regulations require that sampling programmes are in place to ensure that water quality is monitored at water treatment works, service reservoirs, water supply points and consumers' taps in water supply zones. Tests are carried out for forty different substances or organisms known as parameters. A description of each and its prescribed concentration or value is available on our website: www.ni-environment.gov.uk/water-home/drinking_water/public_water/regulations_guidance.htm

Overall Drinking Water Quality

Overall drinking water quality continued to improve in 2009: of the 113,193 tests undertaken by NI Water, 243 (0.21%) failed to meet the standards (Table 1.2 refers). This was a significant improvement compared with the 386 (0.31%) tests which failed in 2008, and was mainly due to improved compliance for trihalomethanes in water supply zones following investment in enhanced water treatment. There was also a significant improvement in the microbiological quality in water supply zones compared with 2008.

Table 1.2: Overall Water Quality in 2009

	Number of Tests	Number of Tests not Meeting the Standards
Water Leaving Water Treatment Works		
E. coli	7,746	4
Coliform bacteria	7,746	9
Microbiological Total	**15,492**	**13**
Nitrite	298	0
Turbidity	7,751	41
Total	**23,541**	**54**
Water in Service Reservoirs		
E. coli	17,429	7
Coliform bacteria	17,429	24
Total	**34,858**	**31**
Water at Consumers' Taps or Authorised Supply Points		
E. coli	5,772	2
Coliform bacteria	5,772	37
Enterococci	460	0
Clostridium perfringens	2,941	1
Microbiological Total	**14,945**	**40**
Zone Chemical Analysis	23,512	115
Supply Point Chemical Analysis	16,337	3
Total	**54,794**	**158**
Overall Microbiological Quality	**65,295**	**84 (0.13%)**
Overall Water Quality	**113,193**	**243 (0.21%)**

While it is encouraging to note the overall improvement in 2009, this report highlights those water quality issues where compliance with the regulatory standards still has to be achieved.

Drinking water quality at consumers' taps is also assessed using 'mean zonal compliance' (MZC), an index which is calculated using 40 parameters from the regulatory sampling programme.

Compared with last year, there has been a significant increase reported for the overall MZC: 99.74% in 2009; and 99.49% in 2008, due to improved compliance for trihalomethanes, *E. coli* and aluminium (Figure 1.1 refers).

Iron compliance, however, showed a downward trend in 2009. The mains rehabilitation programme of work, together with distribution maintenance programmes, is fundamental to improving both compliance and the quality of water supplied to consumers.

Figure 1.1: Overall Drinking Water Quality at Consumers' Taps

Table 1.3: Microbiological Parameters

Test Parameters	Standard	Total Number of Tests	Number of Tests not Meeting the Standards	Comments
Water Leaving Water Treatment Works				
E. coli	0/100ml	7,746	4	
Coliform bacteria	0/100ml	7,746	9	
Number of Water Treatment Works Sampled = 36				
Water Leaving Service Reservoirs				
E. coli	0/100ml	17,429	7	
Coliform bacteria	0/100ml 95% compliance required for each reservoir	17,429	24	339 service reservoirs met the annual 95% compliance rule.
Number of Service Reservoirs Sampled = 340				
Water Sampled at Consumers' Taps (Water Supply Zones)				
E. coli	0/100ml	5,772	2	
Enterococci	0/100ml	460	0	
Number of Water Supply Zones Sampled = 60				

The key water quality results for 2009 are presented in two tables: one showing results for the microbiological parameters (Table 1.3); the other (Table 1.4) presenting the chemical/physical parameters. We discuss specific drinking water quality issues in Part 3 of this report.

Microbiological Quality

To protect public health, microbiological standards have to be met at each individual water treatment works and service reservoir, and at consumers' taps. The significance of the individual test results for each microbiological parameter at each monitoring location varies, and a single positive result cannot be interpreted without other information. Results confirm the general safety of drinking water supplies, with an overall high level of microbiological quality compliance (99.87%) being achieved in 2009.

E. coli at Water Treatment Works and Service Reservoirs

In 2009, across Northern Ireland, a total of 25,175 samples for *E. coli* testing were collected at water treatment works and service reservoirs. *E. coli* was detected in eleven of these samples: four from water treatment works; and seven from service reservoirs. The failures were caused by inadequate disinfection on one occasion, and unrepresentative sampling on five occasions. No apparent reason was determined for the remaining failures. Where the reason for failure was due to sampling error, remedial action was undertaken by NI Water.

On detecting *E. coli*, NI Water is required to act promptly to protect public health. The immediate response when finding *E. coli* in a sample at a works or a service reservoir is to carry out substantive investigative work to help ensure that the water being received by consumers is safe.

Coliform Bacteria at Water Treatment Works

Testing for coliform bacteria at works gives reassurance that water is being treated adequately to remove bacterial and viral pathogens. In 2009, of the 36 works in Northern Ireland, seven sites had coliform bacteria contraventions. After investigation by NI Water, the sample results at six sites were found to be unrepresentative of the final waters. We have expressed our concern about unrepresentative sampling at these sites. Only one site (Shanmoy Borehole) had more than one coliform bacteria contravention during 2009. This was a site that did not receive chlorination; it has subsequently been re-designated as a raw source.

Coliform Bacteria at Service Reservoirs

Testing for coliform bacteria at service reservoirs is used to give reassurance that the quality of water held at these strategic locations in the distribution system is adequately maintained. Service reservoirs which are not maintained in good structural condition can be prone to inward leakage from contaminated surface water.

Secondary disinfection is installed at some service reservoirs in Northern Ireland, particularly where there are long distribution networks. In such cases, NI Water considers it necessary to boost disinfection levels to achieve a disinfection residual at the end of the network. However, it is imperative that secondary disinfection does not disguise a more fundamental problem with a service reservoir, such as compromised integrity. NI Water continues to develop a programme of inspection, cleaning and refurbishment of service reservoirs.

The national standard requires that at least 95 per cent of samples collected weekly from each service reservoir throughout the year are free from all coliform bacteria. In 2009, 340 service reservoirs were sampled and 339 met the regulatory standard. Coliform bacteria were present at 20 (5.88%) service reservoirs during 2009.

The number of occasions when coliform bacteria were detected at service reservoirs increased marginally from 22 in 2008, to 24 in 2009. Investigative work revealed inadequate disinfection was the reason on six occasions and unrepresentative sampling on seven occasions. No apparent reason was found for the remaining 11 samples. We relayed our concern about these water quality issues to NI Water; particularly where disinfection was compromised and the microbiological standards were not met. NI Water is taking the appropriate remedial measures through its service reservoir integrity programme and improved operational practices. NI Water should ensure that unsuitable sample points do not cause unrepresentative sample results.

Enterococci and *E. coli* at Consumers' Taps

The presence of enterococci, like *E. coli*, is indicative of faecal contamination and neither bacterium should be found in any drinking water sample. In 2009, enterococci were not found in any of the 460 samples taken by NI Water at consumers' taps.

During this reporting period, a total of 5,772 consumer tap samples were tested for the presence of *E. coli*. On two occasions, *E. coli* was detected; a significant decrease compared with the 13 failures in 2008. From the information provided by NI Water for the failures in 2009, there was no indication of a faecal contamination event affecting other properties in these zones. Further investigative samples were satisfactory.

Coliform Bacteria at Consumers' Taps

In 2009 there has been a significant decrease in the number of samples that failed to comply with the coliform bacteria standard from samples taken from consumers' taps: 37 (0.64%) compared with 58 (1.00%) in 2008. Of these samples, follow-up investigations reported the condition of consumers' taps or contamination at the time of sampling as the reasons for 29 (78 %) of the contraventions. NI Water advises the consumer where the contravention has been attributed to the domestic plumbing and what action, if any, he/she may take.

Samplers used by NI Water are trained to collect samples from consumers' taps. The Inspectorate, however, continues to express its concern that NI Water's sampling arrangements for consumers' taps should not generate unrepresentative sample results.

Cryptosporidium at Water Treatment Works

NI Water carries out an annual risk assessment for *Cryptosporidium*, and during 2009, 36 water treatment works were assessed. No sites were identified as requiring a continuous monitoring programme for the detection of *Cryptosporidium* oocysts. NI Water carries out operational surveys to monitor for *Cryptosporidium* at all of its water treatment works.

Risk assessment arrangements were established for public health protection and incorporate a formal notification level of one or more oocysts per 10 litres and an alert level of 0.1 oocysts per 10 litres. Of the tests carried out in 2009, all results were below both the formal notification level and the alert reporting level.

During 2009, there were no reports* of mains water supply related outbreaks of cryptosporidiosis in Northern Ireland.

Clostridium Perfringens at Water Treatment Works

The Regulations require monitoring for *Clostridium perfringens* as an indicator parameter, and it can be used in association with other parameters to assess the efficiency of water treatment processes. This organism is a spore-forming bacterium that is exceptionally resistant to unfavorable conditions in the water environment: extremes of temperature and pH; and disinfection processes such as chlorination and ultraviolet light. It is a normal component of the intestinal flora of up to 35 per cent of humans and warm-blooded animals. These characteristics make it a useful indicator of either intermittent or historical faecal contamination.

In 2009, 2,941 tests were carried out for *Clostridium perfringens* on samples collected from water treatment works. The standard of 0/100ml was not met on one occasion at the treatment facility at Forked Bridge (water is supplied to Forked Bridge from Castor Bay WTWs). No cause was determined.

Chemical/Physical Quality

Drinking water quality at consumers' taps is also assessed using 'mean zonal compliance' (MZC), an index which is calculated using 40 parameters from the regulatory sampling programme. Compared with last year, there has been an increase in the compliance achieved at consumers' taps: 99.49% reported for 2008; and 99.74% reported for 2009. The main reason for this is the significant increase in THM compliance following investment in enhanced water treatment.

Table 1.4 summarizes the percentage zonal compliance of all the samples taken to represent the quality of water at consumers' taps in 2009. The 12 parameters which did not achieve full regulatory compliance are listed at the top of the table.

The problems reflected by these parameters which have not achieved full compliance do not apply everywhere in Northern Ireland. Of the 60 water supply zones monitored, 13 zones achieved full compliance. Full details of the water supply zone areas where each parameter standard has not been met are given in Annex 2. Part 2 of this year's report presents the water supply zones where compliance has not been achieved at the local district council level.

Comparing the overall percentage MZC across the UK for 2009, Northern Ireland reports 99.74%; England and Wales, 99.95%, Scottish figure unavailable at the time of going to print. NI Water has continued to improve compliance through sustained investment, particularly, on water treatment and water mains rehabilitation. It is essential that this investment continues to maintain high levels of water quality and to comply with regulatory obligations.

*Data source: Public Health Agency (Northern Ireland).

Table 1.4: % Mean Zonal Compliance of Samples Taken at Consumers' Taps or Supply Points

Parameter	Number of Samples	% Zonal Compliance
Total trihalomethanes	**784**	**96.39**
Iron	**2,036**	**97.24**
Pesticides - other substances*	**12,478**	**98.90**
Aluminium	**2,036**	**99.17**
Lead	**460**	**99.17**
Bromate	**460**	**99.58**
Manganese	**2,036**	**99.70**
Turbidity	**2,036**	**99.76**
Nickel	**460**	**99.79**
Odour	**2,036**	**99.93**
Taste	**2,036**	**99.93**
E. coli	**5,772**	**99.95**
Colour	2,036	100.00
Hydrogen ion	2,036	100.00
Sodium	460	100.00
Nitrate	460	100.00
Nitrite	460	100.00
Nitrate/nitrite formula	460	100.00
Copper	460	100.00
Fluoride	297	100.00
Arsenic	460	100.00
Cadmium	460	100.00
Cyanide	295	100.00

Parameter	Number of Samples	% Zonal Compliance
Chromium	460	100.00
Mercury	297	100.00
Antimony	460	100.00
Selenium	460	100.00
Total pesticides	297	100.00
PAH - sum of four substances	460	100.00
Enterococci	460	100.00
Boron	297	100.00
Benzo(a)pyrene	460	100.00
Tetrachloromethane	297	100.00
Tetrachloroethene/ trichloroethene - sum of two substances	297	100.00
1,2-dichloroethane	297	100.00
Benzene	297	100.00
Aldrin	297	100.00
Dieldrin	297	100.00
Heptachlor	297	100.00
Heptachlor epoxide	297	100.00
Total Number of Samples	**46,541**	
Mean Zonal Compliance %		**99.74**

Trihalomethanes (THMs)

Trihalomethanes arise when chlorine, which is used to disinfect the water and make it microbiologically safe to drink, is added to water containing naturally occurring organic substances. Drinking water in Northern Ireland is predominantly obtained from surface waters, which are likely to contain naturally occurring organic materials. The leaching of this organic content into water supplies is affected by seasonal variations. Water treatment is necessary to remove the organic material prior to disinfection, and optimization of these processes minimizes the production of THMs. Water treatment processes must be robust enough to remove the organic matter which may result from any change in raw water quality.

In 2009, THMs remained the parameter for which there was the greatest number of tests failing to comply with the regulatory standards. Of the 784 tests carried out, 30 (3.83%) exceeded the standard. It is encouraging to note that this was a significant decrease from the 18.43% of tests exceeding in 2008, and was due to improvements at water treatment works. THMs are discussed in more detail in Part 3 of this report.

NI Water must continue to maintain a careful balance between maintaining good bacteriological quality through an adequate disinfection residual, and minimizing chlorine levels to limit the formation of THMs. Where practicable, without compromising disinfection, NI Water should continue to strive for lower THM values, thus, keeping disinfection by-products as low as possible.

**All pesticides other than aldrin, dieldrin, heptachlor and heptachlor epoxide.*

Table 1.5: Trihalomethane Compliance with Regulatory Standards

Year	Number of Determinations	% of Determinations not Meeting 100 µg/l	% of Determinations not Meeting ADs
2009	784	3.83	0.64
2008	765	18.43	2.88

Iron

The regulatory standard for iron has been set for aesthetic reasons because levels persistently above the standard can give rise to discoloured water. The presence of excessive iron may make the appearance and taste of the water unacceptable to consumers. There are various reasons why iron might be present in the water: it may be present in the raw water; iron compounds may be added as part of water treatment; or it can be released as a consequence of the corrosion of iron water mains.

In 2009, of the 2,036 samples taken for iron, 43 (2.11%) failed to meet the 200 µg/l standard largely due to the condition of the distribution network. Of these contraventions, NI Water has identified localized areas within the Dorisland Whiteabbey, Altnahinch Bushmills and Carran Hill Crossmaglen Water Supply Zones for prioritized remedial action within the associated rehabilitation work programme. Iron is discussed in more detail in Part 3 of this report.

Pesticides

Pesticides are a group of substances that include insecticides, herbicides, fungicides and algicides. The Regulations set standards for individual pesticides as well as a standard for the sum of all pesticides, 'the total pesticide' standard. Government guidelines specify that sampling and analysis should be undertaken for those pesticides used in significant amounts on catchments and those most likely to reach water supplies. Water sources may contain traces of pesticide residues as a result of agricultural use (pest control on crops) and non-agricultural use (herbicide for weed control on roads, etc). NI Water is required to assess the risk to drinking water from pesticides in use in its catchments and then develop an appropriate pesticide monitoring programme.

During this reporting period, 46 individual pesticides were monitored. Of the 13,666 determinations, three (two in Carron Hill water supply area and one in the Derg water supply area) failed to comply with the regulatory standard for the individual pesticide MCPA. MCPA is a herbicide used for controlling broad-leaved weeds in grass and cereal crops.

When a pesticide contravention occurs, NI Water liaises with the Northern Ireland Environment Agency's Pollution Control Team to carry out investigations regarding pesticide usage and control within the relevant catchments.

Table 1.6 lists the locations where pesticide contraventions have occurred above the regulatory standard during the last three years. We consider the extent and duration of these regulatory contraventions and take action, as appropriate. Regulatory action has been taken at two locations: firstly, at Lough Cowey Water Treatment Works, where we had granted an Authorised Departure for mecoprop until this works was decommissioned in October 2008; and secondly, at Altmore Water Treatment Works, where work was being undertaken to put in place a treatment barrier (powdered activated carbon) to remove pesticides from the untreated water until this source is removed from supply. We continue to monitor progress with the implementation of an action plan that NI Water has in place to reduce the risk of pesticides entering the water supply. We also continue to encourage the development of a water safety plan approach as an effective means of mitigating the risks of contamination within catchments used to provide drinking water sources.

Table 1.6: Pesticide Exceedences at Water Treatment Works

	2009	2008		2007		
Water Treatment Works	MCPA	MCPA	Total Pesticides	MCPA	Heptachlor Epoxide	Total Pesticides
W2501, Altmore		1	1	1		1
W2802, Carron Hill	2					
W3301, Dunore Point[1]					1	
W3317, Dorisland				2		
W4501, Derg	1			1		
Total Number of Exceedences	3	1	1	4	1	1

[1] *Dunore Point was upgraded in November 2008 under the PPP Scheme.*

Aluminium

Aluminium can occur naturally in many water sources, particularly those derived from upland areas. Aluminium compounds are also used as an important part of the processes used in the treatment and purification of water, including the removal of harmful organisms. In addition to this primary role, aluminium-based water treatment removes naturally occurring aluminium from water. The regulatory standard for aluminium is based on aesthetic considerations because high concentrations in water may cause discoloration.

In 2009, a total of 2,036 samples were tested for aluminium; 20 (0.98%) exceeded the standard. Inadequate treatment or poor control of the coagulation process may lead to aluminium passing through the treatment works and into the supply where it can accumulate in the distribution network. Of the 20 failures for this year, investigative work by NI Water reported 14 were probably due to disturbance of the mains; five were related to treatment problems; and one occurred when a power cut caused the drainage of a service reservoir. NI Water must manage the operational control of the coagulation process to mitigate water quality events arising.

Lead

The regulatory requirements are set as an interim lead standard of 25 µg/l, which was to be met by 25 December 2003, and a final standard of 10 µg/l to be met by 25 December 2013.

Meeting the lead standard is a complex matter because although some lead pipes are owned by NI Water, most belong to consumers, i.e. building owners. Many older properties still have service pipes and internal plumbing, wholly or partly, comprised of lead. Some lead in drinking water may be due to the use of lead solder on copper pipes not owned by NI Water (the use of lead solder on copper pipes has been banned since the early seventies). Whether or not the lead standard is exceeded at a particular tap depends on a number of factors, an important one being the plumbosolvency of the water (the tendency for lead to dissolve in water).

The Regulations require NI Water to carry out a programme of measures (water treatment) to reduce the tendency of water supplies to pick up lead from pipes and fittings. A plumbosolvency strategy to deliver improved compliance for the interim lead standard of 25 µg/l introduced a programme of orthophosphate treatment at all the major water treatment works during 2004.

NI Water has an ongoing programme of replacement of its part of lead service pipes, which is carried out during mains rehabilitation. NI Water will also replace, free of charge, any of its pipes which may be made of lead in the supply to a property, but only when a written request is received from a consumer who has replaced the portion of lead service pipe for which the householder is responsible.

In 2009, of the 460 tests carried out for lead, four (0.87%) exceeded the standard. All of these exceedences occurred in water supply zones which have associated orthophosphate treatment programmes in place, and following further investigation, it was found that all four of these exceedences occurred at properties which had lead service pipes. When the sample has exceeded the standard, NI Water notifies the consumer and the local Environmental Health Officer. Lead is discussed in more detail in Part 3 of this report.

Table 1.7: Lead Compliance with Regulatory Standards

Year	Number of Determinations	% of Determinations not Meeting 25 µg/l	% of Determinations not Meeting 10 µg/l
2009	460	0.87	2.61
2008	468	1.28	4.49

Bromate

Bromate may be generated in the manufacture of sodium hypochlorite disinfectant. It may also be formed during disinfection of drinking water through a reaction between naturally occurring bromide with strong oxidants (usually ozone).

During 2009, of the 460 samples tested for bromate, one (0.22%) failed to meet the standard of 10 µg/l. Follow-up investigation indicated that this was probably due to operational work.

Manganese

The regulatory standard for manganese has been set for aesthetic reasons. Manganese occurs naturally in many of Northern Ireland's water sources and is removed by effective water treatment. Where treatment is inadequate, manganese and iron can accumulate in distribution pipes.

Of the 2,036 samples taken for manganese in 2009, the standard was not met on eight (0.39%) occasions. Follow-up investigation indicated that the most probable cause of the failures was disturbance of the mains.

Water Quality in Distribution

A measure of water quality in distribution is the operational performance index (OPI [TIM]), which is based on the mean zonal compliance of three parameters which best reflect the causes of discoloured water: turbidity, iron and manganese. Comparing OPI (TIM) across the UK for 2009, Northern Ireland reports 98.90% (99.22% in 2008); Scottish figure unavailable at the time of going to print (99.12% in 2008) and England and Wales, 99.86% (99.85% in 2008).

Table 1.8: Operational Performance Index

Parameter	% Mean Zonal Compliance
Turbidity	99.76
Iron	97.24
Manganese	99.70
OPI (TIM)	98.90

The use of this index helps us to identify more clearly where effort is required to raise the quality of water at consumers' taps. The range of OPI (TIM) values across the water supply zones in Northern Ireland in 2009 was between 83.33% and 100%. Failure across the region varies and tends to reflect where the distribution network contains a large proportion of cast-iron mains. Further details on this variation are discussed in Part 3 of this report.

Turbidity

The regulatory standard for water leaving a water treatment works is a turbidity value of 1 NTU. The finely suspended particles which cause turbidity in water must be removed by effective water treatment. Where treatment is inadequate, these particles will remain in the water going into supply. A turbidity value not greater than 1 NTU is considered necessary to achieve effective disinfection.

Turbidity exceedences occurred at 16 (44.4%) water treatment works in 2009. Of the 7,751 samples taken for turbidity analysis from water treatment works, 41 (0.53%) failed to meet the standard. Of these, 28 (68.3%) were related to treatment problems; 11 were due to unrepresentative sampling; one was due to local operational work and no cause was determined for the remaining sample.

This parameter is often, but not always associated with discoloration, which in turn, can be caused by corrosion within the distribution system. Excessive turbidity can make the appearance of the water unacceptable to consumers. Of the 2,036 tests carried out on samples taken at consumers' taps in 2009, six samples failed to meet the turbidity standard of 4 NTU for consumers' taps. On all six occasions the failures were due to disturbance of the mains.

Contraventions – Follow-up Action

If NI Water supplies water that does not meet the drinking water standards, it must investigate the cause of the problem and notify us of its findings. It is incumbent upon NI Water to promptly provide substantive details and comments in its contravention reports.

We assess each notification and determine if the failure is likely to recur. If we consider this to be the case, NI Water is required to put a programme of remedial work in place to improve drinking water quality. We implement the appropriate statutory mechanism to secure or facilitate compliance. During this reporting period, the following statutory mechanisms have been in place: Authorised Departures, and Consideration of Provisional Enforcement Orders.

Authorised Departures (ADs)

Where a water treatment works has been identified as being at risk of failing to meet the regulatory standards, and the existing water treatment is considered inadequate, we agree a water treatment improvement programme with NI Water which is stated within the terms and conditions of an AD. The Regulations recognize that a period of time may be required during which improvement work must be carried out to bring the drinking water into compliance with the standards.

During this reporting period, ADs were in place for THMs in 26 water supply zones, and for the individual pesticide MCPA, in two water supply zones. We provide further details of these ADs in Annex 3 of this report.

Consideration of Provisional Enforcement Orders (CPEOs)

In 2009, a CPEO issued in 2007 was still in place for Seagahan WTWs. The new Seagahan WTWs was brought into service in December 2009, and the CPEO will finish after the commissioning period is completed.

A summary of CPEOs in place during 2009 is given in Table 1.9.

Table 1.9: Consideration of Provisional Enforcement Orders (CPEOs)

Water Treatment Works (WTWs) and Associated Water Supply Areas	Parameter	Progress with Corrective Action
Carmoney WTWs and water supply area	**Aluminium**	A number of corrective actions have been completed. The upgrade to Carmoney WTWs commenced in January 2010.
Killylane WTWs and water supply area	**THMs**	A number of corrective actions have been completed. A study into alternative treatment options is ongoing at this time.
Dorisland WTWs and water supply area	**Iron**	Whiteabbey Lower mains replacement scheme is ongoing. Carrickfergus mains replacement scheme commenced in April 2010. Further mains rehabilitation is to be carried out as identified in zonal studies.
Derg WTWs and water supply area	**THMS**	A number of corrective actions have been completed. Service reservoir retention times are to be kept under review.

Events Affecting Drinking Water Quality

NI Water must inform us of all events that have affected, or are likely to affect, drinking water quality or sufficiency of supplies, and where as a result, there may be a risk to consumers' health. This information has to be provided according to agreed guidance and reporting procedures. NI Water is also encouraged to notify us of events that may fall outside the criteria but which could, nonetheless, impact on water quality or cause concern to consumers.

Assessment of Events by the Inspectorate

When notified of an event, the Inspectorate assesses NI Water's provisional information to determine whether it is an incident or a non-incident. We define an incident as a situation where there has been a demonstrable deterioration in the quality of drinking water, giving rise to a significant potential risk to the health of consumers or a significant adverse aesthetic water quality change. Where no such deterioration has taken place, we classify the situation as a non-incident.

There is always the potential for incidents and non-incidents to happen. What matters is how well NI Water minimizes both the risks of occurrence and the consequences of incidents as it acts to protect public health at all times. We assess all the information available to determine:

- what caused the problem and whether or not it was avoidable;
- what NI Water did in response and how it handled the situation;
- what lessons can be learned to prevent similar incidents in the future; and
- if there were any breaches of the Regulations.

The normal outcome for a non-incident assessment is a closure letter sent to NI Water.

There are several typical outcomes of an incident assessment by the Inspectorate and these are set out below:

- a letter is sent to NI Water and, where appropriate, copied to other relevant parties to advise that the incident is closed;
- a letter is sent to NI Water and, where appropriate, copied to other relevant parties, making recommendations for action which NI Water must take to address deficiencies revealed by the incident;

and/or

- enforcement action may be taken to ensure that satisfactory remedial measures are put in place to prevent further regulatory contraventions.

A greater number of events was reported in 2009: 55 compared with the 41 reported in 2008. Of the 55 events reported, we categorized 35 as incidents and 20 as non-incidents. We recognize that a greater number of events in 2009 were non-incidents (20 in 2009; 12 in 2008). Of the 35 incidents, we note that 15 (42.9%) were related to treatment difficulties at water treatment works leading to aluminium exceedences; seven (20.0%) were bacteriological failures including five 'Boil Water Before Use' notices; seven related to interruptions to supply, including two 'Do Not Drink, Do Not Cook' notices and one 'Do Not Use' notice; three were turbidity failures; two related to pesticide failures; and one related to an odour exceedence.

Mitigation of the risks of non-compliance at water treatment works is within NI Water's control. This must be addressed by NI Water, particularly, where there has been a recurrence of an operational problem. It may be achieved through upgrading water treatment processes or reviewing operational practices where necessary.

Most events notified to us are also brought to the attention of the appropriate district councils and health authorities. When the circumstances are considered, the appropriate health authorities may require 'Boil Water Before Use'; 'Do Not Drink, Do Not Cook'; or 'Do Not Use' advice notifications to be issued by NI Water to the 'affected' consumers. A 'Boil Water Before Use' notice is issued when there is a temporary deterioration in drinking water quality and boiling the water is sufficient to make it safe to drink. A 'Do Not Drink, Do Not Cook' notice is issued when the drinking water may be contaminated and boiling the water will not make it safe to drink. This would be the case with, for example, chemical contamination. A 'Do Not Use' notice is issued when the nature or level of suspected contamination means it is unsafe to use drinking water for any purpose including washing and flushing the toilet. Table 1.10 provides a full list of incidents recorded in 2009; Table 1.11 lists the non-incidents. Both tables include the associated council areas potentially affected.

Table 1.10: Drinking Water Quality Incidents in 2009

Date of Event	Area and Estimate of Population/Properties Potentially Affected	Nature and Cause of Event	Associated Council Area(s)
5 - 12 January	Lough Fea WTWs (37,500 population)	Treatment difficulties led to aluminium exceedences in the final water and related supply area.	Cookstown, Magherafelt.
9 - 12 February	Castor Bay WTWs (267,000 population)	Treatment difficulties led to turbidity and aluminium exceedences in the final water.	Lisburn.
21 - 22 February	Drumaroad WTWs (796,000 population)	Treatment difficulties led to aluminium exceedences in the final water and related supply area.	Ards, Belfast, Castlereagh, Down, Lisburn, North Down.
23 - 25 February	Carnhill Estate, Londonderry (350 properties)	Potential contamination incident during operational work required a **Do Not Use** notice (notice in place for two days).	Derry.
26 - 27 February	Tulnacross Road, Cookstown (35 properties)	Potential contamination incident during operational work required a **Do Not Drink, Do Not Cook** notice (notice in place for two days).	Cookstown.
8 - 9 March	Calone SR (900 properties)	Power failure at SR led to chemical exceedences in related supply area.	Armagh.
21 - 24 March	Portaferry (600 properties)	Extended interruption to supply due to difficulties in effecting burst repair.	Ards.
23 - 24 March	Lough Fea WTWs (37,500 population)	Treatment difficulties led to aluminium and turbidity exceedences in the final water.	Cookstown, Magherafelt.
12 - 14 April	Dunore Point WTWs (220,000 properties)	*E. coli* and coliform bacteria exceedences reported led to a **Boil Water** notice (notice in place for one day).	Antrim, Ards, Ballymena, Belfast, Castlereagh, Larne, Lisburn, Moyle, Newtown-abbey, North Down.
22 April	Ballinrees WTWs (127,000 population)	Treatment difficulties led to aluminium and turbidity exceedences in the final water.	Ballymoney, Coleraine, Limavady.
3 - 4 May	Killylane WTWs (51,500 population)	Treatment difficulties led to an aluminium exceedence in the final water.	Antrim, Ballymena, Larne.
2 - 3 June	Killylane WTWs (51,500 population)	Treatment difficulties led to aluminium exceedences in the final water.	Antrim, Ballymena, Larne.
4 - 6 June	Townhill Road, Rasharkin (12 properties)	Potential contamination incident during operational work required a **Do Not Drink, Do Not Cook** notice (notice in place for two days).	Ballymoney.
15 - 22 June	Drumaroad WTWs (796,000 population)	Treatment difficulties led to aluminium exceedences in the final water and related supply area.	Ards, Belfast, Castlereagh, Down, Lisburn, North Down.
June/July	Derg WTWs (42,500 population)	Pesticide (MCPA) exceedence due to ineffective treatment.	Strabane.
26 June - 16 July	Donegore SR (325 properties)	Coliform bacteria (suspected localized contamination and inadequate disinfection).	Antrim.

Table 1.10 continued

Date of Event	Area and Estimate of Population/Properties Potentially Affected	Nature and Cause of Event	Associated Council Area(s)
2 - 6 July	Killylane WTWs (51,500 population)	Treatment difficulties (after high network demand) led to aluminium exceedences in the final water.	Antrim, Ballymena, Larne.
7 - 8 July	Guiness SR (200 properties)	*E. coli* and coliform bacteria exceedences due to inadequate disinfection (permanently removed from service on 8 July 2009).	Down.
8 -11 July	Slievebane Road, Irvinestown (three properties)	*E. coli* and coliform bacteria exceedences after a burst repair led to a **Boil Water** notice (notice in place for two days).	Fermanagh.
17 - 19 August	Carmoney WTWs (50,000 population)	Treatment difficulties led to aluminium exceedences in the final water.	Derry.
21 - 24 August	Altmore WTWs (14,000 population)	Treatment difficulties led to aluminium exceedences in the final water.	Dungannon and South Tyrone.
25 - 30 August	Ardboe Road, Ardboe (two properties)	*E. coli* and coliform bacteria exceedences after a fire hydrant was replaced led to a **Boil Water** notice (notice in place for two days).	Cookstown.
25 August - 8 September	Killylane WTWs (51,500 population)	Treatment difficulties led to aluminium and turbidity exceedences in the final water.	Antrim, Ballymena, Larne.
31 August - 10 September	Carmoney WTWs (50,000 population)	Treatment difficulties led to aluminium exceedences in the final water.	Derry.
September/ November	Carron Hill WTWs (16,000 population)	Pesticide (MCPA) exceedence due to ineffective treatment.	Newry and Mourne.
2 and 8 October	Altmore WTWs (14,000 population)	Treatment difficulties led to turbidity exceedences in the final water.	Dungannon and South Tyrone.
6 October - 6 November	Killylane WTWs (51,500 population)	Treatment difficulties led to aluminium exceedences in the final water.	Antrim, Ballymena, Larne.
7 - 8 October	Drumaroad WTWs (796,000 population)	Treatment difficulties led to aluminium exceedences in the final water and related supply area.	Ards, Belfast, Castlereagh, Down, Lisburn, North Down.
3 - 13 November	Bridge Street, Portadown (four properties)	*E. coli* and coliform bacteria exceedences after external contamination led to a **Boil Water** notice (notice in place for seven days).	Craigavon.
20 - 23 November	Altmore WTWs (14,000 population)	Treatment difficulties led to manganese and turbidity exceedences in the final water.	Dungannon and South Tyrone.
30 November - 4 December	Altnahinch WTWs (28,500 population)	Treatment difficulties led to chemical exceedences in the final water and related supply area.	Ballymena, Ballymoney, Coleraine, Moyle.

Table 1.10 continued

Date of Event	Area and Estimate of Population/Properties Potentially Affected	Nature and Cause of Event	Associated Council Area(s)
5 - 9 December	Carrick Avenue, Limavady (three properties)	*E. coli* and coliform bacteria exceedences after a burst repair led to a **Boil Water** notice (notice in place for two days).	Cookstown.
8 - 10 December	Cumber Road area, Claudy (30 properties)	Taste and odour failures following operational work.	Derry.
26 December 2009 - 21 January 2010	Mostly western areas	Loss of supply due to frozen pipes and burst mains, etc.	Mainly affected Omagh, Dungannon and South Tyrone.
30 December 2009 - 26 January 2010	Cabragh/Gortlenaghan at Cabragh SR	Chemical exceedences due to emergency supply in use.	Dungannon and South Tyrone.

Table 1.11: Drinking Water Quality Non-Incidents in 2009

Date of Event	Area and Estimate of Population/Properties Potentially Affected	Nature and Cause of Event	Associated Council Area(s)
16 - 17 February	Moyola WTWs (71,500 population)	Coliform bacteria exceedence reported - no apparent reason.	Magherafelt, Cookstown.
25 March - 10 April	Shanmoy Borewell (6,100 properties)	Coliform bacteria exceedences from unchlorinated borewell.	Armagh, Cookstown, Dungannon and South Tyrone.
25 - 26 March	Killylane WTWs (51,500 population)	Disinfection problems requiring manual chlorine boosting.	Antrim, Ballymena, Larne.
26 - 27 March	Clady Bridge and Ballyhill Road, Belfast (200 properties)	Interruption to supply due to difficulties repairing burst main.	Belfast.
24 - 25 May	Lough Macrory (38,000 population)	*E. coli* and coliform bacteria reported - no apparent reason.	Omagh.
17 -18 June	Mullaghanagh SR (6,100 properties)	*E. coli* and coliform bacteria reported - no apparent reason.	Dungannon and South Tyrone.
24 - 25 June	Fofanny WTWs and Knock LL SR (212,000 population)	*E. coli* and coliform bacteria reported - no apparent reason.	Armagh, Banbridge, Craigavon, Down, Lisburn, Newry and Mourne.
29 - 30 June	Seagahan WTWs (40,000 population)	Coliform bacteria reported - no apparent reason.	Armagh.
9 - 10 July	Drumabest Borehole at Dunaghy (2,500 properties)	Chemical exceedences due to unrepresentative sampling.	Ballymoney.
23 - 24 September	Castor Bay WTWs (267,000 population)	Chemical exceedences due to unrepresentative sampling.	Armagh, Banbridge, Belfast, Craigavon, Dungannon and South Tyrone, Lisburn, Newry and Mourne.
19 - 20 October	Seagahan WTWs (40,000 population)	Disinfection problems requiring manual chlorine boosting.	Armagh.

Table 1.11 continued

Date of Event	Area and Estimate of Population/Properties Potentially Affected	Nature and Cause of Event	Associated Council Area(s)
8 - 9 November	Carmoney WTWs (50,000 population)	Turbidity exceedence due to unrepresentative sampling.	Derry.
20 November - 1 December	Killyhevlin WTWs (85,000 population)	Flooding at WTWs and potential loss of supply.	Dungannon and South Tyrone, Fermanagh, Omagh.
23 - 24 November	Seagahan WTWs (40,000 population)	Turbidity exceedence due to intermittent power cuts.	Armagh.
28 - 29 November	Moyola WTWs (71,000 population)	Turbidity exceedence due to power cut.	Cookstown, Magherafelt.
9 - 12 December	Main Street, Carrickmore (one property)	A taste and odour failure related to local contamination.	Omagh.
22 - 23 December	Glarryford Borehole WTWs (14,000 population)	*E. coli* and coliform bacteria reported - no apparent reason.	Antrim, Ballymena, Ballymoney.
24 December 2009 - January 2010	Killyhevlin WTWs (25,000 properties)	Disinfectant problems due to severe weather, requiring manual chlorine boosting.	Dungannon and South Tyrone, Fermanagh, Omagh.
24 December 2009 - January 2010	Derg WTWs (13,880 properties)	Disinfectant problems due to severe weather, requiring manual chlorine boosting.	Derry, Omagh, Strabane.
24 December 2009 - January 2010	Lough Bradan WTWs (7,700 properties)	Disinfectant problems due to severe weather, requiring manual chlorine boosting.	Dungannon and South Tyrone, Fermanagh, Omagh, Strabane.

The Technical Audit Process

Technical audit is the term used for the process by which the Inspectorate checks that NI Water is complying with its statutory obligations. The audit process allows us to observe whether current good practice is being followed. We operate a risk-based approach to technical audit which allows us to take into consideration factors such as water quality monitoring, incidents and previous audits. This enables us to prioritize and focus the technical audit work to have the most benefit.

The technical audit process consists of three elements:

1. Annual Assessment of Drinking Water Quality Data

- A check on the quality of water supplied throughout the year, based on information provided by NI Water; and
- checking that NI Water has met its obligations in regard to sampling programmes and improvement programmes.

2. Inspection of Operational Sites

- Announced visits to observe selected activities of NI Water which are relevant to its provision of drinking water and the sampling and testing of drinking water supplies.

3. Interim Checks

- Carried out on aspects of compliance and based on information provided by NI Water.

In 2009, the technical audit programme was satisfactorily undertaken and we acknowledge NI Water's continued co-operation. NI Water has implemented or provided substantive comment on all recommendations and suggestions in our audit reports.

A clear distinction is made in audit reports between recommendations, which require a formal written response from NI Water, and suggestions. Recommendations are made only where, in our opinion, action is required to avoid a foreseeable risk or a breach of a regulatory duty. If such a breach has occurred, then we may consider 'enforcement action'. We make suggestions in relation to matters which do not present such a risk; instead they relate to an aspect of best practice.

A summary of our findings from the 2009 Inspection Programme is given in Table 1.12.

Table 1.12: Inspection Programme, 2009 - Summary

Location	Audit Activity	Number of Recommendations	Number of Suggestions
Caugh Hill Water Treatment Works	To check that good practice in water treatment is being operated.	16	9
Dungonnell Water Treatment Works	To check that good practice in water treatment is being operated.	11	5
Mains Rehabilitation	To check that good practice in network operations is being operated.	8	7
Altnagelvin Laboratory	To check that good practice in the analysis of water samples is being operated.	9	6
NI Water Headquarters	To check that good practice of the 'Laboratory Information Management System' is being operated.	2	0
Water Quality Samplers	To check that good practice in the collection of water samples is being operated.	12	12

NI Water Consumer Contacts

We asked NI Water to provide us with data on the complaints and concerns of its consumers during 2009 as we are interested in consumer confidence in drinking water quality (Table 1.13 refers). The data we received for 2009 showed a similar trend to that of 2008, when 63.1% of the complaints and concerns were related to the appearance of drinking water; for 2009, 65.6 % related to appearance (see Figure 1.2). In addition to the figures provided by NI Water we are aware that during 2009 there was an incident involving the Dunore water supply area which caused a significant level of consumer contact (approximately an additional 1,200 consumer contacts). These are not represented by the figures supplied by NI Water in Table 1.13. We are reviewing NI Water's procedures for recording consumer contacts, with a view to the company providing more representative data.

Figure 1.2: Main Categories of Consumer Concerns Received by NI Water in 2009

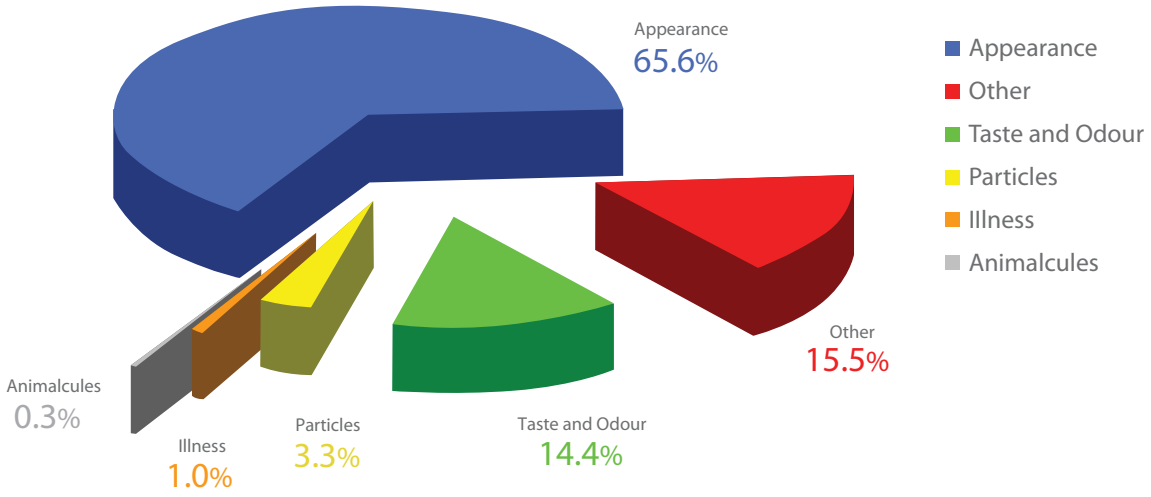


Table 1.13 Categories of Water Quality Contact received by NI Water in 2009

Contact Category		Number of Contacts in 2009	Number of Contacts in 2008
Appearance	Colour	3,840	4,085
	General	171	120
	Hardness	16	44
	Stained Washing	19	26
	White - Air	1,352	1,213
	White - Chalk	765	800
Taste and Odour	Chlorinous	521	543
	Earthy/Musty	210	211
	Other	557	506
	Petrol/Diesel	18	54
	TCP	46	32
Illness		90	119
Particles		307	298
Animalcules		26	32
Other	Water Quality Concern - Campaigns	20	8
	Water Quality Concern - Incident Related - General	59	13
	Water Quality Concern - Lifestyle	8	9
	Water Quality Concern - Pets/Animals	23	10
	Water Quality Concern - Sample	899	1,031
	Water Quality Concern - Lead	214	621
	Water Quality (No Concern) Fluoride	7	4
	Water Quality (No Concern) Other Information	61	63
	Water Quality (No Concern) Water Hardness	137	106
	Water Quality (No Concern) Water Quality Report	23	23
	Miscellaneous	7	0
	TOTAL	**9,396**	**9,971**

Appearance of the Water

Colour

Within the appearance category, the main concern (62.3%) relates to discoloured water (see Figure 1.3).

The most common cause of coloured water concerns is an orange, brown or black discoloration caused by suspended particles of iron (orange/brown) and manganese (black). Iron discoloration may occur through natural iron present in the raw water passing through, inadequate treatment or from corrosion of cast-iron distribution mains. Manganese is present in some raw waters and may not be removed if treatment is inadequate. It is expected that the long-term mains rehabilitation programme of the distribution system will improve the appearance of water.

Hardness

Temporary water hardness, usually caused by dissolved calcium carbonate, can give rise to complaints as it causes scale to form in kettles and other household appliances.

Stained Washing

Brown or black staining of clothes can occur in clothes inadvertently washed in discoloured water. If clothes are kept damp, the staining can often be removed by gently acidifying with a suitable substance such as citric acid. However, staining may also arise from a fault with the washing machine.

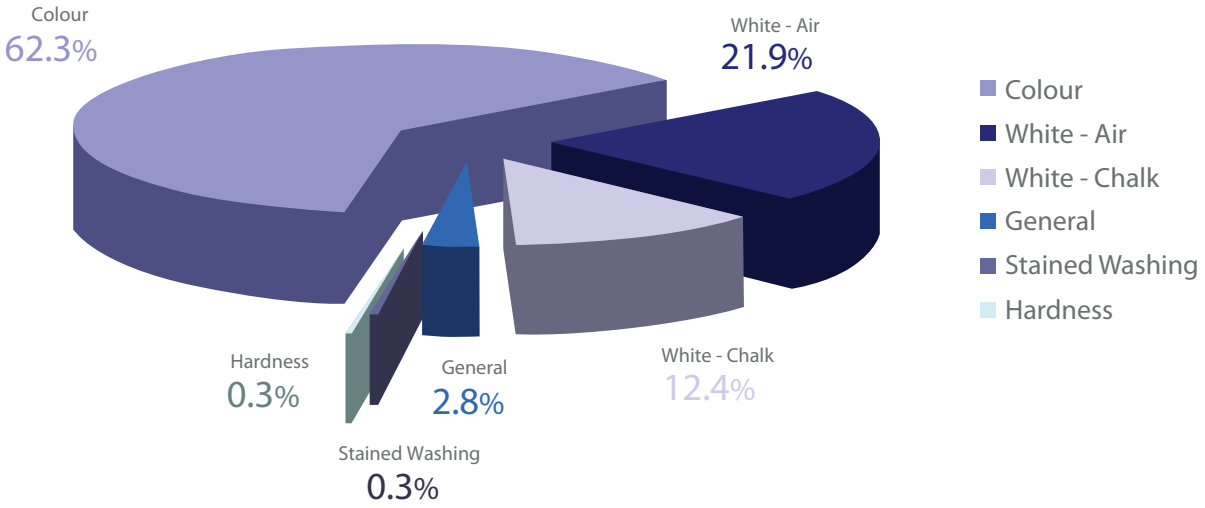
White Water - Air

Another appearance concern is 'white water'. The most common cause of 'white water' concerns is air dissolved in water. This causes a cloudy or milky white appearance because air is a gas and so it appears as a haze of tiny bubbles. These make the water appear white or grey and misty in appearance. A number of possible causes include burst mains, malfunctioning pumps and consumer stop taps. If air is the cause of white water, the cloudy appearance will clear in a glass of water from the bottom up.

White Water - Chalk

Chalk has a white powdery appearance and is made up of natural minerals found in water which form what is known as 'hardness'. A glass of water containing chalk will take up to an hour to clear from the top downwards, leaving fine white sediment in the bottom of the glass.

Figure 1.3: Breakdown of Consumer Concerns within the Appearance Category Received by NI Water in 2009



Particles

The presence of visible particulate matter in water which is otherwise not discoloured can be caused by corrosion of iron mains or deposits of sand, grit or other material present in the main being re-suspended following a change in the flow of the main.

Animalcules

A small proportion of contacts received concern animalcules. This category includes complaints of insects or other animals in the water supply. Most complaints arise where an insect has crawled up a tap or is present in the sink. Very occasionally, water systems can contain animals which may arise from the raw water, treatment works or within the mains themselves.

Taste and Odour

All water sources contain naturally occurring minerals. The varying concentrations of these minerals can give rise to slightly different tastes that may be detected by people, especially when travelling or moving to different areas. Water also contains dissolved gases, such as oxygen and carbon dioxide, which give tap water a characteristic taste. Without these elements, water would taste flat and unappetizing. There may be other substances present in the water which can also cause consumer complaints. One such substance, which is intentionally added to drinking water, is chlorine. Other taste and odours should not be present in drinking water for aesthetic reasons (TCP or earthy/musty) or health reasons (petrol/diesel).

Chlorinous

Some people are more sensitive to the taste and odour of chlorine which is used to maintain hygienic conditions within the water supply network. Chlorine taste and odours should dissipate if the water is left to stand in the fridge for a few hours. Boiling the water will also remove the chlorine.

Earthy/Musty

Earthy or musty tastes can arise due to naturally occurring compounds present in raw waters that have not been removed by the treatment process. Geosmin is one such compound commonly associated with earthy/musty tastes. Complaints are more common in the summer months when biological activity is highest; algal blooms in raw water sources are common causes of widespread musty tastes.

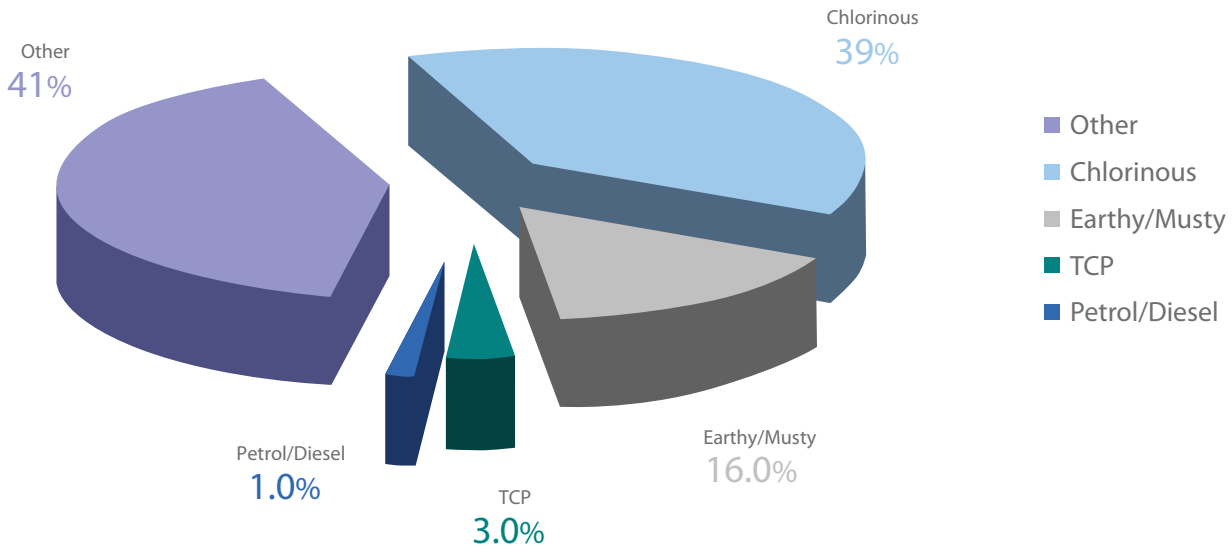
Petrol/Diesel

This is not a common problem and should be investigated immediately. Spillages of petrol, diesel or paraffin can percolate through the soil and penetrate plastic water mains.

TCP

Phenolic tastes can occur when chlorine reacts with components in household appliances or plumbing and can be more persistent. Descriptions used by consumers may include TCP, medicinal, swimming pool, bitter, and chemical. Common sources of phenol include washing machine hoses, tap washers and kettles. British Standard approved plumbing products, which do not contain phenol, should be used in all plumbing installations.

Figure 1.4: Breakdown of Consumer Contacts with Taste and Odour Concerns in 2009



Information on Drinking Water Quality Issues

If you want to find out about the quality of drinking water supplied to your home or workplace, or if you have a drinking water quality concern or complaint, then you should first contact NI Water at its Customer Service Unit:

Telephone: 08457 440088
E-mail: waterline@niwater.com

If you have discussed your concerns with NI Water and feel that the issue has not been satisfactorily resolved, you may contact the Consumer Council for Northern Ireland - see Appendix 4 for further details.

General information on drinking water quality matters is also available on the Inspectorate's website: www.ni-environment.gov.uk/water-home/drinking_water/consumer.htm

Information Leaflets

Water UK launched a consumer guide entitled 'Looking after WATER in your home'. It provides advice on how to maintain the quality of tap water in your home. The Inspectorate is pleased to support this industry-wide guide and has promoted and encouraged its use through NI Water, district councils and the Consumer Council for Northern Ireland. NI Water has published its own regional version of this leaflet and it can be viewed on the web page: www.niwater.com/siteFiles/resources/pdf/corporate/nie%20consumer%20guide.pdf

General Information about us

General information is available to the public on our website at: www.ni-environment.gov.uk/water-home/drinking_water.htm

Complaints about the Inspectorate

If a complaint is received about the way the Inspectorate handles or carries out its tasks, the Chief Inspector of Drinking Water will initiate an investigation of the issue and inform the complainant of the outcome of the review.

Our Handling of Enquiries

We received a range of general information enquiries from businesses and the general public during 2009. When a written request for information was received, we replied within the 15 working days stipulated in NIEA's 'Statements of Charter Standards'.

NIEA's Customer Services Standards – Customer Charter

The customer charter is available to download from NIEA's website: www.ni-environment.gov.uk/customer-charter.pdf

Part 2
Drinking Water Quality in District Council Areas

Part 2
Drinking Water Quality in District Council Areas

In this part of the report we provide a summary of public drinking water quality data for each local district council area.

Summary of Drinking Water Quality Information

We include 'Drinking Water Quality in District Council Areas' in our report as a way of assisting readers to understand more easily what the water quality is like in water supply zones that are within their local district council areas. To do this, we have taken each district council area, and based on the parameters which are used to assess drinking water quality at consumers' taps, have listed those water supply zones which have not achieved full compliance with the regulatory standards. These contraventions have been presented in tables using an indicator measure referred to as 'mean zonal compliance'. [1]

It is important to note that there are 40 parameters which are used to measure water quality within a water supply zone and it is only when parameters have not achieved 100% compliance, that they are listed on the tables.

When a contravention occurs, Northern Ireland Water Ltd (NI Water) carries out an investigation and appropriate remedial action is taken. The Inspectorate's assessment of a significant contravention of the Regulations may result in it taking 'enforcement action' by issuing a Consideration of Provisional Enforcement Order (CPEO). CPEOs require NI Water to put a programme of remedial work in place to improve drinking water quality. Where a treatment works has been identified as being at risk of failing to meet the regulatory standards, and the existing water treatment is considered inadequate, the Inspectorate agrees a water treatment improvement programme. In consultation with the health authorities, we may consider granting an Authorised Departure (AD) while this improvement work is carried out. An AD permits NI Water to temporarily supply water exceeding a drinking water standard if there are no adverse health implications. Where specific programmes of work are required by ADs or CPEOs, we list them in each council area. For summary details of work that is being carried out at specific water treatment works, please refer to Annex 3. For more specific detail on the work being carried out, the reader should contact NI Water's Customer Service Unit on: 08457 440088.

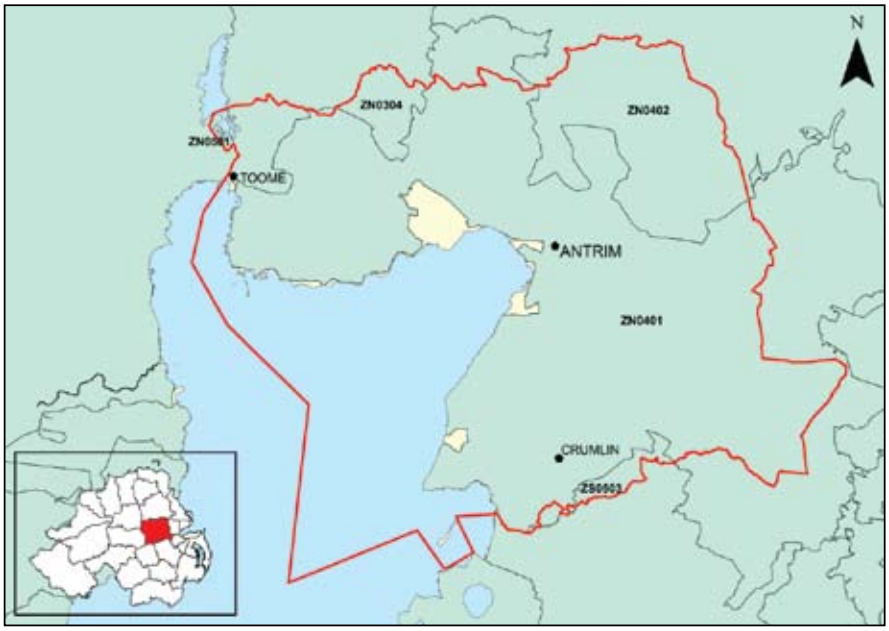
Variations in water quality compliance performance continue across Northern Ireland, reflecting the need for the completion of current and future planned improvement work.

Provision of Drinking Water Quality Information to District Councils

District councils use various means to keep themselves informed about drinking water quality. The Regulations require NI Water to provide each district council with an annual report summarizing drinking water quality within its area. NI Water has to inform district councils of events affecting drinking water quality within their areas (Tables 1.10 and 1.11 in Part 1 of this report refer). District councils may carry out their own monitoring programmes and some will get involved in helping to resolve consumer complaints about drinking water quality.

[1] The definition of mean zonal compliance can be found in Annex 4 of our 2007 report and can be viewed at: www.ni-environment.gov.uk/drinking_water_quality_in_northern_ireland_2007.pdf

Water Quality in Antrim Borough Council Area



Water Supply Zones (WSZs) in Council Area

ZN0304 – Glarryford Ahoghill
ZN0401 – Dunore Point Antrim
ZN0402 – Killylane Ballynure
ZN0501 – Moyola Magherafelt
ZS0503 – Forked Bridge Stoneyford

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.1: % Zonal Compliance in Water Supply Zones in Antrim Borough Council Area

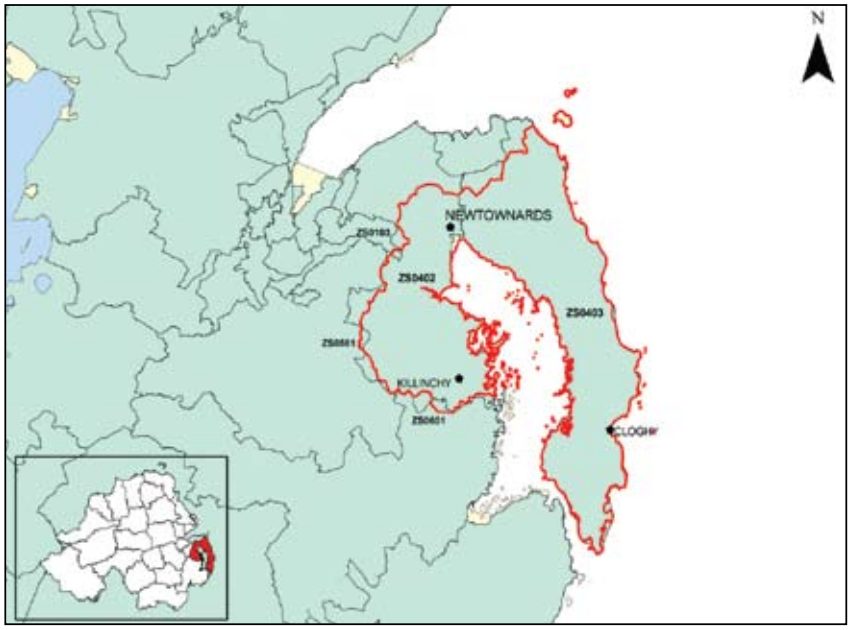
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0401, Dunore Point Antrim	Iron	98.08
ZN0402, Killylane Ballynure	Aluminium Iron Trihalomethanes	96.15 96.15 62.50
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZS0503, Forked Bridge Stoneyford	Iron	95.83

*All other parameters in this area achieved full compliance and are therefore not included in this table. Glarryford Ahoghill Water Supply Zone (ZN0304) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0401, Dunore Point Antrim; ZN0402, Killylane Ballynure; ZN0501, Moyola Magherafelt; and ZS0503, Forked Bridge Stoneyford ended during 2009.

Consideration of Provisional Enforcement Orders requiring specific work to be undertaken to improve THM compliance as an interim measure applied to ZN0401, Dunore Point Antrim and ZN0402, Killylane Ballynure until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Ards Borough Council Area



Water Supply Zones (WSZs) in Council Area

ZS0103 – Belfast Ballyhanwood
ZS0402 – Drumaroad Comber
ZS0403 – Drumaroad Peninsula
ZS0501 – Drumaroad Lisburn
ZS0601 – Drumaroad Ballynahinch

WSZs

Area with no WSZs

Table 2.2: % Zonal Compliance in Water Supply Zones in Ards Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0402, Drumaroad Comber	Aluminium	96.15
ZS0403, Drumaroad Peninsula	Aluminium Iron	98.08 98.08
ZS0501, Drumaroad Lisburn	Aluminium Iron Manganese Turbidity	96.15 98.08 96.15 98.08

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZS0103, Belfast Ballyhanwood ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to ZS0103, Belfast Ballyhanwood and ZS0501, Drumaroad Lisburn until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Armagh City and District Council Area

Water Supply Zones (WSZs) in Council Area

ZN1001 – Shanmoy Dungannon
ZN1101 – Clay Lake Keady
ZN1102 – Seagahan Armagh
ZS0801 – Castor Bay Ardress
ZS0803 – Castor Bay Portadown
ZS0903 – Fofanny Jerrettspass
ZS1001 – Carran Hill Crossmaglen

WSZs

Table 2.3: % Zonal Compliance in Water Supply Zones in Armagh City and District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN1101, Clay Lake Keady	Trihalomethanes	87.50
ZN1102, Seagahan Armagh	Aluminium Iron Manganese Trihalomethanes Turbidity	97.22 97.22 97.22 33.33 97.22
ZS0801, Castor Bay Ardress	*E. coli*	98.81
ZS0803, Castor Bay Portadown	Iron	98.08
ZS1001, Carran Hill Crossmaglen	Iron	87.50

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN1001, Shanmoy Dungannon; ZN1102, Seagahan Armagh; ZS0801, Castor Bay Ardress; and ZS0803, Castor Bay Portadown ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applies to ZN1102, Seagahan Armagh.

Consideration of Provisional Enforcement Orders for THMs applied to ZN1001, Shanmoy Dungannon; ZS0801, Castor Bay Ardress; and ZS0803, Castor Bay Portadown until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Ballymena Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZN0202 – Altnahinch Bushmills
ZN0301 – Buckna Glenarm
ZN0302 – Dungonnell Glarryford
ZN0303 – Dunore Point Ballymena
ZN0304 – Glarryford Ahoghill
ZN0401 – Dunore Point Antrim
ZN0402 – Killylane Ballynure
ZN0501 – Moyola Magherafelt

WSZs

Table 2.4: % Zonal Compliance in Water Supply Zones in Ballymena Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0202, Altnahinch Bushmills	Iron Trihalomethanes	75.00 87.50
ZN0302, Dungonnell Glarryford	Aluminium	97.22
ZN0401, Dunore Point Antrim	Iron	98.08
ZN0402, Killylane Ballynure	Aluminium Iron Trihalomethanes	96.15 96.15 62.50
ZN0501, Moyola Magherafelt	Turbidity	98.08

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0303, Dunore Point Ballymena; ZN0401, Dunore Point Antrim; ZN0402, Killylane Ballynure; and ZN0501, Moyola Magherafelt ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applies to ZN0402, Killylane Ballynure.

Consideration of Provisional Enforcement Orders for THMs applied to ZN0303, Dunore Point Ballymena and ZN0401, Dunore Point Antrim until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Ballymoney Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZN0101 – Ballinrees Coleraine
ZN0201 – Alcrossagh Ballycastle
ZN0202 – Altnahinch Bushmills
ZN0203 – Ballinrees Ballymoney
ZN0302 – Dungonnell Glarryford
ZN0304 – Glarryford Ahoghill

WSZs

Table 2.5: % Zonal Compliance in Water Supply Zones in Ballymoney Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0101, Ballinrees Coleraine	Aluminium Iron Manganese	98.08 98.08 98.08
ZN0202, Altnahinch Bushmills	Iron Trihalomethanes	75.00 87.50
ZN0203, Ballinrees Ballymoney	Iron	97.22
ZN0302, Dungonnell Glarryford	Aluminium	97.22

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Water Quality in Banbridge District Council Area

Water Supply Zones (WSZs) in Council Area

ZS0601 – Drumaroad Ballynahinch
ZS0801 – Castor Bay Ardress
ZS0802 – Castor Bay Lurgan
ZS0803 – Castor Bay Portadown
ZS0902 – Fofanny Dromore
ZS0903 – Fofanny Jerrettspass
ZS0904 – Fofanny Mourne

WSZs

Table 2.6: % Zonal Compliance in Water Supply Zones in Banbridge District Council Area

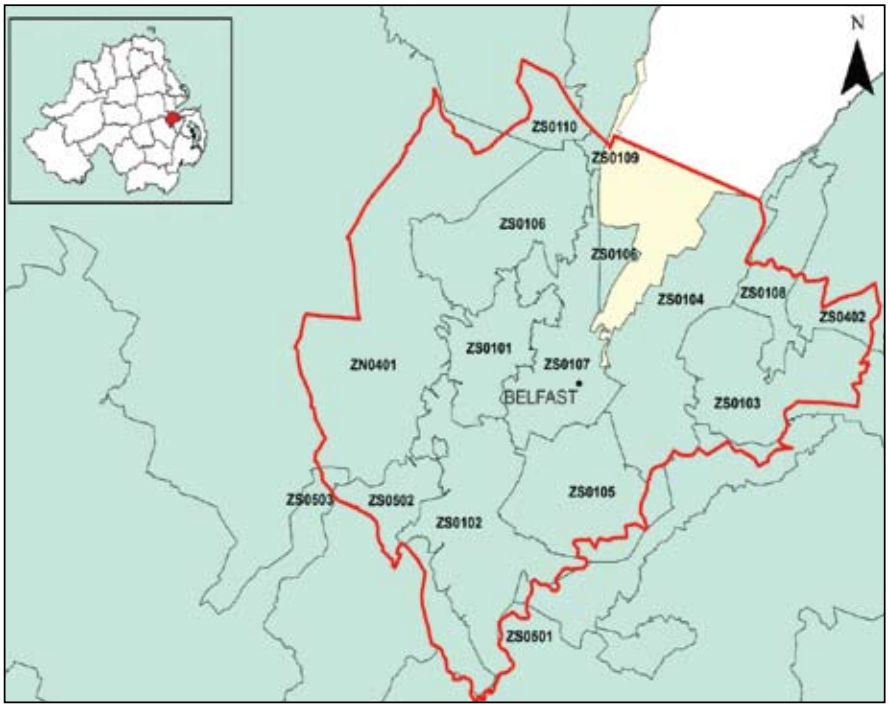
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0801, Castor Bay Ardress	*E. coli*	98.81
ZS0802, Castor Bay Lurgan	Iron	98.08
ZS0803, Castor Bay Portadown	Iron	98.08
ZS0902, Fofanny Dromore	Iron	94.44
ZS0904, Fofanny Mourne	Iron	98.08

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZS0802, Castor Bay Lurgan and ZS0803, Castor Bay Portadown ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to ZS0801, Castor Bay Ardress; ZS0802, Castor Bay Lurgan; and ZS0803, Castor Bay Portadown until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Belfast City Council Area



Water Supply Zones (WSZs) in Council Area

ZN0401 – Dunore Point Antrim
ZS0101 – Belfast Ballygomartin North
ZS0102 – Belfast Ballygomartin South
ZS0103 – Belfast Ballyhanwood
ZS0104 – Belfast Breda North
ZS0105 – Belfast Breda South
ZS0106 – Belfast North
ZS0107 – Belfast Oldpark
ZS0108 – Belfast Purdysburn
ZS0109 – Dorisland Whiteabbey
ZS0110 – Dunore Point Glengormley
ZS0402 – Drumaroad Comber
ZS0501 – Drumaroad Lisburn
ZS0502 – Forked Bridge Dunmurry
ZS0503 – Forked Bridge Stoneyford

WSZs

Area with no WSZs

Table 2.7: % Zonal Compliance in Water Supply Zones in Belfast City Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0401, Dunore Point Antrim	Iron	98.08
ZS0101, Belfast Ballygomartin North	Lead	87.50
ZS0102, Belfast Ballygomartin South	Aluminium Iron Manganese Turbidity	97.22 94.44 97.22 97.22
ZS0104, Belfast Breda North	Lead	87.50
ZS0106, Belfast North	Lead	87.50
ZS0107, Belfast Oldpark	Iron Lead	98.08 87.50
ZS0109, Dorisland Whiteabbey	Aluminium Iron Manganese	98.08 86.54 98.08
ZS0402, Drumaroad Comber	Aluminium	96.15
ZS0501, Drumaroad Lisburn	Aluminium Iron Manganese Turbidity	96.15 98.08 96.15 98.08
ZS0502, Forked Bridge Dunmurry	Aluminium Iron Manganese Turbidity	98.08 96.15 98.08 98.08
ZS0503, Forked Bridge Stoneyford	Iron	95.83

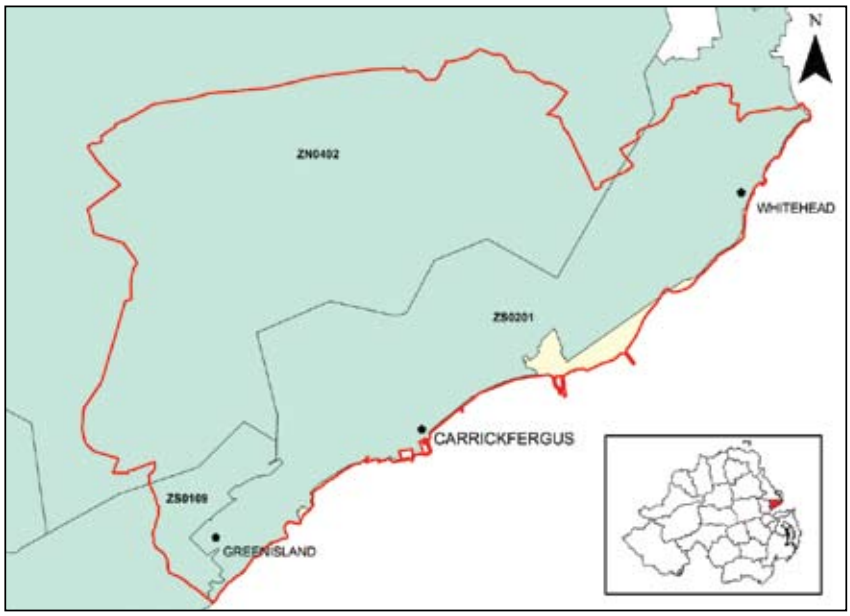
*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to all of the listed water supply zones, with the exceptions of ZS0109, Dorisland Whiteabbey and ZS0402, Drumaroad Comber ended during 2009.

A Consideration of Provisional Enforcement Order for iron applies to ZS0109, Dorisland Whiteabbey.

Consideration of Provisional Enforcement Orders for THMs applied to all the water supply zones listed, with the exceptions of ZS0109, Dorisland Whiteabbey and ZS0402, Drumaroad Comber, until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Carrickfergus Borough Council Area



Water Supply Zones (WSZs) in Council Area

ZN0402 – Killylane Ballynure

ZS0109 – Dorisland Whiteabbey

ZS0201 – Dorisland Carrick

WSZs

Area with no WSZs

Table 2.8: % Zonal Compliance in Water Supply Zones in Carrickfergus Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0402, Killylane Ballynure	Aluminium Iron Trihalomethanes	96.15 96.15 62.50
ZS0109, Dorisland Whiteabbey	Aluminium Iron Manganese	98.08 86.54 98.08
ZS0201, Dorisland Carrick	Aluminium	97.22

*All other parameters in these water supply zones achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0402, Killylane Ballynure ended during 2009.

Consideration of Provisional Enforcement Orders for iron apply to ZS0109, Dorisland Whiteabbey and ZS0201, Dorisland Carrick; and for THMs to ZN0402, Killylane Ballynure.

Water Quality in Castlereagh Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZS0102 – Belfast Ballygomartin South
ZS0103 – Belfast Ballyhanwood
ZS0104 – Belfast Breda North
ZS0105 – Belfast Breda South
ZS0108 – Belfast Purdysburn
ZS0402 – Drumaroad Comber
ZS0501 – Drumaroad Lisburn

WSZs

Area with no WSZs

Table 2.9: % Zonal Compliance in Water Supply Zones in Castlereagh Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0102, Belfast Ballygomartin South	Aluminium Iron Manganese Turbidity	97.22 94.44 97.22 97.22
ZS0104, Belfast Breda North	Lead	87.50
ZS0402, Drumaroad Comber	Aluminium	96.15
ZS0501, Drumaroad Lisburn	Aluminium Iron Manganese Turbidity	96.15 98.08 96.15 98.08

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to all of the above listed water supply zones, with the exception of ZS0402, Drumaroad Comber, ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to all the water supply zones listed above, with the exception of ZS0402, Drumaroad Comber, until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Coleraine Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZN0101 – Ballinrees Coleraine
ZN0202 – Altnahinch Bushmills
ZN0203 – Ballinrees Ballymoney
ZN0501 – Moyola Magherafelt
ZN0601 – Ballinrees Limavady
ZN0602 – Brishey Limavady East
ZN0606 – Stradreagh Aghanloo

WSZs

Table 2.10: % Zonal Compliance in Water Supply Zones in Coleraine Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0101, Ballinrees Coleraine	Aluminium Iron Manganese	98.08 98.08 98.08
ZN0202, Altnahinch Bushmills	Iron Trihalomethanes	75.00 87.50
ZN0203, Ballinrees Ballymoney	Iron	97.22
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0602, Brishey Limavady East	Bromate	75.00

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0501, Moyola Magherafelt ended during 2009.

Water Quality in Cookstown District Council Area

Water Supply Zones (WSZs) in Council Area

ZN0501 – Moyola Magherafelt
ZN0502 – Lough Fea Cookstown
ZN0503 – Unagh Cookstown
ZN0705 – Lough Macrory Beragh
ZN0902 – Altmore Donaghmore
ZN1001 – Shanmoy Dungannon

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.11: % Zonal Compliance in Water Supply Zones in Cookstown District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0502, Lough Fea Cookstown	Iron Trihalomethanes	95.83 87.50
ZN0503, Unagh Cookstown	Aluminium *E. coli*	95.83 97.92
ZN0705, Lough Macrory Beragh	Odour Taste	95.83 95.83
ZN0902, Altmore Donaghmore	Trihalomethanes	66.67

*All other parameters in this area achieved full compliance and are therefore not included in this table. Shanmoy Dungannon Water Supply Zone (ZN1001) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0501, Moyola Magherafelt; ZN0503, Unagh Cookstown; ZN0902, Altmore Donaghmore; and ZN1001, Shanmoy Dungannon ended during 2009. An Authorised Departure requiring work to upgrade water treatment facilities and improve MCPA compliance applying to ZN0902, Altmore Donaghmore ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applies to ZN1001, Shanmoy Dungannon.

Water Quality in Craigavon Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZS0801 – Castor Bay Ardress
ZS0802 – Castor Bay Lurgan
ZS0803 – Castor Bay Portadown
ZS0902 – Fofanny Dromore

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.12: % Zonal Compliance in Water Supply Zones in Craigavon Borough Council Area

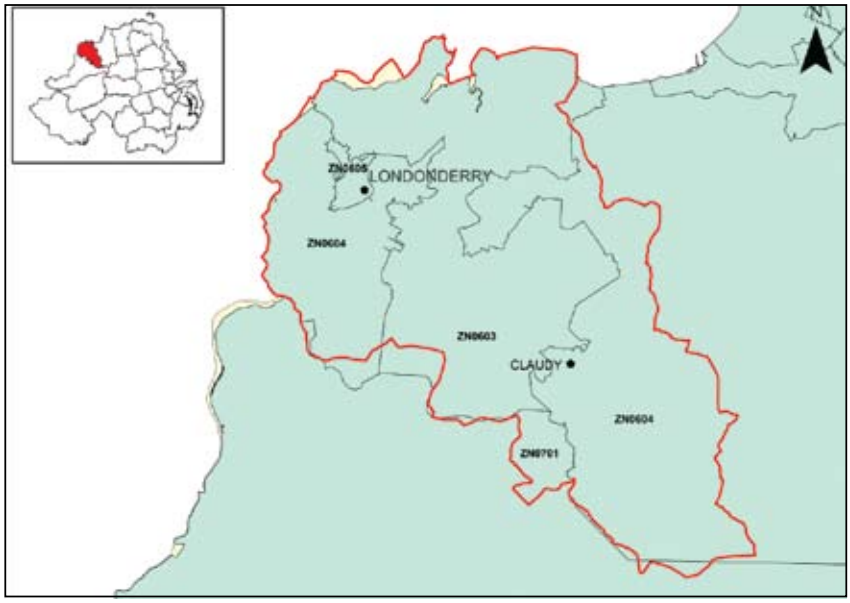
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0801, Castor Bay Ardress	*E. coli*	98.81
ZS0802, Castor Bay Lurgan	Iron	98.08
ZS0803, Castor Bay Portadown	Iron	98.08
ZS0902, Fofanny Dromore	Iron	94.44

*All other parameters in these water supply zones achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZS0801, Castor Bay Ardress; ZS0802, Castor Bay Lurgan; and ZS0803, Castor Bay Portadown ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to ZS0801, Castor Bay Ardress; ZS0802, Castor Bay Lurgan; and ZS0803, Castor Bay Portadown until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Derry City Council Area



Water Supply Zones (WSZs) in Council Area

ZN0603 – Carmoney Eglinton
ZN0604 – Caugh Hill Dungiven
ZN0605 – Creggan Derry
ZN0701 – Derg Strabane

WSZs

Area with no WSZs

Table 2.13: % Zonal Compliance in Water Supply Zones in Derry City Council Area

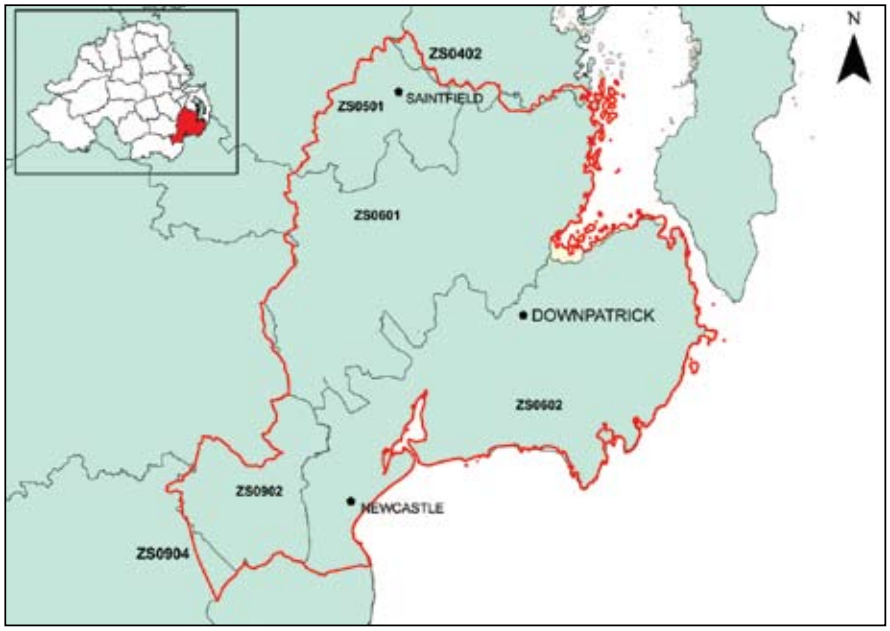
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0603, Carmoney Eglinton	Aluminium Trihalomethanes	97.22 87.50
ZN0605, Creggan Derry	Aluminium Iron	94.44 97.22
ZN0701, Derg Strabane	Iron Manganese Trihalomethanes Turbidity	97.22 97.22 87.50 97.22

*All other parameters in this area achieved full compliance and are therefore not included in this table. Caugh Hill Dungiven Water Supply Zone (ZN0604) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries an investigation and appropriate remedial action is taken.

Consideration of Provisional Enforcement Orders for THMs apply to ZN0605, Creggan Derry and ZN0701, Derry Strabane.

Consideration of Provisional Enforcement Orders for aluminium applied to ZN0603, Carmoney Eglinton and ZN0605, Creggan Derry until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Down District Council Area



Water Supply Zones (WSZs) in Council Area

ZS0402 – Drumaroad Comber
ZS0501 – Drumaroad Lisburn
ZS0601 – Drumaroad Ballynahinch
ZS0602 – Drumaroad Downpatrick
ZS0902 – Fofanny Dromore
ZS0904 – Fofanny Mourne

WSZs

Area with no WSZs

Table 2.14: % Zonal Compliance in Water Supply Zones in Down District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0402, Drumaroad Comber	Aluminium	96.15
ZS0501, Drumaroad Lisburn	Aluminium Iron Manganese Turbidity	96.15 98.08 96.15 98.08
ZS0602, Drumaroad Downpatrick	Aluminium Iron	97.22 97.22
ZS0902, Fofanny Dromore	Iron	94.44
ZS0904, Fofanny Mourne	Iron	98.08

*All other parameters in this area achieved full compliance and are therefore not included in this table. Drumaroad Ballynahinch Water Supply Zone (ZS0601) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZS0501, Drumaroad Lisburn ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applied to ZS0501, Drumaroad Lisburn until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Dungannon and South Tyrone Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZN0502 – Lough Fea Cookstown
ZN0705 – Lough Macrory Beragh
ZN0706 – Lough Macrory Killyclogher
ZN0802 – Killyhevlin Enniskillen
ZN0901 – Altmore Cabragh
ZN0902 – Altmore Donaghmore
ZN1001 – Shanmoy Dungannon
ZN1102 – Seagahan Armagh
ZS0801 – Castor Bay Ardress

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.15: % Zonal Compliance in Water Supply Zones in Dungannon and South Tyrone Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0502, Lough Fea Cookstown	Iron Trihalomethanes	95.83 87.50
ZN0705, Lough Macrory Beragh	Odour Taste	95.83 95.83
ZN0901, Altmore Cabragh	Iron	50.00
ZN0902, Altmore Donaghmore	Trihalomethanes	66.67
ZN1102, Seagahan Armagh	Aluminium Iron Manganese Trihalomethanes Turbidity	97.22 97.22 97.22 33.33 97.22
ZS0801, Castor Bay Ardress	*E. coli*	98.81

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0706, Lough Macrory Killyclogher; ZN0901, Altmore Cabragh; ZN0902, Altmore Donaghmore; ZN1001, Shanmoy Dungannon; ZN1102, Seagahan Armagh; and ZS0801, Castor Bay Ardress ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applies to ZN1102, Seagahan Armagh.

Consideration of Provisional Enforcement Orders for THMs applied to ZN1001, Shanmoy Dungannon and ZS0801, Castor Bay Ardress until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Fermanagh District Council Area

Water Supply Zones (WSZs) in Council Area

ZN0704 – Lough Bradan Drumquin
ZN0706 – Lough Macrory Killyclogher
ZN0801 – Belleek Garrison
ZN0802 – Killyhevlin Enniskillen

WSZs

Area with no WSZs

Lakes/Loughs

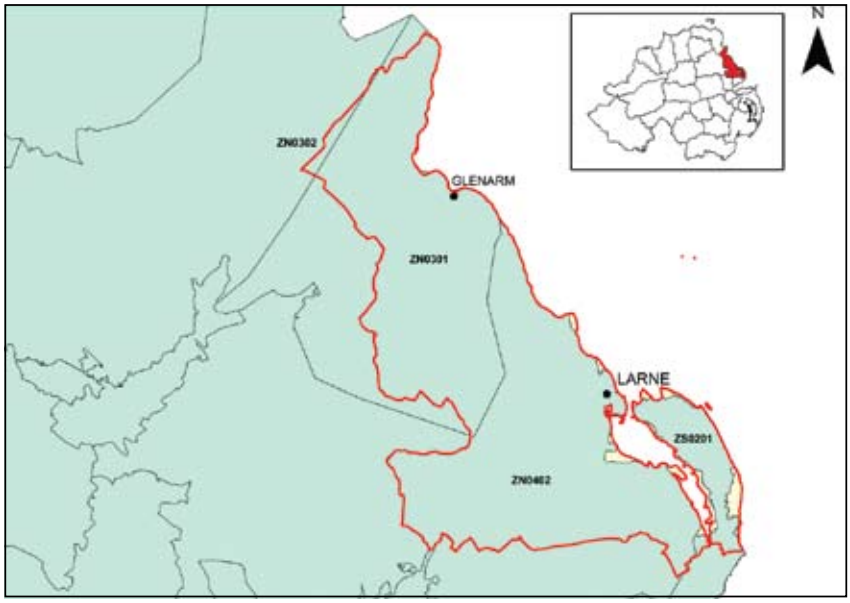
Table 2.16: % Zonal Compliance in Water Supply Zones in Fermanagh District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0704, Lough Bradan Drumquin	Aluminium	95.83
	Iron	95.83
	Trihalomethanes	83.33

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance apply to ZN0704, Lough Bradan Drumquin and ZN0706, Lough Macrory Killyclogher.

Water Quality in Larne Borough Council Area



Water Supply Zones (WSZs) in Council Area

ZN0301 – Buckna Glenarm
ZN0302 – Dungonnell Glarryford
ZN0402 – Killylane Ballynure
ZS0201 – Dorisland Carrick

WSZs

Area with no WSZs

Table 2.17: % Zonal Compliance in Water Supply Zones in Larne Borough Council Area

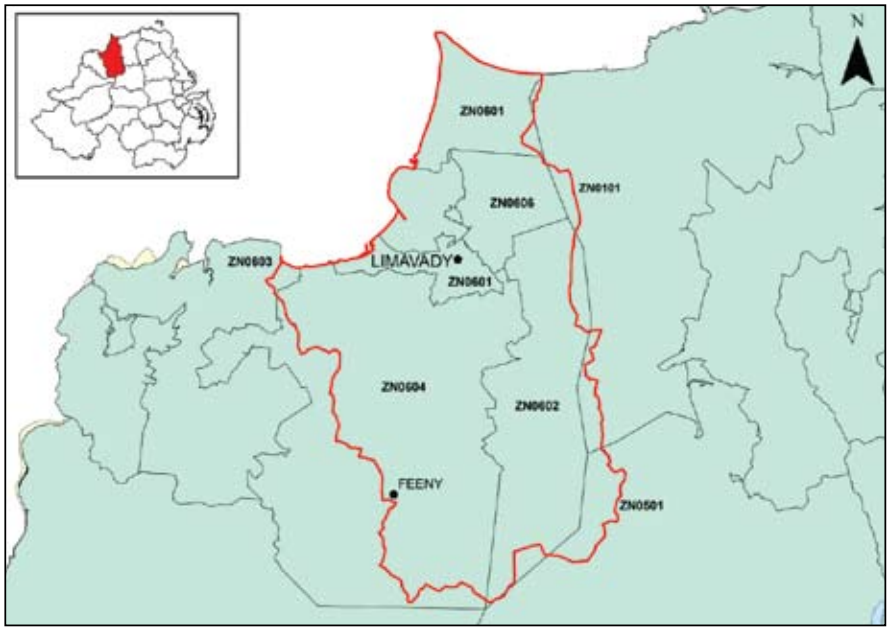
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0302, Dungonnell Glarryford	Aluminium	97.22
ZN0402, Killylane Ballynure	Aluminium Iron Trihalomethanes	96.15 96.15 62.50
ZS0201, Dorisland Carrick	Aluminium	97.22

*All other parameters in this area achieved full compliance and are therefore not included in this table. Buckna Glenarm Water Supply Zone (ZN0301) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0402, Killylane Ballynure ended during 2009.

Consideration of Provisional Enforcement Orders apply to ZN0402, Killylane Ballynure for THMs; and ZS0201, Dorisland Carrick for iron.

Water Quality in Limavady Borough Council Area



Water Supply Zones (WSZs) in Council Area

ZN0101 – Ballinrees Coleraine
ZN0501 – Moyola Magherafelt
ZN0601 – Ballinrees Limavady
ZN0602 – Brishey Limavady East
ZN0603 – Carmoney Eglinton
ZN0604 – Caugh Hill Dungiven
ZN0606 – Stradreagh Aghanloo

WSZs

Area with no WSZs

Table 2.18: % Zonal Compliance in Water Supply Zones in Limavady Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0101, Ballinrees Coleraine	Aluminium Iron Manganese	98.08 98.08 98.08
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0602, Brishey Limavady East	Bromate	75.00
ZN0603, Carmoney Eglinton	Aluminium Trihalomethanes	97.22 87.50

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

A Consideration of Provisional Enforcement Order for aluminium applies to ZN0603, Carmoney Eglinton.

Water Quality in Lisburn City Council Area

Water Supply Zones (WSZs) in Council Area

ZN0401 – Dunore Point Antrim
ZS0501 – Drumaroad Lisburn
ZS0502 – Forked Bridge Dunmurry
ZS0503 – Forked Bridge Stoneyford
ZS0601 – Drumaroad Ballynahinch
ZS0802 – Castor Bay Lurgan
ZS0902 – Fofanny Dromore

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.19: % Zonal Compliance in Water Supply Zones in Lisburn City Council Area

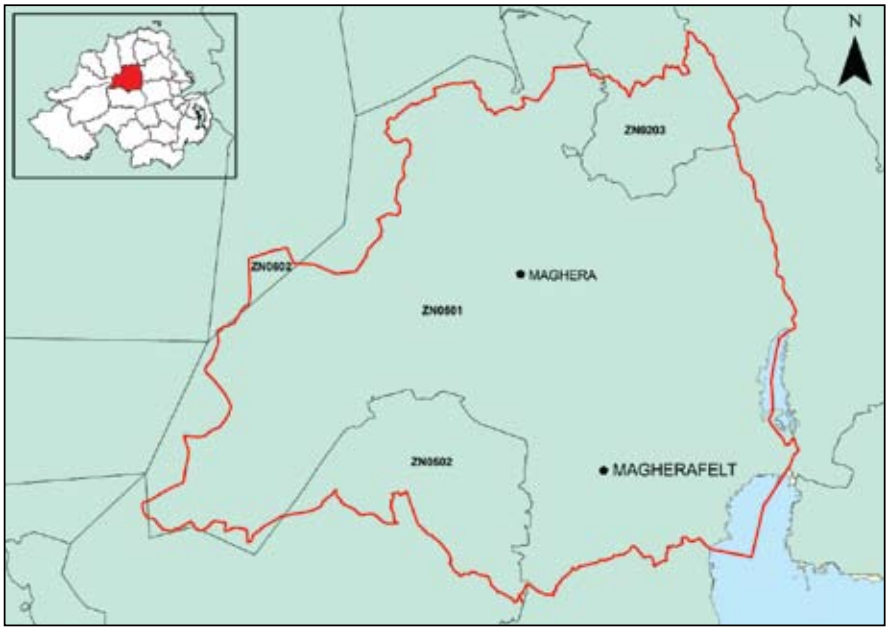
Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0401, Dunore Point Antrim	Iron	98.08
ZS0501, Drumaroad Lisburn	Aluminium Iron Manganese Turbidity	96.15 98.08 96.15 98.08
ZS0502, Forked Bridge Dunmurry	Aluminium Iron Manganese Turbidity	98.08 96.15 98.08 98.08
ZS0503, Forked Bridge Stoneyford	Iron	95.83
ZS0802, Castor Bay Lurgan	Iron	98.08
ZS0902, Fofanny Dromore	Iron	94.44

*All other parameters in this area achieved full compliance and are therefore not included in this table. Drumaroad Ballynahinch Water Supply Zone (ZS0601) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to all of the above listed water supply zones, with the exceptions of ZS0601, Drumaroad Ballynahinch and ZS0902, Fofanny Dromore, ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to ZN0401, Dunore Point Antrim; ZS0501, Drumaroad Lisburn; ZS0502, Forked Bridge Dunmurry; and ZS0802, Castor Bay Lurgan until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Magherafelt District Council Area



Water Supply Zones (WSZs) in Council Area

ZN0203 – Ballinrees Ballymoney
ZN0501 – Moyola Magherafelt
ZN0502 – Lough Fea Cookstown
ZN0602 – Brishey Limavady East

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.20: % Zonal Compliance in Water Supply Zones in Magherafelt Distict Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0203, Ballinrees Ballymoney	Iron	97.22
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0502, Lough Fea Cookstown	Iron Trihalomethanes	95.83 87.50
ZN0602, Brishey Limavady East	Bromate	75.00

*All other parameters in these water supply zones achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0501, Moyola Magherafelt ended during 2009.

Water Quality in Moyle District Council Area

Water Supply Zones (WSZs) in Council Area

ZN0201 – Alcrossagh Ballycastle
ZN0202 – Altnahinch Bushmills
ZN0203 – Ballinrees Ballymoney
ZN0204 – Rathlin Island
ZN0301 – Buckna Glenarm
ZN0302 – Dungonnell Glarryford

WSZs

Area with no WSZs

Table 2.21: % Zonal Compliance in Water Supply Zones in Moyle District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0202, Altnahinch Bushmills	Iron Trihalomethanes	75.00 87.50
ZN0203, Ballinrees Ballymoney	Iron	97.22
ZN0302, Dungonnell Glarryford	Aluminium	97.22

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Water Quality in Newry and Mourne District Council Area

Water Supply Zones (WSZs) in Council Area

ZN1101 – Clay Lake Keady
ZN1102 – Seagahan Armagh
ZS0602 – Drumaroad Downpatrick
ZS0901 – Camlough Newry West
ZS0902 – Fofanny Dromore
ZS0903 – Fofanny Jerrettspass
ZS0904 – Fofanny Mourne
ZS1001 – Carran Hill Crossmaglen

WSZs

Area with no WSZs

Table 2.22: % Zonal Compliance in Water Supply Zones in Newry and Mourne District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN1101, Clay Lake Keady	Trihalomethanes	87.50
ZN1102, Seagahan Armagh	Aluminium Iron Manganese Trihalomethanes Turbidity	97.22 97.22 97.22 33.33 97.22
ZS0602, Drumaroad Downpatrick	Aluminium Iron	97.22 97.22
ZS0901, Camlough Newry West	Iron	95.83
ZS0902, Fofanny Dromore	Iron	94.44
ZS0904, Fofanny Mourne	Iron	98.08
ZS1001, Carran Hill Crossmaglen	Iron	87.50

*All other parameters in this area achieved full compliance and are therefore not included in this table.
Fofanny Jerrettspass Water Supply Zone (ZS0903) attained full compliance and consequently is not listed.
Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

An Authorised Departure requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN1102, Seagahan Armagh ended during 2009.

A Consideration of Provisional Enforcement Order for THMs applies to ZN1102, Seagahan Armagh.

Water Quality in Newtownabbey Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZN0401 – Dunore Point Antrim
ZN0402 – Killylane Ballynure
ZS0109 – Dorisland Whiteabbey
ZS0110 – Dunore Point Glengormley
ZS0201 – Dorisland Carrick

WSZs

Area with no WSZs

Table 2.23: % Zonal Compliance in Water Supply Zones in Newtownabbey Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0401, Dunore Point Antrim	Iron	98.08
ZN0402, Killylane Ballynure	Aluminium Iron Trihalomethanes	96.15 96.15 62.50
ZS0109, Dorisland Whiteabbey	Aluminium Iron Manganese	98.08 86.54 98.08
ZS0201, Dorisland Carrick	Aluminium	97.22

*All other parameters in this area achieved full compliance and are therefore not included in this table. Dunore Point Glengormley Water Supply Zone (ZS0110) attained full compliance and consequently is not listed. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0401, Dunore Point Antrim; ZN0402, Killylane Ballynure; and ZS0110, Dunore Point Glengormley ended during 2009.

Consideration of Provisional Enforcement Orders apply to ZN0402, Killylane Ballynure for THMs; and to ZS0109, Dorisland Whiteabbey and ZS0201, Dorisland Carrick for iron.

Consideration of Provisional Enforcement Orders for THMs applied to ZN0401, Dunore Point Antrim and ZS0110, Dunore Point Glengormley until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in North Down Borough Council Area

Water Supply Zones (WSZs) in Council Area

ZS0104 – Belfast Breda North
ZS0108 – Belfast Purdysburn
ZS0401 – Drumaroad Bangor
ZS0402 – Drumaroad Comber
ZS0403 – Drumaroad Peninsula

WSZs

Area with no WSZs

Table 2.24: % Zonal Compliance in Water Supply Zones in North Down Borough Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZS0104, Belfast Breda North	Lead	87.50
ZS0402, Drumaroad Comber	Aluminium	96.15
ZS0403, Drumaroad Peninsula	Aluminium Iron	98.08 98.08

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZS0104, Belfast Breda North and ZS0108, Belfast Purdysburn ended during 2009.

Consideration of Provisional Enforcement Orders for THMs applied to ZS0104, Belfast Breda North and ZS0108, Belfast Purdysburn until May 2009 when the Inspectorate formally accepted that all associated work had been carried out.

Water Quality in Omagh District Council Area

Water Supply Zones (WSZs) in Council Area

ZN0501 – Moyola Magherafelt
ZN0502 – Lough Fea Cookstown
ZN0701 – Derg Strabane
ZN0702 – Glenhordial Omagh
ZN0703 – Lenamore Greencastle
ZN0704 – Lough Bradan Drumquin
ZN0705 – Lough Macrory Beragh
ZN0706 – Lough Macrory Killyclogher
ZN0802 – Killyhevlin Enniskillen
ZN0902 – Altmore Donaghmore

WSZs

Area with no WSZs

Lakes/Loughs

Table 2.25: % Zonal Compliance in Water Supply Zones in Omagh District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0502, Lough Fea Cookstown	Iron Trihalomethanes	95.83 87.50
ZN0701, Derg Strabane	Iron Manganese Trihalomethanes Turbidity	97.22 97.22 87.50 97.22
ZN0702, Glenhordial Omagh	Nickel	87.50
ZN0704, Lough Bradan Drumquin	Aluminium Iron Trihalomethanes	95.83 95.83 83.33
ZN0705, Lough Macrory Beragh	Odour Taste	95.83 95.83
ZN0902, Altmore Donaghmore	Trihalomethanes	66.67

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance applying to ZN0501, Moyola Magherafelt and ZN0902, Altmore Donaghmore ended during 2009.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance apply to ZN0704, Lough Bradan Drumquin and ZN0706, Lough Macrory Killyclogher.

A Consideration of Provisional Enforcement Order for THMs applies to ZN0701, Derg Strabane.

Water Quality in Strabane District Council Area

Water Supply Zones (WSZs) in Council Area

ZN0501 – Moyola Magherafelt
ZN0602 – Brishey Limavady East
ZN0603 – Carmoney Eglinton
ZN0604 – Caugh Hill Dungiven
ZN0701 – Derg Strabane
ZN0703 – Lenamore Greencastle
ZN0704 – Lough Bradan Drumquin
ZN0705 – Lough Macrory Beragh
ZN0706 – Lough Macrory Killyclogher

WSZs

Area with no WSZs

Table 2.26: % Zonal Compliance in Water Supply Zones in Strabane District Council Area

Sampling Location - Zones	Parameter	% Zonal Compliance*
ZN0501, Moyola Magherafelt	Turbidity	98.08
ZN0603, Carmoney Eglinton	Aluminium Trihalomethanes	97.22 87.50
ZN0701, Derg Strabane	Iron Manganese Trihalomethanes Turbidity	97.22 97.22 87.50 97.22
ZN0704, Lough Bradan Drumquin	Aluminium Iron Trihalomethanes	95.83 95.83 83.33
ZN0705, Lough Macrory Beragh	Odour Taste	95.83 95.83

*All other parameters and water supply zones in this area achieved full compliance and are therefore not included in this table. Where a standard has not been met, NI Water carries out an investigation and appropriate remedial action is taken.

Authorised Departures requiring work to upgrade water treatment facilities and improve THM compliance apply to ZN0704, Lough Bradan Drumquin and ZN0706, Lough Macrory Killyclogher.

Consideration of Provisional Enforcement Orders apply to ZN0603, Carmoney Eglinton for aluminium; and to ZN0701, Derg Strabane for THMs.

Part 3
Protecting Drinking Water Quality

Part 3
Protecting Drinking Water Quality

In this part of the report we give a summary of the work which is being undertaken to protect drinking water quality in Northern Ireland. We look at the improvement programmes which are being implemented and targeted, in particular, where the standards have not been met. Our regulatory processes of granting Authorised Departures or serving Enforcement Notices, and other regulatory responsibilities ensure that water quality issues form part of the Investment Planning Process 'PC10'.

We also look at the new regulatory requirement to undertake risk assessments of water supply systems, commonly referred to as drinking water safety plans. This new approach will identify and quantify risks associated with the drinking water that NI Water provides. The plans will cover the supply of water from source to tap: from catchments, through the water treatment works and onwards through distribution networks to consumers' taps.

In order to protect and improve drinking water supplies, NI Water continues to complete infrastructure, treatment and distribution projects. Many of these programmes of work are driven by conditions related to Authorised Departures (ADs), Enforcement Notices and other regulatory processes.

During 2009, many of the ADs came to an end, coinciding with the completion and coming into service of five major water treatment works and this was reflected in improved overall drinking water compliance throughout Northern Ireland.

As part of the future investment planning process we have been involved in a partnership agreement, whereby, all interested stakeholders engage to identify investment priorities. This forms part of the Price Control Process (PC10) by which NI Water bids for government funding. We recognize that competing priorities exist but our primary objective during this process was to identify programmes of work that were necessary to secure drinking water compliance.

To further protect drinking water quality, the new regulatory requirement for NI Water to undertake risk assessments of all its water supply systems will, as part of the investment planning process, assist in identifying and targeting infrastructure and operational improvements.

Drinking Water Quality Improvement Programmes at Water Treatment Works (WTWs)

In order to meet drinking water quality standards, NI Water has an ongoing major investment programme to improve water quality compliance.

2009 was the first year of operation for the five treatment facilities constructed under the Public Private Partnership (PPP), Alpha Project: Dunore Point, Castor Bay, Moyola, Forked Bridge and Ballinrees. The completion of this work contributed to a significant improvement in compliance with water quality standards, particularly, trihalomethanes (THMs).

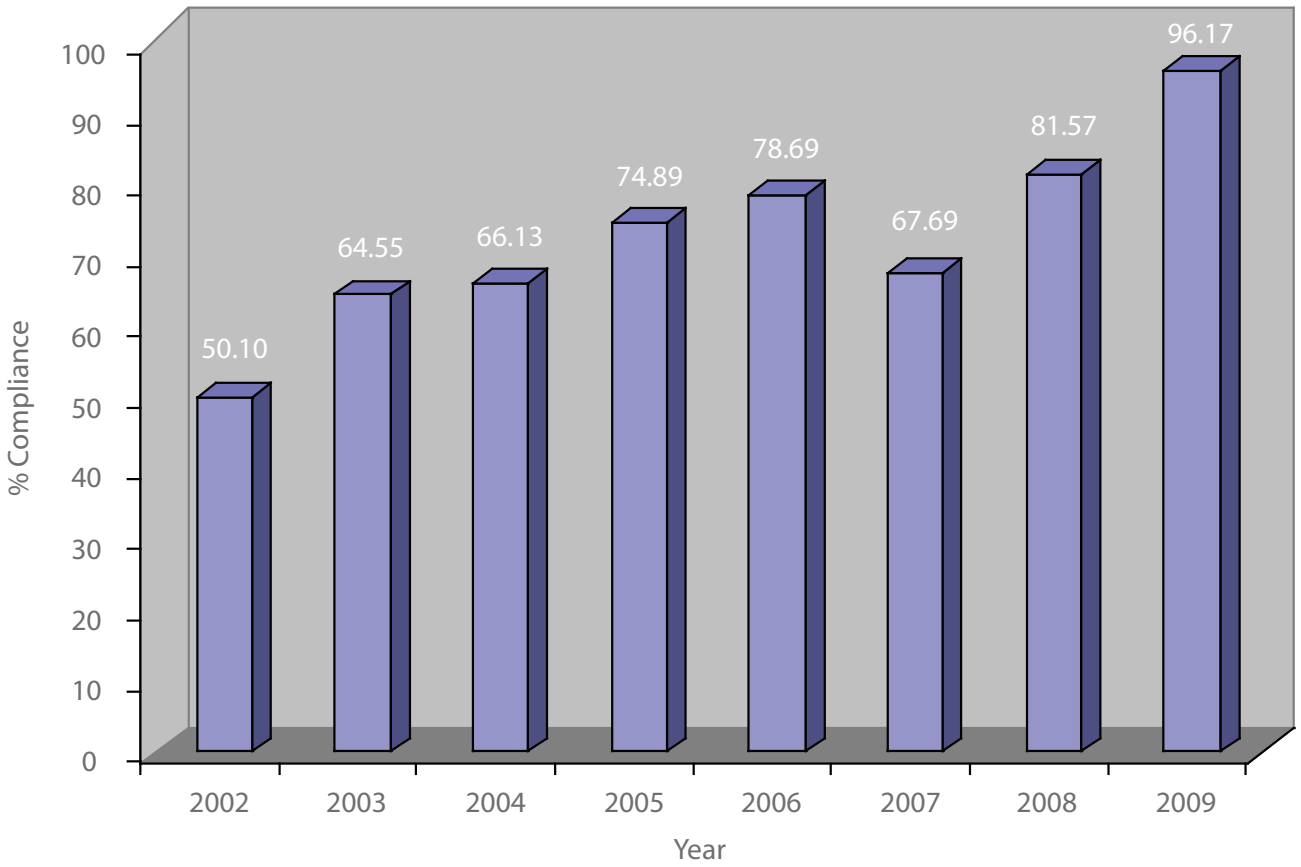
Other projects which are necessary to further improve compliance are under way:

- Seagahan WTWs has been upgraded during 2009 to improve THM compliance;
- Lough Bradan WTWs is being upgraded during 2010 to improve THM compliance;
- Altmore WTWs is to be decommissioned early in 2011 and following a major network upgrade, the water to this area will be supplied from Castor Bay WTWs;
- Derg WTWs is being upgraded to improve THM compliance;
- Killylane WTWs is currently undergoing investigations into optimizing the treatment processes to improve THM compliance; and
- Carmoney WTWs is being upgraded to improve compliance with aluminium.

Drinking Water Quality Improvements - Authorised Departure Compliance Programmes

One of the regulatory processes which we use to focus infrastructural and operational change to enhance drinking water compliance is referred to as 'Authorisation of Departures'. Under certain time-bounded conditions, we can grant ADs to NI Water. In 2009, there were 28 ADs in place: 26 for THMs; and two for pesticides. The completion and commissioning of a number of major work programmes during 2008 and 2009 has meant a substantial number of ADs expired in 2009. In Annex 3 we provide details of the Authorised Departures that were in place during 2009.

Figure 3.1: Percentage of Tests Meeting the 100 µg/l THM Standard



Trihalomethanes

Trihalomethanes are disinfection by-products that arise when chlorine, which is used to disinfect the water and make it microbiologically safe to drink, is added to water containing naturally occurring organic substances. A history of inadequate treatment to remove this organic material at many of NI Water's water treatment works has resulted in a high level of THM non-compliance.

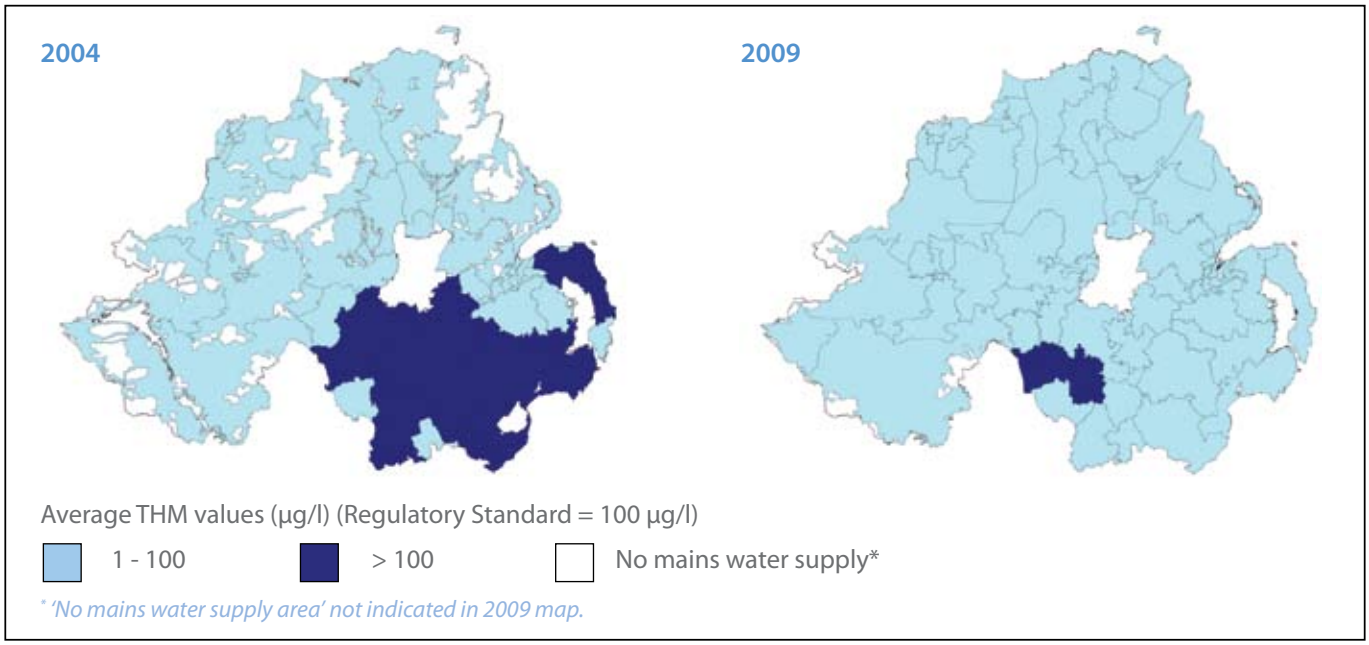
To address the issue of achieving THM compliance, NI Water has undertaken an extensive programme of upgrading treatment at existing works and constructing new works, as well as reviewing operational practices in distribution through a THM action plan.

We welcome this investment and recognize the overall improving compliance for THMs, particularly in recent years as can be seen above in Figure 3.1. We note, in particular, that compliance with the THM standard has increased by 46% between 2002 and 2009.

The maps in Figure 3.2 present the average THM values in water supply zones in 2004 and 2009. Improvement works to replace or upgrade existing water treatment works has been ongoing for many years now. The maps illustrate the improved THM compliance that is particularly evident in the water supply zones in the south-eastern parts of county Down and Armagh; the Ards Peninsula; and the south-eastern parts of Belfast supplied by the treatment facilities at Drumaroad and Fofanny WTWs, which treat the surface waters derived from the peaty catchments in the Mourne Mountains.

The small area detailed as being above the regulatory standard in the 2009 map in mid Armagh, represents the water supply zones supplied by Seagahan WTWs. The upgrade to this treatment works was completed in November 2009.

Figure 3.2: Average THM Values in Water Supply Zones across Northern Ireland in 2004 and 2009



Drinking Water Quality Improvement Programmes in the Distribution Network

In addition to the upgrade of water treatment facilities, NI Water has an ongoing mains rehabilitation programme to restore or replace water mains pipe work. In Northern Ireland, there are approximately 26,000 kilometres of water mains that deliver water to consumers' taps, and many of these mains are made of cast iron.

The condition of water mains may result in consumers receiving discoloured drinking water due to the presence of iron or manganese. Deposits of these naturally occurring substances have accumulated over many years in the distribution networks as a consequence of their presence in source waters, and a lack of effective water treatment. In other situations, where the distribution network is comprised of old unlined cast-iron water mains, iron can be released into the water main as a result of corrosion. Where iron has accumulated in distribution pipes, through any of the above routes and these deposits are disturbed, this may cause orange-brown or black discoloration of the water.

In our submission on PC10 to the Northern Ireland Authority for Utility Regulation (NIAUR) we highlighted the need for ongoing investment in the distribution network. We also drew attention to the high percentage of consumer complaints received by NI Water, over 60 per cent of which related to appearance, with the majority of complaints within this category, again over 60 per cent, related to discoloured water.

The ongoing delivery of new and upgraded works throughout recent years has, in many instances, reduced the levels of iron and manganese being carried over from ineffective treatment into the distribution system. However, the accumulation of these deposits over many years within the distribution network needs to be controlled as part of ongoing distribution maintenance. NI Water operates an ongoing scouring and cleaning programme to minimize water quality problems associated with these accumulations.

Mains Rehabilitation Programme

In order to address water quality problems caused by the deterioration of old water mains, NI Water continues to implement the water mains rehabilitation programme. This involves the replacement of water mains within its distribution network that experience water quality and other supply problems identified through detailed zonal studies. It is a rolling programme of work. We carry out technical audits of NI Water (or approved contractors who carry out work on the company's behalf) to ensure good practice and agreed procedures are fully implemented in undertaking mains rehabilitation work.

NI Water continued its rehabilitation work during 2009. This was a significant programme of works involving the replacement of 375 kilometres of water mains. In 2009 there were also 13 zonal studies carried out allowing NI Water to identify and prioritize specific areas within the distribution network for pipe replacement and also to assess the effectiveness of the pipe replacement programme after installation. We monitor NI Water's programmes of work through regular meetings with the company. The work programmes for mains rehabilitation continue, with a major commitment from NI Water demonstrated through the awarding of new contracts to take forward work into 2010 and beyond.

Assessment of Distribution Maintenance

A measure of water quality in distribution used by the Inspectorate is known as OPI (TIM). This is an operational performance index (OPI) based on compliance of three parameters which best reflect the causes of discoloured water: turbidity, iron and manganese (TIM). In Northern Ireland, the use of this index helps to identify those areas where more effort is required to raise the quality of water at consumers' taps.

OPI (TIM) values across the water supply zones in Northern Ireland in 2009 range from 83.33% to 100%. Failure to achieve 100% across the region varies and tends to reflect where the distribution network contains a large proportion of cast-iron mains. For 2009, 40% of water supply zones across Northern Ireland have OPI (TIM) values of less than 100%. The average for all zones for 2009 was 98.90%: a lower figure compared to the 99.22% reported for 2008. This also reflects the 1% decrease in overall mean zonal compliance for iron noted between 2008 and 2009 (Figure 3.3 refers).

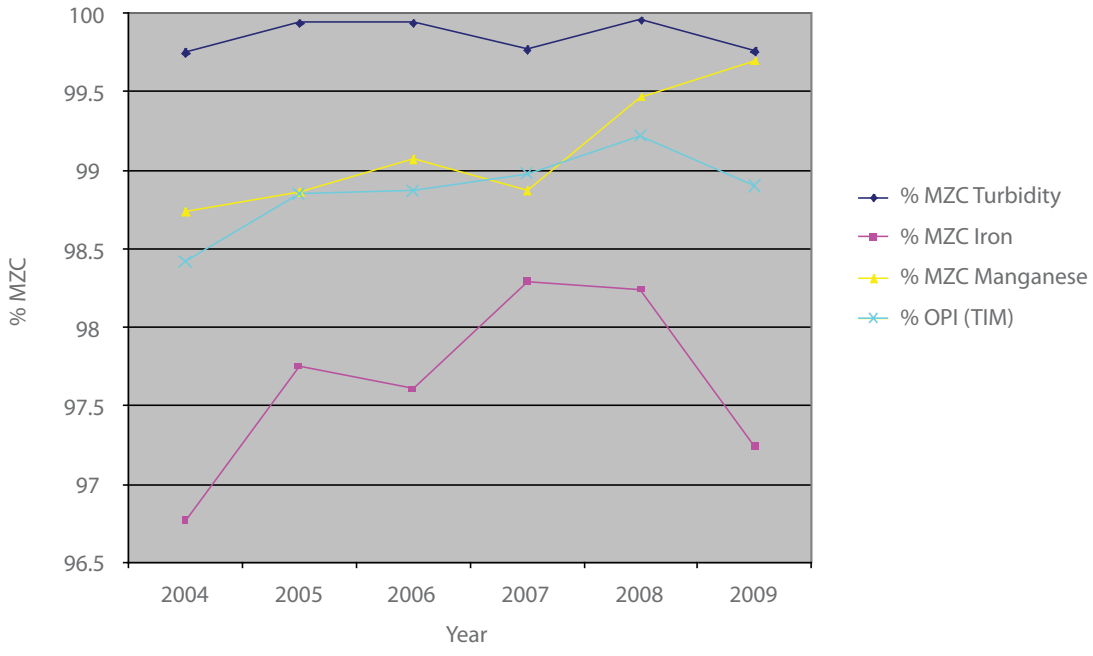
The % mean zonal compliance for iron has shown a downward trend in 2009. Although this drop in compliance may appear significant, there is no indication that the level of iron failures throughout the entire distribution network has increased throughout 2009. The failures are localized and reflect the condition of mains within specific areas. Where these failures are regarded as significant, we consider further regulatory action with NI Water through our enforcement process.

The use of the compliance sampling programme for iron is only one of many drivers used by NI Water in the process of identifying and prioritizing areas where remedial action is required. NI Water also uses information obtained from zonal studies, samples taken as part of operational activities, and consumer complaints to provide a clearer picture of the areas where specific work is required within the distribution network.

In terms of the general upkeep and maintenance of its distribution network, NI Water also takes into account other factors in determining where rehabilitation is to be carried out, such as water pressure, leakage, bursts, and sufficiency of supply.

We are encouraged by NI Water's commitment to bringing forward improvements in iron compliance into 2010 and beyond. However, as identified in the PC10 process, there is further work required to better quantify the extent of water quality compliance problems and the level of investment needed for mains replacement to more effectively inform funding requirements for the next investment period. We will work with NI Water and other stakeholders in carrying out this work. We will continue to look to statutory mechanisms where we consider it necessary to formalize existing or future work programmes to ensure ongoing compliance.

Figure 3.3: OPI (TIM) and % MZC for Turbidity, Iron and Manganese, 2004-2009



Improving Compliance with Current and Future Lead Standards

As part of its steps to improve lead compliance, NI Water has an orthophosphate treatment strategy in place to reduce lead in water supplies. This involves a programme of orthophosphate treatment being undertaken at major water treatment works. This work has been ongoing since 2004. Through the use of treatment and lead pipe replacement, the overall strategy aims to:

- optimize orthophosphate treatment throughout the distribution network to achieve compliance with the 10 µg/l lead standard by December 2013;
- continue opportunistic replacement of lead service pipes;
- replace lead pipe work at the request of the consumer or due to a regulatory requirement; and
- replace lead pipe work as part of the mains rehabilitation programme.

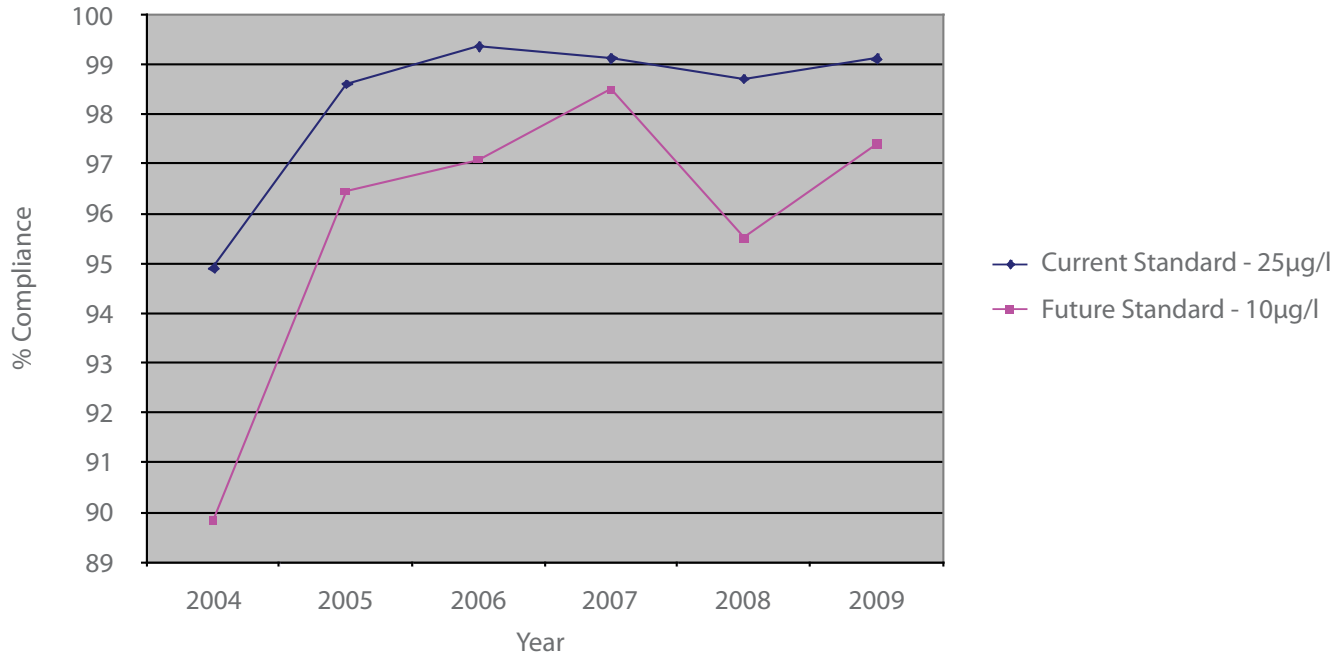
It is encouraging to report that the ongoing work carried out by NI Water continues to result in an improving trend in overall lead compliance with the 25 µg/l standard in Northern Ireland since 2004, as shown in Figure 3.4. However, while there has been an increase in compliance with the 10 µg/l standard: 97.39% in 2009 compared with 95.51% in 2008, we note that a significant amount of work is still required to achieve compliance with the final lead standard of 10 µg/l by December 2013.

Throughout 2008 and 2009, with the introduction of new water treatment works and treatment processes and the rezoning of water supply zones, the previous data held by NI Water on optimization of orthophosphate treatment within the distribution network is being reassessed to ensure correct optimization and stabilization of this treatment has been achieved.

We will continue to monitor NI Water's compliance against the higher standard of 10 µg/l for lead. We have also identified in the PC10 process that provision is made for NI Water to consider a review of its integrated package of measures to address the regulatory requirements for lead by 2013.

Improving compliance with the lead standard is a complex matter because although some lead pipes are owned by NI Water, most belong to consumers (building owners). The pipe connecting a property to NI Water's main, together with internal plumbing, is the most common source of lead in drinking water. NI Water notifies the consumer, the relevant health authority and district council whenever a failure of a standard occurs. The responsibility and cost for replacing lead pipes within domestic properties is not a drinking water quality regulatory requirement: rather, it is a choice that the owner has to make.

Figure 3.4: Percentage of Tests Meeting the Current and Future Standards for Lead, 2004 – 2009



Drinking Water Safety Plans (DWSPs)

The World Health Organization (WHO) recommends that a water safety plan is the most effective way of ensuring that a water supply is safe for human consumption. It is based on a comprehensive risk assessment and the adoption of a risk management approach for each of the steps in a water supply chain: from catchment to consumer. This approach has been incorporated in amended regulatory requirements to further safeguard the supply of drinking water.

The Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009 have introduced a regulatory requirement to widen the scope of risk assessments. Under regulation 27 of these new Regulations, NI Water must carry out a risk assessment, commonly referred to as a drinking water safety plan (DWSP), at every treatment works, associated catchment and supply system. Regulation 28 then requires NI Water to provide the Inspectorate with a report on each risk assessment. DWSPs should be completed for all water supply systems with summary reports submitted to us by December 2010.

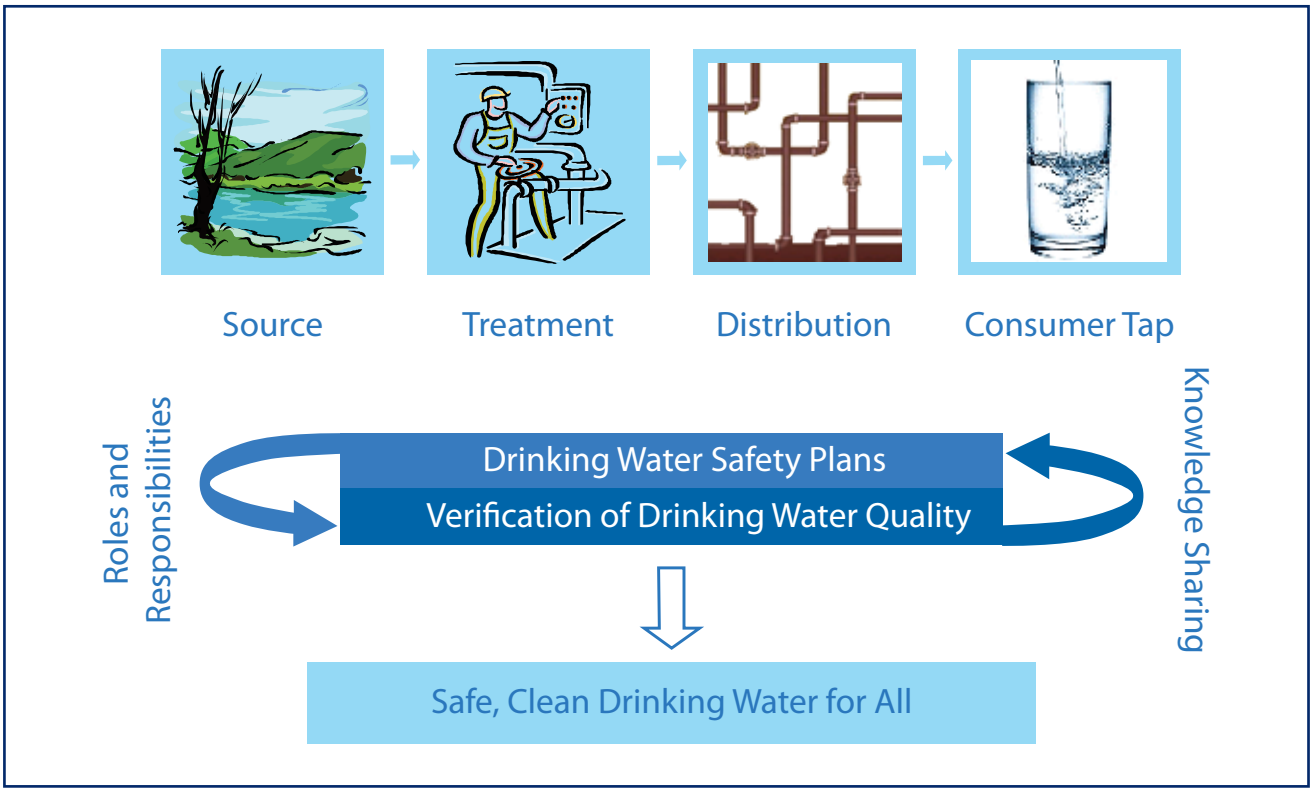
As well as providing an assessment of risk attached to water supply systems, DWSPs are also viewed as a means of identifying funding requirements and are recognized as 'a means to identify residual risks to water quality and form the basis of further investment' in the PC10 process.

The primary objectives of a DWSP are to identify and quantify the inherent risks throughout individual water supply systems and to mitigate these risks through adopting effective controls to protect drinking water quality. This is carried out by looking to: minimize the potential contamination of source waters; reduce or remove contaminants through appropriate treatment processes; and prevent contamination of the distribution network and domestic (building) water systems. This should ultimately provide increased protection of human health and also ensure good water supply practice.

We have issued guidance to NI Water on interpreting the principles behind incorporating this approach and have been working with the company in bringing forward the implementation of this guidance.

The steps in the production of a DWSP would include an assessment of the information gathered in relation to the four areas which make up a water supply, through a process of knowledge sharing, information gathering, and defining roles and responsibilities. The verification of drinking water quality would be through a combination of the ongoing implementation of outputs from a DWSP and from statutory and non-statutory water quality testing of drinking water supplies. This approach is detailed in the schema shown in Figure 3.5.

Figure 3.5: Drinking Water Safety Plan



Water Sources (Catchment)

In the development of its DWSPs, NI Water must look to assess the arrangements in place to protect the catchments from where it abstracts water, and also to obtain ongoing monitoring data of the quality of the water it abstracts. It does this by the use of catchment management plans for abstraction points. It also undertakes an abstraction sampling programme. This information and data is used to provide input to the source and treatment sections of the DWSPs. NI Water must liaise closely with other stakeholders such as Northern Ireland Environment Agency, Department of Agriculture and Rural Development and Forestry Service, to ensure appropriate lines of communication exist to provide information on potential contamination threats to catchments.

NI Water continues to assess the risks within its catchments and establishes monitoring programmes as necessary. The 'Amendment' Regulations require NI Water to undertake a raw water monitoring programme that will further inform the risk assessments and DWSPs. These monitoring programmes are necessary for the management of NI Water's treatment processes in the provision of safe drinking water supplies. This is particularly important in relation to establishing baseline information on raw water quality to evaluate changes such as increased natural organic matter which is prevalent in upland peaty surface water sources.

The summary data below in Table 3.2 gives an indication of the range of water quality that NI Water is normally required to treat in order to comply with the Drinking Water Quality Regulations.

Table 3.2: Summary of Data from Sampling of Water Sources

Parameter Name	Number of Tests	2009 Minimum Value	2009 Maximum Value	2009 Average Value	2008 Average Value
Coliform bacteria (per 100mls)	80	0	6,600	243.02	383.77
E. coli (per 100mls)	80	0	2,700	68.95	98.86
Enterococci (per 100mls)	39	0	260	13.90	23.05
Colour (mg/l pt/Co)	151	0.5	253	50.31	44.18
Hydrogen ion (pH)	151	5.59	9.06	7.36	7.52
Manganese (µg/l)	80	0.5	6,450	266.66	196.26
Iron (sol) (µg/l)	80	6	4,927	529.12	413.67
Ammonium (mg/l)	151	0.005	12.39	0.09	0.03
Nitrate (mg/l)	151	0.05	30.2	3.18	5.18
Pesticides - total (µg/l)	37	0.025	0.351	0.046	0.04

Water Treatment

NI Water must ensure that the treatment processes it has in place at each water treatment works are robust and designed to deal with the range of raw water quality which could occur within the water source. The DWSP approach requires an assessment to be made between the source water and the type of water treatment in place. One important measure of the effectiveness of treatment is the assessment of the water quality throughout the treatment process and the quality of the final water leaving the works into distribution. In Table 3.3, groupings of two sets of parameters are used to describe the effectiveness of water treatment processes: process control parameters and disinfection parameters.

In 2009, the risks of non-compliance remained for some of the process control parameters used to measure effective water treatment. There has been good progress with compliance for THMs, with significant improvement noted (Table 3.3 refers). It is hoped that the implementation of DWSPs will further highlight that good operational control of the water treatment process is fundamental in mitigating the risk of non-compliance with the standards.

The second grouping of parameters in the water treatment table looks at the effectiveness of disinfection and pathogen removal. In 2009, there has been a slight decrease in compliance with coliform bacteria, *E. coli* and turbidity standards at water treatment works. Through the production and implementation of DWSPs, NI Water should identify and mitigate against any risk factors which could affect the disinfection process.

To safeguard drinking water from the risk of microbiological organisms being present, the process of effective disinfection is fundamental to treatment works' operation. It is, therefore, paramount that NI Water achieves its primary duty of disinfecting drinking water before it is supplied to consumers and that appropriate critical control measures are in place.

The 'Amendment' Regulations now require that NI Water, through undertaking disinfection, must carry out this process to keep disinfection by-products as low as possible without compromising the disinfection process, and must also have in place systems to verify the effectiveness of disinfection. This is a critical aspect of the water treatment process to ensure safe drinking water. Through the development and implementation of the DWSP approach, and in meeting its regulatory duty, NI Water must ensure the verification of disinfection along with appropriate control measures are fully documented, implemented and reviewed for sites where disinfection is practised.

Table 3.3: Water Treatment Indicators

Process Control Parameters	Place of Sampling	% of Tests not Meeting the Standards in 2009	% of Tests not Meeting the Standards in 2008
Colour	Water Supply Zones	0.00	0.14
Hydrogen ion	Water Supply Zones	0.00	0.05
Nitrate	Water Supply Zones	0.00	0.00
Nitrite	Water Treatment Works	0.00	0.00
Aluminium	Water Supply Zones	**0.98**	1.27
Trihalomethanes	Water Supply Zones	**3.83**	18.43
Bromate	Water Supply Zones	**0.22**	0.00
Disinfection Parameters			
Coliform bacteria	Water Treatment Works	**0.12**	0.08
E. coli	Water Treatment Works	**0.05**	0.02
Turbidity	Water Treatment Works	**0.53**	0.47

Water Distribution Systems

Given the nature of the distribution network for which NI Water has responsibility, the production of DWSPs will include a series of generic control measures to cover the 26,000 kilometres of pipe work but should also address the specific localized issues. For the issues identified through the DWSP there should be more detailed and site specific control measures in place to mitigate against any significant risks.

In Table 3.4, two measures are used which describe the water quality within a distribution system (from where the water leaves the treatment works up to the point of supply to consumer): distribution maintenance and reservoir integrity.

The selection of these distribution parameters is to reflect the age, condition and maintenance status both of the pipes (water mains) and, to a lesser extent, the reservoirs which comprise the distribution network. The figures detailed in Table 3.4 relating to distribution maintenance would reflect the downward trend noted for 2009 in relation to OPI (TIM) reported on earlier.

Microbiological sampling takes place weekly at service reservoirs as a check on their integrity and general hygienic status. The assessment of reservoir integrity is based on this microbiological quality. In 2009, there were 340 service reservoirs used in Northern Ireland in the supply and distribution of water to consumers. The results for 2009 show a marginal decrease in compliance against the 2008 figures. We would consider that although compliance is high for water leaving service reservoirs there is still a need for controls in this part of the distribution process, through actions such as ensuring an ongoing programme of reservoir cleaning.

Like disinfection, the integrity of reservoirs gives information on the water safety record of NI Water as regards to risk of ingress of contaminants. Secondary disinfection is carried out through chlorine boosting at selected service reservoirs in Northern Ireland (particularly those with long distribution networks) to achieve a disinfection residual at the end of the network.

It is, however, imperative that secondary disinfection does not disguise a more fundamental problem such as compromised reservoir integrity because of the condition (structural integrity) of the reservoir or its configuration (flow management). In the process of implementing the DWSP approach, we would expect NI Water to review the control measures in place to ensure an adequate disinfection residual is effectively maintained and managed throughout the distribution network.

Table 3.4: Water Distribution Indicators

Process Control Parameters	Place of Sampling	% of Tests not Meeting the Standards in 2009	% of Tests not Meeting the Standards in 2008
Distribution Maintenance*			
Turbidity	Water Supply Zones	**0.29**	0.09
Iron	Water Supply Zones	**2.11**	1.93
Manganese	Water Supply Zones	**0.39**	0.47
Reservoir Integrity			
Coliform bacteria	Service Reservoirs	**0.14**	0.13
E. coli	Service Reservoirs	**0.04**	0.02

**Turbidity, iron and manganese are also the parameters used to calculate OPI (TIM).*

Water Systems within Buildings

Once water has passed through NI Water's distribution network it will then come into contact with domestic water systems within buildings. These systems can be those within individual domestic properties or within larger commercial or public premises. In the development of its DWSPs, NI Water must take account of the potential for the water it supplies to become contaminated by these systems through, for example, the condition and maintenance of the pipe work or storage facilities. NI Water's sampling programme within water supply zones is randomly generated to take samples from within consumers' properties. NI Water must keep a record of the type of property the sample was taken from (e.g. a public building).

The regulations require that sampling must take place at consumers' drinking water taps. Some of the parameters that are monitored for at consumers' taps may not be totally within NI Water's control. Certain parameters such as lead, copper, and nickel are influenced by the nature and condition of water distribution systems within buildings.

In instances where water quality issues have been identified as being caused by the distribution system within a building, NI Water is required to investigate to determine the cause. As part of this investigation, it should determine if the water quality issue found within the building is as a consequence of the distribution system not complying with The Water Supply (Water Fittings) Regulations (NI) 2009 or if the problem related to other matters.

In 2009 there was a significant decrease in the number of samples taken at consumers' taps which failed the coliform standard: 0.64% failing in 2009 compared with 1.0% in 2008. On follow-up investigations, nearly 80% of these failures were attributed to either the condition of the tap or contamination at the time of sampling. In such instances, NI Water is required to inform the consumer and provide appropriate advice.

As a way of helping consumers understand what steps they can take to control risks arising within their homes, a guide called 'Looking after WATER in your home' is available from NI Water's website: www.niwater.com/siteFiles/resources/pdf/corporate/nie%20consumer%20guide.pdf

Of the 94 samples taken at taps in public buildings during 2009, four samples failed (all for iron). In carrying out its investigations, NI Water was able to determine that two of these failures were attributable to internal plumbing in the public buildings. As required, under the legislation at that time, the owners of these buildings were notified by NI Water of the failures.

The Water Supply (Domestic Distribution Systems) Regulations (Northern Ireland) 2010

Under The Water Supply (Domestic Distribution Systems) Regulations (Northern Ireland) 2010, which came into operation on the 20 April 2010, NI Water is now to report instances of water quality failures caused by the internal distribution system occurring within public buildings to the Inspectorate. It would then be our responsibility to assess the significance of any failures reported to us under these new regulations, and where required, ensure remedial action is undertaken by the person responsible for the building.

Part 4
Private Drinking Water Supplies

Part 4
Private Drinking Water Supplies

In this part of the report we give details of the private water supplies for which we are responsible.

Introduction

Northern Ireland Water Ltd (NI Water) supplies water to over 99 per cent of the Northern Ireland population; the remainder of the population is served by private water supplies.

Private water supplies are defined in The Water and Sewerage Services (Northern Ireland) Order 2006 as any supplies of water provided otherwise than by NI Water. Private water supplies are diverse in nature and range from those which serve single domestic dwellings through to those supplying large commercial properties.

Under The Private Water Supplies (Northern Ireland) Regulations 1994, the Drinking Water Inspectorate has a regulatory responsibility for private water supplies which are used for drinking, cooking, food preparation or other domestic purposes; or those used in commercial food production: the manufacture, processing, preservation, or marketing of food or drink for sale for human consumption. We implement the regulations with the support of staff from the Environmental Health Departments of district councils who collect samples and assist in follow-up investigations. The information on private water supplies at dairy farms contained in this report is provided to us annually by the Department of Agriculture and Rural Development (DARD) and forms part of DARD's monitoring of water quality on dairy farms.

There are 1,276 private supplies currently registered with us. It is estimated that there are a further 4,000 private supplies to individual private domestic dwellings, which do not need to be registered under the 1994 Regulations. We are required to review the information we hold on private supplies on an annual basis.

Although there are some (mainly commercial) private supplies in urban areas, the majority are situated in the more remote, rural parts of Northern Ireland. Private water supplies may be drawn from a variety of surface and groundwater sources. Surface sources include streams, rivers and lakes; groundwater sources include wells, boreholes and springs. The majority (98 per cent) of private supplies in Northern Ireland are from groundwater sources.

Ninety-one per cent (1,162) of the private water supplies registered with us are dairy farms; the remaining nine per cent (114) are commercial and domestic supplies.

Table 4.1: Number of Private Water Supplies by Classification in 2009

Classification	Monitoring Frequency (per annum)	Number of Supplies	Classifications Excluding Dairy Farms	
			Number of Supplies	% Excluding Dairy Farms
Dairy Farms				
2.5	1	1,162		
Commercial/Public Supplies				
2.5	1	5	5	4.39
2.4	2	45	45	39.47
2.3	6	29	29	25.44
2.2	12	13	13	11.40
2.1	24	2	2	1.75
Domestic Supplies				
1.E	1	20	20	17.54
Total No.		1,276	114	100

Registration and Monitoring of Private Supplies

The owners or users of private water supplies for commercial or domestic purposes, other than single private dwellings, are required to register their supply with us by completing a private water supplies registration form[1]. Private water supplies are split into two categories and further assessed into classifications:

- category 1 (domestic) - a supply that is used only for drinking, washing or cooking by people living in properties receiving the supply: water used solely for domestic purposes. Category 1 supplies are placed in classes A to E depending on the number of people supplied, or volume of water used; and
- category 2 (commercial/public) - a supply that is used to make food or drink that is sold, or is used in properties with a regularly changing population, e.g. hospitals, hotels, caravan sites or schools. Category 2 supplies are placed in classes 1 to 5 depending on the volume of water used.

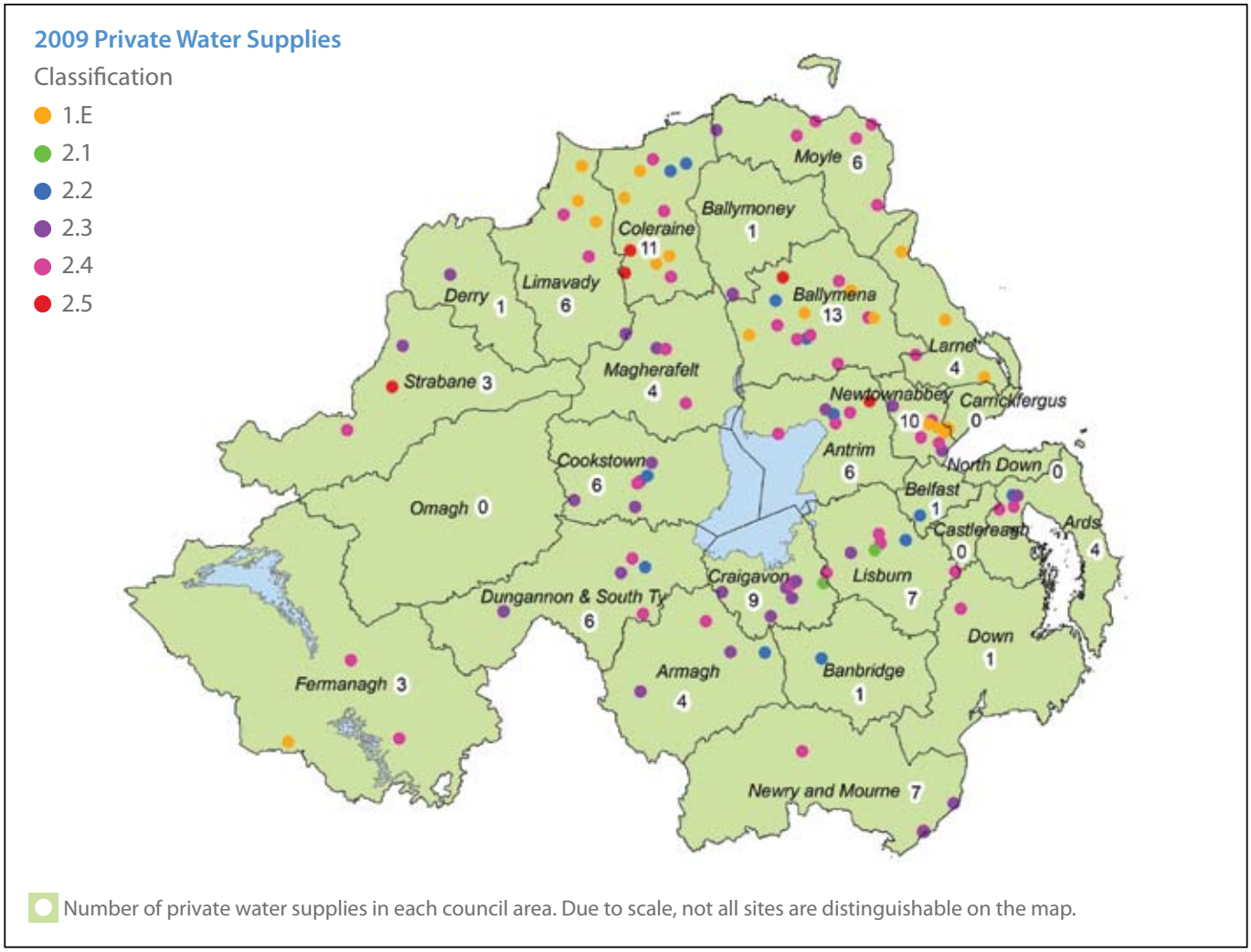
Depending on the classification, a sampling programme is put in place for each individual private supply. The frequency of the sampling and the range of parameters tested for are based on the classification of the supply.

There are 114 private water supplies on our monitoring schedule: 82 per cent are commercial/public supplies; and 18 per cent are domestic premises (groupings of two or more houses only). A breakdown of the number of private water supplies within each classification, together with the monitoring frequencies, is shown in Table 4.1.

A breakdown of private water supplies by district council area is shown below in Figure 4.1.

Figure 4.1: Private Water Supplies (Excluding Dairy Farms) by Council Area in 2009

Note: Carrickfergus, Castlereagh, North Down, and Omagh Councils do not have private water supplies included in our 2009 sampling programme.



[1] www.ni-environment.gov.uk/pws_registration_form.pdf

Drinking Water Quality

Since June 1999, we have been carrying out a sampling programme at private water supply sites. We hold results of the analysis and inform the owners/users of their test results within six weeks of samples being taken.

Table 4.2 provides an overview of the quality of water in private supplies in 2009. These results are reported to the standards set by the Drinking Water Directive (98/83/EC).

The results show that out of a total of 12,384 tests carried out, 96.96% met the regulatory standards. The regulatory requirements were not met on 376 occasions; 222 of these contraventions related to non-compliances at dairy farms.

This overall compliance of 96.96% for 2009 is a marginal improvement on 2008 (96.80%). We continue to work with private water supply owners and the local councils to bring forward improvements to these supplies.

Table 4.2: Overall Water Quality in Private Water Supplies in 2009

Parameters	Determinations in 2009			
	Total No.	Exceeding PCV		% Compliance
		No.	%	
Coliform bacteria	505	28	5.54	94.46
E. coli	505	8	1.58	98.42
Manganese	169	27	15.98	84.02
Iron	169	24	14.20	85.80
Trihalomethanes	172	7	4.07	95.93
Turbidity	213	7	3.29	96.71
Odour (quantitative)	163	4	2.45	97.55
Magnesium	123	3	2.44	97.56
Hydrogen ion (pH)	247	6	2.43	97.57
Ammonium	165	4	2.42	97.58
Colour	165	3	1.82	98.18
Sodium	123	2	1.63	98.37
Oxidizability	123	2	1.63	98.37
Sulphate	123	2	1.63	98.37
Aluminium	167	2	1.20	98.80
Temperature	459	4	0.87	99.13
Calcium	123	1	0.81	99.19
Individual pesticides	754	4	0.53	99.47
Conductivity	247	0	0.00	100.00
Nitrate	211	0	0.00	100.00
Nitrite	211	0	0.00	100.00
Taste (quantitative)	135	0	0.00	100.00
Total pesticides	58	0	0.00	100.00
Other parameters	5,804	16	0.28	99.72
Dairy Farms*				
Coliform bacteria	625	129	20.64	79.36
E. coli	625	93	14.88	85.12
Total for all Private Supplies	12,384	376	3.04	96.96

**Dairy farm data is collected by DARD and reported annually to us.*

Physical/ Chemical Quality

Contraventions of the physical/chemical standards have been reported for a range of parameters. As with previous years where the standards have not been met, they relate mainly to non-compliance for manganese (15.98%) and iron (14.20%).

Both iron and manganese can occur naturally in the water supply but a proportion may also enter the supply through old pipe work. High levels of these metals may affect the appearance, taste or smell of the water and could interfere with the disinfection process.

There are effective treatments which can be installed to reduce the levels of these elements in private supplies. Further information on these treatment options is available in the technical manual on private water supplies.[2]

Microbiological Quality

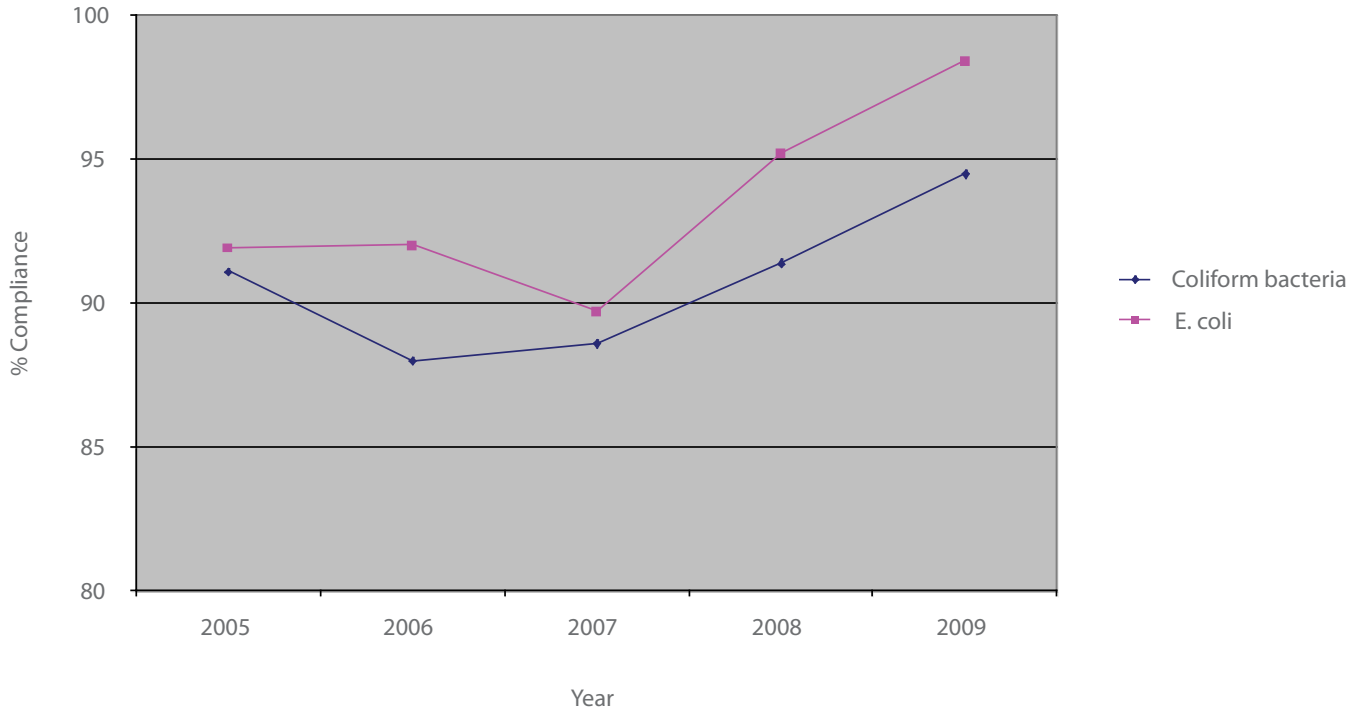
The overall microbiological quality of all registered private water supplies (excluding dairy farms) is given in Figure 4.2. The compliance rate at dairy farms is detailed in Table 4.2. The compliance rate among private supplies serving small domestic supplies, category 1, is notably lower (at 68%) than the larger category 2, commercial supplies (at 98%).

Water supplies in the vicinity of farmed land where animals graze or manure is spread are most at risk and this risk is particularly high at times of heavy rainfall when water may run directly off farmland and carry micro-organisms into unprotected private supplies.

The source of a private water supply should be regularly inspected to ensure it is adequately protected from surface run-off and is not accessible to animals. Any collection or storage tanks or borehole head works should have watertight walls and lids to prevent ingress of run-off water.

We can provide advice on appropriate disinfection treatment options, as can the Environmental Health Departments of local councils. Further information is also available in the technical manual on private water supplies.[2]

Figure 4.2: Summary of Microbiological Quality of Private Water Supplies, 2005 - 2009 (Excluding Dairy Farms)



[2] www.privatewatersupplies.gov.uk

Follow-up Actions on Regulatory Exceedences

We report exceedences of the regulatory standards at private supplies to the relevant district councils who inform the owners/users. We follow up all contraventions in conjunction with the appropriate Environmental Health Department and take remedial actions depending on the nature and level of the failures. These actions may include carrying out site visits and providing practical advice on source protection and treatment options to reduce the potential risks of contamination.

Acknowledgements

We acknowledge the co-operation and assistance of staff from the Environmental Health Departments of district councils, the Quality Assurance Branch of DARD, and the AFBI Newforge Laboratory in meeting the requirements of The Private Water Supplies Regulations (Northern Ireland) 1994.

New Regulations

New regulations for private water supplies in Northern Ireland came into force in January 2010: The Private Water Supplies Regulations (Northern Ireland) 2009 (SR 413), as amended in 2010 (SR 131). These new regulations transpose the 1998 Drinking Water Directive in respect of private supplies and revoke the previous 1994 Regulations.

It is important to note that, as with the 1994 Regulations, private supplies to single dwellings are not monitored under the 2009 Regulations. We do, however, offer advice to all private supply owners and users. A new classification system is included in the new regulations, whereby, the sampling frequency for private supply sites is reduced and the list of parameters tested for is slightly amended. The new regulations exclude bottled water suppliers, who are regulated under The Natural Mineral Water, Spring Water and Bottled Drinking Water Regulations (Northern Ireland) 2007.

The new regulations also require that a risk assessment at all registered private water supplies is carried out. The World Health Organization (WHO) recommends that the most effective means of consistently ensuring the safety of a drinking water supply is through a comprehensive risk assessment and risk management approach. This risk assessment will identify areas where there may be potential contamination and will include the whole private supply system, from source to tap. This method is similar to the drinking water safety plans in place for the public water supply.

The introduction of new procedures in the event of a failure means breaches of the wholesomeness standards in the regulations must be investigated and followed up to seek compliance. If compliance cannot be achieved through informal agreement, we will apply more formal mechanisms in the form of Authorised Departures or notices to secure improvement.

Where we consider that a failure at a private supply could be a risk to human health, we consult with the Public Health Agency. In these instances, the regulations allow us to issue notices restricting the use of the supply.

Technical Information

A technical manual on private supplies is available on the internet and provides comprehensive guidance for owners/users. It is a useful tool for those required to assess or work with these supplies. A copy of the manual and other general information relating to private supplies can be downloaded from the website.[2]

Further advice on private water supplies and general information on drinking water quality can be found on the websites below:

Drinking Water Inspectorate for Northern Ireland

www.ni-environment.gov.uk/water-home/drinking_water/private_water.htm

World Health Organization

www.who.int/water_sanitation_health/dwq/gdwq3rev/en/index.html

[2] www.privatewatersupplies.gov.uk

Part 5
Drinking Water Quality Standards

Part 5
Drinking Water Quality Standards

In this part of the report we provide details of how drinking water quality is regulated and the standards that apply.

We also include a useful reference to the Drinking Water Quality and Health Research Programme.

How is Drinking Water Quality Regulated?

The Legal Framework

The Drinking Water Inspectorate for Northern Ireland was formed in 1996 to provide independent reassurance that public water supplies in Northern Ireland are safe. The regulatory framework for water supplies in Northern Ireland has been changed from The Water and Sewerage Services (Northern Ireland) Order 1973 to The Water and Sewerage Services (Northern Ireland) Order 2006. This enabled the Water Reform process to proceed, whereby, Water Service, the public supplier of water here in Northern Ireland, began to operate as a government-owned company, Northern Ireland Water Ltd (NI Water), on 1 April 2007.

A public water supply is one provided by NI Water for the purposes of drinking, washing, cooking or food production.

Water supplies that are not provided by NI Water are known as private water supplies.

Wholesome Drinking Water

The law requires that water must be wholesome at the time of supply. Wholesomeness is defined by reference to drinking water quality standards and other requirements set out in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 and the Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009. These are available on our website: www.ni-environment.gov.uk/water-home/drinking_water/public_water/regulations_guidance/regulations.htm

Many of these standards come from the 1998 European Drinking Water Directive, which came fully into force on 25 December 2003. The Directive focuses on those parameters of importance to human health but it also includes others that relate to the control of water treatment processes and the aesthetic quality of drinking water. The Directive allows member states to set additional or tighter national standards to secure the good quality of water already achieved and to prevent it from deteriorating in the future. In the United Kingdom there are national specific definitions for wholesomeness of water at water treatment works, service reservoirs and in water supply zones.

To be wholesome, water leaving a water treatment works must not contain:

- *E. coli* in excess of 0/100ml (national requirement);
- coliform bacteria in excess of 0/100ml (national requirement); or
- nitrite in excess of 0.1 mgNO_2/l (Directive requirement).

To be wholesome, water leaving a service reservoir must not contain:

- *E. coli* in excess of 0/100ml (national requirement); or
- coliform bacteria in excess of 0/100ml in more than five per cent of samples taken in a year (national requirement).

To be wholesome, water at consumers' taps or water leaving a tanker must:

- contain nothing alone (other than a parameter) or in combination (including parameters) that is a potential danger to public health (this is a catch-all provision which reflects the concept of wholesomeness as developed over the years);
- meet the standards (maximum or minimum in Schedule 1, Tables A and B, i.e. Directive and national standards); and
- satisfy the nitrate/nitrite formula ($NO_3/50 + NO_2/3 \leq 1$) (Directive requirement).

As can be seen, the concept of wholesomeness is based firmly on regulatory standards. However, what should be stressed, is that unwholesome drinking water does not necessarily represent a risk to consumers' health. Most standards are set with a very wide margin of safety and are based on a lifetime's consumption of water.

Drinking Water Quality Standards

The drinking water quality standards are set out in statute in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 and the Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009. Each regulated substance or organism is known as a parameter. As well as setting standards for each parameter, the Regulations state how often each one should be tested for and where the samples should be taken from. Samples are routinely collected at water treatment works, service reservoirs and consumers' taps. Anyone wishing to find out more about how each standard is derived can do so by accessing the World Health Organization's expert opinion at: www.who.int/water_sanitation_health/dwq/gdwq3rev/en/index.html

Microbiological Standards

To protect public health there are microbiological standards which have to be met at each treatment works and treated water service reservoir or tower. Microbiological determinations are also undertaken on consumer tap samples. The significance of individual test results for each microbiological parameter at each location varies, and a single positive result does not necessarily mean that water is unsafe to drink. Other information is required to assess water safety and each result is assessed on a case-by-case basis.

European Health-Based Chemical Standards

European health-based standards for chemicals are set with a wide margin of safety on the basis of a lifetime's consumption of water, taking into account the amounts present in food. Just because a standard has been set for a substance does not mean that it is present in drinking water. The vast majority of the regulated chemicals are never found in drinking water in Northern Ireland. Others occur only in very specific or localized circumstances.

National Chemical and Physical Standards

The European Drinking Water Directive recognizes the importance of maintaining a high quality of drinking water, and for this reason, several standards set in the original 1980 Drinking Water Directive (but not the 1998 Drinking Water Directive) have been continued in the form of national standards. Most of the standards address levels that make the water unacceptable to consumers on the grounds of odour, taste or appearance.

Additional Monitoring Parameters

In addition to the drinking water standards, NI Water is required to test for additional indicator parameters to assist it with good water supply management and control of drinking water quality.

Our website can be referenced to find out how each parameter complied with the regulatory standards: www.ni-environment.gov.uk/water-home/drinking_water/public_water/drinking_water_quality.htm

Standing Committee of Analysts (SCA)

NI Water must follow methods of analysis set out in the Directive and the Regulations. National methods are published by the Standing Committee of Analysts and are updated to take account of ongoing method developments. The most up-to-date methodology can be downloaded, free of charge, from the SCA section of the Environment Agency website at: www.environment-agency.gov.uk/research/commercial/32874.aspx

Approval of Products for use in the Provision of Water Supplies

The Drinking Water Inspectorate for England and Wales provides a technical resource to facilitate the approval, nationally, of chemicals and materials of construction through its 'Regulation 31 Enquiries Service'. For further information on the approval of products and for the current 'List of Approved Products', please refer to the Drinking Water Inspectorate for England and Wales' website: www.dwi.gov.uk/drinking-water-products/approved-products/soslistcurrent.pdf

Drinking Water Quality and Health Research Programme

Most research into drinking water quality and health is funded by the Department of the Environment, Food and Rural Affairs (DEFRA) in England. On DEFRA's behalf, the Drinking Water Inspectorate for England and Wales manages the national Drinking Water Quality and Health Research Programme (DWQH).

The objective of the DWQH is to provide the science base for policy on drinking water quality, encompassing both health and consumer acceptability issues.

Further information on current and future research is available from the Drinking Water Inspectorate for England and Wales' website: www.dwi.gov.uk/research/index.htm

Annexes

Annex 1
Glossary and Definition of Terms

Aesthetic	associated with the senses of taste, smell and sight.
AFBI	Agri-Food and Biosciences Institute, a non-departmental public body of the Department of Agriculture and Rural Development, created on 1 April 2006.
Aggressive	a term used to indicate that the water has a tendency to dissolve copper (and other metals) from the inner surface of a pipe or water fitting such as a tap.
Alkali	a solution containing an excess of free hydroxyl ions, with a pH greater than 7.
Aluminium	occurs naturally in some water sources. It is removed by conventional water treatment (coagulation and filtration). Aluminium sulphate and polyaluminium chloride may be used as water treatment chemicals at some water treatment works.
Analytical Quality Control (AQC)	Analytical Quality Control is the method used to ensure that laboratory analysis methods are performing correctly.
Animalcule	a tiny or microscopic life form.
Aquifer	underground strata containing water.
Authorised Departure (AD)	authorisation granted by the Inspectorate, in consultation with the health authorities, for NI Water to temporarily supply water exceeding a drinking water standard, provided that there is a planned programme of work at the water treatment works to improve the water quality and that there are no adverse health implications.
Authorised Supply Point	a sampling point within the distribution system authorised for certain parameters by the Inspectorate because the results of the analysis of such samples are unlikely to differ in any material respect from the results of the analysis of samples taken from consumers' taps.
Bromate	may be formed during disinfection of drinking water through a reaction between naturally occurring bromide and strong oxidants (usually ozone). It may also be generated in the manufacture of sodium hypochlorite disinfectant.
Catchment	the area of land that drains into a watercourse.
Chlorine Residual	the small amount of chlorine present in drinking water to maintain its quality as it passes through NI Water's network of pipes and consumers' household plumbing.
Coagulation	a process employed during drinking water treatment to assist in the removal of particulate matter.
Coliforms	a group of bacteria which may be faecal or environmental in origin.
Colour	occurs naturally in some upland water sources. It is removed by conventional water treatment.
Communication Pipe	the connection from the water main to the consumer property boundary (normally at the outside stop tap).
Compliance Assessment	a comparison made by the Inspectorate of data (gathered by NI Water) against standards and other regulatory requirements.
Compound	a compound consists of two or more elements in chemical combination.
Consideration of Provisional Enforcement Order (CPEO)	the means, as set out in The Water and Sewerage Services (Northern Ireland) Order 2006, by which the Department for Regional Development requires NI Water to comply with certain regulatory requirements.
Contact Tank	a tank, normally situated on a water treatment works site, which forms part of the disinfection process. A disinfectant chemical (normally chlorine) is dosed into the water as it flows into the tank. The period of time that the water takes to flow through the tank allows sufficient 'contact' time for the chemical to kill or deactivate any viruses or pathogenic organisms that may be present in the water.
Contravention	a breach of the regulatory requirement.

Cryptosporidiosis	the illness produced by infection with *Cryptosporidium*.
Cryptosporidium	a protozoan parasite.
DEFRA	Department of the Environment, Food and Rural Affairs.
Determination	an analysis for a specific parameter.
Distribution Systems	NI Water's network of mains, pipes, pumping stations and service reservoirs through which treated water is conveyed to consumers.
Drinking Water Directive	European Council Directive (98/83/EC), relating to the quality of water intended for human consumption – setting out drinking water standards to be applied to member states.
Drinking Water Standards	the prescribed concentrations or values listed in the Regulations.
Enterococci	a sub-group of faecal streptococci commonly found in the faeces of humans and warm-blooded animals.
Epidemiology	a process of studying the distrubution of cases of disease within a population in relation to exposure to possible sources of the infection, with a view to establishing the actual source of the infection.
Escherichia Coli (*E. coli*)	a type of faecal coliform bacteria commonly found in the intestines of animals and humans. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination.
Event	a situation affecting, or threatening to affect, drinking water quality.
Exceedence	relates to a contravention or breach of regulatory standards.
Faecal Coliforms	a sub-group of coliforms, almost exclusively faecal in origin.
Filtration	the separation of suspended particulate matter from a fluid.
Formal Notification	a process which commences with a 'notice' to NI Water of the Inspectorate's intention to initiate a formal process of notification documenting the Inspectorate's requirements where a regulatory requirement has not been met.
Glyphosate	a broad-based spectrum herbicide used in both agriculture and forestry, and for aquatic weed control.
Granular Activated Carbon (GAC)	an absorbent filtration media used to remove trace organic compounds from water.
Groundwater	water from aquifers or other underground sources.
Hydrogen ion (pH)	gives an indication of the degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and above 7 are alkaline. A low pH water may result in pipe corrosion. This is corrected by adding alkali during water treatment.
Incident	an event where there has been a demonstrable deterioration in the quality of drinking water.
Indicator Organism	an organism which indicates the presence of contamination and, hence, the possible presence of pathogens.
Indicator Parameter	something that is measured to check that the control measures, such as water treatment, are working effectively.
Inspectorate	the Drinking Water Inspectorate for Northern Ireland.
Investment Programme	investment in improvement works to water treatment works and distribution systems.
Iron	is present naturally in many water sources. It is removed by treatment. Some iron compounds are used as water treatment chemicals. However, the greatest source of iron in drinking water is corrosion of iron water mains.
Lead	its presence tends to reflect the existence of lead plumbing in older properties. If the water being supplied has a tendency to dissolve lead, then it is treated to reduce consumer exposure.
Leaching	to lose, or cause to lose, soluble substances by the action of a percolating liquid.
Mains Rehabilitation	restoration of water mains pipework to a proper condition.

Manganese	is present naturally in many water sources and is removed during water treatment.
Mean Zonal Compliance %	a measure of compliance with drinking water standards - see zonal percentage compliance.
MCPA	(4-chloro-2-methylphenoxy) acetic acid. An aryloxyalkanoic acid herbicide used for controlling broad-leaved weeds in grass or cereal crops.
Mecoprop (MCPP)	2-(4-chloro-2-methylphenoxy) propanoic acid. An aryloxyalkanoic acid herbicide used for controlling broad-leaved weeds in grass or cereal crops.
Microbiological	associated with the study of microbes.
m^3/d	cubic metres per day.
mg/l	milligrammes per litre (one thousandth of a gramme per litre).
ml	millilitre.
Ml/d	megalitres per day (one Ml/d is equivalent to 1,000 m^3/d or 220,000 gallon/d).
ng/l	nanogrammes per litre (one billionth of a gramme per litre).
µg/l	microgrammes per litre (one millionth of a gramme per litre).
Nickel	a metallic element which occurs naturally in some groundwater. The primary source of nickel in drinking water is the coatings on modern taps and other plumbing fittings.
Non-Incident	an event where there has been no demonstrable deterioration in the quality of drinking water.
Notice of Intention	a necessary precursor to the issue of a formal notice - see formal notification.
Oocyst	the resistant form in which *Cryptosporidium* occurs in the environment, and which is capable of causing infection.
Organoleptic	characteristics of a substance detected by our senses, for example, taste, odour or colour.
Orthophosphoric Acid	a chemical which is added in low concentrations at water treatment works to minimize the uptake of lead from old pipework.
Ozone Process (Ozonation)	the application of ozone gas in drinking water treatment.
PAHs	a group of organic compounds known as polycyclic aromatic hydrocarbons, comprising, for the purposes of the Regulations, four substances: benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi) perylene, and indeno (1,2,3-cd) pyrene.
Parameters	the substances, organisms and properties listed in Schedules 1 and 2, and regulation 2 of the Regulations.
Pathogen	an organism which causes disease.
Pentachlorophenol	a phenoxyacidic pesticide used primarily for protecting wood from fungal growth.
Pesticides	any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
pH Value	a measure of the acidity or basicity related to the concentration of the hydrogen ion.
Phosphate Dosing	treatment of water that results in a protective film building up on the inside of pipes, minimizing the likelihood of lead being present in drinking water supplied through lead pipes.
Plumbosolvency	the tendency for lead to dissolve in water.
Prescribed Concentration or Value (PCV)	the numerical value assigned to drinking water standards, defining the maximal or minimal legal concentration or value of a parameter.

Private Water Supplies	any supplies of water provided otherwise than by the public supplier, NI Water.
Protozoan Parasite	a single-celled organism that can only survive by infecting a host.
Public Registers	the drinking water quality information made available to the public as required by the Regulations.
Public Supplies	water supplied by NI Water.
Raw Water	water prior to receiving treatment for the purpose of drinking.
Remedial Action	action taken to improve a situation.
Residual Disinfectant	the small amount of chlorine present in drinking water to maintain its quality as it passes through NI Water's network of pipes and consumers' household plumbing.
Service Connection	connection between the NI Water main to a consumer's property.
Service Pipe	pipe that connects the consumer's property to NI Water's main. It comprises two parts: the communication pipe which is the connection from the water main to the consumer's property boundary (normally at the outside stop tap); and the supply pipe which runs from the boundary of the property to the consumer's inside stop tap.
Service Reservoir	a water tower, tank or other reservoir used for the storage of treated water within the distribution system.
Supply Pipe	pipe connecting between the boundary of a consumer's property and the inside stop tap.
Supply Point	a point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations.
Surface Water	untreated water from rivers, impounding reservoirs or other surface water sources.
Technical Audit	the means of checking that NI Water is complying with its statutory obligations.
Time of Supply	the moment when water passes from NI Water's pipework into a consumer's pipework.
Toxicology	the study of the health effects of substances.
Treated Water	water treated for domestic use as defined in the Regulations.
Trihalomethanes (THMs)	a group of organic substances comprising, for the purposes of the Regulations, four substances: trichloromethane (also known as chloroform), tribromomethane (also known as bromoform), dibromochloromethane and dichlorobromomethane.
Water Supply Zone	a pre-defined area of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.
WHO	World Health Organization.
Wholesome/ Wholesomeness	a concept of water quality which is defined by reference to standards and other requirements set out in the Regulations.
WRAS	Water Regulations Advisory Scheme.
WRc	Water Research Centre (1989) plc and/ or, as the context may require, its predecessor body.
Zonal Percentage Compliance	the percentage of results for a specific parameter which complied with the PCV. The mean zonal percentage compliance is the average of the zonal percentage compliances of all water supply zones in a region.

Annex 2
Drinking Water Quality Look-up Tables

The following tables provide more detail of where the standards have not been met in the individual water supply zones. The tables present, by parameter, all the contraventions and the '% zonal compliance' that occurred in water supply zones and supply points at water treatment works during 2009.

The '% zonal compliance' is calculated using the mean zonal compliance indicator. For further detail on how this is calculated, the reader should refer to Annex 4 of our 2007 report: www.ni-environment.gov.uk/drinking_water_quality_in_northern_ireland_2007.pdf

Water Quality in Water Supply Zones in 2009

Table 2.1: % Mean Zonal Compliance - Aluminium

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	44	1,372	0	100.00
ZN0101, Ballinrees Coleraine	1	52	1	98.08
ZN0302, Dungonnell Glarryford	1	36	1	97.22
ZN0402, Killylane Ballynure	1	52	2	96.15
ZN0503, Unagh Cookstown	1	24	1	95.83
ZN0603, Carmoney Eglinton	1	36	1	97.22
ZN0605, Creggan Derry	1	36	2	94.44
ZN0704, Lough Bradan Drumquin	1	24	1	95.83
ZN1102, Seagahan Armagh	1	36	1	97.22
ZS0102, Belfast Ballygomartin South	1	36	1	97.22
ZS0109, Dorisland Whiteabbey	1	52	1	98.08
ZS0201, Dorisland Carrick	1	36	1	97.22
ZS0402, Drumaroad Comber	1	52	2	96.15
ZS0403, Drumaroad Peninsula	1	52	1	98.08
ZS0501, Drumaroad Lisburn	1	52	2	96.15
ZS0502, Forked Bridge Dunmurry	1	52	1	98.08
ZS0602, Drumaroad Downpatrick	1	36	1	97.22
Total number of zones	60	2,036	20	
Mean Zonal Compliance				**99.17**

Table 2.2: % Mean Zonal Compliance - Bromate

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	59	456	0	100.00
ZN0602, Brishey Limavady East	1	4	1	75.00
Total number of zones	60	460	1	
Mean Zonal Compliance				**99.58**

Table 2.3: % Mean Zonal Compliance - *E. coli*

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	58	5,640	0	100.00
ZN0503, Unagh Cookstown	1	48	1	97.92
ZS0801, Castor Bay Ardress	1	84	1	98.81
Total number of zones	60	5,772	2	
Mean Zonal Compliance				**99.95**

Table 2.4: % Mean Zonal Compliance - Iron

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	35	1,064	0	100.00
ZN0101, Ballinrees Coleraine	1	52	1	98.08
ZN0202, Altnahinch Bushmills	1	24	6	75.00
ZN0203, Ballinrees Ballymoney	1	36	1	97.22
ZN0401, Dunore Point Antrim	1	52	1	98.08
ZN0402, Killylane Ballynure	1	52	2	96.15
ZN0502, Lough Fea Cookstown	1	24	1	95.83
ZN0605, Creggan Derry	1	36	1	97.22
ZN0701, Derg Strabane	1	36	1	97.22
ZN0704, Lough Bradan Drumquin	1	24	1	95.83
ZN0901, Altmore Cabragh	1	4	2	50.00
ZN1102, Seagahan Armagh	1	36	1	97.22
ZS0102, Belfast Ballygomartin South	1	36	2	94.44
ZS0107, Belfast Oldpark	1	52	1	98.08
ZS0109, Dorisland Whiteabbey	1	52	7	86.54
ZS0403, Drumaroad Peninsula	1	52	1	98.08
ZS0501, Drumaroad Lisburn	1	52	1	98.08
ZS0502, Forked Bridge Dunmurry	1	52	2	96.15
ZS0503, Forked Bridge Stoneyford	1	24	1	95.83
ZS0602, Drumaroad Downpatrick	1	36	1	97.22
ZS0802, Castor Bay Lurgan	1	52	1	98.08
ZS0803, Castor Bay Portadown	1	52	1	98.08
ZS0901, Camlough Newry West	1	24	1	95.83
ZS0902, Fofanny Dromore	1	36	2	94.44
ZS0904, Fofanny Mourne	1	52	1	98.08
ZS1001, Carran Hill Crossmaglen	1	24	3	87.50
Total number of zones	60	2,036	43	
Mean Zonal Compliance				**97.24**

Table 2.5: % Mean Zonal Compliance - Lead

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	56	428	0	100.00
ZS0101, Belfast Ballygomartin North	1	8	1	87.50
ZS0104, Belfast Breda North	1	8	1	87.50
ZS0106, Belfast North	1	8	1	87.50
ZS0107, Belfast Oldpark	1	8	1	87.50
Total number of zones	60	460	4	
Mean Zonal Compliance				**99.17**

Table 2.6: % Mean Zonal Compliance - Manganese

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	53	1,720	0	100.00
ZN0101, Ballinrees Coleraine	1	52	1	98.08
ZN0701, Derg Strabane	1	36	1	97.22
ZN1102, Seagahan Armagh	1	36	1	97.22
ZS0102, Belfast Ballygomartin South	1	36	1	97.22
ZS0109, Dorisland Whiteabbey	1	52	1	98.08
ZS0501, Drumaroad Lisburn	1	52	2	96.15
ZS0502, Forked Bridge Dunmurry	1	52	1	98.08
Total number of zones	60	2,036	8	
Mean Zonal Compliance				**99.70**

Table 2.7: % Mean Zonal Compliance - Nickel

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	59	452	0	100.00
ZN0702, Glenhordial Omagh	1	8	1	87.50
Total number of zones	60	460	1	
Mean Zonal Compliance				**99.79**

Table 2.8: % Mean Zonal Compliance - Odour

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	59	2,012	0	100.00
ZN0705, Lough Macrory Beragh	1	24	1	95.83
Total number of zones	60	2,036	1	
Mean Zonal Compliance				**99.93**

Table 2.9: % Mean Supply Point Compliance - Pesticides - Other Substances

Sampling Location - Supply Points	Number of Supply Points	Number of Samples	Number of Tests > PCV per Supply Point	% Supply Point Compliance
Number of compliant supply points	32	12,462	0	100.00
W2802, Carron Hill (new works)	1	8	2	75.00
W4501, Derg	1	8	1	87.50
Total number of supply points	34	12,478	3	
Mean Supply Point Compliance				**98.90**

Table 2.10: % Mean Zonal Compliance - Taste

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	59	2,012	0	100.00
ZN0705, Lough Macrory Beragh	1	24	1	95.83
Total number of zones	60	2,036	1	
Mean Zonal Compliance				**99.93**

Table 2.11: % Mean Zonal Compliance - Trihalomethanes

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	51	688	0	100.00
ZN0202, Altnahinch Bushmills	1	8	1	87.50
ZN0402, Killylane Ballynure	1	8	3	62.50
ZN0502, Lough Fea Cookstown	1	8	1	87.50
ZN0603, Carmoney Eglinton	1	8	1	87.50
ZN0701, Derg Strabane	1	8	1	87.50
ZN0704, Lough Bradan Drumquin	1	12	2	83.33
ZN0902, Altmore Donaghmore	1	12	4	66.67
ZN1101, Clay Lake Keady	1	8	1	87.50
ZN1102, Seagahan Armagh	1	24	16	33.33
Total number of zones	60	784	30	
Mean Zonal Compliance				**96.39**

Table 2.12: % Mean Zonal Compliance - Turbidity

Sampling Location - Zones	Number of Zones	Number of Samples	Number of Tests > PCV per Zone	% Zonal Compliance
Number of compliant zones	54	1,772	0	100.00
ZN0501, Moyola Magherafelt	1	52	1	98.08
ZN0701, Derg Strabane	1	36	1	97.22
ZN1102, Seagahan Armagh	1	36	1	97.22
ZS0102, Belfast Ballygomartin South	1	36	1	97.22
ZS0501, Drumaroad Lisburn	1	52	1	98.08
ZS0502, Forked Bridge Dunmurry	1	52	1	98.08
Total number of zones	60	2,036	6	
Mean Zonal Compliance				**99.76**

Annex 3
Authorised Departures (ADs)

The information contained in the following tables lists by water supply zone, the water treatment works (WTWs) supplying the zone and a summary of the associated Authorised Departure compliance improvement schemes which the Inspectorate has agreed with NI Water. During 2009, 26 ADs were in place for THMs and two ADs were in place for the pesticide MCPA.

Table 3.1: 2009 Authorised Departures and Associated Improvement Schemes for THMs

Zone Code	Zone Name	WTWs Supplying Water Supply Zone	THMs AD Value µg/l	Population (rounded up to nearest 1,000)	AD End Date	Progress with WTWs Compliance Measures
ZN0303	Dunore Point Ballymena	**Dunore Point PPP**	150	29,000	15 October 2009	The new **Dunore Point WTWs** became operational in November 2008.
ZN0401	Dunore Point Antrim		150	79,000		
ZN0402	Killylane Ballynure		150	52,000		
ZS0101	Belfast Ballygomartin North		150	44,000		
ZS0102	Belfast Ballygomartin South		150	42,000		
ZS0103	Belfast Ballyhanwood		150	63,000		
ZS0104	Belfast Breda North		150	49,000		
ZS0105	Belfast Breda South		150	65,000		
ZS0106	Belfast North		150	40,000		
ZS0107	Belfast Oldpark		150	76,000		
ZS0108	Belfast Purdysburn		150	45,000		
ZS0110	Dunore Point Glengormley		150	37,000		
ZS0501	Drumaroad Lisburn		150	75,000		
ZN0501	Moyola Magherafelt	**Moyola PPP**	150	56,000	16 July 2009	The new **Moyola WTWs** became operational in June 2008.
ZN0503	Unagh Cookstown		150	16,000		
ZN1001	Shanmoy Dungannon	**Castor Bay PPP**	150	41,000	24 September 2009	The new **Castor Bay WTWs** became operational in November 2008.
ZS0801	Castor Bay Ardress		150	33,000		

ZS0802	Castor Bay Lurgan	**Castor Bay PPP** via Forked Bridge PPP	150	71,000	16 December 2009	Link main to provide water from the new **Castor Bay WTWs** became operational in November 2008.
ZS0803	Castor Bay Portadown		150	75,000		
ZS0502	Forked Bridge Dunmurry		150	64,000		
ZS0503	Forked Bridge Stoneyford		150	27,000		
ZN0704	Lough Bradan Drumquin	**Lough Bradan**	150	26,000	6 August 2010	**Lough Bradan WTWs** upgrade. Work is now under way on the scheme and it is anticipated the upgrade will be complete by November 2010.
ZN0706	Lough Macrory Killyclogher		150	22,000		
ZN0901	Altmore Cabragh	**Altmore**	150	5,000	24 December 2009	**Altmore WTWs** to be decommissioned following network upgrade. Work commenced 6 November 2009. Completion expected by January 2011.
ZN0902	Altmore Donaghmore		150	9,000		
ZN1102	Seagahan Armagh	**Seagahan**	150	40,000	24 December 2009	The upgraded **Seagahan WTWs** was brought into supply 5 November 2009 and is undergoing a year's commissioning period.

Table 3.2: 2009 Authorised Departures and Associated Improvement Schemes for Pesticides

Zone Code	Zone Name	WTWs Supplying Water Supply Zone	MCPA AD Value µg/l	Population (rounded up to nearest 1,000)	AD End Date	Progress with WTWs Compliance Measures
ZN0901	Altmore Cabragh	**Altmore**	0.5	5,000	24 December 2009	**Altmore WTWs** to be decommissioned following network upgrade. Completion expected by January 2011.
ZN0902	Altmore Donaghmore		0.5	9,000		

Annex 4
Useful Contacts

Northern Ireland Water Ltd (NI Water)

Web address:	www.niwater.com
Tel:	08457 440088
E-mail:	waterline@niwater.com
Address:	Northern Ireland Water Ltd PO Box 1026 Belfast BT1 9DJ

Northern Ireland Authority for Utility Regulation (NIAUR)

The Northern Ireland Authority for Utility Regulation has a responsibility to protect the interests of water and sewerage consumers with regard to price and quality of services, by promoting effective competition in the supply of water and the provision of sewerage services.

Web address:	www.niaur.gov.uk/water_sewerage/
Tel:	+44 (028) 9031 1575
E-mail:	info@niaur.gov.uk
Address:	Queens House 14 Queen Street Belfast BT1 6ER

Consumer Council for Northern Ireland

The Consumer Council for Northern Ireland is a statutory body whose aims are to promote and safeguard the interests of all consumers in Northern Ireland.

Web address:	www.gccni.org.uk
Tel:	0800 121 6022
E-mail:	info@consumercouncil.org.uk or complaints@consumercouncil.org.uk
Address:	The Consumer Council Elizabeth House 116 Holywood Road Belfast BT4 1NY

Northern Ireland Environment Agency's Water Management Unit (WMU)

The Northern Ireland Environment Agency has a duty to promote the conservation of the water resources of Northern Ireland and the cleanliness of water in waterways and underground strata. WMU protects the aquatic environment.

Web address:	www.ni-environment.gov.uk/water-home/water.htm
Tel:	+44 (028) 9262 3100
E-mail:	EP@doeni.gov.uk

The Public Health Agency for Northern Ireland (PHA)

The responsibilities of the Communicable Disease Surveillance Centre Northern Ireland (CDSC [NI]) have transferred to the new Public Health Agency (PHA). PHA has responsibility for a range of functions in Health and Social Care including the surveillance of communicable disease and research. It also provides advice and support to DHSSPS, Health and Social Services Boards and Trusts, and professionals.

Web address:	www.publichealth.hscni.net
Tel:	+44 (028) 9031 1611
E-mail:	Foi.pha@hscni.net

Food Standards Agency Northern Ireland

The Food Standards Agency is an independent government department set up to protect the public's health and consumer interests in relation to food, including the use of water in food production.

Web address:	www.food.gov.uk/northernireland/
Tel:	+44 (028) 9041 7700
E-mail:	infofsani@foodstandards.gsi.gov.uk

Local District Councils

The Environmental Health Departments of district councils can be contacted if you have a private water supply serving a single domestic dwelling. They are also responsible for the administration of the regulations relating to bottled waters.

Web address:	www.nidirect.gov.uk/local-councils-in-northern-ireland

Drinking Water Inspectorate (DWI) England and Wales

The Drinking Water Inspectorate (DWI) regulates public water supplies in England and Wales.

Web address:	www.dwi.gov.uk
Tel:	+44 (0)207 270 3370
E-mail:	dwi.enquiries@defra.gsi.gov.uk

Drinking Water Quality Regulator for Scotland (DWQR)

The role of the Drinking Water Quality Regulator for Scotland is to ensure that Scottish water is complying with the Drinking Water Quality Regulations.

Web address:	www.dwqr.org.uk
Tel:	+44 (0) 131 244 0224
E-mail:	regulator@dwqr.org.uk

Environmental Protection Agency Ireland (EPA)

EPA has responsibilities for a wide range of licensing, enforcement, monitoring and assessment activities associated with environmental protection.

Web address:	www.epa.ie
Tel:	+353 053 916 0600
E-mail:	info@epa.ie

Water UK

Water UK is the industry association that represents all UK water and waste water service suppliers at national and European level.

Web address:	www.water.org.uk/home
Tel:	+44 (0)207 344 1844
E-mail:	info@water.org.uk

UK Water Industry Research (UKWIR)

UKWIR facilitates collaborative research for UK water operators. The UKWIR programme generates sound science for regulation and practice.

Web address:	www.ukwir.co.uk
Tel:	+44 (0)207 344 1807
E-mail:	mail@ukwir.org.uk

Foundation for Water Research (FWR)

An independent non-profit-making organization, with charitable status, that shares and disseminates knowledge about water, waste water and research into related environmental issues.

Web address:	www.fwr.org
Tel:	+44 (0)162 889 1589
E-mail:	office@fwr.org.uk

Water Regulations Advisory Scheme (WRAS)

WRAS is an advisory scheme which aims to promote knowledge of the water regulations throughout the UK, to prevent waste, undue consumption, misuse or contamination of water.

Web address:	www.wras.co.uk/
Tel:	+44 (0) 1495 248454
E-mail:	info@wras.co.uk

Annex 5
Staffing

In organizational terms, the Inspectorate is one of five functional units within the Environmental Protection Directorate of the Northern Ireland Environment Agency (NIEA), an executive agency within the Department of the Environment.

The agency is headed by a Chief Executive and a board of Directors which spans four directorates: Natural Heritage, Built Heritage, Environmental Protection and Corporate Services.

A list of the Inspectorate staff is given below.

Chief Inspector	Margaret Herron
Senior Inspector	David O'Neill
Senior Inspector	Colin Clements
Senior Inspector	Vacant
Higher Scientific Officer	Una Mailey
Higher Scientific Officer	Bernadette Corr
Scientific Officer	Elaine O'Rourke
Administrative Officer	Claire Shields

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E: DWI@doeni.gov.uk

www.ni-environment.gov.uk

Our aim is to protect, conserve and promote the natural environment and built heritage for the benefit of present and future generations.

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