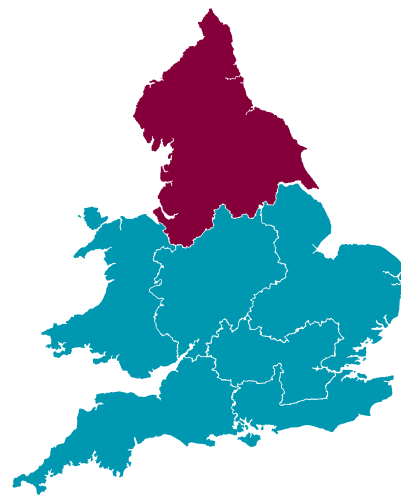


# Drinking water 2010

## Public water supplies in the Northern region of England

**July 2011**

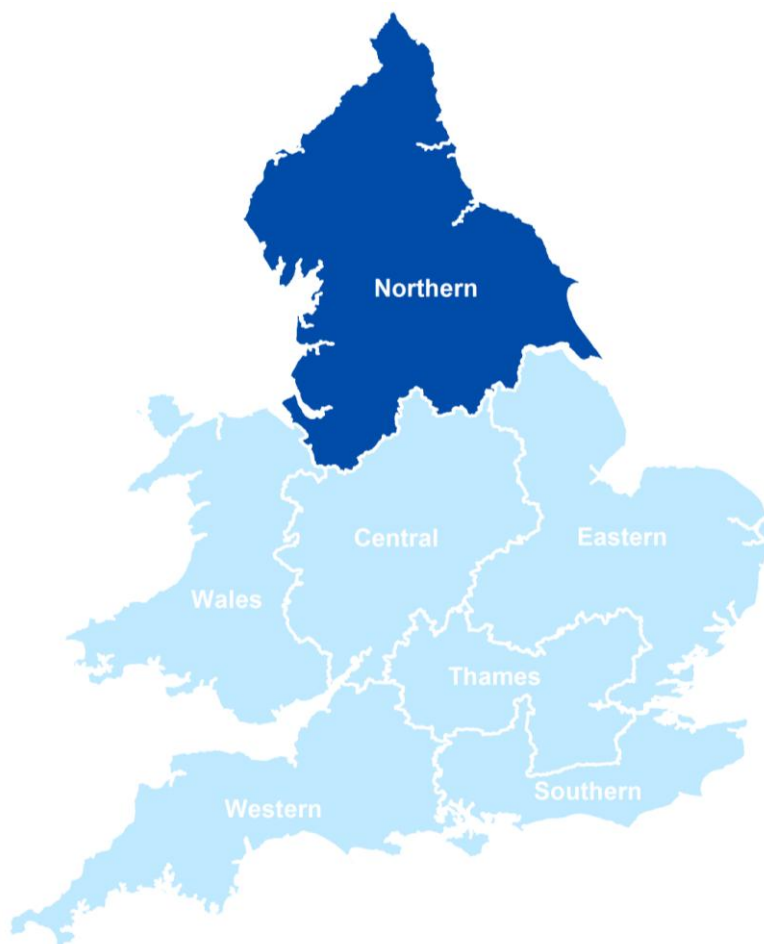
A report by the Chief Inspector of Drinking Water





## Drinking water 2010

### Northern region of England



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# Contents

Introduction	4
Water supply arrangements	8
Drinking water quality testing	10
Drinking water quality results	11
Drinking water quality events	38
Technical audit activity	41
Public confidence in drinking water quality	44
Planned drinking water quality improvements	48
Annex 1: Further sources of information	53
Annex 2: Glossary and description of standards	54
Annex 3: Drinking water quality events in the region	67
Annex 4: Planned drinking water quality improvements	92
Annex 5: Competition in the water industry	96
Annex 6: Water company indices	98

*Drinking Water 2010 is the annual report of the Drinking Water Inspectorate and comprises reports covering public and private water supplies.*

*Public supplies – This part describes drinking water quality in the Northern region. The Inspectorate also publishes a series of companion reports on public supplies for other regions of England (Central, Eastern, Southern, Thames and Western regions) and a separate report for Wales.*

*Private supplies – A summary of information on private water supplies is reported for England and Wales.*

*All parts are available on the Inspectorate's website [www.dwi.gov.uk](http://www.dwi.gov.uk).*



The results of testing in 2010 demonstrated that the overall quality of drinking water in the Northern region was good. The figure for compliance with drinking water standards at consumers' taps was 99.96%, up from the figure of 99.93% reported in 2009 and in line with the industry overall average. This figure is made up of the results of all the tests for 39 parameters with European or national standards. The circumstances of the few failures and the actions taken to safeguard public health are discussed in the body of the report.

When the Northern region is judged by the Inspectorate's four indices of water quality performance, which look in turn at water treatment (comprising process control and disinfection), service reservoir integrity and network maintenance, three indices demonstrated a good improvement in 2010: water treatment (99.98% process control, 99.97% disinfection), and network maintenance (99.80%). These improvements mean that the Northern region is no longer the lowest performing region for these aspects of water quality management. However, the service reservoir integrity figure declined in 2010 to 99.94%. This is now lower than all of the other regions. While this signals a broadly better year for the Northern region, none of the indices exceeded the industry average. Individual water company figures are reported in *Annex 6*.

Across the region there were more operational events (92 compared to 86 in 2009) and more than half were of a type that necessitated a detailed investigation by an inspector. This is similar to the proportion of events requiring a greater input from inspectors in 2009. One event was classified 'serious', necessitating a considerable amount of Inspectorate resource. The event arose early in 2010 during a period of cold weather, when treatment processes at a works supplying the Crewe and Nantwich area failed to adequately remove the elevated level of ammonia in the raw water with a resultant adverse impact on consumers due to the presence of objectionable tasting disinfection by-products. The company also failed to recognise the link between the large volume of consumer contacts about taste and the water treatment problem, leading the Inspectorate to conclude that the company's response was inadequate. The event is described in more detail in the *Drinking water quality events* section. In terms of the nature of the events reported on this year, common themes were discolouration arising from disturbed mains deposits and loss of process control at treatment works and resultant taste and odour issues. Detailed findings regarding all the significant events in 2010 can be found in *Annex 3*. In 2010, risk-based technical audit highlighted analytical malpractice at a laboratory operated by Severn Trent Services affecting eight water companies and six regions (see the *Technical audit activity* section for further details).

The long-term trend in public confidence in drinking water quality continues to improve in the Northern region; however, the region still contributes four out of every ten consumer contacts in England, the highest of any region. The decline in the most common cause of consumer concern (discoloured water and objectionable taste of chlorine) occurred mainly in the area served by United Utilities. Also, in 2010, fewer consumers were sufficiently dissatisfied with the way a company dealt with their complaint to raise the matter directly with the Inspectorate (11 compared with 18 in 2009). Overall, these measures of public confidence demonstrate how public perception about drinking water quality in the region is improving overall.

This year sees the 20-year anniversary of the implementation of the European Drinking Water Directive and this report contains a summary of how the approach to regulating for safe, clean drinking water for all has developed over two decades. An overview of how this translates into action in the region is contained in the *Planned drinking water improvement* section. Additionally, *Annex 4* contains information about the schemes of work delivered by companies in 2010 and those planned for delivery over the next four years.

In reviewing drinking water quality in 2010, the Inspectorate considers that two topics are worthy of highlighting to the industry. The first concerns the number of events and failures of drinking water standards which have been due to cross-connections or misconnections between the domestic water supply and other sources, for example, rainwater, private water supplies and in one instance a sewer. These defects generally occur at points close to the consumer, therefore the risk to public health is high. Companies need to give high priority in their water safety plans to control measures to address these risks, such as accurate records of network assets, the competency of those who work on the network and more appropriate targeting and prioritisation of fittings inspections. Although companies have recently been identifying and taking enforcement action in relation to cross-connections between the public water supply and either domestic rainwater harvesting systems or private water supplies, the Inspectorate has found it necessary to remind a number of companies that fittings inspections need to be carried out when investigating failures of drinking water standards, particularly in relation to the following parameters: taste, odour, lead, copper, nickel, *E.coli* and Enterococci. As a result of changes to the regulations to bring them into line with the EU Drinking Water Directive, it is mandatory to consider carrying out fittings inspections as part of investigations into failures arising in public buildings and also when requested by a local authority in relation to risk assessments of private water supplies. Companies need to make sure that these changes have been reflected in their policies and practices relating to fittings

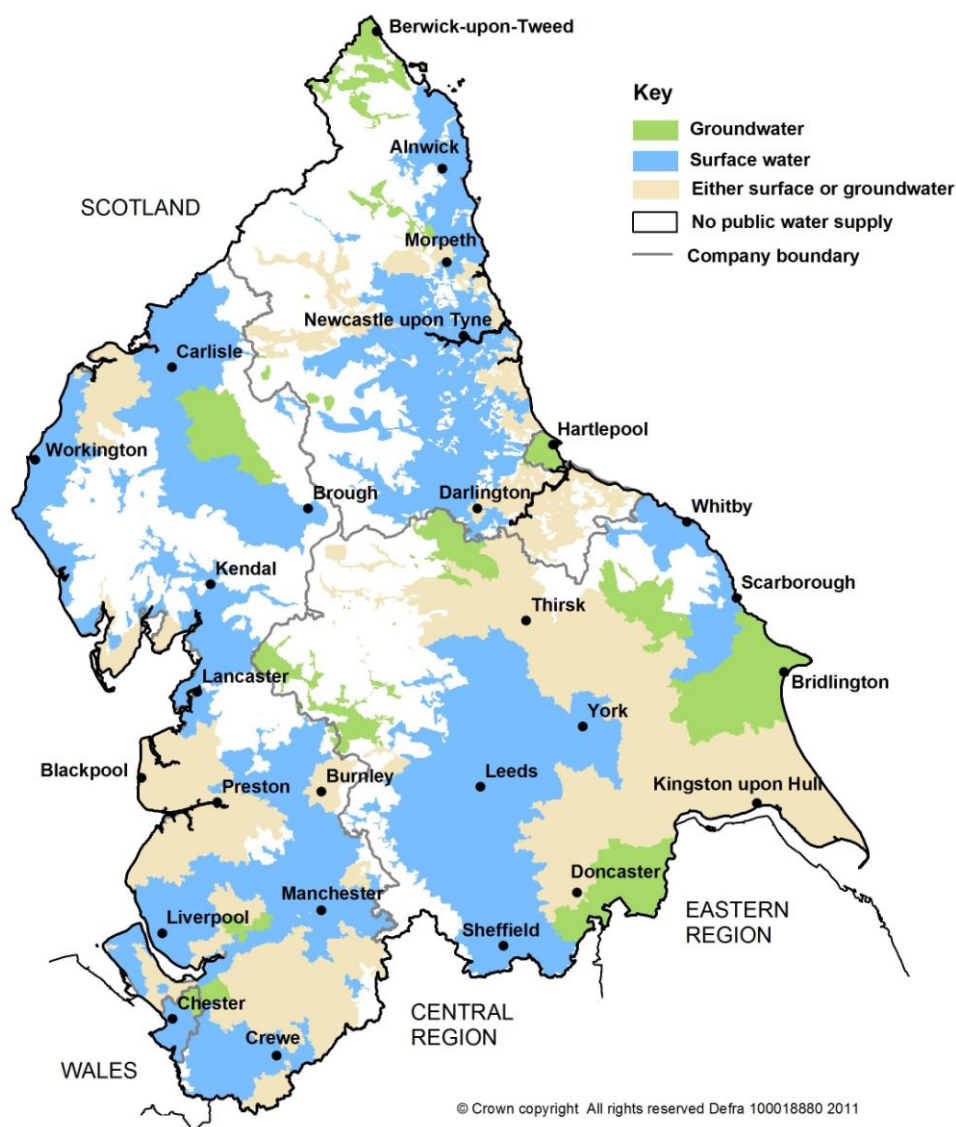
inspections, which should be given a higher profile in relation to water safety plan methodology and should be taken into account during regulatory risk assessments.

The second observation concerns bulk supplies. These are situations where one water company relies on another for a source of either raw or treated water. In relation to a number of events or failures of drinking water standards, it is evident that arrangements in relation to these bulk supplies are less than adequate. In particular, companies who import bulk supplies are reminded that they are under a duty to carry out a full risk assessment and it would be advisable for there to be formal arrangements to ensure that such supplies are both wholesome and fit for human consumption before supply to their own customers. The regulatory risk assessment (and formal agreement) must include arrangements for alternate supplies of water in the event of either a quality or quantity event. There is a need for jointly agreed risk assessments ensuring full awareness of the control measures with clear lines of accountability and communication under both normal and abnormal operating situations.

## Water supply arrangements

Six water companies supply drinking water in the Northern region: Dee Valley Water (DVW), Hartlepool Water (HPL), Northumbrian Water (NNE), United Utilities (UU) and Yorkshire Water (YKS). This includes one inset appointee; Peel Water Networks (PWN) supplies the Media City site in Salford Quays, Greater Manchester.

**Figure 1: Map illustrating sources of drinking water by zone across the region**



Much of the water supplied in the region is surface water (81%), abstracted from rivers such as the Dee, Derwent, Eden, Lune, Ouse, Tees, Tyne and Wyre. The main reservoir sources supplying the region are the Derwent reservoir in the Pennines and other large reservoirs like Kielder in Northumberland, Haweswater and Thirlmere in Cumbria and Vyrnwy in

Wales. Natural lakes are an important regional water resource, with abstractions from Crummock Water, Ennerdale, Windermere and Ullswater.

Groundwater provides a valuable resource in the region (11%). Most boreholes draw water from the sandstone aquifers, between Doncaster and Selby, in the Eden Valley, from Cheshire and West Lancashire aquifers and from the Fylde aquifer. Hartlepool Water relies exclusively on groundwater from the limestone aquifer in southeast Durham and this source also supplies the Sunderland area (Northumbrian Water). There is another important chalk aquifer in the Yorkshire Wolds. The remainder (8% by volume) of water supplies in the region can be drawn from a mixture of surface and groundwater.

Summary facts about the drinking water supply infrastructure of the region are set out in Table 2 along with outline geographical and demographic information.

**Table 2: Key facts about the Northern region supply arrangements**

<b>Key facts</b>			
Population supplied	14,430,060	Abstraction points	332
Water supplied (l/day)	3,826 million	Treatment works	201
Number of local authorities (with a further 11 partially covering the region)	65	Service reservoirs	964
		Water supply zones	401
		Length of mains pipe (km)	91,582
Area of supply		Water composition	
Cheshire, Cleveland, County Durham, Cumbria, Derbyshire (part), Lancashire, Merseyside, Greater Manchester, North Lincolnshire, Northumberland, Tyne and Wear and Yorkshire		Surface sources	81%
		Groundwater sources	11%
		Mixed sources	8%

## Drinking water quality testing

Throughout 2010, water companies sampled drinking water across the region to test for compliance with the standards in the drinking water regulations. More than a third (40%) of the testing was carried out on drinking water drawn from consumers' taps selected at random.

For monitoring purposes, company water supply areas are divided into zones based on population (maximum 100,000). Generally, zones are sampled at consumers' taps with the number of required tests being greatest in zones with larger populations. Other sample locations are water treatment works and treated water (service) reservoirs. Collectively, the six water companies carried out a total of 955,450 tests during 2010. Only 332 of these tests failed to meet the standards set down in the regulations.

**Table 3: Number of tests carried out by companies in the region**

Company	Place of sampling			Number of tests per company	Estimate of population
	Water treatment works	Service reservoirs	Consumers' taps (zones)		
Dee Valley Water	5,867 (2)	624 (2)	3,672 (5)	10,163	101,000
Hartlepool Water	1,550 (3)	1,560 (6)	1,720 (3)	4,830	88,000
Northumbrian Water	43,154 (33)	65,902 (215)	62,782 (75)	171,838	2,493,000
Peel Water Networks	0 (0)	0 (0)	401 (1)	401	60
United Utilities	121,191 (83)	116,476 (378)	179,452 (241)	417,119	6,823,000
Yorkshire Water	103,203 (75)	109,922 (359)	137,974 (76)	351,099	4,925,000
<b>Region overall</b>	<b>274,965 (196)</b>	<b>294,484 (960)</b>	<b>386,001 (401)</b>	<b>955,450</b>	<b>14,430,060</b>

Note: Numbers in brackets reflect the number of works, reservoirs or zones operated by that company in the region in 2010. Some companies are permitted to carry out some tests on samples taken from supply points rather than from consumers' taps.

The regulations require companies to test for specified parameters at prescribed frequencies. Most of the testing is for parameters with European or national standards, however, water companies are also

required by the regulations to test for other parameters, such as ammonium, sulphate and colony counts.

A summary of the results of testing by companies for each parameter can be found on the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)) and on the CD accompanying this report.

## Drinking water quality results

The key water quality results for the Northern region are presented in two tables, one showing the results for microbiological parameters (Table 4), the other dealing with chemical and physical parameters (Table 6).

The microbiological quality of water is discussed first. Companies report all the results of the tests on a monthly basis to the Inspectorate. Also, tables in *Annex 6* describe the performance of each company supplying in the region.

### Microbiological quality

To protect public health, microbiological standards have to be met at each individual treatment works and service reservoir. The results confirm the overall microbiological safety of drinking water supplies in the region. The significance of the individual test results for each microbiological parameter at each location varies and a single positive result cannot be interpreted without other information. All companies are expected to follow best practice as set out in *The Microbiology of Drinking Water* published by the Standing Committee of Analysts (SCA) which can be found by visiting the Environment Agency's website ([www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)).

**Table 4: Microbiological tests**  
**The number of tests performed and the number of tests not meeting the standard**

Parameter	Current standard	Total number of tests	Number of tests not meeting the standard	Additional information
<b>Water leaving water treatment works</b>				
<i>E.coli</i>	0/100ml	37,766	0	
Coliform bacteria	0/100ml	38,027	9	DVW (1), NNE (1), UU (3), YKS (4)
<i>Clostridium perfringens</i>	0/100ml	14,484	11	DVW (2), NNE (2), UU (2), YKS (5)
Turbidity <sup>1</sup>	1NTU	37,743	20	DVW (2), NNE (6), UU (10), YKS (2)
<b>Water leaving service reservoirs</b>				
<i>E.coli</i>	0/100ml	49,129	4	NNE (2), UU (1), YKS (1)
Coliform bacteria	0/100ml in 95% of tests at each reservoir	49,129	50	HPL (1), NNE (14), UU (18), YKS (17)  All 960 reservoirs in the region met the 95% compliance rule
<b>Water sampled at consumers' taps</b>				
<i>E.coli</i>	0/100ml	36,799	11	NNE (1), UU (9), YKS (1)
Enterococci	0/100ml	3,065	3	NNE (1), UU (2)

<sup>1</sup>Turbidity is a critical control parameter for water treatment and disinfection.

### ***E.coli* at works and service reservoirs**

In 2010, out of a total of 37,766 tests at works none contained *E.coli* and out of 49,129 tests at service reservoirs there were just four positive samples (2 NNE, 1 UU, 1 YKS). This is an improvement compared to 2009 when there were four positive samples for *E.coli* at water treatment works and six detections of *E.coli* at service reservoirs. This improvement is reassuring and shows that companies have responded effectively to criticism by the Inspectorate in previous years.

On detecting *E.coli*, companies are required to act promptly to protect public health. Their immediate response when finding *E.coli* at a works or service reservoir is to sample again, and more widely, to confirm that water being received by consumers is safe. In 2010, these additional tests gave satisfactory results in all cases and there were no subsequent *E.coli* failures.

At Shilbottle reservoir (near Alnwick), Northumbrian Water responded to an *E.coli* detection in April by taking the reservoir out of supply and carrying out a full structural assessment. No significant leaks or points of ingress were discovered, but the sample point was replaced because it was not served by a dedicated line. The reservoir was returned to service in May after satisfactory results; however, a subsequent routine sample in July contained coliform bacteria. In August, *E.coli* was detected in a sample from another nearby service reservoir (North Charlton reservoir, near Alnwick). When the compartment was removed from supply for internal inspection, although no obvious ingress was observed, it was found that repairs to screens following previous failures in 2009 were outstanding. This work was completed in September. The *E.coli* failures at both reservoirs were notified as events (Annex 3) and these reservoirs are part of the distribution system served by Warkworth works where there is a history of events and microbiological failures over the past two years. An audit of Warkworth works by the Inspectorate in May was generally satisfactory (see the *Technical audit activity* section). The Inspectorate is considering enforcement action whereby the company will enter into a legally binding programme of work to fully investigate and improve water quality within this distribution system.

Following a detection of *E.coli* at Oldham Edge reservoir (near Oldham) in July, United Utilities isolated the reservoir from supply and carried out an internal inspection and inundation test. This identified the need for repairs to prevent ingress. The company carried out a further inundation test in August to verify that the repairs had been effective before returning the reservoir to supply. This was classified by the Inspectorate as a significant event (see *Annex 3*).

In May, *E.coli* was detected at Starbotton reservoir, near Kettlewell. Yorkshire Water's follow-up samples were satisfactory and chlorine was added manually. In June, the reservoir was drained and inspected internally. Although no routes of ingress were found, the company has continued with enhanced (large volume) sampling as a proactive approach towards preventative maintenance.

**Table 5: Detection of *E.coli* and Enterococci at treatment works, service reservoirs and consumers' taps**

Company	<i>E.coli</i> in water leaving treatment works	<i>E.coli</i> in water leaving service reservoirs	<i>E.coli</i> at consumers' taps	Enterococci at consumers' taps
Dee Valley Water	0 – 782	0 – 104	0 – 288	0 – 36
Hartlepool Water	0 – 168	0 – 312	0 – 240	0 – 20
Northumbrian Water	0 – 5,893	2 – 10,984	1 – 6,434	1 – 541
Peel Water Networks	0 – 0	0 – 0	0 – 49	0 – 4
United Utilities Water	0 – 16,562	1 – 19,407	9 – 17,931	2 – 1,882
Yorkshire Water	0 – 14,361	1 – 18,322	1 – 11,857	0 – 582
<b>Region overall</b>	<b>0 – 37,766</b>	<b>4 – 49,129</b>	<b>11 – 36,799</b>	<b>3 – 3,065</b>

Note: Results are shown as the number of positive tests – the total number of tests.

### Coliform bacteria at works

Testing for coliform bacteria gives reassurance that water entering supply was treated adequately to remove bacterial and viral pathogens. Repeated occurrences of coliform bacteria in samples from the same works in one year are thus of concern and require action to be taken. In 2010, this situation did not occur at any of the 196 works in the region.

In 2010, the occurrence of coliform bacteria at works across the Northern region was well below that reported in the previous two years (nine compared to 27 in 2009 and 17 in 2008) and there was no particular geographic or company pattern: 1 DVW, 1 NNE, 3 UU, 4 YKS.

Coliform bacteria were detected in a sample collected in October from Llwyn Onn works, near Wrexham, operated by Dee Valley Water. There is no history of bacteriological failures at this treatment works, although turbidity breaches have not been uncommon. The investigation by Dee Valley Water included an internal inspection of the treated water storage reservoir using a remotely operated camera in January 2011. This revealed the potential for surface water ingress through the reservoir roof due to the loss of numerous rivets from the roof structure. Due to health and safety reasons repairs to the roof have been delayed until September 2011. A Notice has been issued by the Inspectorate to secure assurance of water quality during the interim period. The reservoir structure had been investigated before the coliform failure and further investigation is currently part of the Asset Management Plan of Dee Valley Water for the

period 2015 – 2020 (AMP6). The Inspectorate expects that companies to have a proactive and robust programme of maintenance and inspection covering all reservoirs and contact tanks. When a quality failure occurs, the expectation is that the company carries out a robust investigation, including an expeditious inspection of the asset, with the findings resulting in an update of the company's risk-based asset management and maintenance plans.

In September, Northumbrian Water detected coliform bacteria at Fowberry works (near Wooler). Although the company found nothing untoward on that occasion, the Inspectorate has noted that coliform bacteria were detected in 2008 and, in response to that event, the company installed ultraviolet (UV) disinfection. It has been further noted that there was a coliform positive sample reported in 2009. The company reported a disinfection problem at the site resulting in the company acting to update the site risk assessment and to review the disinfection arrangements. The Inspectorate will be closely scrutinising the steps that the company takes to proactively safeguard drinking water quality and to improve the robustness of disinfection at this site.

United Utilities detected coliform bacteria in a sample taken in September from Huntington No. 1 works (near Chester). Although further samples gave satisfactory results, the investigation found that a 'butterfly valve' was failing on the contact tank by-pass. The valve was replaced in November. There is a history of failures at this site and the Inspectorate initiated enforcement action resulting in a legally binding programme of work to improve the disinfection operation and monitoring arrangements at the site. United Utilities plan to replace the chlorinators in June 2011 (see *Annex 4*).

In July, coliform bacteria were detected at United Utilities' Mitchells works (near Accrington) and the company investigation found ingress in the north side of the contact tank around the hatches. Work to re-seal all potential routes of ingress was completed by September and there have been no subsequent failures.

Yorkshire Water detected a coliform in a sample from Thornton Steward works (near Leyburn) in November. Despite satisfactory large volume investigational samples, Yorkshire Water has scheduled to inspect the contact tank during 2011. Repairs to the contact tank were carried out during 2008 and 2009 and this was the first recorded coliform failure in five years.

Coliforms were also detected at three other sites managed by Yorkshire Water: Cowick works (near Goole) in June, Austerfield works (near Bawtry) in October and Tophill No. 2 works (near Beverley) in November. Yorkshire Water has put in place enhanced monitoring at all these sites and the

Inspectorate expects this information to be taken into account during a review of the company's risk assessments.

The Inspectorate has noted that coliform bacteria were found in nine samples from treatment works in the Northern region during the year and this information will be taken into account during the Inspectorate's risk-based programme of technical audit.

### ***Clostridium perfringens***

This organism is a spore-forming bacterium that is exceptionally resistant to unfavourable conditions in the water environment, such as extremes of temperature and pH, and disinfection processes such as chlorination and UV light. It is a normal component of the intestinal flora of up to 35% of humans and other warm-blooded animals. These characteristics make it a useful indicator of either intermittent or historical faecal contamination of a groundwater source or surface water filtration plant performance. The detection of any *Clostridium perfringens* in the supply should trigger an investigation by the water company.

In 2010, out of 14,484 samples taken in the region, 11 did not meet the specified value (2 DVW, 2 NNE, 2 UU, 5 YKS) compared to 20 positive detections in samples during 2009.

*Clostridium perfringens* were detected on two occasions from Boughton works, operated by Dee Valley Water in January and May. The company's investigation did not identify any treatment deficiencies. The Inspectorate expects this information to be taken into account during the company's risk assessment for this site, particularly in relation to the operation and maintenance of filtration.

Northumbrian Water found *Clostridium perfringens* on two separate occasions in consumers' tap samples: Whitley Bay zone in June and Sacriston zone in September. A similar situation was reported by United Utilities in relation to consumers' tap samples: Gorsty South zone in March and Crosby zone in June. These resistant spores are probably widespread in historic deposits accumulated in the region's surface water derived distribution systems. Companies should be taking data on the occurrence of *Clostridium perfringens* into account in their Distribution, Operation and Maintenance Strategies (DOMS).

Yorkshire Water detected *Clostridium perfringens* in five samples taken from five treatment works: Graincliffe No. 2 and Elvington works in November; Headingley No. 2, Ainderby and Chellow Heights works in December. The Inspectorate expects this information to be taken into account during the company's risk assessment for these sites, particularly

in relation to the operation and maintenance of filtration from surface water derived sources.

In *Drinking Water 2009*, advice was given to companies regarding the inapplicability of continued monitoring for *Clostridium perfringens* at consumers' taps and, wherever practicable, it was expected that companies should focus their monitoring efforts on supply points (or reservoirs). The Inspectorate is pleased to note that Dee Valley Water and Yorkshire Water have adapted their sampling practices. Northumbrian Water and United Utilities continue to monitor for *Clostridium perfringens* within zones and the Inspectorate reminds these companies that a pattern of repeated detections in a zone should trigger a review of the Regulation 27 risk assessment of the supply system with action plans linking to the company's DOMS, with particular reference to local flushing regimes to clear historic deposits.

### Turbidity at works

Turbidity is a measure of how much light can pass through water and indicates the condition or 'cloudiness' of water. Turbidity is caused by particles suspended in the water and is an important critical control measure of the performance of disinfection. Turbidity is measured at two points in the water supply chain, at treatment works where a value of 1NTU applies and at consumers' taps where the standard of 4NTU applies. The following discussion focuses on the results of samples taken at treatment works.

In 2010, there was an adverse trend in the Northern region in relation to turbidity at works with the number of occasions when turbidity above 1NTU was reported rising to 20, compared to 12 in 2009.

At Llynn Onn works, near Wrexham (DVW), turbidity in excess of 1NTU occurred in June and December. A third failure was reported in January 2011. Dee Valley Water concluded that inadequate flushing of the sample line was responsible for these failures. The Inspectorate notes that multiple turbidity failures occurred at this works in 2008 when the company also attributed the problem to accumulation of lime deposits in the sample facilities. The Inspectorate reminds companies that it is a duty under the regulations to ensure that samples are representative of water in supply at all times.

During the year, Northumbrian Water reported a value of more than 1NTU in six samples collected from four works. At two sites there were multiple failures of the turbidity standard. In February and March, at Fulwell works (near Sunderland), the company investigation found that these failures were not representative of the final water entering supply. The monitors

were relocated in March 2010 and all subsequent results have been satisfactory. At Horsley works in July, Northumbrian Water notified the Inspectorate of a turbidity event (see *Annex 3*). The multiple failures were caused by a change in the pumping regime for bringing the works back into supply after the repair of a burst raw water main.

United Utilities reported high turbidity in samples from Prescott New works (near St. Helens) in July and again in September. The turbidity problems were linked to works start up and the company attributed the failures to mobilised sediment due to flow changes. The sample point was improved in August, but samplers were not adequately briefed about the changes until after the failure was recorded in September. All subsequent results have been satisfactory. Mobilisation of deposits during pump start up was also considered to be the cause at the following sites managed by United Utilities: Martholme Accrington works, Martholme Burnley works, Tosside works, Sutton Hall No 1 works, Stockswell works and Townsend Fold works.

At Forest Farm works (near Newton-le-Willows), United Utilities detected high turbidity in two samples in June and December. Although a change in raw water quality was not obvious at the time, both samples showed evidence by staining (visible under the microscope) of the presence of manganese and iron, and the severe cold weather event in December was associated with higher than usual demand, resulting in increased works output.

At Malton Norton works (near Norton-on-Derwent), the high turbidity result in January appeared to be linked to a drop in demand the previous day which may have caused flow changes. Yorkshire Water has since replaced the sample line as a precaution against localised sediment mobilisation.

The failure in December 2010 at Irton works (near Scarborough) occurred in the cold weather event. The sample tap had been left running slowly to prevent freezing and it is thought by Yorkshire Water that sediment was disturbed when the tap flow was increased to collect the sample.

### **Coliform bacteria at service reservoirs**

Testing for coliform bacteria gives reassurance that the quality of water held at these strategic points in the distribution system is adequately maintained. The national standard requires that at least 95% of no less than 50 samples collected from each service reservoir throughout one year are free from all coliform bacteria. In 2010, all 960 service reservoirs (including water towers) in the region met the standard.

Shilbottle reservoir, operated by Northumbrian Water, was affected by coliform failures in both April and July, with *E.coli* also detected in April (see *E.coli at works and reservoirs* section).

In July and August, coliform bacteria were detected by Northumbrian Water at West Swansfield reservoir (near Alnwick). The reservoir had been internally inspected in March when integrity issues were ruled out. A coliform failure at Beacon Hill reservoir in November was followed up by an internal inspection in February 2011 which revealed ingress points around the air vents. Repairs are to be done before this reservoir is returned to service. Both these sites comprise part of the Warkworth distribution system which is under investigation following *E.coli* failures (see the *E.coli at works and service reservoirs* section).

In response to a coliform positive sample at Gilsland reservoir (near Brampton) in August, Northumbrian Water took the reservoir out of supply for an internal inspection. The inundation test revealed ingress in the area around the hatch covers. Repair work was carried out immediately and the reservoir was returned to supply during August, since when there have been no further coliform failures.

United Utilities detected coliforms in samples from Firclose reservoir (near Kidsgrove) in both June and July. When the reservoir was inspected subsequently, evidence of ingress was found around the entrance hatches, which were re-grouted in October. At Garthhead reservoir (near Brampton), coliform bacteria were reported by United Utilities in August. The reservoir had just been cleaned and inspected, revealing potential routes for ingress through the main access cover seal. Also, a leak on the incoming cast iron main was suspected. Repairs were completed by October. Both reservoirs have given satisfactory results since being returned to service.

Following repeated coliform failures at Knutsford Tank in September and November, the inspection ruled out integrity defects and United Utilities reinstated booster chlorination of the upstream supply from the Manchester Ring Main at Dunham Park reservoir. Mesh guards were installed on the vents of both galvanised steel tanks in January 2011..

A coliform failure in July at Boarshead reservoir (near Wigan) prompted United Utilities to schedule an internal inspection. This was carried out in January 2011 where significant ingress was found at numerous points across the roof which was repaired immediately. This case highlights the need for companies not to be complacent about the finding of coliforms in the absence of *E.coli* in a single sample. Inspections should be proactive and timely.

At Drybeck reservoir (near Appleby-in-Westmorland), United Utilities detected coliform bacteria in September. During an earlier inspection in

June, ingress of groundwater had been observed at a wall joint and through disused air vents in the roof. These vents were sealed in October and the company is evaluating the feasibility of completing outstanding remedial works during 2011. The Inspectorate expects this information to be taken into account during a review and update of the company's risk assessment.

In July, following a coliform failure at Oaks Park reservoir, near Sheffield, Yorkshire Water found possible ingress near the inlet pipework and, when excavating the area, damage to a previous repair was observed where telemetry cables had been run into the valve house. Temporary dosing of sodium hypochlorite was put in place until both cells could be taken out of supply for repairs. The work was completed in September. Enhanced large volume sampling was employed as an extra precaution and all subsequent results have been satisfactory.

Yorkshire Water reported coliform bacteria in a sample collected from Stannington reservoir (near Sheffield) in January. This sample was taken from a downstream consumer's tap because the sampling pump at the site was faulty. The pump was repaired and all further samples have given satisfactory results.

At Overton reservoir (near Horbury), large volume sampling taken following a coliform failure in August confirmed the presence of large numbers of coliform bacteria. Yorkshire Water took the reservoir out of supply whereupon significant ingress was found. The reservoir was returned to supply in April 2011 following completion of the repair work.

A detection of coliform bacteria at Adwick-le-Street reservoir (near Doncaster) in August led to an inspection and the finding of several small holes in the metal roof covering the reservoir. These were immediately filled. This asset is due to be abandoned in 2011 and as a precaution in the interim Yorkshire Water increased inspections at the site.

At Harlow Hill No2 reservoir (near Harrogate), in response to a detection of coliform bacteria in September, Yorkshire Water identified possible ingress at a failing roof and wall joint. The reservoir was repaired in November and has been scheduled to be drained, cleaned and inspected in 2011. The Inspectorate expects this information to be taken into account during a review and update of the company's risk assessment.

In October, following a report of coliform bacteria in a sample taken from Bullamoor No3 reservoir (near Northallerton), large volume samples contained *E.coli*. The subsequent internal inspection revealed several points of ingress on the floor and from many wall joints. Yorkshire Water removed the reservoir from supply pending option for evaluating options for repair or abandonment. The Inspectorate expects this information to be

taken into account during a review and update of the company's risk assessment.

There has been a disappointing upward trend of coliform failures at service reservoirs across the Northern region over the past three years; 33 in 2008, 38 in 2009 and 50 in 2010. In line with the water safety plan approach, the Inspectorate expects all companies to continually review trends over time and to consider spatial and temporal associations in light of knowledge of the infrastructure condition and hydraulics.

The Inspectorate has noted the upward trend in relation to coliform bacteria at service reservoirs in the Northern region and this information will be taken into account during the Inspectorate's risk-based programme of technical audit.

### ***E.coli* and Enterococci at consumers' taps**

In 2010, a total of 36,799 consumers' taps were tested for *E.coli* and 11 were positive (1 NNE, 9 UU, 1 YKS). Out of 3,065 tests for Enterococci at consumers' taps just three were positive, each in a different zone (1 NNE, 2 UU). There was no indication, from information gathered by the three water companies, of a faecal contamination event affecting other properties in these zones.

In April, a consumer's tap sample collected by Northumbrian Water in the Whitley Bay zone contained *E.coli*. The company concluded that the hygienic condition of the tap was the most probable cause and notified the homeowner, the local authority and the Consumer Council for Water.

Wider testing by Northumbrian Water gave satisfactory results when investigating the finding of Enterococci in a consumer's tap in Washington zone in July. After flushing the supply main, all samples were satisfactory.

United Utilities detected *E.coli* in a sample taken from a consumer's tap in Blackpool Central zone in January. The consumer did not permit access to the property to investigate, but sampling neighbouring properties demonstrated that there was not a wider problem with water quality. The company wrote an advisory letter to the consumer and informed the local health authority. The company took similar action in relation to another property in Wigan South zone after *E.coli* was detected in a sample from a consumer's tap in February.

United Utilities detected Enterococci in a sample taken from Nangreaves zone in December. Precautionary boil water advice was given and the Inspectorate was notified of the potential event. Subsequent sampling at

the same and neighbouring properties indicated that tap hygiene was the cause.

Two samples taken from free (concessionary) supplies provided by United Utilities in September and October contained *E.coli*. In addition, Enterococci were also reported in a concessionary supply sample collected in March. These supplies in the Lancaster and Derbyshire regions are subject to Regulation 28(4) Notices and are due to be connected to a mains supply by March 2013 (see *Annex 4*). The company has advised the consumers to boil their water before drinking or cleaning their teeth, provided ceramic candle filters and worked with the property owners to protect the incoming supply from the influence of livestock.

Yorkshire Water detected *E.coli* in a consumer's tap sample from Wakefield City North zone in May. Further sampling indicated the problem was associated with the unhygienic condition of the tap and letters were sent to the consumer and the local authority.

## Chemical quality

The drinking water regulations set out the minimum testing requirements for all chemical and physical parameters. A full summary of the results of testing by each company, including the results for indicator parameters, is provided on the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)) and on the CD accompanying this report.

The following text and Table 6 set out the results for those parameters where there has been a failure to meet a European or national standard (mandatory quality standards) and any other parameter of interest. In addition, at the request of local authorities, the results of testing for fluoride, iron, lead, manganese, nitrate, nitrite and pesticides are given.

**Table 6: Chemical and physical parameters**  
**The number of tests performed and the number of tests not meeting the standard**

Parameter	Current standard or specified concentration <sup>1</sup>	Total number of tests	Number of tests not meeting the standard	Additional information
Aesthetic parameters				
– colour	20mg/l Pt/Co scale	13,313	1	UU (1)
– odour	No abnormal change	10,311	7	NNE (2), UU (2), YKS (3)
– taste		10,298	12	NNE (3), UU (7), YKS (2)
Aluminium	200µg/l	13,199	7	NNE (1), UU (3), YKS (3)
Bromate	10µg/l	3,041	1	UU (1)
Fluoride	1.5mg/l	3,047	0	
Iron	200µg/l	13,203	62	NNE (18), UU (23), YKS (21)
Lead (current standard)	25µg/l	3,072	7	NNE (1), UU (5), YKS (1)
Lead (future standard)	10µg/l	3,072	31	DVW (1), NNE (8), UU (14), YKS (8)
Manganese	50µg/l	13,186	16	NNE (9), UU (5), YKS (2)
Nickel	20µg/l	3,066	5	NNE (1), UU (3), YKS (1)
Nitrate	50mg/l	5,928	0	
Nitrite	0.5mg/l	5,928	0	
Pesticides – total	0.5µg/l	3,238	0	
Pesticide – individual <sup>2</sup>	0.1µg/l	52,550	3	Chlortoluron UU (1), Metaldehyde NNE (1), YKS (1)
pH (Hydrogen ion)	6.5 – 9.5	13,329	1	YKS (1)
Sulphate	250mg SO <sub>4</sub> /l	1,910	2	NNE (2)
Turbidity (at consumers' taps)	4NTU	13,315	4	NNE (1), UU (3)
Notes:				
<sup>1</sup> For comparison, 1mg/l is one part in a million, 1µg/l is one part in a thousand million.				
<sup>2</sup> A further 5,803 tests were done for aldrin, dieldrin, heptachlor, heptachlor epoxide, all of which met the relevant standard.				

## Aesthetic parameters

Consumers expect their drinking water to be clear and bright in appearance and free from discernible taste or odour. In recognition of this the regulations stipulate national standards for colour, odour and taste. Companies are required to investigate the cause of any adverse result.

During the year just one out of 13,313 tests failed the standard for colour (1 UU) at a property with a free (concessionary) supply in June. This supply is due to be changed to a mains supply by March 2012 (see *Annex 4*).

In 2010, a total of 19 samples from consumers' taps in the region exhibited a positive taste or odour. These taste and odour results are summarised below in relation to their nature and cause as determined by the investigations carried out by the companies. From this information it can be seen that many were confined to a single property and did not reflect a wider problem in the water supply zone.

- Pencil: 3 (2 NNE, 1 YKS): this descriptor is specific to a substance associated with unapproved black plastic pipe; the remedy is to advise the householder to replace the pipe with approved medium density polyethylene pipe. When Northumbrian Water investigated a pencil taste and odour at a consumer's tap in Spennymore zone in November, a fittings inspection found a washing machine connected to the drinking water pipe with no 'check valve'. The consumer was advised to fit a 'check valve' and all subsequent samples were satisfactory. Yorkshire Water reported a 'woody' taste from a sample at a consumer's tap in Shipley/Bingley zone in June; however, no cause was found because the company did not carry out a fittings inspection. The Inspectorate expects companies to investigate taste or odour results using fittings inspections to rule out problems such as cross connections or incorrect plumbing arrangements which may manifest only intermittently (see *Drinking Water 2009*).
- Oil/Solvent: 1 (1 UU) these descriptors relate to situations where there has been a spillage of central heating oil, petrol or diesel on the property and this has permeated through the plastic water supply pipe; the remedy is to advise the householder on the need to replace the affected pipe and to safeguard against future spills. Another cause of this type of taste and odour problem can be cross connections between cold water and central heating systems. A sample taken from Quarryhill zone in September exhibited a solvent odour. United Utilities looked for obvious signs of a fuel spillage in the vicinity, but none was observed and follow-up samples were free from hydrocarbons.

- Earthy/Musty: 6 (4 UU, 2 YKS) these descriptors relate to situations where harmless, but objectionable, substances are produced by the growth of algae in raw water storage reservoirs (or the growth of fungi in poorly designed plumbing systems); the remedies are either improved treatment/reservoir management by the company or advice to the householder on necessary changes to the design and maintenance of the plumbing system. United Utilities reported earthy/swampy tastes and odours in samples from Uppermill zone in January, the Counthill zone in October and Godley Hills zone in November. No cause was found for these results, however, United Utilities have updated their 'Response to reported taste and odour in treated water samples' procedure and in future earthy taste results will prompt a mains flush and a water fittings inspection. In October, Yorkshire Water recorded a yeasty odour in a consumer's tap sample from Bradford Central zone. The company was unable to regain access to the property, but after identifying that the property was served by a dead leg of main, a wash out point was installed to enable regular flushing.
- TCP/Chemical/Medicinal: 5 (2 NNE, 2 YKS) this descriptor relates to situations where the low level of residual chlorine in the mains water supply is reacting with an unapproved material; the remedy is to advise the householder about typical causes, e.g. certain types of kettle, appliance hoses, tap washers etc. Investigations by Northumbrian Water following the detection of a TCP taste in consumers' taps in Tyneside Central and North zone in June and Byrness zone in September 2010 were followed up by inspections. Yorkshire Water reported a 'slight disinfectant' taste and odour from a property in Doncaster Rural zone in February. Follow-up samples taken a week later were free from taste or odour. The company did not carry out a fittings inspection.
- Sulphurous: 1 (1 NNE) this descriptor indicates there was a problem with carrying out the analysis.
- Unknown: 3 (3 UU) samples from consumers' taps in two related zones (Ashton East zone in September; Ashton West zone in October) were reported by United Utilities as having a positive taste or odour, but no descriptors were reported. The Inspectorate expects companies to establish and record descriptions as these are important indicators of probable cause and guide the investigation. The company has recognised the need to train taste and odour panellists in the correct procedure.

A new taste and odour method was published in 2010 and if this is followed by companies it should resolve some of the common

methodological issues which have resulted in companies erroneously reporting chlorinous and sulphurous tastes.

An objectionable chlorine-related taste/odour was detected in water supplied to 143,803 consumers in the Crewe and Nantwich zones during January (see *Annex 3* and the *Drinking water quality events* section).

Treatment to address taste and odour is due to be installed at two works: Lancaster and Watergrove operated by United Utilities by December 2012. The company also has a further taste and odour improvement programme at Piethorne works due for completion in July 2014. When this work is completed, which involves installing granular activated carbon in existing sand filters, more than 300,000 consumers will benefit from improved water quality.

## Aluminium

Aluminium can occur naturally in some drinking water sources. Also, aluminium-based water treatment chemicals may be used at surface water works to aid the process of filtration.

In 2010, a total of 13,199 samples were tested for aluminium in the Northern region. Hartlepool Water, Peel Water Networks and Dee Valley Water achieved 100% compliance with the aluminium standard (200µg/l). Just seven tests exceeded the standard (1 NNE, 3 UU, 3 YKS). None occurred as a result of an operational problem at a works and the underpinning cause was disturbance of accumulated deposits in the distribution network. This represents an improvement compared to the 17 aluminium failures in 2009.

Aluminium above the standard reported by Northumbrian Water at a consumer's tap in the Nunthorpe zone was associated with failures of the standards for iron and manganese (see the *Maintaining water quality in distribution* section). This failure was linked in time to a mains burst resulting in consumer calls about discoloured water. The company repaired the main and flushed to remove the disturbed deposits.

United Utilities reported three failures of the aluminium standard, two in January from consumer's taps in the Millom zone and one in the Gorsehill zone in August which was associated with a failure of the standard for iron (see the *Maintaining water quality in distribution* section). The situation in Milom zone was linked to high demand and flow changes during the extremely cold weather conditions. The company flushed the main.

During the year burst mains were the cause of three failures of the aluminium standard in consumers' tap samples in Yorkshire Water's

area: Hornsea zone in May and August; and Holderness zone in May. Flushing was undertaken by the company.

## Bromate

Bromate can be formed in drinking water if the surface water source contains bromide and ozone is used in the treatment process. The process of chlorination may also produce bromate, for example, through the use of a sodium hypochlorite solution containing bromide or when chlorine is generated on site by electrolysis. In recent years, companies have put in place control measures aimed at meeting the standard of 10µg/l.

In the Northern region, out of a total of 3,041 tests, the standard was exceeded on just one occasion (1 UU).

In January, United Utilities recorded a high value of bromate of 58.4µg/l from a consumer's tap sample in Warrington East zone. Subsequent sampling at the original property and widely found no further evidence of elevated bromate levels. Checks did not reveal a problem with the analysis so the failure remains unexplained. This information will be taken into account during the Inspectorate's risk-based programme of technical audit.

## Fluoride

Traces of fluoride occur naturally in many water sources, particularly in groundwaters. For example, fluoride is found in the Hartlepool and Easington area where water is drawn from the limestone aquifer. Consumers can obtain specific information on the level of fluoride in the drinking water supply to their home or workplace from their water company.

Fluoride is not removed by conventional water treatment. Some companies fluoridate water supplies where required by the local health authority as a protection against tooth decay. Fluoride is added on this basis to water supplied by Northumbrian Water in Derwentside, Gateshead, Newcastle, North Tyneside and parts of the Northumberland coastal area, and by United Utilities to parts of West Cumbria and the Crewe and Nantwich area. The North West Strategic Health Authority has consulted United Utilities on the technical feasibility of a regional fluoridation scheme. The next step would be a public consultation, however, plans for this are on hold due to legislation in Parliament proposing organisational change in the health service, which will alter responsibilities for fluoridation schemes.

In 2010, all 3,047 tests for fluoride taken across the region met the regulatory standard (1.5mg/l). Please refer to the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)) for more information on fluoridation.

## Lead

The pipe connecting a property to the water company main, together with internal plumbing, is the most common source of lead in drinking water. Properties built or renovated since 1970 are unlikely to have lead pipes and lead solder was banned for use with copper drinking water installations in the early 1970's. The only other recognised source of lead in drinking water in some buildings is fittings made from brass. The extent of lead pick up depends on various factors; temperature, acidity (pH), water hardness, the length of pipe and the time that water is left to stand in the pipe (stagnation) before it is drawn off.

The monitoring data collected by companies during 2010 has been added by the Inspectorate to that gathered in previous years to provide an updated picture of progress towards meeting the future standard for lead of 10µg/l by the end of 2013 (see Figure 7).

**Figure 7: Percentage of tests meeting the current and future standard for lead between 2001 and 2010**

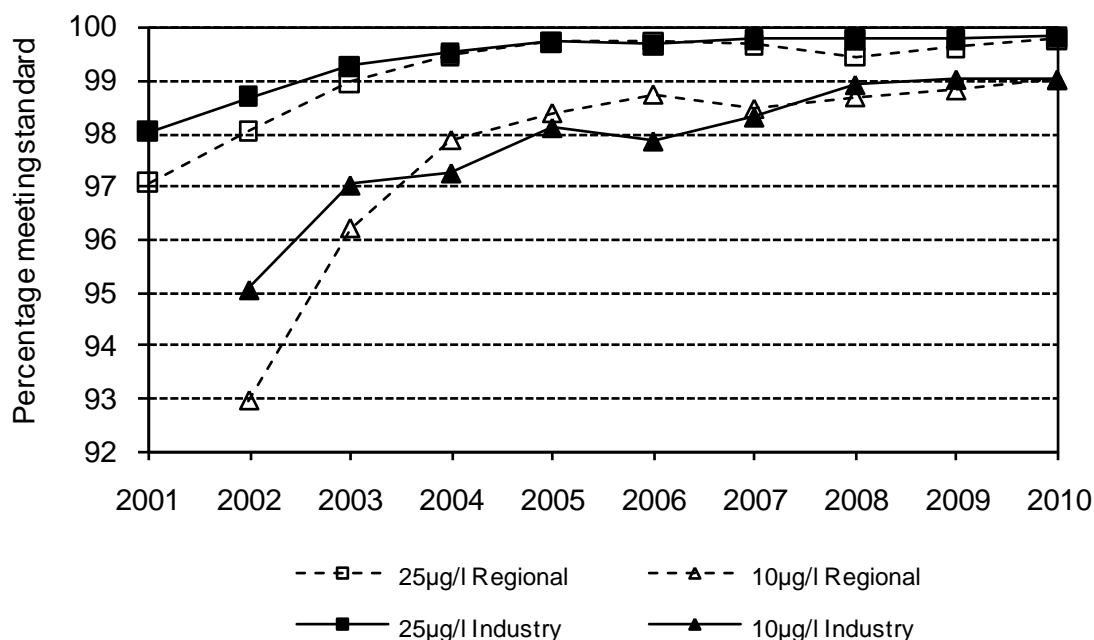
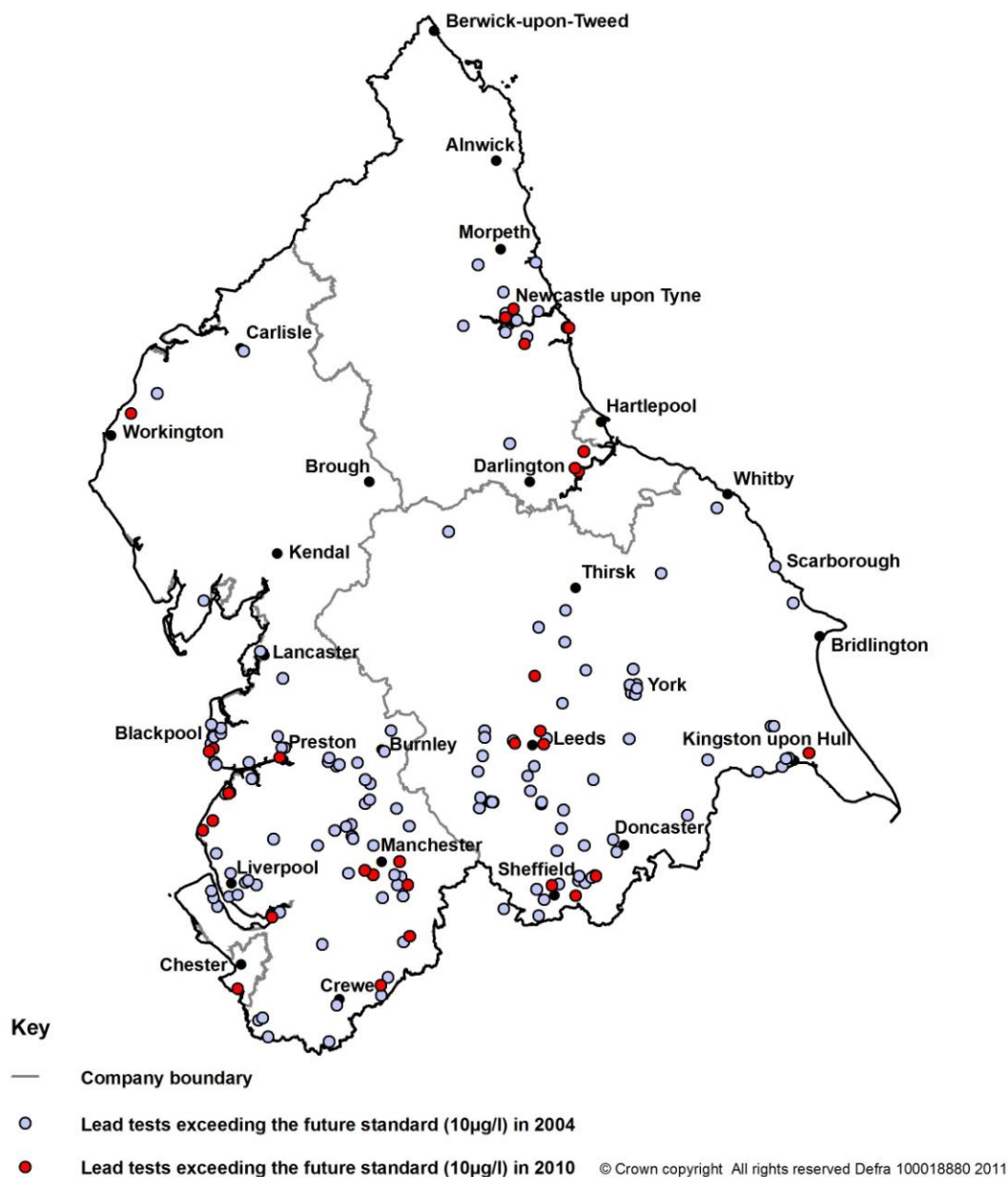


Figure 7 summarises a decade of randomised consumer tap sampling for lead by the industry. The data confirm the beneficial effect of water treatment which has been introduced over the same period. In particular, in the Northern region, the percentage of annual tap samples failing the

future lead standard of  $10\mu\text{g/l}$  has fallen from around 7% in 2002 to about 1% in 2010.

**Figure 8: Comparison of the spatial distribution of failures of the future standard for lead in 2004 and 2010**



Water companies notify both the consumer and the relevant local authority whenever a failure of the future lead standard occurs. In 2010, the Inspectorate was notified of a total of seven failures of the current standard of  $25\mu\text{g/l}$  (1 NNE, 5 UU, 1 YKS) and 31 failures of the future standard (1 DVW, 8 NNE, 14 UU, 8 YKS) in the region. Figure 8 shows

where in the Northern region failures of the future standard occurred in 2010 compared to 2004.

Companies in the region have put in place action plans under Regulation 28 to address the risk of not meeting the future lead standard by the end of 2013. Following the successful introduction of water treatment, the work of companies is increasingly focusing on raising awareness among vulnerable groups of people in communities where the risk from lead is highest. An example of good practice in the Northern region is United Utilities partnership with key health professionals' and Liverpool John Moores University to prepare information targeted towards pregnant women and mothers with young infants. The results of their initial study identified that information given during pre-natal sessions by health professionals encourages changes in behaviour which minimises lead risk. The Inspectorate expects companies in the region to further develop these action plans with bespoke services, such as Anglian Water's initiative which targets at risk groups identified by health protection teams and Primary Care Trusts, and offers a free lead test with free replacement of communication pipes if the sample exceeds the 2013 standard of 10µg/l. Anglian Water's dedicated Lead Strategy Team are also identifying opportunities to work in tandem with local authorities and housing associations – combining their schemes to refurbish council or housing association owned properties with the company's lead communication pipe replacement work; therefore resulting in the elimination of lead pipework to these properties.

During 2010, companies in the Northern region have responded to 673 consumer requests to check the level of lead in drinking water in a particular property.

## Nickel

Nickel may be present in coatings on modern tap fittings. In 2010, a total of 3,066 tests were carried out for nickel and all but five (1 NNE, 3 UU, 1 YKS) met the standard (20µg/l).

A level of 66µg/l nickel was reported in a sample from a consumer's tap in the Burnhope Pipeline zone. Northumbrian Water found that the tap was a chrome fitting used infrequently. The fittings inspection did not find any other problems with the domestic plumbing.

United Utilities reported a sample from a consumer's tap in Carlisle South zone with a value of 31.9µg/l nickel. The tap was a chrome plated mixer tap in poor condition. At two further consumers' properties, in Chorley zone and Broughton zone, nickel failures of 39µg/l nickel and 47.9µg/l

respectively were recorded. The company was unable to gain access to the properties to investigate, but consumers were given advice in a letter.

A level of 42µg/l nickel was reported from a consumer's tap in Batley/Morley zone by Yorkshire Water. A chrome tap was identified as the probable cause, although timed stagnation samples failed to reproduce the original high value of nickel.

## Nitrate and nitrite

Nitrate occurs naturally in all source waters due to the decay of vegetable material in soil. Nitrogenous fertilisers used on arable farmland are a significant source of nitrate in groundwater. Rainfall washes nitrate from the soil into lakes, rivers and streams. Nitrate levels can be reduced by water treatment or by blending with another, low nitrate, water source. In 2010, all 5,928 tests for nitrate across the Northern region met the standard (50mg/l).

During 2010, Yorkshire Water completed a nitrate improvement programme at Keldgate works. The commissioning of ion exchange treatment at this site in February has resulted in improved water quality for around 490,000 consumers in the Hull, Beverley, Hornsea, Holderness and Market Weighton area.

From extensive information gathered by the water companies, a likelihood of drinking water supplies in the region failing the nitrate standard in the longer term has been confirmed at a few sites. As a consequence, a legally binding agreement is in place for additional treatment, if required, at Yorkshire Water's Tophill works. These improvements are currently due to be commissioned during 2015, and will also improve water quality for around 260,000 people in the Hull, Beverley, Hornsea and Holderness area.

Nitrite may be formed when chloramine is used as the residual disinfectant to maintain the microbiological quality in the distribution network. The formation of nitrite is controlled by careful optimisation of the chloramination process. A few supplies in the region are chloraminated, for example, in York, the upper Tees Valley and around Chester. Nitrite can also form in samples of water, after collection and before analysis, especially if the sample is not kept cool. In 2010, all 5,928 tests carried out across the region for nitrite met the standard (0.5mg/l).

## Pesticides and related products

This group of substances, generically called pesticides, includes many organic chemicals ranging from weed killers, to insecticides and

fungicides. Water sources may contain traces of pesticide residues as a result of agricultural use (pest control on crops) and non-agricultural uses (herbicides for weed control on highways etc.). Water companies are required to assess the risk to drinking water supplies of pesticide use in their catchments and test for those which might be present. Companies have documented potential and actual pesticide hazards through their Regulation 27 risk assessments, which are informed by raw water monitoring and identify the control measures in place. When pesticides are first detected, water companies will enhance their monitoring of raw water and notify the Environment Agency to facilitate appropriate action to safeguard drinking water quality.

In 2010, none of the tests in the region exceeded the standard for total pesticides. Likewise, there was 100% compliance (5,803 tests) for the four pesticides with a standard of 0.03µg/l. Out of a total of 52,550 tests for individual pesticides, just three (1 NNE, 1 UU, 1 YKS) exceeded the standard of 0.1µg/l. This compares favourably with the previous year when the standard was exceeded on 24 occasions. The circumstances and substances involved this year are summarised below.

### **Chlortoluron**

Chlortoluron is a herbicide for use in winter cereal crops. The standard is 0.1µg/l.

In November, chlortoluron was detected at a level of 0.15µg/l in a sample from Cumwhinton works near Carlisle. United Utilities examined the water supply from source to tap and found no ongoing presence of this substance. No evidence was found to suggest an error in the analysis of the original sample. This is the first time that this herbicide has been detected at this works and the company have taken this information into account in their risk assessment and continue to monitor for chlortoluron in the raw water.

### **Metaldehyde**

Metaldehyde is the active ingredient in slug some pellets. The standard is 0.1µg/l.

In November, metaldehyde was detected at a level of 0.17µg/l in a sample from Warkworth works, near Alnwick. Northumbrian Water has identified increased usage of metaldehyde containing products in the catchment. The company has updated its risk assessment for the site and there is a legally binding programme of work in place to carry out catchment control measures (see *Annex 4*).

Metaldehyde at a level of 0.13µg/l occurred in Yorkshire Water's York East zone in October. The company has identified six of its surface treatment

works which are at risk from metaldehyde and increased monitoring of both raw and treated waters has been put in place at these sites.

Several catchments in the Northern region are the subject of multi-agency activities to improve the management of metaldehyde usage (see the *Planned drinking water quality improvements* section). Through the legally binding agreements, which last until 2015, companies are working with a variety of stakeholders. Catchment management officers have been recruited who regularly meet with farmers, manufacturers, agronomists, Natural England and the Environment Agency. Since 2009, there has been a general decline in the levels of metaldehyde identified through raw water monitoring and a growing knowledge of the prevalence and seasonality of use of this substance enabling focused action to be taken.

### pH (Hydrogen ion)

pH is a measure of the acidity of the water. Where water is supplied from upland areas the water naturally picks up iron and humic acids from the peaty soils, resulting in slightly acidic water with a low pH, which is commonly described as 'soft water'. Such water has an increased potential to corrode iron pipes and leach material from cement lined mains. Acidity can also be affected when water is artificially softened by a treatment device in a consumer's property. The standard is a range of 6.5 – 9.5.

In the Northern region, out of a total of 13,329 tests, the standard was exceeded on one occasion (1 YKS) in 2010.

Yorkshire Water reported a pH value of 9.77 from a consumer's tap in the Skipton/Craven zone in June. Investigational monitoring found that the elevated pH was arising because of conditions of low flow in a cement lined main serving the property. The main was replaced with medium density polyethylene (MDPE) pipe during November and all further samples have given satisfactory results.

### Sulphate

The level of naturally occurring sulphates in water is highly variable and normally reflects the local geology, with higher amounts tending to be found in brown coal regions and in salt areas. The finding of an increased level of sulphates, along with chlorides, can also indicate human pollution of a water source. Waters of naturally high sulphate content, particularly alkali and magnesium sulphates, act as a purgative. Even relatively small amounts may cause a temporary disturbance to the normal intestinal function. Higher levels have a tendency to cause diarrhoea, especially among children. The standard of 250mg/l is set to avoid these concerns and to assist with the selection of suitable sources of drinking water.

In 2010, there were two failures of the sulphate standard out of a total of 1,910 tests (2 NNE).

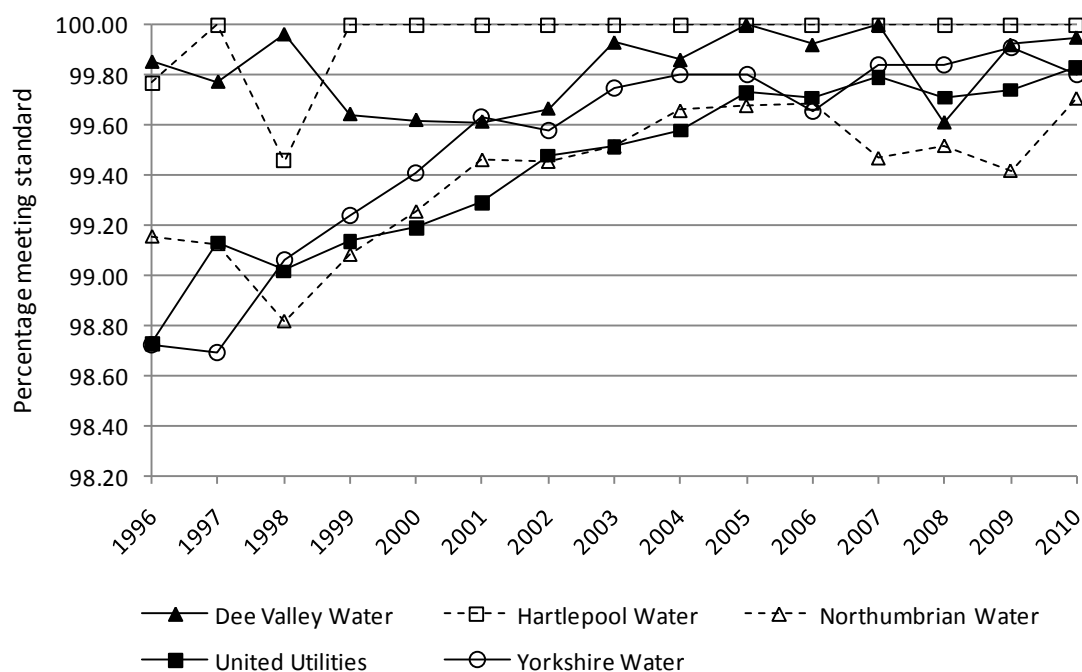
The two sulphate failures occurred in the Sunderland Pallion zone (June) and the Sunderland West zone (July) where the water supply is derived from the River Wear which is seasonally affected by sulphate rich wash-out from local mines. The control measure in place is blending with low sulphate water from another works (Stoneygate). The highest recorded level of sulphate was 310µg/l and Northumbrian Water has obtained advice from the Health Protection Agency indicating that this level of sulphate does not pose a risk to public health.

### **Maintaining water quality in distribution**

The parameters most commonly linked to aesthetic water quality problems are iron and manganese. These substances may be present naturally in raw water sources. Iron compounds may be added as part of water treatment or can be released as a consequence of the corrosion of iron mains. The most severe problems tend to be where the distribution network contains a large proportion of old cast iron mains. Effective water treatment reduces iron and manganese at source, but if treatment has been inadequate historically then iron and manganese will have accumulated in local parts of the distribution system. When these deposits are disturbed, they may cause black, brown or orange discolouration of the water which in turn results in breaches of the turbidity standard. A related, but less frequent, problem that may arise in the distribution network is the deterioration of old coal tar linings of cast iron mains, causing failures of the standards for polycyclic aromatic hydrocarbons (PAH) including benzo(a)pyrene.

Elevated levels of iron or manganese are objectionable to consumers because the water may appear turbid, it may have an astringent or bitter taste and the deposits are unsightly and may stain water fittings. Since 1996, the Inspectorate has been measuring the progress of companies' distribution maintenance work to address these problems with an index made up of the three parameters (iron, manganese and turbidity). Figure 9 shows the improvements generally.

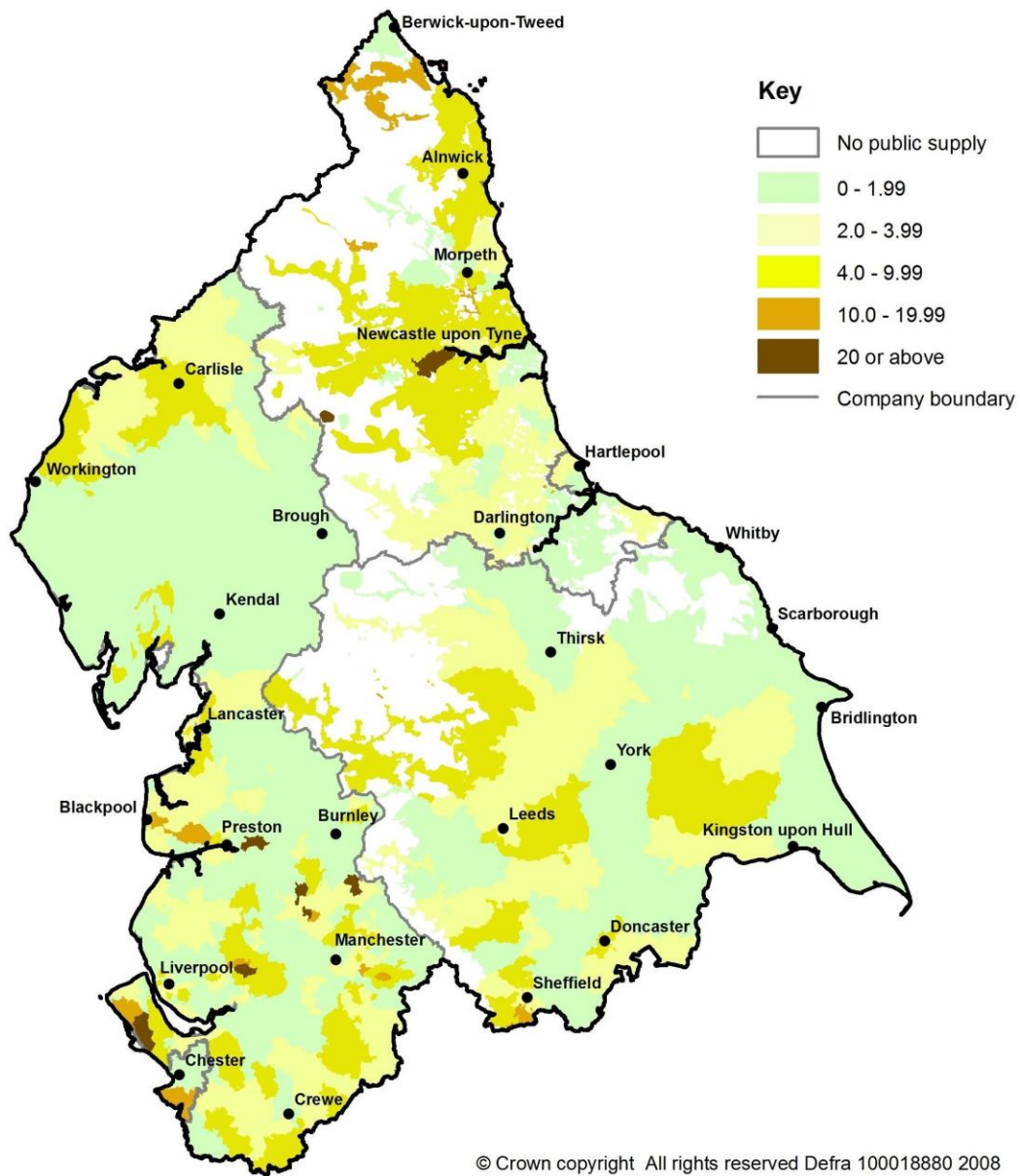
**Figure 9: Percentage of the tests taken meeting the standards for turbidity, iron and manganese**



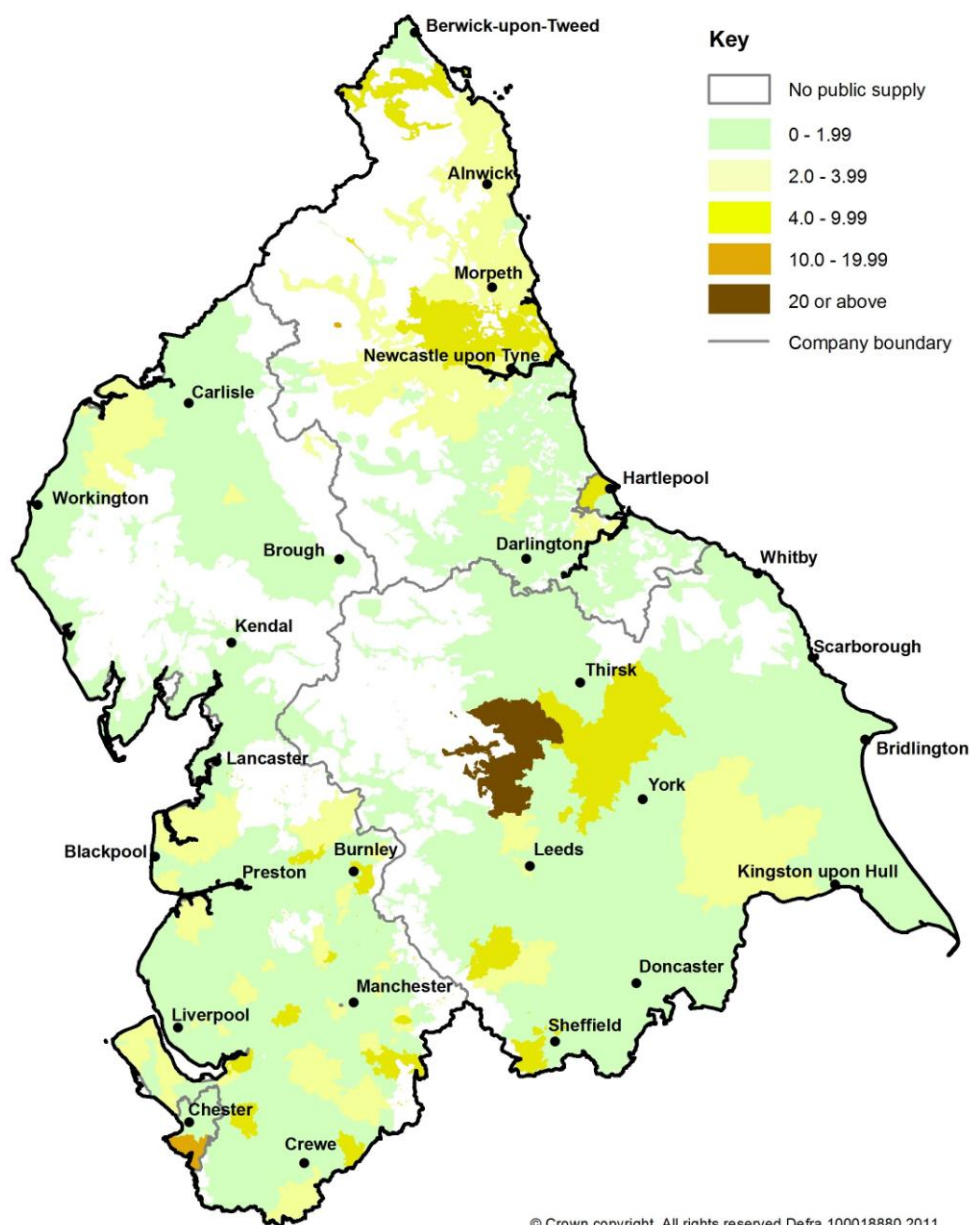
Note: Peel Water Networks only began supplying in 2009. They achieved 91.67% in 2009 and 100% in 2010.

Discolouration of water supplies often prompts consumers to contact their water company. The rate of contacts in 2007 and 2010 for each supply zone is mapped in Figures 10 and 11.

**Figure 10: Rate of consumer contact per 1,000 population reporting black, brown or orange water in 2007**



**Figure 11: Rate of consumer contact per 1,000 population reporting black, brown or orange water in 2010**



The two maps in Figures 10 and 11 illustrate the improvements made over the four-year period in reducing discolouration contacts in the Northern region, particularly in areas around Newcastle, Darlington, Leeds, Carlisle and Crewe. However, there is an increase in the number of contacts about appearance in the areas to the south of Thirsk (see the *Public confidence in drinking water quality* section).

In 2010, there were 62 failures of the iron standard compared to 57 in 2009 and on five occasions the elevated level of iron was associated with failures of the standards for aluminium or manganese. Over half of the iron failures occurred in zones where the company is committed to a legally

binding programme of work to address discoloured water (see *Annex 4*). The remainder were linked to a localised disturbance of mains deposits cleared by flushing. The Inspectorate expects companies to utilise information about localised discoloured water reports to update and validate their Distribution, Operation and Maintenance Strategies (DOMS).

Consumers in the Northern region continue to be affected adversely by discolouration events with 19 classified by the Inspectorate as significant during 2010. These were mostly caused by burst mains or changes to a works pumping regime (see *Annex 3*). The risk of discoloured water events in the Northern region will remain unacceptably high until companies have completed planned maintenance work on the distribution network which is a phased programme lasting until 2020 (see *Annex 4*).

## Drinking water quality events

Water quality events are classified into five broad categories based on the initial company report. The categories are:

**Not significant:** no further information required by an inspector to assess the event.

**Minor:** it is unlikely that further information would be required by an inspector to assess the event.

**Significant:** a full company report may be required to enable an inspector to assess the event.

**Serious:** in addition to a full company report, the assessment may require action by more than one inspector and a resultant investigation.

**Major:** in addition to a full company report, the assessment is likely to involve an investigation led by senior inspectors requiring extensive information gathering and wide-ranging investigations.

In 2010, companies in the Northern region notified the Inspectorate of 92 events. Table 12 shows how these events were classified.

**Table 12: Water quality events in the region in 2010**

Nature of event	Risk assessment category (DWI)					
	Minor/not-significant		Significant		Major/serious	
	2009	2010	2009	2010	2009	2010
Air in water	-	-	-	-	-	-
Chemical	4	1	1	-	-	-
Discoloured water	6	2	18	18	-	-
Inadequate treatment	-	6	4	9	-	-
Loss of supplies/poor pressure	4	3	4	6	-	-
Microbiological	14	4	11	3	-	-
Taste/Odour	-	3	1	4	-	1
Health concern	1	1	-	6	-	-
Public concern	6	14	2	5	-	-
Other	2	1	8	5	-	-
<b>Region overall</b>	<b>37</b>	<b>35</b>	<b>49</b>	<b>56</b>	<b>-</b>	<b>1</b>
<b>England and Wales</b>	<b>276</b>	<b>222</b>	<b>141</b>	<b>160</b>	<b>5</b>	<b>9</b>

A summary of the nature, cause and duration of each event categorised as significant, serious or major, along with details of the Inspectorate's findings are set out in *Annex 3*. Most events were of relatively short duration and the company took appropriate action at the time to inform and safeguard consumers and other stakeholders. A comparison of 2009 events with those in 2010 shows an overall increase in those considered significant. In particular, there were more events associated with water treatment works and a greater number where there was a potential risk to public health or the public was caused concern. More than half (57 out of 92) of the events in the Northern region were of a type that necessitated detailed investigation by an inspector and one warranted a higher level of investigation by the Inspectorate. This compares unfavourably to the other regions in England where a much smaller proportion of inspector time was spent on investigating events.

Wider learning points from event investigations in the region in 2010 are highlighted by the following cases:

#### **Consumer complaints of taste and odour due to disinfection**

- Hurlston works treats water stored in an on-site raw water reservoir, fed by the Llangollen canal, owned by British Waterways. It supplies approximately 144,000 people in the Crewe and Nantwich areas. From 9 to 22 January 2010, United Utilities received a total of 866 customer contacts about an objectionable taste and odour which was caused by the presence in tap water of trichloramine.

The cause of the problem was a failure to achieve breakpoint chlorination because the operational arrangements at the works

were unable to respond adequately to rising ammonia levels in the raw water combined with very low water temperatures. The problem was exacerbated by the lime dosing point (lower pH) being moved and the cold conditions caused higher flows and poor mixing.

The Inspectorate was critical of the company because high levels of ammonia in the raw water were known to occur, therefore the operational arrangements at the works should have been more robust. However, the Inspectorate was not only critical of the company for its poor understanding of the treatment conditions and processes; the company failed to recognise the link between high raw water ammonia levels and unprecedented numbers of relevant taste and odour consumer contacts (over 300 contacts in the first day) and this failure resulted in a response that was tardy and less than adequate. This event highlights the importance of companies having robust systems in place to secure early recognition of multiple taste and odour reports, including those described by consumers as 'chlorinous' (see *Annex 3*).

**Consumer complaints of taste and odour linked to valve operations:**

- In January, Northumbrian Water operated valves on two sections of a main to investigate a leak on Chester Road in East Stanley, Durham. Over the next few days 27 consumers downstream of the repair contacted the company reporting an odour in the water. No definitive cause was found, but it was probable that the valve operations had introduced stagnant water into the supply.

In November, following valve operations to facilitate a mains repair in Horden, Peterlee, stagnant water entered the supply resulting in consumer contacts about taste and odour (9) and illness (2).

The Inspectorate was critical of the company for the lack of learning represented by repeated events with a similar cause.

Recommendations were made regarding the need for improved risk assessment embedded in procedures and record keeping. These events highlight the need for companies to ensure the water safety plan approach embraces all operational activities to secure learning in a timely manner to prevent recurrence (see *Annex 3*).

One offence is currently under consideration by the Inspectorate in connection with an event that occurred in the region in 2010.

## Technical audit activity

The Inspectorate has operated a risk-based approach to technical audit since 2005. In line with better regulation principles, no technical audit takes place without a reason.

The Inspectorate's tool for generating the technical audit programme looks at the critical components of the safe management of drinking water supplies, including information on water quality monitoring, event assessments, previous audits, consumer complaints and other relevant intelligence. Through this ranking of all relevant water company assets, procedures and practices, inspectors are able to prioritise and focus their technical audit work where it will have most benefit. The resultant audit programme for 2010 is set out in Table 13. In 2010, the audit programme highlighted analytical malpractice at a laboratory operated by Severn Trent Services affecting eight water companies in six regions. Although no company in the Northern region had a contract for analysis of compliance samples with this laboratory in 2010, the audit findings are applicable to the industry as a whole and are therefore included in Table 13.

**Table 13: Summary of the Inspectorate's technical audits in the region**

Site name	Audit topic	Main findings from audit
<b>Northumbrian Water</b>		
Fowberry works	Repeated bacteriological failures	Satisfactory <ul style="list-style-type: none"> <li>No recommendations.</li> </ul>
Lartington works	Disinfection	Satisfactory <ul style="list-style-type: none"> <li>No recommendations.</li> </ul>
Wandylaw service reservoirs 1&2	Repeated bacteriological failures	Generally satisfactory <ul style="list-style-type: none"> <li>Recommendations made about review of inspection and maintenance strategies, investigating potential for short circuiting, ownership and delivery of maintenance, effectiveness of external inspections.</li> </ul>
Warkworth works	Repeated bacteriological failures	Generally satisfactory <ul style="list-style-type: none"> <li>It was noted that the rapid gravity filters were cracked and backwashing was inadequate and the company plans to replace the filters.</li> <li>Recommended the company produce a site specific disinfection policy.</li> </ul>
<b>Peel Water Networks</b>		
Mountain Heath Laboratories	Analytical arrangements for pesticide sample	Unsatisfactory <ul style="list-style-type: none"> <li>Various issues with non-validated method and use of unaccredited laboratory and lack of a written method.</li> </ul>

Site name	Audit topic	Main findings from audit
<b>Severn Trent Services – Analytical Services Ltd</b>		
Bridgend laboratory	Analytical malpractice.	<p>Audit deemed unsatisfactory – subsequent investigation ongoing</p> <ul style="list-style-type: none"> <li>• Recommendations were made in respect of inorganic chemical analysis for the water undertakers or the combined licensees in failing to meet their obligations under Regulations 16 and 34 for analysis of water samples and, in particular, derived analytical data, competency, retention of appropriate records and for the appropriate time using suitable equipment.</li> <li>• The Inspectorate reminded companies that it is the duty of the water undertaker or the combined licensee to ensure they are compliant and this cannot be deferred to a third party laboratory.</li> <li>• Recommendations were made to ensure that the provision of information as part of the companies regulatory duties must be demonstrated to be a true representation of a robust and an actual analytical procedure.</li> <li>• Recommendations were made for the future avoidance of breaches of the regulations requiring the laboratory through the duties of the statutory undertakers to implement and maintain a system of operational management covering a number of areas, but including robust, timely, effective and responsive use of quality systems, capacity management and independent business and quality objectives.</li> <li>• Enforcement action taken in respect of eight companies using the laboratory for chemical analysis of regulatory drinking water samples.</li> <li>• Full details are to be provided in the form of a published audit report and will be available on the Inspectorate’s website on completion of the investigation.</li> </ul>

Site name	Audit topic	Main findings from audit
<b>United Utilities</b>		
Huntington works	Disinfection	<p>Unsatisfactory Enforcement action taken (see <i>Annex 3</i>).</p> <ul style="list-style-type: none"> <li>• Numerous issues identified and recommendations made regarding the need to: <ul style="list-style-type: none"> <li>• improve automatic control of the coagulation process.</li> <li>• review the performance of the contact tank.</li> <li>• develop a site specific disinfection policy.</li> <li>• introduce procedures for prioritisation of critical maintenance activities</li> <li>• improve the frequency of checks of on-line monitors.</li> </ul> </li> <li>• A number of suggestions were also made regarding general housekeeping and good practice.</li> </ul>
Prescot works	Disinfection and process events	<p>Generally satisfactory</p> <ul style="list-style-type: none"> <li>• Recommendations made regarding the need to: <ul style="list-style-type: none"> <li>• keep site log up to date.</li> <li>• ensure maintenance of UPS device.</li> </ul> </li> <li>• Develop a site specific disinfection policy.</li> </ul>
Lightshaw works	Repeated bacteriological failures	<p>Unsatisfactory,</p> <ul style="list-style-type: none"> <li>• Recommendations made regarding: <ul style="list-style-type: none"> <li>• ineffective filtration including backwashing.</li> <li>• lack of data available in the control room for operators running the plant.</li> <li>• lack of validation of chlorine disinfection with specific areas of concern raised due complexity of processes.</li> <li>• borehole usage determined by quantity with minimal consideration of water quality.</li> </ul> </li> </ul>

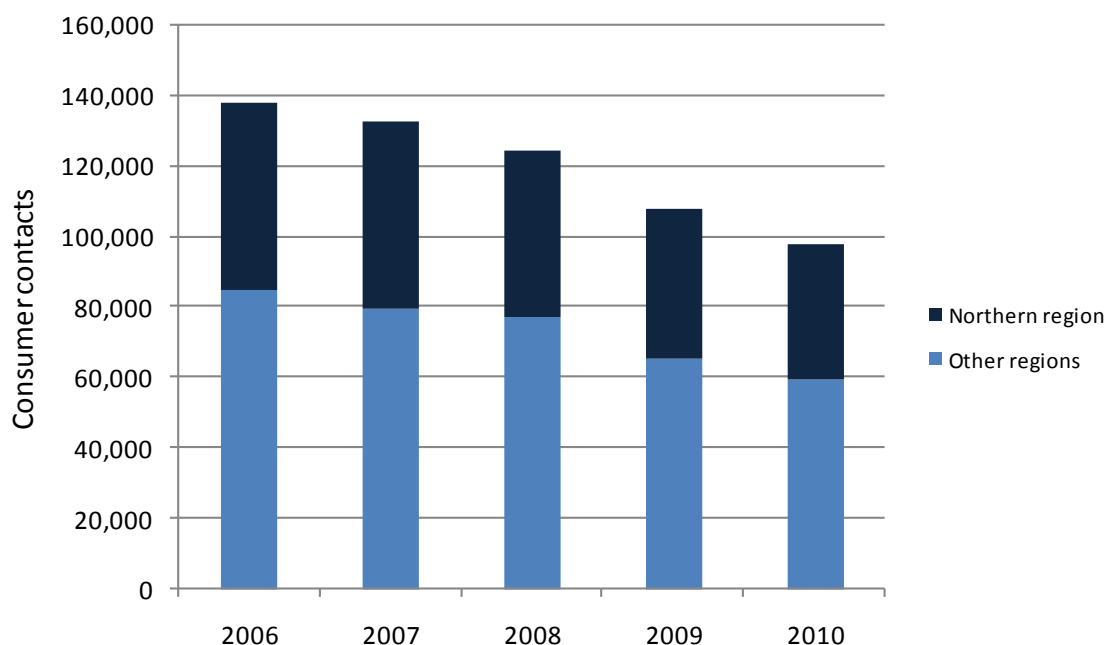
## Public confidence in drinking water quality

### Consumer contacts to water companies

When consumers have a question or a concern about drinking water quality their first point of contact is the water company. All companies record these contacts using definitions agreed with the Inspectorate.

The Inspectorate has been collecting consumer contact information from the industry for a number of years. Figure 14 illustrates the improving picture in England, with a 29% reduction over five years in the number of consumers reporting a problem with their tap water (now about 98,000 compared to 138,000 in 2006). Over the same time frame, the Northern region has seen a 27% reduction in contacts, with about 39,000 recorded in 2010 compared to approximately 53,000 in 2006. The number of contacts in the Northern region represents a large proportion of the total for England as a whole and, in 2010, four out of every 10 contacts were from consumers in the Northern region, double the number recorded for any other English region.

**Figure 14: Total consumer contacts for appearance, taste and odour, illness 2006–2010**



### Black, brown or orange water

Looking in more detail at the reductions, the largest single consumer concern is discoloured water (black, brown or orange) caused by the disturbance of main deposits. In 2010, the previously reported steady

decline continued with the number of these contacts now standing at just over 22,000, (down from over 31,000 in 2006). However, the improvement has not been evenly spread across the region. While United Utilities and Yorkshire Water reported the lowest figures in five years, the figures for Hartlepool Water in both 2009 and 2010 were notably above those reported in the three previous years and Northumbrian Water and Dee Valley Water have reported higher figures in 2010 compared to 2009 (see Table 15).

**Table 15: Number of contacts reporting black, brown or orange water**

Company	Year				
	2006	2007	2008	2009	2010
Dee Valley Water	33	25	38	29	49
Hartlepool Water	178	130	154	300	247
Northumbrian Water	8,229	6,368	4,603	4,022	5,066
United Utilities	14,507	16,984	11,821	11,610	9,332
Yorkshire Water	8,731	9,052	9,079	7,987	7,438
<b>Northern region total</b>	<b>31,678</b>	<b>32,559</b>	<b>25,695</b>	<b>23,948</b>	<b>22,132</b>
Note: Peel Water Networks began supplying one zone in 2009 and has had no contacts in this category					

Maps in the *Maintaining water quality in distribution* section illustrate, on a zone-by-zone basis, where discolouration problems are occurring. The map shows how a relatively large part of Northumbrian Water's area exhibits a contact rate of two per 1,000 consumers or greater compared with the industry average of one per 1,000. The map also shows an area north of Leeds where an event in 2010 caused an increase in discolouration contacts. Companies are reminded that data returns must follow the template and instructions issued by the Inspectorate (Information letter IL 2006/01), which explains how companies should report event-related contacts so that the general underlying contact rate is not influenced by one-off events in the region. The company concerned has taken action to ensure accurate returns in the future.

### White water – air

In the Northern region, white water caused by entrained air remains a significant cause of consumer concern although there has been a steady improvement, as evidenced by the decline in white water contact numbers to 5,000 compared to over 7,000 in 2006. However, the benefit has been confined solely to customers of United Utilities. Northumbrian Water exhibited a rise in this type of contact in 2010 and previous improvements by Yorkshire Water stalled this year. The Inspectorate expects companies to use contact data to analyse events in the network to improve operational practices and thereby minimise the impact on consumers.

## Taste and odour – chlorine

There has been no significant improvement in 2010 in relation to contacts about objectionable chlorinous tastes and odours, with the figure standing at just over 3,500 for the region. Figures for United Utilities and Dee Valley Water were slightly better, but figures from other companies in the region are responsible for the lack of progress this year.

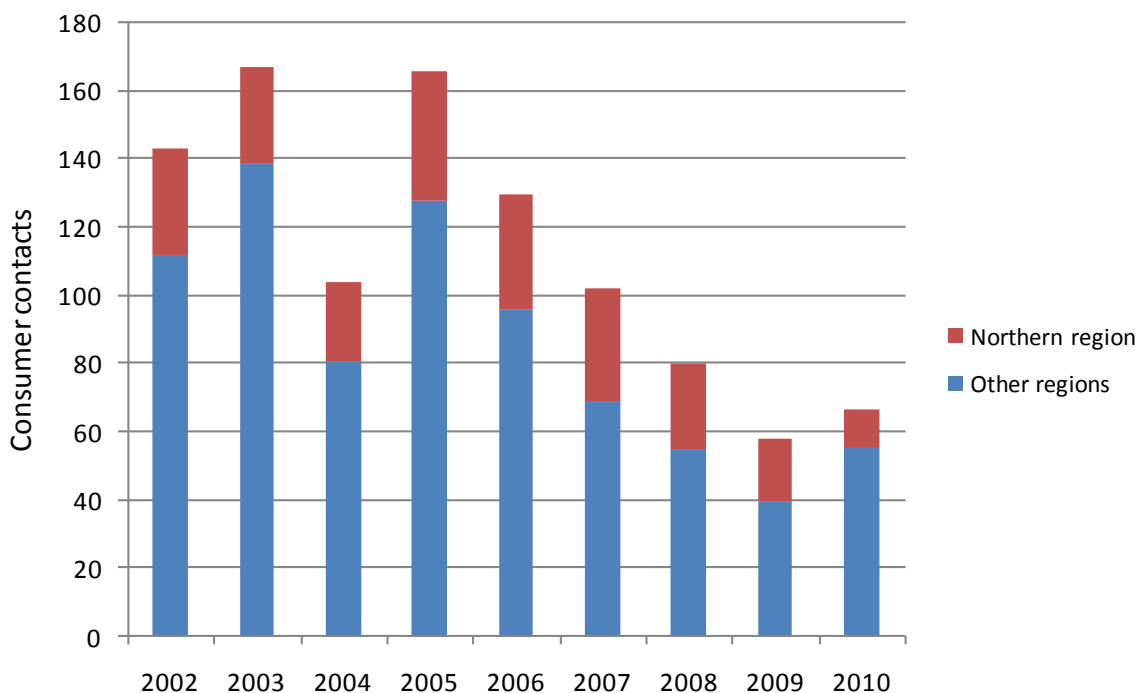
## Consumer complaints to the Inspectorate

When the response of a company to a consumer contact about drinking water quality fails to provide the necessary reassurance or remedy, then the consumer may contact the Inspectorate for advice. In 2010, there were 11 consumers in the region who were sufficiently dissatisfied with the company's initial response to their complaint to raise the matter with the Inspectorate. The reasons for contacting the Inspectorate are provided in Table 16.

**Table 16: Contacts from consumers received by the Drinking Water Inspectorate**

Category	Number of contacts
Appearance	5
Taste and odour	3
Report of illness	-
Water quality concern	3
Number of contacts to DWI from consumers by company. NNE (4), UU (7)	
Categories are as defined in Information Letter 1/2006	

Figure 17 shows the numbers of consumer complaints received by the Inspectorate from consumers in the region since 2002 in the context of the total complaints received from consumers in England and Wales. From this it can be seen that the number of complaints from the Northern region has generally fallen in line with the declining trend for the industry as a whole although there was a slight upturn in 2010.

**Figure 17: Complaints received by the Inspectorate (2002 to 2010)****Case example**

In June, the Inspectorate was contacted by a customer of United Utilities about black particles in their tap water. The problem had been ongoing since 2005 and eventually, in 2009, the company identified the cause as a section of cast iron main in the local distribution network. This was isolated from supply and a regular flushing programme put in place at the consumers' property. However, the problem recurred in 2010 when the consumer contacted the company again. The company investigation found that the cast iron main had been returned to supply following a burst main. Once again the cast iron main was taken out of supply and flushing reinstated.

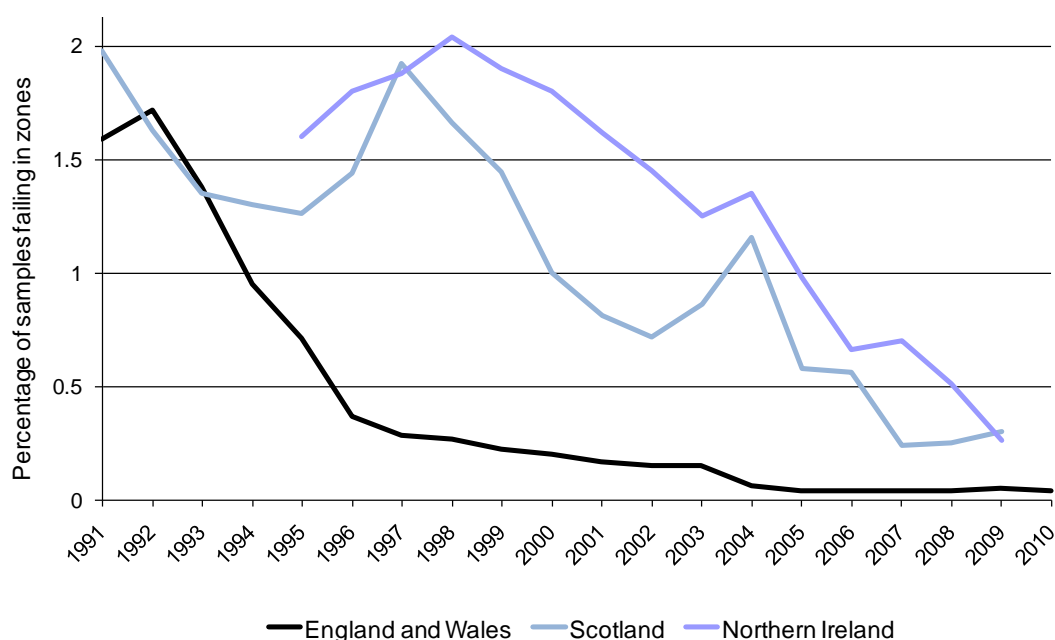
This case illustrates how public confidence can be eroded when companies do not ensure that actions taken to improve and maintain drinking water quality are not embedded in procedures. The case also shows the importance of ensuring that complaints and related short-term mitigation steps are taken into account in companies' Distribution, Operation and Maintenance Strategies so that long-term solutions are implemented.

## Planned drinking water quality improvements

### Securing safe, clean drinking water through the application of a risk-based approach to regulation

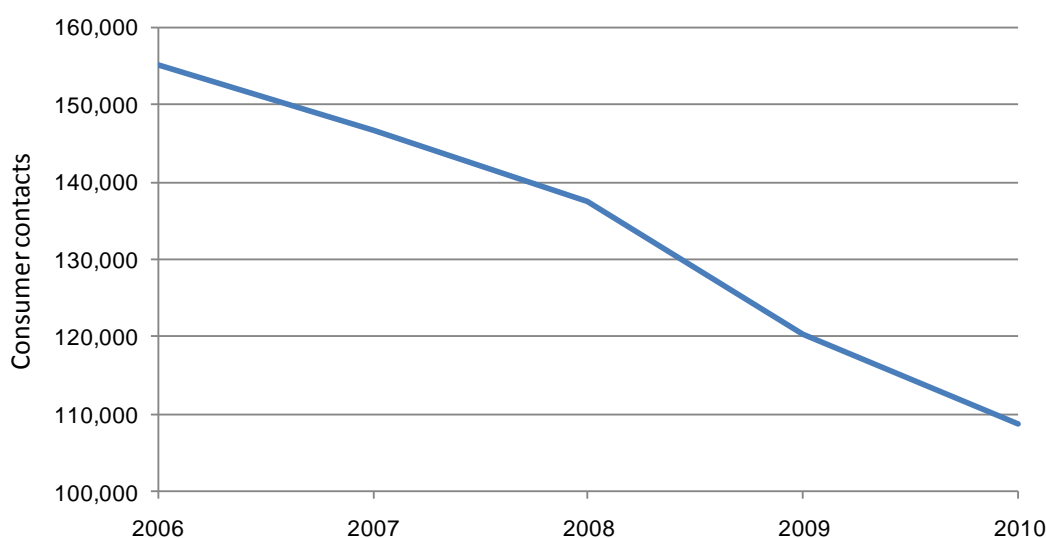
The publication of *Drinking water 2010* marks an important milestone in the history of drinking water regulation, namely the 20-year anniversary of implementation by government of the EU Drinking Water Directive. It records how the regulatory regime has been applied successfully and improved upon since. In particular, the regulatory framework now goes beyond rectifying deficiencies in drinking water quality by converting two decades of essential investment in water treatment and distribution into sustainable, improved drinking water supplies through operator risk assessment and timely preventative action incentivised by independent oversight and firm, but fair, sanctions.

**Figure 18: The percentage of tests failing the standards from 1991 to 2010**



The purpose of drinking water regulation is to secure safe, clean drinking water for all and this outcome is measured objectively by the Inspectorate using verified scientific data (Figure 18) alongside data to confirm the benefit in the form of consumer reports about tap water quality (Figure 19). These outputs are measured at the tap and therefore provide verification of the efficacy of all the historical investment and operational management actions taken at every point throughout a supply system from source to tap.

**Figure 19: The total amount of consumer contacts for appearance, taste, odour and illness from 2006 to 2010**



The principal regulatory enforcement tool that has enabled this improvement in drinking water quality has been the putting in place of legally binding programmes of work to address clearly identified and specific deficiencies by the Inspectorate. Over 20 years these ‘undertakings’, given under Section 19 of the Water Industry Act 1991, have enabled water companies to design and deliver technically appropriate asset improvement schemes. An undertaking comprises a schedule of sequential remedial steps; typically these will be an investigation, followed by changes to the operation of a treatment works/supply system or installation of new treatment equipment at a works or renovation/replacement/cleaning of water mains. The schedules set delivery dates for each milestone step with reporting requirements for progress monitoring and demonstration of benefit, i.e. that the outcome required has been achieved.

In 2004, the World Health Organisation (WHO) published the water safety plan approach as the most effective means of securing a sufficient supply of safe, clean drinking water for all. In 2005, the Inspectorate adopted the water safety plan approach as its strategic policy for developing the regulatory regime for drinking water first introduced by Parliament in England and Wales in 1990. In 2007, the drinking water regulations in England and Wales were amended to formally embed this risk-based approach into the legal framework.

These amendments included provision for Regulation 28(4) Notices, a new enforcement tool that is now converting two decades of investment in improvement into sustainable supplies of safe, clean drinking water. These Notices set out the steps that are necessary to mitigate

unacceptable residual risks. A Notice typically specifies the following types of actions: additional improvements or maintenance, regular reviews and audits of operational controls, conditions under which use of a supply is prohibited, management and other information requirements and reporting.

The principal difference between the two enforcement tools is that undertakings are generally failure driven, whereas Notices are risk-based and preventative. Undertakings are used where a failure has occurred and is considered likely to recur, identified usually through the audit activity of the Inspectorate, or as part of a water company's business planning processes. Notices, by contrast, arise out of a process of continuous risk assessment carried out by water companies where the Inspectorate acknowledges the manner by which identified risks are being mitigated and controlled. If necessary for the protection of public health, certain controls or remedial actions can be audited, imposed or made mandatory. Both enforcement tools serve as an incentive to improve drinking water supplies and to protect consumers. Furthermore, as a consequence of putting risk assessment at the heart of the new enforcement tool, the extent to which risk management and risk prevention are becoming embedded in the industry can be measured objectively by the recording of acknowledged actions to mitigate risk.

Across the industry, there are currently 469 mandatory schemes documented in the report (*Annex 4*) where enforcement has been used to improve those few water supplies that continue to fail to meet drinking water standards (undertakings) or to mitigate previously unrecognised risks which pose a potential danger to human health (Notices). In addition, there are 516 other preventative actions identified by water companies through risk assessment and acknowledged by the Inspectorate. Table 20 reflects the progress of the industry in delivering these acknowledged preventative actions. Together all these data can be used to demonstrate the extent to which a proactive preventative approach to the management of drinking water quality has become embedded in water companies as a result of the switch to mandatory risk management. For example, more than half (52%) of the 985 improvement actions identified as necessary at the end of 2008 are being delivered voluntarily, without the need for enforcement action by the Inspectorate.

**Table 20: Acknowledged actions to sustain safe, clean drinking water**

Region	Additional acknowledged actions to mitigate risk (as at Dec 2008)	Acknowledged actions completed (as at Dec 2010)
Central	0	0
Eastern	10	1
Northern	44	15
Southern	51	20
Thames	62	36
Western	38	25
Wales	311	35
<b>Total</b>	<b>516</b>	<b>132</b>

Note: The Central region figures do not include Dŵr Cymru Welsh Water. The figures for the Northern region do not include Dee Valley Water. The figures for Wales do not include Severn Trent Water.

### Mitigating risks at source through catchment management

An important element of the risk assessment process carried out under the Regulations is the characterisation of hazards within catchments, determining where these pose a risk to the quality of a specific drinking water supply and how they will be mitigated through actions in the catchment to protect or improve raw water quality. Arising out of this work, a number of companies now have catchment management schemes as a component of undertakings and catchment management activities may be specified in Notices or in acknowledged action plans. The direct benefits of catchment management are the potential for removing the need for costly provision, or replacement, of water treatment or for reducing operational expenditure in relation to treatment already in place. These schemes also provide wider benefits where they result in improvements to the natural environment.

A typical example is a scheme or action plan where the water company commits to carrying out an investigation to pinpoint the source of specific contaminants (such as nitrate, one or more pesticides, or colour as a precursor of disinfection by-products) by setting up a working partnership with local stakeholders such as the Environment Agency, farmers, land managers or agronomists, for example, to alter the way in which a product is being applied to land. The company will carry out targeted raw water monitoring and contribute other resources to set up and facilitate the work of the partnership. Table 21 summarises the catchment management work in the Northern region in relation to the drinking water quality parameters.

**Table 21: Catchment management activities in the region**

<b>Company</b>	<b>Treatment works where regulated catchment management is in place</b>	<b>Risk being mitigated</b>
Dee Valley Water	0	N/A
Hartlepool Water	0	N/A
Northumbrian Water	4	Metaldehyde (4)
Peel Water Networks	0	N/A
United Utilities Water	3	Colour/Trihalomethane (3)
Yorkshire Water	11	Colour/Trihalomethane (5) Metaldehyde (6)
<b>Region overall</b>	<b>18</b>	<b>Colour/Trihalomethane (8) Metaldehyde (10)</b>

*For further information on the Water Supply (Water Quality) Regulations 2000, or the microbiological and chemical parameters covered by the regulations please refer to the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)).*

*If you have a need for more specific information than that on our website, please contact us on the DWI enquiry line: 030 0068 6400.*

## Annex 1

### Further sources of information

The publication *Drinking water 2010* comprises the regional reports for England and a report covering Wales. There are six regional reports for England (Central, Eastern, Northern, Southern, Thames and Western) and one for Wales (in two languages). Each report presents information from 2010 under the following headings:

- Introduction to the report.
- Water supply arrangements.
- Drinking water quality testing.
- Drinking water quality results.
- Risk assessments.
- Drinking water quality events.
- Technical audit activity.
- Public confidence in drinking water quality.

There are also separate reports covering private water supplies, one covering England and one covering Wales.

The reports and other content are published on the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)).

### Content of the CD

The CD supplied with the printed report holds all of the above content and additionally it contains:

#### Water company look-up tables

These summarise all the results of water company monitoring in 2010. They provide information on:

- what was tested;
- how many tests were performed;
- the range of the results of testing; and
- how many tests failed to meet the standards.

#### Significant drinking water quality events in England and Wales 2010

To promote shared learning, the Inspectorate has compiled a list of all incidents that occurred in 2010 which illustrate the nature and cause of each incident, the main actions by the company and findings from the inspectors' assessments. Relevant content from this overall list is contained in an annex to each regional report.

## Annex 2

### Glossary and description of standards

These definitions will assist the understanding of the report where technical terms have been used.

<b>µg/l</b>	microgram per litre (one millionth of a gram per litre).
<b>1,2-Dichloroethane</b>	is a solvent that may be found in groundwater in the vicinity of industrial sites. Where necessary it can be removed by special water treatment. A European health-based standard of 3µg/l applies.
<b>Acrylamide</b>	European health-based standard. A monomer is not normally found in drinking water. It is produced in the manufacture of polyacrylamides occasionally used in water treatment. Its presence in drinking water is limited by control of the product specification. Standard is 0.1µg/l.
<b>Aesthetic</b>	associated with the senses of taste, smell and sight.
<b>Aggressive</b>	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.
<b>Alkali</b>	a solution containing an excess of free hydroxyl ions, with a pH greater than seven.
<b>Aluminium</b>	occurs naturally in some source waters. It is removed from drinking water by conventional water treatment (coagulation and filtration). Aluminium sulphate and polyaluminium chloride may be used as water treatment chemicals at some water treatment works. A national standard of 200µg/l applies.
<b>Ammonium</b>	salts are naturally present in trace amounts in most waters. Their presence might indicate contamination of sanitary significance and they interfere with the operation of the disinfection process. An indicator parameter with a guide value of 0.5mg/l.

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<b>Analytical quality control (AQC)</b>	the method used to ensure that laboratory analysis methods are performing correctly.
<b>Antimony</b>	is rarely found in drinking water. Trace amounts can be derived from brass tap fittings and solders. A European health-based standard of 5µg/l applies.
<b>Aquifer</b>	water-containing underground strata.
<b>Arsenic</b>	occurs naturally in only a few sources of groundwater. Specific water treatment is required to remove it. A European health-based standard of 10µg/l applies.
<b>Authorised departure</b>	authorisation for a water company to temporarily supply water exceeding a drinking water standard, granted by the authorities only when there is no risk to human health.
<b>Benzene</b>	is present in petrol. It is not found in drinking water, but it can migrate through underground plastic water pipes if petrol is spilt in the vicinity. Some bottled waters and soft drinks which include sodium benzoate as an ingredient have been reported as containing benzene. A European health-based standard of 1µg/l applies.
<b>Benzo(a)pyrene</b>	is one of several compounds known as polycyclic aromatic hydrocarbons (PAHs). Their source in drinking water is as a result of deterioration of coal tar, which many years ago was used to line water pipes. Due to extensive water mains refurbishment and renewal it is now rare to detect this substance in drinking water. A European health-based standard of 0.01µg/l applies.
<b>Boron</b>	in surface water sources comes from industrial discharges or from detergents in treated sewage effluents. The very low concentrations found in some drinking waters are not a concern to public health. A European health-based standard of 1mg/l applies.

<b>Bromate</b>	can be formed during disinfection of drinking water through a reaction between naturally occurring bromide and strong oxidants (usually ozone). It may be generated in the manufacture of sodium hypochlorite disinfectant. Exceptionally, groundwater beneath an industrial site can become contaminated with bromate. A European health-based standard of 10µg/l applies.
<b>Bulk supply</b>	water supplied in bulk, usually in treated form, from one water company to another.
<b>Cadmium</b>	is rarely detected in drinking water and trace amounts are usually due to dissolution of impurities from plumbing fittings. A European health-based standard of 5µg/l applies.
<b>Catchment</b>	when used in connection with water, the catchment is the area drained by a river or water body.
<b>Chloramination</b>	the process of generating a chloramine disinfectant residual in water leaving a treatment works.
<b>Chloramine</b>	a substance formed by a reaction between chlorine and ammonia, used as a disinfectant in distribution systems because of its long-lasting properties compared to chlorine.
<b>Chloride</b>	is a component of common salt. It may occur in water naturally, but it may also be present due to local use of de-icing salt or saline intrusion. An indicator parameter with a guide value of 250mg/l.
<b>Chlorine residual</b>	the small amount of chlorine or chloramines present in drinking water to maintain its quality as it passes through the water company's network of pipes and household plumbing.
<b>Chromium</b>	is not present in drinking water. A European health-based standard of 50µg/l applies.
<b><i>Clostridium perfringens</i></b>	is a spore-forming bacterium that is present in the gut of warm-blooded animals. The spores can survive disinfection. The presence of spores in drinking water indicates historic contamination that requires investigation. The standard is 0 per 100ml.

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<b>Coagulation</b>	a process employed during drinking water treatment to assist with the removal of particulate matter.
<b>Coliform bacteria</b>	are widely distributed in the environment often as a result of human or animal activity, but some grow on plant matter. Their presence in a water supply indicates a need to investigate the integrity of the water supply system. The standard is 0 per 100ml.
<b>Colony counts</b>	are general techniques for detecting a wide range of bacteria, the types and numbers being dependent on the conditions of the test. These counts, if done regularly, can help to inform water management, but they have no direct health significance. The standard is 'no abnormal change'.
<b>Colour</b>	occurs naturally in upland water sources. It is removed by conventional water treatment. A national standard of 20mg/l on the Platinum/Cobalt (Pt/Co) scale applies.
<b>Communication pipe</b>	the connection from the water main to the consumer's property boundary.
<b>Compliance assessment</b>	a comparison made by the Inspectorate of data gathered by water companies against standards and other regulatory requirements.
<b>Compound</b>	a compound consists of two or more elements in chemical combination.
<b>Concessionary supplies</b>	historical free supplies of water for a householder, established when a company wanted to lay mains across land and the landowner might agree, subject to a permission, to take a supply of water from the main.
<b>Conductivity</b>	is a non-specific measure of the amount of natural dissolved inorganic substances in source waters. An indicator parameter with a guide value of 2,500 $\mu$ S/cm.
<b>Contact tank</b>	a tank, normally situated on a 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.

<b>Contravention</b>	a breach of a regulatory requirement.
<b>Copper</b>	in drinking water comes mostly from copper pipes and fittings in households. In general, water sources are not aggressive towards copper, but problems very occasionally occur on new housing estates. These 'blue water' events can be avoided by good plumbing practices. A European health-based standard of 2mg/l applies.
<b><i>Cryptosporidium</i></b>	is a parasite that causes severe gastroenteritis and can survive disinfection. In the UK, continuous monitoring is undertaken at works classified by the company as being at significant risk.
<b>Cyanide</b>	is not present in drinking water. A European health-based standard of 50µg/l applies.
<b>Dead leg</b>	refers to a piece of piping which is stopped off at one end, but is connected to the supply at the other end and can result in stagnant water in the pipework.
<b>Distribution systems</b>	a water company's network of mains, pipes, pumping stations and service reservoirs through which treated water is conveyed to consumers.
<b>Drinking water standards</b>	the prescribed concentrations or values listed in regulations.
<b>EC Drinking Water Directive</b>	Council Directive 98/83/EC December 1998 – setting out drinking water standards to be applied in member states.
<b>Enforcement action</b>	the means, as set out in the Water Act 1989 and consolidated into the Water Industry Act 1991, by which the Secretary of State requires a water company to comply with certain regulatory requirements.
<b>Enterococci</b>	see <i>Escherichia coli</i> .
<b>Environment Agency</b>	the Environment Agency is responsible for maintaining or improving the quality of fresh, marine, surface and underground water in England and Wales.

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<b>Epichlorohydrin</b>	can be found in trace amounts in polyamine water treatment chemicals. Its presence in drinking water is limited by control of the product specification. A European health-based standard of 0.1µg/l applies.
<b>Epidemiology</b>	a process of studying the distribution 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.
<b><i>Escherichia coli</i> and Enterococci</b>	are bacteria present in the gut of warm-blooded animals. They should not be present in drinking water and, if present, immediate action is required to identify and remove any source of faecal contamination that is found. The standard is 0 per 100ml.
<b>Event</b>	water companies have to inform the Inspectorate about occasions when water quality or sufficiency is affected or when public confidence in drinking water quality may be impacted. The Inspectorate refer to these instances as 'Events'.
<b>Filtration</b>	the separation of suspended particulate matter from a fluid.
<b>Fluoride</b>	occurs naturally in many water sources, especially groundwater. It cannot be removed by conventional water treatment so high levels must be reduced by blending with another low fluoride water source. Some water companies are required by the local health authority to fluoridate water supplies as a protection against tooth decay. The drinking water standard ensures levels are safe in either circumstance. Fluoridation of water is a Department of Health policy. A European health-based standard of 1.5mg/l applies.
<b>Geosmin</b>	a substance produced by the growth of algae, normally in surface waters which gives rise to a characteristic 'earthy' or 'musty' taste or odour.
<b>Granular activated carbon</b>	an adsorbent filtration media used to remove trace organic compounds from water.
<b>Groundwater</b>	water from aquifers or other underground sources.

<b>Hydrogen Ion (pH)</b>	gives an indication of the degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and values above 7 are alkaline. A low pH water may result in pipe corrosion. This is corrected by adding an alkali during water treatment. A specification of between 6.5 and 9.5 applies.
<b>Improvement programmes</b>	water company improvement works, these are legally binding on the company and each programme will remedy an actual or potential breach of a drinking water standard within a specified time period.
<b>Indicator organism</b>	an organism which indicates the presence of contamination and hence the possible presence of pathogens.
<b>Indicator parameter</b>	something that is measured to check that control measures, such as water treatment, are working effectively.
<b>Information Letter</b>	formal guidance to water companies given by the Inspectorate and published on the Inspectorate's website at <a href="http://www.dwi.gov.uk">www.dwi.gov.uk</a>
<b>Inspectorate</b>	The Drinking Water Inspectorate.
<b>Iron</b>	is present naturally in many water sources. It is removed by water treatment. Some iron compounds are used as water treatment chemicals. However, the commonest source of iron in drinking water is corrosion of iron water mains. A national standard of 200µg/l applies.
<b>Lead</b>	very occasionally occurs naturally in raw waters, but the usual reason for its presence in drinking water is plumbing in older properties. If the water supply has a tendency to dissolve lead then water companies treat the water to reduce consumer exposure. The permanent remedy is for householders to remove lead pipes and fittings. A European health-based standard of 25µg/l applies, but 10µg/l will apply from 25 December 2013 onwards.
<b>m<sup>3</sup>/d</b>	cubic metre per day.
<b>Manganese</b>	is present naturally in many sources and is usually removed during treatment. A national standard of 50µg/l applies.

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<b>Mean zonal compliance percentage</b>	a measure of compliance with drinking water standards introduced by the Inspectorate in 2004.
<b>Mercury</b>	is not found in sources of drinking water. A European health-based standard of 1µg/l applies.
<b>mg/l</b>	milligram per litre (one thousandth of a gram per litre).
<b>Microbiological</b>	associated with the study of microbes.
<b>MI/d</b>	megalitre per day (one MI/d is equivalent to 1,000 m <sup>3</sup> /d, or to 220,000 gallon/d).
<b>Nickel</b>	occurs naturally in some groundwater and where necessary special treatment can be installed to remove it. Another source of nickel in drinking water is the coatings on modern taps and other plumbing fittings. A European health-based standard of 20µg/l applies.
<b>Nitrate</b>	occurs naturally in all source waters although higher concentrations tend to occur where fertilisers are used on the land. Nitrate can be removed by ion exchange water treatment or through blending with other low nitrate sources. A European health-based standard of 50mg/l applies.
<b>Nitrite</b>	is sometimes produced as a by-product when chloramine is used as the essential residual disinfectant in a public water supply. Chloramine is the residual disinfectant of choice in large distribution systems because it is more stable and long-lasting. Careful operation of the disinfection process ensures levels of nitrite are kept below the standard. A European health-based standard of 0.5mg/l applies.
<b>Notice</b>	an instruction served by the Secretary of State (in the case of water supplies, the Chief Inspector of Water) requiring specific actions to be taken by the recipient within a specified timescale.
<b>Odour</b>	can arise as a consequence of natural processes in surface waters, particularly between late spring and early autumn. Water treatment with activated carbon or ozone will remove natural substances causing taste. The standard relates to the evaluations of a panel of people assessing samples in the laboratory.

<b>Ofwat</b>	the water industry's economic regulator.
<b>Oocyst</b>	the resistant form in which <i>Cryptosporidium</i> occurs in the environment, and which is capable of causing infection.
<b>Organoleptic</b>	characteristics of a substance as detected by our senses, for example taste, odour or colour.
<b>Ozone process (ozonation)</b>	the application of ozone gas in drinking water treatment.
<b>Parameters</b>	the substances, organisms and properties listed in Schedule 2 and Regulation 3 of the regulations. Parameter definitions can be found further on in this annex.
<b>Pathogen</b>	an organism which can infect humans and cause disease.
<b>PCV</b>	see 'Prescribed concentration or value'.
<b>Periodic review</b>	the economic regulator's process of setting water prices.
<b>Pesticides</b>	any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
<b>Pesticides – organochlorine compounds (aldrin, dieldrin, heptachlor, heptachlor epoxide)</b>	are no longer used in the UK because they are persistent in the environment. They are not found in drinking water. A European chemical standard of 0.03µg/l for each compound applies.
<b>Pesticides – other than organochlorine compounds</b>	is a diverse and large group of organic compounds used as weed killers, insecticides and fungicides. Many water sources contain traces of one or more pesticides as a result of both agricultural and non-agricultural uses, mainly on crops and for weed control on highways and in gardens. Where needed, water companies have installed water treatment (activated carbon and ozone) so that pesticides are not found in drinking water. Water companies must test for those pesticides used widely in their area of supply. Pesticide monitoring thus varies according to risk. A European chemical standard of 0.1µg/l for each individual substance and 0.5µg/l for the total of all pesticides applies.

<b>Phosphate dosing</b>	treatment of water that results in a protective film building up on the inside of pipes minimising the likelihood of lead being present in drinking water supplied through lead pipes.
<b>Plumbosolvency</b>	the tendency for lead to dissolve in water.
<b>Polycyclic aromatic hydrocarbons (PAHs)</b>	is a group name for several substances present in petroleum-based products such as coal tar. (see Benzo(a)pyrene listed above for more information). A European health-based standard of 0.1µg/l for the sum of all the substances applies.
<b>Powdered activated carbon (PAC)</b>	powdered activated carbon is employed in treatment processes to remove pollutants.
<b>Pre- and post-renovation assessment (PPRA)</b>	a programme of assessment before and after mains renovation to demonstrate justification for the work, and the improvements achieved by the renovation.
<b>Prescribed concentration or value (PCV)</b>	the numerical value assigned to drinking water standards defining the maximal or minimal legal concentration or value of a parameter.
<b>Private supplies</b>	water supplied for human consumption or food production which is not provided by a water undertaker or licensed water supplier.
<b>Protozoan parasites</b>	a single cell organism that can only survive by infecting a host.
<b>Public Register</b>	drinking water quality information made available to the public by water companies as required by regulations.
<b>Public supplies</b>	water supplied by a company licensed for that purpose.
<b>Raw water</b>	water prior to receiving treatment for the purpose of drinking.
<b>Regulations</b>	The Water Supply (Water Quality) Regulations 2000 (England), 2010 (Wales).
<b>Remedial action</b>	action taken to improve a situation.
<b>Residual disinfectant</b>	the small amount of chlorine or chloramines present in drinking water to maintain its quality as it passes through the water company's network of pipes and household plumbing.

<b>Risk assessment</b>	a review undertaken to identify actual or potential hazards to human health in a water treatment works and associated supply system. Prioritisation of risk is based on consideration of likelihood and consequence of the risk occurring.
<b>Secretary of State</b>	Secretary of State for Environment, Food and Rural Affairs.
<b>Selenium</b>	is an essential element and a necessary dietary component. Amounts in drinking water are usually well below the standard. A European health-based standard of 10µg/l applies.
<b>Service connection</b>	connection between the water company's main to a consumer's property.
<b>Service pipe</b>	any pipe subject to mains water pressure or subject to mains pressure but for the closing of some valve.
<b>Service reservoir</b>	a water tower, tank or other reservoir used for the storage of treated water within the distribution system.
<b>Sodium</b>	is a component of common salt. It is present in seawater and brackish groundwater. Some treatment chemicals contain sodium. Concentrations in drinking water are extremely low, but some water softeners can add significant amounts to drinking water where they are installed in homes or factories. A national standard of 200mg/l applies.
<b>Springs</b>	groundwater appearing at the surface at the outcrop of the junction of a permeable stratum with an impermeable stratum.
<b>Sulphate</b>	occurs naturally in all waters and is difficult to remove by treatment. An indicator parameter with a guide value of 250mg/l.
<b>Supply pipe</b>	see service pipe.
<b>Supply point</b>	a point other than a consumer's tap authorised for the taking of samples for compliance with the regulations.
<b>Surface water</b>	untreated water from rivers, impounding reservoirs or other surface water source.

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<b>Taste</b>	can arise as a consequence of natural processes in surface waters, particularly between late spring and early autumn. Water treatment with activated carbon or ozone will remove natural substances causing taste. The standard relates to the evaluations of a panel of people assessing samples in the laboratory.
<b>Technical audit</b>	the means of checking that water companies are complying with their statutory obligations.
<b>Tetrachloroethane and Trichloroethene</b>	are solvents that may occur in groundwater in the vicinity of industrial sites. Where necessary they are removed by specialist treatment. A European health-based standard of 10µg/l for the sum of both substances applies.
<b>Tetrachloromethane</b>	is a solvent that may occur in groundwater in the vicinity of industrial sites. Where necessary it is removed by specialist water treatment. A national standard of 3µg/l applies.
<b>Time of supply</b>	the moment when water passes from the water company's pipework into a consumer's pipework.
<b>Total indicative dose</b>	is a measure of the effective dose of radiation the body will receive from consumption of the water. It is calculated only when screening values for gross alpha or gross beta (radiation) are exceeded. An indicator parameter with a guide value of 0.10mSv/year.
<b>Total organic carbon</b>	represents the total amount of organic matter present in water. An indicator parameter with a guide value of 'no abnormal change'.
<b>Toxicology</b>	the study of the health effects of substances.
<b>Treated water</b>	water treated for use for domestic purposes as defined in the regulations.
<b>Trihalomethanes</b>	are formed during disinfection of water by a reaction between chlorine and naturally occurring organic substances. Their production is minimised by good operational practice. A European health-based standard of 100µg/l applies.
<b>Tritium</b>	is a radioactive isotope of hydrogen. Discharges to the environment are strictly controlled and there is a national programme of monitoring surface waters. An indicator parameter with a guide value of 100Bq/l.

<b>Turbidity</b>	is a measure of the cloudiness of water. At treatment works, measurement is an important non-specific water quality control parameter because it can be monitored continuously on line and alarms set to alert operators to deterioration in raw water quality or the need to optimise water treatment. An indicator parameter with a guide value of 1NTU. When detected at the consumer's tap it can arise from disturbance of sediment within water mains. A national standard of 4NTU applies in this case.
<b>Undertakings</b>	legally binding programmes of work agreed between a water company and the Chief Inspector of Drinking Water in order to address actual or potential water quality issues.
<b>Vinyl chloride</b>	may be present in plastic pipes as a residual of the manufacturing process of polyvinyl chloride (PVC) water pipes. Its presence in drinking water is controlled by product specification. A European health-based standard of 0.5µg/l applies.
<b>Water supply zone</b>	a pre-defined area of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.
<b>WHO</b>	World Health Organisation.
<b>Wholesome/wholesomeness</b>	a legal concept of water quality which is defined by reference to standards and other requirements set out in the regulations.

## Annex 3

### Drinking water quality events in the region

#### Not significant and minor drinking water quality events

<b>Nature</b>	<b>Number of not significant and minor events</b>	<b>Area affected (estimate of population affected)</b>
Chemical	1 – YKS (1)	Harrogate North Yorkshire (5)
Discolouration	2 – UU (1), YKS (1)	Parts of Bolton (16,250) Clayton and Buttershaw, Yorkshire (9,975)
Health concern	1 – YKS (1)	Marsett, Yorkshire (45)
Inadequate treatment	6 – DVW (3), NNE (1), UU (2)	North East of Chester (5,927) on three occasions North Northumberland, Glendale (4,586) Oldham, Lancashire (92,500) Greater Manchester (177,370)
Loss of supplies/ poor pressure	3 – NNE (3)	Wooler and Lowick, Northumberland (1,475) Yarm and Ingleby Barwick (19,493) Woodham Village (6,188)
Microbiological	4 – UU (2), YKS (2)	Burnley, Lancashire (3) Bolton, Greater Manchester (5) Starbottan and Buckden villages, Skipton, Yorkshire (375) Fearby near Masham, N Yorkshire (283)
Other	1 – UU (1)	Not applicable – cold weather event

Nature	Number of not significant and minor events	Area affected (estimate of population affected)
Public concern	14 – NNE (1), UU (11), YKS (2)	Stockton-on-Tees (100) Widnes (13) Tarvin, Cheshire (3) Kendal, Cumbria (3) Moorland, Penrith, Cumbria (3) Nantwich, Cheshire (3) Clitheroe Lancashire (3) Gorton, Lancashire (3) Frizington, Cumbria (3) Rivington, Lancashire (3) Bolton, Greater Manchester (3) Knott End Lancashire (3) Burley-in-Wharfedale, West Yorkshire (100) York (103)
Taste or odour	3 – NNE (1), YKS (2)	Blaydon on Tyne (7,308) Market Weighton, Yorkshire (3) Otley Road Bradford (298)
<b>Total</b>	<b>35 –DVW (3), NNE (6), UU (17), YKS (9)</b>	<b>354,289</b>

### Significant, serious and major drinking water quality events

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
06 Jan 2010 For 2 days (UU)	Ellesmere Port, Wirral and surrounding area	34,250	Brown discolouration: due to burst on private supply.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Advised consumers to trickle flush their taps.</li> <li>• Briefed key customers on need to communicate any water supply issues or change in operations in the area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate follow-up sampling.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
09 Jan 2010 For 13 days (UU)	Crewe and Nantwich	143,803	Chlorine taste and odour due to raw water deterioration.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Provided bottled water on request.</li> <li>• Sampled affected area.</li> <li>• Increased water from other source.</li> <li>• Introduced powdered activated carbon.</li> <li>• Introduced lime dosing earlier in process.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate initial investigations.</li> <li>• Company had made changes to the treatment process in 2009 which resulted in compromised treatment.</li> <li>• Poor response by company in respect of consumer complaints.</li> <li>• Poor understanding of break-point chlorination.</li> <li>• The severe adverse weather conditions contributed to this event.</li> </ul> <p>Risk classification: serious</p> <p>(see the <i>Drinking water quality events</i> section)</p>
11 Jan 2010 For 9 days (NNE)	Greenside service reservoir supplying Greenside, Prudhoe, Ryton and Stocksfield	13,953	Loss of supplies/poor pressure due to burst main.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Provided an alternative supply by tanker/bowser.</li> <li>• Repaired main.</li> <li>• Sampled affected area.</li> <li>• Company have project to replace pumps at Wylam to improve resilience in the area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfied with company response.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
11 Jan 2010 For 2 days (YKS)	Ripon	25,000	Brown discolouration due to increased pumping.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Supplied unwholesome water.</li> <li>• Sample results for iron, aluminium, manganese and turbidity above the standards.</li> </ul> <p>Risk classification: significant</p>
13 Jan 2010 For 2 days (UU)	Heswall area of the Wirral	62,000	Brown discolouration due to burst main.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Repaired main.</li> <li>• Sampled affected area.</li> <li>• Provided an alternative supply by tanker/bowser.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Commended actions taken to maintain supplies from Heswall Service reservoir during the period of repair.</li> <li>• Criticised the lack of microbiological checks filling reservoir from an alternative source.</li> </ul> <p>Risk classification: significant</p>
13 Jan 2010 For 5 days (YKS)	Chapel Allerton, Leeds	3	Sulphurous odour due to microbiological contamination in a dead leg main.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> <li>• Connected school to an alternative main.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Supplied water unfit for human consumption, but transferred school to alternative supply immediately.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
15 Jan 2010 For 4 days (UU)	Prescot works, supplying south Liverpool and West Prescot	382,056	<i>Cryptosporidium.</i>	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Investigation of the treatment works.</li> <li>• Undertook genotyping of the oocysts.</li> <li>• Reviewed relevant risk assessment.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommended that the company put in place robust processes and procedures to prevent rapid flow changes at the works.</li> <li>• Recommended that the company ensure staff are fully aware of the potential impact of flow changes and the recommendations of the Badenoch and Bouchier reports.</li> <li>• Recommended the company take all possible actions to ensure accurate turbidity monitoring at the works and no discrepancies between laboratory and on-line results.</li> </ul> <p>Risk classification: significant</p>
20 Jan 2010 For 24 hours (NNE)	Warkworth works supplying the North Tyneside area	161,000	<i>Cryptosporidium.</i>	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment process – filtration.</li> <li>• Inadequate procedures.</li> <li>• Criticised the company for lack of site specific disinfection policy.</li> <li>• Recommendation following site audit in May that the company should develop a site specific disinfection policy to meet the requirements of Regulation 26.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
21 Jan 2010 For 17 hours (NNE)	Chester Road, Stanley, County Durham	6,069	Sulphurous taste and odour due to valve operations following burst main.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Repaired main.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Supplied water in breach of regulatory standards due to valve operations.</li> <li>• Company could not explain the delay between stagnant water entering supply and consumers complaining.</li> <li>• Suggest company review DOMS and flow and pressure data for the area.</li> </ul> <p>Risk classification: significant</p> <p>(see the <i>Drinking water quality events</i> section).</p>
25 Jan 2010 For 1 day (UU)	Huntington works supplying parts of Cheshire and Merseyside	1,500,000	<i>Cryptosporidium.</i>	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment – clarification.</li> <li>• Inadequate site start up procedures.</li> </ul> <p>Risk classification: significant</p>
26 Jan 2010 For 1 day (YKS)	Blackmoorfoot works supplying areas of Huddersfield, West Yorkshire	70,000	<i>Cryptosporidium.</i>	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommended the company reviews the Regulation 27 risk assessment in light of this event and, if appropriate, provide an updated copy of the Regulation 28 report to the Inspectorate.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
12 Feb 2010 For 12 hours (UU)	Oldham, Lancashire	33,000	Interruption to pH dosing leading to elevated turbidity.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Review of procedures.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate follow up sampling.</li> <li>• Inadequate treatment – lime dosing.</li> <li>• Critical of failure of automatic shutdown alarms on site.</li> </ul> <p>Risk classification: significant</p>
16 Feb 2010 For 3 days (YKS)	Goldthorpe, South Yorkshire	2,000	Loss of supplies due to third party damage to main.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Rezoned area (brought in water from different source).</li> <li>• Replaced main.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• The company acted appropriately to protect consumers by sampling the area, rezoning supplies and informing consumers.</li> </ul> <p>Risk classification: significant</p>
21 Mar 2010 For 1 hour (UU)	Huntington works supplying parts of Cheshire and Merseyside	1,500,000	Loss of disinfection.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Review of procedures.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical that water with no chlorine residual left site undetected for 40 minutes.</li> <li>• Critical of lack of low chlorine alarm visibility on site.</li> <li>• Critical of lack of site shutdown.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
02 Apr 2010 For 11 hours (YKS)	Headingley, Leeds	58,000	Discolouration due to burst main.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Repaired main.</li> <li>• Rezoned area (brought in water from different source).</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfactory investigation and actions.</li> </ul> <p>Risk classification: significant</p>
13 Apr 2010 For 4 days (YKS)	Huddersfield, West Yorkshire	6,250	Discolouration due to burst main.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate follow-up sampling.</li> </ul> <p>Risk classification: significant</p>
17 Apr 2010 For 4 days (YKS)	Batley, West Yorkshire	78	Issue of Boil Notice due to burst main.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> <li>• Issued precautionary boil water notice due to extent of damage caused by burst.</li> <li>• Portable booster chlorinator on site to increase residual chlorine in the area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfactory investigation and actions.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
20 Apr 2010 For 3 days (NNE)	Forest Hall area of Newcastle	59,350	Brown discolouration due to planned work.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Rezoned area (brought in water from different source).</li> <li>• Sampled affected area.</li> <li>• Repaired main.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical of unreliable alarm responses from turbidity monitor which were used to inform and support operational procedures.</li> </ul> <p>Risk classification: significant</p>
20 Apr 2010 For 7 days (UU)	Penrith in Cumbria and surrounding area	3,750	Higher than usual residual chlorine following disinfection failure.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Replaced faulty equipment.</li> <li>• Removed service reservoir from supply.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment – overdosing chlorine.</li> <li>• Inadequate investigations into root cause.</li> <li>• Inadequate communication caused delay in response.</li> <li>• Samples not analysed for appropriate parameters.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
30 Apr 2010 For 2 days (NNE)	Shilbottle service reservoir supplying north Tyneside	25,000	<i>E.coli.</i>	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Isolated reservoir from supply.</li> <li>• Sampled affected area.</li> <li>• Sample point relocated.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical that sample point was highlighted as inappropriate in 2008 and had not been moved.</li> <li>• One of several microbiological failures at associated reservoirs.</li> <li>• Enforcement action considered.</li> </ul> <p>Risk classification: significant</p>
10 May 2010 For 11 days (UU)	Rossendale near Oldham, Lancashire	300	Cross connection with a private supply.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Issued a boil water notice.</li> <li>• Rezoned area (brought in water from different source).</li> <li>• Sampled affected area.</li> <li>• Disconnected spring supply from mains.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• United Utilities followed good practice to reduce the risk to private supply users.</li> <li>• Event should be used as training example within the company for good collaborative work with stakeholders.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
20 May 2010 For 10 days (UU)	Parts of the Wirral including Wallasey, near Merseyside	127,000	Loss of supplies/poor pressure due to planned work.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Provided an alternative supply by tanker/bowser.</li> <li>• Repaired main.</li> <li>• Repaired faulty equipment.</li> <li>• Provided bottled water on request.</li> <li>• Rezoned area (brought in water from different source).</li> <li>• Review of procedures.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate training/competence of staff.</li> <li>• Poor asset information.</li> </ul> <p>Risk classification: significant</p>
20 May 2010 For 1 hour (UU)	Huntington works supplying parts of Cheshire and Merseyside	1,548,909	<i>Cryptosporidium.</i>	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Review of procedures.</li> <li>• Sampled affected area.</li> <li>• Carried out reviews of procedures and audited the site.</li> <li>• Identified the need for investment in the backwash water treatment process.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical of lack of robustness of treatment processes during power dips and/or shutdown and start up.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
25 May 2010 For 1 day (UU)	High Newton, Cumbria	12,785	Discolouration due to burst main.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Flushed affected area.</li> <li>• Sampled area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Discolouration was short-lived.</li> <li>• Appropriate company response.</li> </ul> <p>Risk classification: significant</p>
30 May 2010 For 27 hours (UU)	Bromborough, Wirral	46,327	Brown discolouration associated with an increase in flow from Sutton Hall works.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate investigations into root cause.</li> <li>• Information should be taken into account in DOMS.</li> </ul> <p>Risk classification: significant</p>
04 Jun 2010 For 5 hours (NNE)	Houghton-le-spring, Tyne and Wear	155	Brown discolouration due to flow changes.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate procedures.</li> <li>• Recommended that the company review the site operating manual and make appropriate amendments where necessary to ensure all information contained within the site operating manual is accurate.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
07 Jun 2010 For 4 hours (UU)	Prescot works, supplying south Liverpool and west Prescot	380,000	Disinfection.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Replaced faulty equipment.</li> <li>• Sampling response.</li> <li>• The company has carried out a technical review of the treatment process and changes to mitigate the identified risks.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment process – clarification.</li> <li>• Recommended that the company produce up to date site specific disinfection policy for all its water treatment works.</li> <li>• There were three events at this works in 2010.</li> </ul> <p>Risk classification: significant</p>
11 Jun 2010 For 3 days (NNE)	Longbenton, Northumberland	42,990	Discolouration due to mobilisation of network deposits.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Flushed mains.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Cause of discolouration was mains deposits</li> <li>• Zone awaiting cleaning as part of a legally binding programme of work.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
15 Jun 2010 For 2 days (DVW)	Chester and North East Wales	160,000	<i>Cryptosporidium</i> .	<p><b>Dee Valley Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Process investigation undertaken.</li> <li>• The company audited the laboratory.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• This event was caused by a false positive laboratory result.</li> <li>• No recommendations or suggestions were made.</li> </ul> <p>Risk classification: significant</p>
23 Jun 2010 For 1 hour (UU)	Huntington works supplying parts of Cheshire and Merseyside	1,500,000	Elevated turbidity due to equipment failure.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Repaired faulty equipment.</li> <li>• Company has identified upgrades to the control instrumentation.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Company should review and update the site risk assessment.</li> <li>• Critical that the emergency lime dosing system cannot be controlled adequately.</li> <li>• Did not sample for appropriate parameters.</li> <li>• Required the company to improve disinfection control on site.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
29 Jun 2010 For 6 hours (HPL)	Woodstock Way, Hartlepool	463	Loss of supplies/poor pressure due to planned work.	<p><b>Hartlepool Water Plc Action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inaccurate asset plans resulted in incorrect valve operation.</li> </ul> <p>Risk classification: significant</p>
01 Jul 2010 For 12 hours (UU)	Sutton Hall area of the Wirral	67,126	Brown discolouration: due to increased flow in trunk main.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Issued a boil water notice to a single property.</li> <li>• Sampled affected area.</li> <li>• Isolated pump from contact tank to prevent further high flows.</li> <li>• Restricted flows into contact tank.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Samples not analysed for appropriate parameters.</li> <li>• Inadequate follow-up sampling.</li> </ul> <p>Risk classification: significant</p>
02 Jul 2010 For 20 days (YKS)	Part of North Yorkshire including Bedale, Leyburn, Wensleydale, Masham and Northallerton	43,000	Earthy musty tastes and odours due to algae in the raw water.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Review of procedures.</li> <li>• Revised risk assessment.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Did not notify Inspectorate initially.</li> <li>• Inadequate contingency planning.</li> <li>• Inadequate number of samples taken.</li> <li>• Company should prioritise planned replacement of powdered activated carbon dosing.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
05 Jul 2010 For 3 days (UU)	Tosside works supplying Skipton	87	Elevated turbidity.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Review of procedures.</li> <li>• Filter installed to remove iron from raw water.</li> <li>• Procedures updated to ensure consumer notices are delivered to the correct location.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate procedures.</li> <li>• Inadequate treatment process – filtration.</li> <li>• The raw water turbidity monitor was not commissioned at the time of the event.</li> </ul> <p>Risk classification: significant</p>
05 Jul 2010 For 1 day (UU)	Castle Carrock works supplying Carlisle and surrounding areas	106,000	Loss of coagulation.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Sampled affected area.</li> <li>• Shut down treatment works.</li> <li>• Changes made to process control and alarm settings and to proactive maintenance programme.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment process – clarification.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
08 Jul 2010 For 3 days (UU)	Parts of the Manchester area	64,855	<i>E.coli</i> at Oldham Edge service reservoir.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Repaired faulty equipment.</li> <li>• Removed service reservoir from supply.</li> <li>• Inspected reservoir, identified integrity problem, remediated and performed a successful inundation test.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommend the company ensures sampling facilities comply with internal standards.</li> <li>• Lack of maintenance of equipment.</li> </ul> <p>Risk classification: significant</p>
10 Jul 2010 For 1 day (UU)	Parts of St Helens, Lancashire	6,229	Brown discolouration due to burst main.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Flushed mains.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommended review of risk assessment procedures on reactive work in the network and ensure documentation is completed.</li> <li>• Update current procedures.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
15 Jul 2010 For 5 days (NNE)	Horsley works supplying Ashington, Lynemouth, Ellington, Blyth, Cramlington, Gosforth, Longbenton and Whitley Bay.	500,000	Loss of supplies/poor pressure due to burst main.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Rezoned area and flushed mains.</li> <li>• Sampled affected area.</li> <li>• Deployed tankers and alternative supplies.</li> <li>• Repaired main.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical that ends of an open main were not capped.</li> <li>• Investigation ongoing.</li> </ul> <p>Risk classification: significant</p>
18 Jul 2010 For 22 hours (UU)	Liverpool	380,000	Loss of coagulation.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Review of procedures.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate investigations into root cause.</li> <li>• Recommended that once a failure of a treatment process has been identified the company ensures it acts immediately to identify the cause and the potential impact on public health.</li> </ul> <p>Risk classification: significant</p>
23 Jul 2010 For 2 days (UU)	Single property, Leagram, Preston	3	Boil notice issued due to raw water deterioration.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Issued boil water advice.</li> <li>• Sampled the area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommend company bring forward date of connection of this supply to mains water.</li> <li>• Recommend enhanced monitoring.</li> <li>• Regulation 28 Notice under review.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
25 Jul 2010 For 2 days (UU)	Prescot and Whiston, Merseyside	5,591	Brown discolouration due to vandalism.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfactory investigation and actions.</li> </ul> <p>Risk classification: significant</p>
14 Aug 2010 For 1 day (NNE)	North Charlton service reservoir and Warkworth works supplying areas of north Tyneside	3,750	<i>E.coli</i> at service reservoir.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Isolated reservoir from supply.</li> <li>• Sampled affected area.</li> <li>• Repaired mesh vents.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Critical that mesh vent repairs highlighted in 2009 had not been carried out.</li> <li>• One of several microbiological failures at associated reservoirs.</li> <li>• Enforcement action considered.</li> </ul> <p>Risk classification: significant</p>
25 Aug 2010 For 28 hours (UU)	Warrington	50,000	Third party damage to main.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Rezoned area (brought in water from different source).</li> <li>• Repaired main.</li> <li>• Provided bottled water on request.</li> <li>• Provided an alternative supply by tanker/bowser.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfactory investigation and actions.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
26 Aug 2010 For 8 days (UU)	Single property, Langley, Macclesfield	3	Issue of a do not drink notice due to metallic taste in free (concessionary) supply.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Issued a do not drink notice.</li> <li>• Provided an alternative supply by tanker/bowser.</li> <li>• Provided bottled water on request.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate number of samples taken.</li> <li>• Samples not analysed for appropriate parameters.</li> </ul> <p>Risk classification: significant</p>
03 Sep 2010 For 12 hours (UU)	Waterhead works supplying the Oldham area	71,000	Elevated turbidity.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Replaced faulty equipment.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Supplied unwholesome water.</li> <li>• Inadequate follow-up sampling.</li> <li>• Inadequate treatment process – filtration.</li> </ul> <p>Risk classification: significant</p>
24 Sep 2010 For 4 days (YKS)	Kepwick, North Yorkshire	15,490	Disinfection.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Increased chlorine residuals at service reservoir.</li> <li>• Sampled affected area.</li> <li>• Improved operator awareness and installed extra monitors.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate treatment process, loss of chlorine in final water.</li> <li>• Company has introduced measures to prevent reoccurrence.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
25 Sep 2010 For 8 hours (UU)	Nelson, Barrowford, Newchurch and Roughlee in East Lancashire	27,000	Loss of polymer dosing control.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Replaced faulty equipment.</li> <li>• Sampled affected area.</li> <li>• In the short term, additional alarms have been installed.</li> <li>• In the long term, a failsafe coagulation system is scheduled to be installed.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Further information requested regarding maintenance and calibration of pH probes and polymer pumps.</li> <li>• Recommended the service reservoir downstream of this site is internally inspected and records retained.</li> </ul> <p>Risk classification: significant</p>
04 Oct 2010 For 48 hours (YKS)	Hessle and the surrounding area	2,000	Brown discolouration due to planned work.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampling from area.</li> <li>• Review of procedures.</li> <li>• Review of risk assessment.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate communication caused delay in response.</li> <li>• Inadequate contingency planning.</li> <li>• Inadequate risk assessment.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
07 Oct 2010 (YKS)	North Yorkshire	No people affected	Contaminated water treatment chemical.	<p><b>Yorkshire Water Services Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Isolated works from supply.</li> <li>• Checks with rest of the industry.</li> <li>• Liaised with chemical supplier to identify batch.</li> <li>• Reviewed customer complaint data.</li> <li>• Extensive sampling from other sites.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Satisfied with company response and communication.</li> <li>• Information letter issued to the industry.</li> </ul> <p>Risk classification: significant</p>
12 Oct 2010 For 2 hours (UU)	Rochdale, Lancashire	100,000	Elevated turbidity and aluminium.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Company contained 60% of the high turbidity water before it reached consumers.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommend the company review start up procedures.</li> <li>• Recommend the company develop a design standard for alarms and alarm philosophy and apply company wide.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
15 Oct 2010 For 1 day (UU)	Padgate and Orford areas of Warrington	13,663	Brown discolouration.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Repaired faulty equipment.</li> <li>• Flushed mains.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate risk assessment.</li> <li>• Recommended to incorporate learning points into Distribution, Operation and Maintenance Strategy (DOMS).</li> </ul> <p>Risk classification: significant</p>
11 Nov 2010 For 12 hours (NNE)	Middlesbrough	6,643	Brown discolouration due to burst main.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Repaired faulty equipment.</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommend the company update their site operations manual.</li> <li>• Recommend the company update their site risk assessment.</li> <li>• Supplied water in breach of regulatory standards.</li> </ul> <p>Risk classification: significant</p>
18 Nov 2010 For 24 hours (NNE)	Hordon, Peterlee	23	Musty taste and odour.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate procedures.</li> <li>• Inadequate training/competency of staff.</li> <li>• Supplied water in breach of regulations.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
07 Dec 2010 For 14 hours (UU)	Waterhead, Oldham	154,570	Elevated turbidity on works start up.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Sampled the area.</li> <li>• Problem exacerbated by cold weather event.</li> <li>• Heaters brought to site to thaw frozen dissolved-air supply lines.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Recommended the company review their procedures for appropriate sampling during events and brief staff.</li> </ul> <p>Risk classification: significant</p>
14 Dec 2010 For 3 days (NNE)	Blyth, Northumberland	16,994	Brown discolouration due to planned work.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Sampled affected area.</li> <li>• Carried out localised flushing.</li> <li>• Notified Health Protection Agency and local authority.</li> <li>• Carried out network modelling to risk assess this planned work.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Concern over contractors following their own procedures.</li> </ul> <p>Risk classification: significant</p>
17 Dec 2010 For 12 hours (NNE)	Cramlington, Northumberland	28,205	Brown discolouration due to burst main.	<p><b>Northumbrian Water Ltd action:</b></p> <ul style="list-style-type: none"> <li>• Repaired main.</li> <li>• Retrained staff.</li> <li>• Rezoned area (brought in water from different source).</li> <li>• Sampled affected area.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Inadequate follow-up sampling.</li> <li>• Recommended to ensure samples are representative of the whole area affected.</li> </ul> <p>Risk classification: significant</p>

Date and duration	Area	Estimate of population affected	Nature and cause of the event	Main actions and findings from the Inspectorate investigation
22 Dec 2010 For 8 hours (UU)	Oldham, Lancashire and surrounding area	98,000	Disinfection.	<p><b>United Utilities Water Plc action:</b></p> <ul style="list-style-type: none"> <li>• Reduced works output.</li> <li>• Cleaned the sulphuric acid dosing lines.</li> <li>• Notified Health Protection Unit and Environmental Health.</li> </ul> <p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Assessment ongoing.</li> </ul> <p>Risk classification: significant</p>

### Event affecting a number of water companies

Date and duration	Nature and cause of event	Main actions and findings from the Inspectorate investigation
02 Jul 2010 Duration not applicable (Severn Trent Services)	Analytical malpractice.	<p><b>DWI comments and findings:</b></p> <ul style="list-style-type: none"> <li>• Serious deficiencies were found by the water undertakers or the combined licensees for failing to meet their obligations under Regulations 16 and 34 for analysis of water samples and, in particular, derived analytical data, competency, retention of appropriate records, and for the appropriate time, using suitable equipment found in analytical practices for inorganic chemical analysis (Regulation 16).</li> <li>• Full details in the published audit report.</li> <li>• Initiated enforcement action in relation to the eight water companies using Severn Trent Services.</li> </ul> <p>Risk classification: serious</p>

Note: A complete table of events in England and Wales in 2010 can be found on the CD in the folder. It is named **Significant drinking water events in England and Wales 2010.pdf**. It is also available on the DWI website ([www.dwi.gov.uk](http://www.dwi.gov.uk)).

## Annex 4

### Planned drinking water quality improvements

Company	Parameter, hazard or driver	Site	Due for completion	Status	Legal Instrument
NNE	Iron	Distribution system – Tyneside	30-Mar-15	Ongoing	Notice
NNE	Iron	Distribution system – Wearside	31-Mar-15	Ongoing	Notice
NNE	Iron and Manganese	Consumer acceptability measures – distribution system	30-Mar-11	Delayed	Undertaking
NNE	Iron and Manganese	Distribution system – Teesdale and Teeside	30-Apr-13	Ongoing	Undertaking
NNE	Iron and Manganese	Distribution system – Tyneside	31-Mar-15	Ongoing	Undertaking
NNE	Lead	Distribution system	31-Mar-15	Ongoing	Undertaking
NNE	Metaldehyde	Horsley catchment	31-Mar-15	Ongoing	Undertaking
NNE	Metaldehyde	Lumley catchment	31-Mar-15	Ongoing	Undertaking
NNE	Metaldehyde	Warkworth catchment	31-Mar-15	Ongoing	Undertaking
NNE	Metaldehyde	Whittle Dene catchment	31-Mar-15	Ongoing	Undertaking
UU	Benzo(a)pyrene	Knutsford area	30-Apr-10	Completed 12-May-10	Undertaking
UU	Colour and Total Trihalomethanes	Clay Lane	31-Dec-13	Ongoing	Undertaking
UU	Colour and Total Trihalomethanes	Kinder/Wybersley catchment	31-Mar-15	Ongoing	Undertaking
UU	Colour and Total Trihalomethanes	Lake Vyrnwy catchment	31-Jul-14	Ongoing	Undertaking
UU	Colour and Total Trihalomethanes	Woodhead/Arnfield catchment	31-Mar-15	Ongoing	Undertaking
UU	<i>Cryptosporidium</i>	Concessionary supply (1)	31-Mar-13	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (2)	31-Mar-15	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (3)	31-Mar-13	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (4)	31-Mar-13	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (5)	31-Mar-12	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (6)	31-Mar-12	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (7)	31-Mar-13	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (8)	31-Mar-12	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (9)	31-Mar-11	Ongoing	Notice
UU	<i>Cryptosporidium</i>	Concessionary supply (10)	31-Mar-15	Ongoing	Notice

Company	Parameter, hazard or driver	Site	Due for completion	Status	Legal Instrument
UU	Integrity and raw water protection	Grange	31-May-12	Ongoing	Notice
UU	Iron	Vyrnwy – trunk main	31-Dec-20	Ongoing	Undertaking
UU	Iron and Manganese	Birkenhead – trunk and distribution mains	31-Aug-16	Ongoing	Undertaking
UU	Iron and Manganese	Blackpool and Lytham – trunk and distribution mains	31-Aug-17	Ongoing	Undertaking
UU	Iron and Manganese	Carlisle – trunk and distribution mains	30-Apr-20	Ongoing	Undertaking
UU	Iron and Manganese	Cleveleys Thornton – trunk and distribution mains	31-Jul-12	Ongoing	Undertaking
UU	Iron and Manganese	Crosshill to Wallasey – trunk and distribution mains	31-Aug-16	Ongoing	Undertaking
UU	Iron and Manganese	Ellesmere Port – trunk and distribution mains	30-Sep-12	Ongoing	Undertaking
UU	Iron and Manganese	Fleetwood – trunk main investigations	31-Aug-14	Ongoing	Undertaking
UU	Iron and Manganese	Hapsford – trunk and distribution mains	31-Aug-16	Ongoing	Undertaking
UU	Iron and Manganese	Lancashire conjunctive use scheme large diameter trunk mains	31-Mar-10	Delayed	Undertaking
UU	Iron and Manganese	Liverpool and Wigan – trunk and distribution mains	31-Mar-14	Ongoing	Undertaking
UU	Iron and Manganese	Manchester – trunk and distribution mains	31-Mar-14	Ongoing	Undertaking
UU	Iron and Manganese	Manchester – trunk mains	31-Mar-13	Ongoing	Undertaking
UU	Iron and Manganese	Preston – trunk and distribution mains	31-Mar-11	Delayed	Undertaking
UU	Iron and Manganese	Ridgegate – trunk and distribution mains	31-Dec-11	Ongoing	Undertaking
UU	Iron and Manganese	Rivington – trunk and distribution mains	31-Mar-15	Ongoing	Undertaking
UU	Iron and Manganese	Vyrnwy – trunk and distribution mains	31-Mar-14	Ongoing	Undertaking
UU	Iron, Manganese, Aluminium and Turbidity	Distribution system	31-Jul-09	Ongoing	Undertaking
UU	Lead	Bowscar and Gamblesby	31-Mar-10	Completed 30-Sep-10	Notice
UU	Lead	Distribution system	31-Mar-15	Ongoing	Undertaking
UU	Manganese	Dee – trunk mains and distribution system	31-Dec-15	Ongoing	Undertaking

Company	Parameter, hazard or driver	Site	Due for completion	Status	Legal Instrument
UU	Manganese	Hodder – trunk and distribution mains	30-Sep-10	Completed 25-Mar-11	Undertaking
UU	Manganese	Hodder – trunk main	31-Dec-09	Completed 13-Apr-10	Undertaking
UU	Manganese	Liverpool distribution system	30-Jun-14	Ongoing	Undertaking
UU	Network maintenance	Haweswater – trunk main	31-Dec-16	Ongoing	Notice
UU	Pathogens	Buckton Castle	28-Feb-10	Completed 26-Feb-10	Notice
UU	Taste and odour	Lancaster	31-Dec-12	Ongoing	Undertaking
UU	Taste and odour	Piethorne	31-Jul-14	Ongoing	Undertaking
UU	Taste and odour	Watergrove	31-Dec-12	Ongoing	Undertaking
YKS	Colour	Ewden	31-Mar-10	Completed 15-Apr-10	Undertaking
YKS	Colour	Graincliffe	31-Mar-10	Completed 23-Jul-10	Undertaking
YKS	Colour and Total Trihalomethanes	Chellow Heights catchment	31-Mar-14	Ongoing	Undertaking
YKS	Colour and Total Trihalomethanes	Langsett catchment	31-Mar-14	Ongoing	Undertaking
YKS	Colour and Total Trihalomethanes	Longwood catchment	31-Mar-14	Ongoing	Undertaking
YKS	Colour and Total Trihalomethanes	Loxley catchment	31-Mar-14	Ongoing	Undertaking
YKS	Colour and Total Trihalomethanes	Oldfield catchment	31-Dec-12	Ongoing	Undertaking
YKS	Iron and Manganese	Rivelin distribution system	30-Jun-12	Ongoing	Undertaking
YKS	Iron and Manganese	Studforth	31-Mar-10	Completed 15-Feb-10	Undertaking
YKS	Lead	Leeds distribution system	31-Dec-13	Ongoing	Undertaking
YKS	Manganese	Embsay	31-Dec-13	Ongoing	Undertaking
YKS	Manganese	Ingbirchworth	31-Mar-15	Ongoing	Undertaking
YKS	Manganese	Rivelin	31-Dec-12	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Acomb Landing catchment	31-Mar-14	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Eccup catchment	31-Mar-14	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Elvington catchment	31-Mar-14	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Huby catchment	31-Mar-14	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Loftsome Bridge catchment	31-Mar-14	Ongoing	Undertaking
YKS	Metaldehyde and Total Pesticides	Tophill Low catchment	31-Mar-14	Ongoing	Undertaking
YKS	Nitrate	Keldgate	31-Mar-10	Completed 1-Feb-10	Undertaking
YKS	Nitrate	Tophill Low	31-Mar-15	Ongoing	Undertaking
YKS	Pathogens	Chapel-le-Dale	31-Mar-15	Ongoing	Notice

<b>Company</b>	<b>Parameter, hazard or driver</b>	<b>Site</b>	<b>Due for completion</b>	<b>Status</b>	<b>Legal Instrument</b>
YKS	Pathogens	Concessionary supply (11)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Concessionary supply (12)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Concessionary supply (13)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Concessionary supply (14)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Concessionary supply (15)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Concessionary supply (16)	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Countersett	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Hawkswick	31-Dec-13	Ongoing	Notice
YKS	Pathogens	Horsehouse	31-Mar-15	Ongoing	Notice
YKS	Pathogens	Marsett	31-Dec-12	Completed 31-Mar-11	Notice
YKS	Pathogens	Oughtershaw	31-Dec-13	Ongoing	Notice
YKS	Pathogens	Stalling Busk	31-Dec-12	Completed 31-Mar-11	Notice

## Annex 5 Competition in the water industry

The following table indicates the extent of competition in the water industry in England and Wales.

### **Inset appointments in place in 2010**

<b>Site</b>	<b>Appointee</b>	<b>Incumbent and region</b>	<b>Status</b>
Shotton Paper, Shotton	Albion Water	Dŵr Cymru, Wales	Supplying water
Buxted Chicken, Flixton	Anglian Water	Essex and Suffolk Water, Eastern region	Supplying water
Wynyard, near Wolviston	Hartlepool Water	Northumbrian Water, Northern region	Supplying water
Brooklands, Milton Keynes	Independent Water Networks Ltd	Anglian Water, Eastern region	Supplying water
Great Billing Way, Northampton	Independent Water Networks Ltd	Anglian Water, Eastern region	Supplying water
Long Croft Road, Corby	Independent Water Networks Ltd	Anglian Water, Eastern region	Supplying water
Priors Hall, Corby	Independent Water Networks Ltd	Anglian Water, Eastern region	Supplying water
Kings Cross, London	Independent Water Networks Ltd	Thames Water, Thames region	Supplying water
The Bridge, Dartford	Independent Water Networks Ltd	Thames Water, Thames region	Supplying water
Media City, Salford Quays	Peel Water Networks Ltd	United Utilities, Northern region	Supplying water
Graylingwell, Chichester	SSE Water	Portsmouth Water/Southern Water, Southern region	Supplying water
Bromley Common, Bromley	SSE Water	Thames Water, Thames region	Supplying water
Hale Village, Tottenham	SSE Water	Thames Water, Thames region	Supplying water
Kennet Island, Reading	SSE Water	Thames Water, Thames region	Supplying water
Park Views, Epsom	SSE Water	Thames Water, Thames region	Supplying water
The Portway, near Salisbury	SSE Water	Wessex Water, Western region	Supplying water
Fairfield Park and Lower Wilbury Farm, Arlesey	Veolia Water Central	Anglian Water, Eastern region	Supplying water
MoD Tidworth near Andover	Veolia Water Projects	Wessex Water, Western region	Supplying water

**New inset appointments in place for 2010 (by 31 May 2011)**

<b>Site</b>	<b>Appointee</b>	<b>Incumbent and region</b>	<b>Status</b>
Berryfields, Aylesbury	Independent Water Networks Ltd	Thames Water, Thames region	Supplying water from April 2011
Llanilid Park, South Wales	SSE Water	Dŵr Cymru, Wales	Appointment granted
Great Western Park, Didcot	SSE Water	Thames Water, Thames region	Supplying water from April 2011
Kingsmere, Bicester	SSE Water	Thames Water, Thames region	Appointment granted

**Water supply licenses in place in 2010**

<b>Name of company</b>	<b>License type</b>	<b>Date license granted by Ofwat</b>	<b>Status</b>
Aquavitae	Combined	1 December 05	Licence revoked
Avon Valley Water	Retail	6 August 10	Not yet operating
Business Stream	Retail	23 January 09	Not yet operating
Osprey Water Services Ltd	Combined	5 January 07	Not yet operating
Satec Ltd	Combined	24 May 06	Not yet operating
Severn Trent Water Select Ltd	Combined	1 December 05	One retail customer Eastern region
UU Water Sales Ltd	Combined	3 January 07	Not yet operating
Watercall Ltd	Combined	1 December 05	Inactive
YorWater Ltd	Retail	21 March 06	Not yet operating

## Annex 6 Water company indices

### Dee Valley Water plc

#### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	6	Water supplied (MI/day)	64
Number of service reservoirs	31	Percentage from surface sources	94
Number of water supply zones	18	Percentage from ground sources	6
Length of mains pipe (km)	1,848	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	260,000	Cheshire, Flintshire, Denbighshire and Wrexham	
Number of local authorities	4		

#### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	99.92%	99.99%	99.89%	99.96%
<b>Water treatment</b>				
Process Control Index	99.99%	100%	100%	99.99%
Disinfection Index	99.77%	99.90%	99.87%	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	99.61%	99.92%	99.95%	99.86%
Reservoir Integrity Index	99.88%	99.82%	99.97%	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	99.84%	99.93%	99.76%	99.89%

#### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	202	185	155	N/A
Rate per 1,000 population	0.77	0.71	0.59	1.26
<b>Acceptability of water to consumers</b>				
Total number	689	598	775	N/A
Rate per 1,000 population	2.64	2.30	2.97	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
No consumers of Dee Valley Water plc directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters.

## Hartlepool Water plc

### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	3	Water supplied (MI/day)	35
Number of service reservoirs	6	Percentage from surface sources	0
Number of water supply zones	3	Percentage from ground sources	100
Length of mains pipe (km)	597	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	88,000	Hartlepool and surrounding area	
Number of local authorities	2		

### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	100%	100%	100%	99.96%
<b>Water treatment</b>				
Process Control Index	100%	100%	100%	99.99%
Disinfection Index	100%	99.91%	100%	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	100%	100%	100%	99.86%
Reservoir Integrity Index	100%	100%	99.84%	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	100%	99.92%	100%	99.89%

### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	22	16	20	N/A
Rate per 1,000 population	0.25	0.18	0.23	1.26
<b>Acceptability of water to consumers</b>				
Total number	278	396	347	N/A
Rate per 1,000 population	3.21	4.44	3.95	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
No consumers of Hartlepool Water plc directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters.

## Northumbrian Water Ltd

### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	33	Water supplied (MI/day)	725
Number of service reservoirs	215	Percentage from surface sources	82
Number of water supply zones	75	Percentage from ground sources	6
Length of mains pipe (km)	17,061	Percentage from mixed sources	12
Population served		Area of supply	
Population supplied	2,493,000	Northumberland (Northumberland County Council) (large part) County Durham (Durham County Council) (large part) North Yorkshire (North Yorkshire County Council) (part) Cumbria (Cumbria County Council) (very small part)	
Number of local authorities	17		

### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	99.93%	99.93%	99.95%	99.96%
<b>Water treatment</b>				
Process Control Index	99.98%	99.98%	>99.99%	99.99%
Disinfection Index	99.94%	99.93%	99.93%	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	99.52%	99.42%	99.71%	99.86%
Reservoir Integrity Index	99.92%	99.92%	99.93%	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	99.8%	99.85%	99.85%	99.89%

### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	1,536	1,226	999	N/A
Rate per 1,000 population	0.61	0.49	0.40	1.26
<b>Acceptability of water to consumers</b>				
Total number	8,667	7,300	8,505	N/A
Rate per 1,000 population	3.47	2.94	3.41	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
A total of 4 consumers of Northumbrian Water Ltd directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters.

## Peel Water Networks

### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	0	Water supplied (MI/day)	0.12
Number of service reservoirs	0	Percentage from surface sources	100
Number of water supply zones	1	Percentage from ground sources	0
Length of mains pipe (km)	1.2	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	60	Media City, Salford	
Number of local authorities	1		

### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	N/A	94.14%	100%	99.96%
<b>Water treatment</b>				
Process Control Index	N/A	N/A	N/A	99.99%
Disinfection Index	N/A	N/A	N/A	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	N/A	91.67%	100%	99.86%
Reservoir Integrity Index	N/A	N/A	N/A	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	N/A	88.89%	100%	99.89%

### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	N/A	0	1	N/A
Rate per 1,000 population	N/A	0	16.67	1.26
<b>Acceptability of water to consumers</b>				
Total number	N/A	0	0	N/A
Rate per 1,000 population	N/A	0	0	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
No consumers of Peel Water Networks directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters.

## United Utilities Water plc

### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	88	Water supplied (MI/day)	1,756
Number of service reservoirs	378	Percentage from surface sources	84
Number of water supply zones	241	Percentage from ground sources	4
Length of mains pipe (km)	42,391	Percentage from mixed sources	12
Population served		Area of supply	
Population supplied	6,823,000	Cumbria, Lancashire, Merseyside, Greater Manchester and Cheshire	
Number of local authorities	45		

### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	99.91%	99.94%	99.96%	99.96%
<b>Water treatment</b>				
Process Control Index	99.92%	99.94%	99.97%	99.99%
Disinfection Index	99.82%	99.87%	99.97%	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	99.71%	99.74%	99.83%	99.86%
Reservoir Integrity Index	99.95%	99.95%	99.94%	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	99.8%	99.87%	99.86%	99.89%

### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	2,052	2,742	1,752	N/A
Rate per 1,000 population	0.3	0.40	0.26	1.26
<b>Acceptability of water to consumers</b>				
Total number	20,425	19,645	16,315	N/A
Rate per 1,000 population	3.00	2.90	2.39	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
A total of 7 consumers of United Utilities Water plc directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters.

## Yorkshire Water Services Ltd

### Water supply arrangements

Company assets		Water supplied	
Number of treatment works	75	Water supplied (MI/day)	1,285
Number of service reservoirs	363	Percentage from surface sources	80
Number of water supply zones	76	Percentage from ground sources	20
Length of mains pipe (km)	31,062	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	4,925,000	Yorkshire	
Number of local authorities	22		

### Drinking water quality summary data

	Company figure			Industry average
	2008	2009	2010	2010
<b>Overall drinking water quality*</b>	99.96%	99.96%	99.97%	99.96%
<b>Water treatment</b>				
Process Control Index	99.99%	99.81%	99.99%	99.99%
Disinfection Index	99.82%	99.98%	99.99%	99.97%
<b>Distribution systems</b>				
Distribution Maintenance Index	99.84%	99.91%	99.80%	99.86%
Reservoir Integrity Index	>99.99%	99.98%	99.95%	99.96%
<b>Building water systems</b>				
Parameters influenced by domestic water systems	99.87%	99.88%	99.92%	99.89%

### Consumer contacts

	Company figure			Industry average
	2008	2009	2010	2010
<b>Informing consumers</b>				
Total number	3,040	2,655	2,143	N/A
Rate per 1,000 population	0.65	0.57	0.46	1.26
<b>Acceptability of water to consumers</b>				
Total number	17,189	14,536	13,578	N/A
Rate per 1,000 population	3.66	3.10	2.89	1.98
<b>Complaints to the Drinking Water Inspectorate</b>				
No consumers of Yorkshire Water Services Ltd directly contacted DWI in 2010.				

Note: Summary results for each company of tests for individual parameters are supplied on the DWI website at [www.dwi.gov.uk](http://www.dwi.gov.uk)

\* Overall drinking water quality as represented by mean zonal compliance for 39 parameters



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