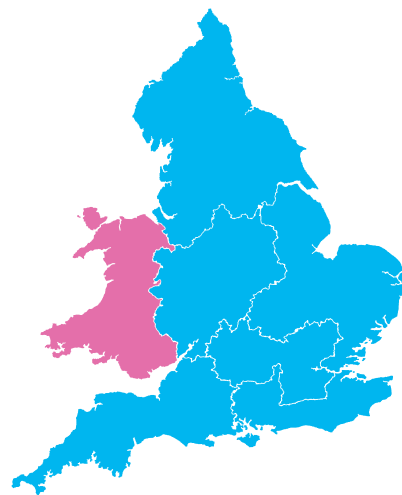


Drinking water 2008

Drinking water quality in Wales

July 2009

A report by the Chief Inspector of Drinking Water





Drinking water in Wales 2008



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Contents

Introduction to the report for Wales	4
Water supply arrangements	8
Drinking water quality testing	9
Drinking water quality results	11
Consumer perceptions of drinking water quality	28
Incidents in 2008	32
Local authority engagement	35
Annex 1: Further sources of information	39
Annex 2: Glossary and description of standards	41
Annex 3: Incidents in Wales in 2008	54
Annex 4: Improvement programmes in Wales	65
Annex 5: Competition in the water industry	66
Annex 6: Regulation 27 risk assessments by local authority	68
Annex 7: Water company data summary tables	69

Drinking Water 2008 is the annual report of the Drinking Water Inspectorate and comprises a number of parts.

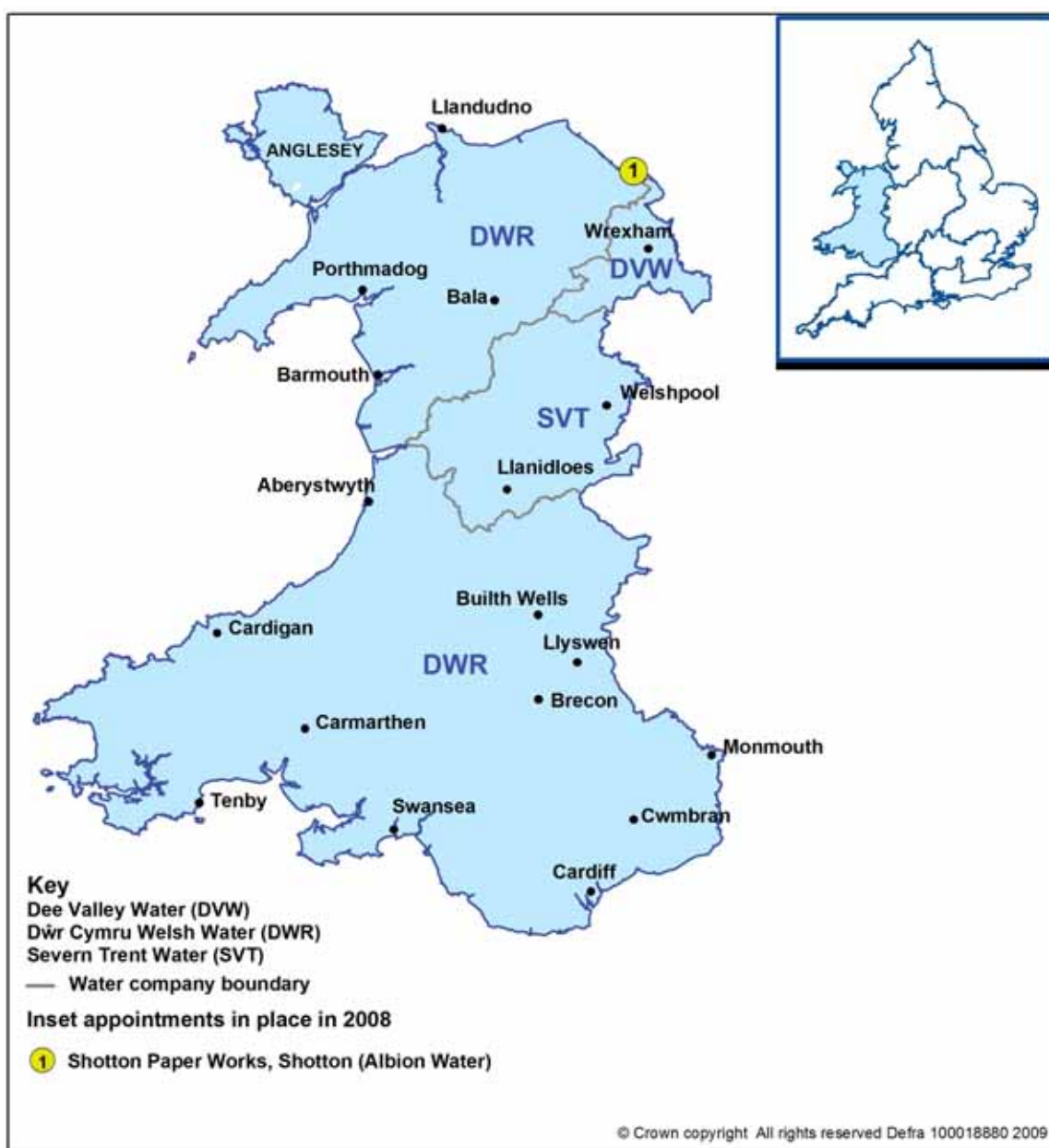
This part describes drinking water quality in Wales. The Inspectorate also publishes a series of companion reports for regions of England (Central, Eastern, Northern, Southern, Thames and Western regions).

All parts are available on the Inspectorate's website <http://www.dwi.gov.uk> and on the CD accompanying this report along with separate summary data for water company sampling programmes.

Introduction to the report for Wales

Drinking Water 2008 is published as a series of seven reports covering Wales and the six regions of England. Each report presents information about drinking water quality in a form that meets the needs of those who have an interest in the quality and safe management of drinking water supplies from the consumer perspective, namely the local authorities and the regional committees of the Consumer Council for Water.

The report describes the key facts about the quality of drinking water in Wales, which is served by four water companies (Albion Water, Dee Valley Water, Dŵr Cymru Welsh Water and Severn Trent Water) delivering public water supplies to close to three million consumers.



The results of testing in 2008 demonstrated that the overall quality of drinking water in Wales was good. The figure for compliance with drinking water standards at consumers' taps was 99.95% compared to 99.92% in 2007. This figure is made up of the results of all the tests for 39 parameters¹ with European or national standards. The circumstances of the few failures and the actions taken to safeguard public health are discussed in the main body of the report.

At water treatment works in 2008 there were more microbiological failures generally, but fewer samples exceeded the specification for turbidity with a good reduction in reported turbidity failures from 39 in 2007 to just 14 in 2008. The number of samples containing coliforms in 2008 was 11 compared to eight in 2007. *E.coli* was detected on three occasions. The measurement of these three parameters verifies how well water companies are achieving their primary duty of making sure that all water is microbiologically safe before it is supplied to consumers. A common cause of failures was defects in the integrity of treated water tanks at works operated by Dŵr Cymru Welsh Water.

In 2008, the microbiological quality of treated water stored in service reservoirs in Wales generally improved with 23 samples positive for coliforms compared to 39 in 2007 and fewer samples containing *E.coli* (three compared to 10 in 2007). The purpose of this testing is verification that the quality of treated water held in these strategic storage structures is not being compromised as a consequence of the maintenance of the reservoir or its configuration. It is regrettable that during the year the Inspectorate had reason to be critical of the timing and quality of Dŵr Cymru Welsh Water's investigations.

In 2007, the Inspectorate's annual report described an event where banned lead solder had been used in a new housing development in Anglesey. Subsequently the developer has gone bankrupt. Dŵr Cymru Welsh Water has worked closely with residents in the affected housing development and out of 34 properties affected, 31 are now fully compliant with the lead standard. Dŵr Cymru Welsh Water has introduced action to identify any further similar situations if they arise. Further information can be found under the heading *Lead* in the section *Chemical quality*.

Outside of Wales, during 2008, metaldehyde, the active ingredient of slug pellets, has been identified by 11 companies as a new pesticide hazard in some water sources. The Health Protection Agency has

¹ For 2008 the calculation is based on 39 parameters, in previous years this was 40 parameters. The pH parameter is no longer a national standard.

advised that no adverse health effects are expected from the levels found. The Inspectorate has initiated enforcement action to enable the companies to develop and implement catchment management control with the Environment Agency, other regulators and other stakeholders to minimise the occurrence of this pesticide in raw water sources. Companies are aware of the need to keep their pesticide risk assessment and monitoring arrangements fully updated.

Companies in Wales notified the Inspectorate of 54 events, of which 22 were classified as water quality incidents requiring an independent investigation by the Inspectorate. Overall, there were more incidents in 2008 compared to 2007 and most of these were due to faults with the operation or performance of treatment works, notable examples being loss of control of coagulation at Dŵr Cymru Welsh Water's Llyswen works on three occasions. In August, boil water advice was issued to consumers on two occasions; once when disinfection was bypassed at a works and once as a precautionary measure while investigations to establish the source and nature of oocysts in a raw water supply were carried out. The Inspectorate is not satisfied that Dŵr Cymru Welsh Water has implemented appropriate procedures to ensure that each of its works is fully compliant with the treatment and disinfection requirements of the regulations. Action is being taken by the company and the Inspectorate will be carrying out a series of independent audits during 2009 to verify compliance with Regulation 26. A summary of the nature, cause and duration of all incidents in Wales in 2008 is set out in *Annex 3*.

Fewer consumers in Wales reported a problem with the quality of drinking water at the tap in their home or workplace as evidenced by the lower contact rate of four per 1,000 population (compared to five per 1,000 population in 2007). Over the last three years complaints about discolouration from customers of Dŵr Cymru Welsh Water have fallen by around one-quarter (from a total of 11,001 in 2006 to 8,120 in 2008), demonstrating the benefits of the company's long-term section 19 mains renovation programme. This programme is planned to conclude in September 2009. Dŵr Cymru Welsh Water has informed the Inspectorate of the possibility of further delays upto December 2009 affecting a small part of the work due to issues with obtaining highways permission. The Inspectorate considers that effort with other stakeholders needs to be made by the company to deliver clean water to those consumers who have already waited a long time for these improvements. As a demonstration of the strength of feeling of consumers experiencing 'dirty' tap water, included in the report is a case example of a complaint made directly to the Inspectorate by a group of residents living in Abergavenny who petitioned Dŵr Cymru Welsh Water about an ineffective remedial

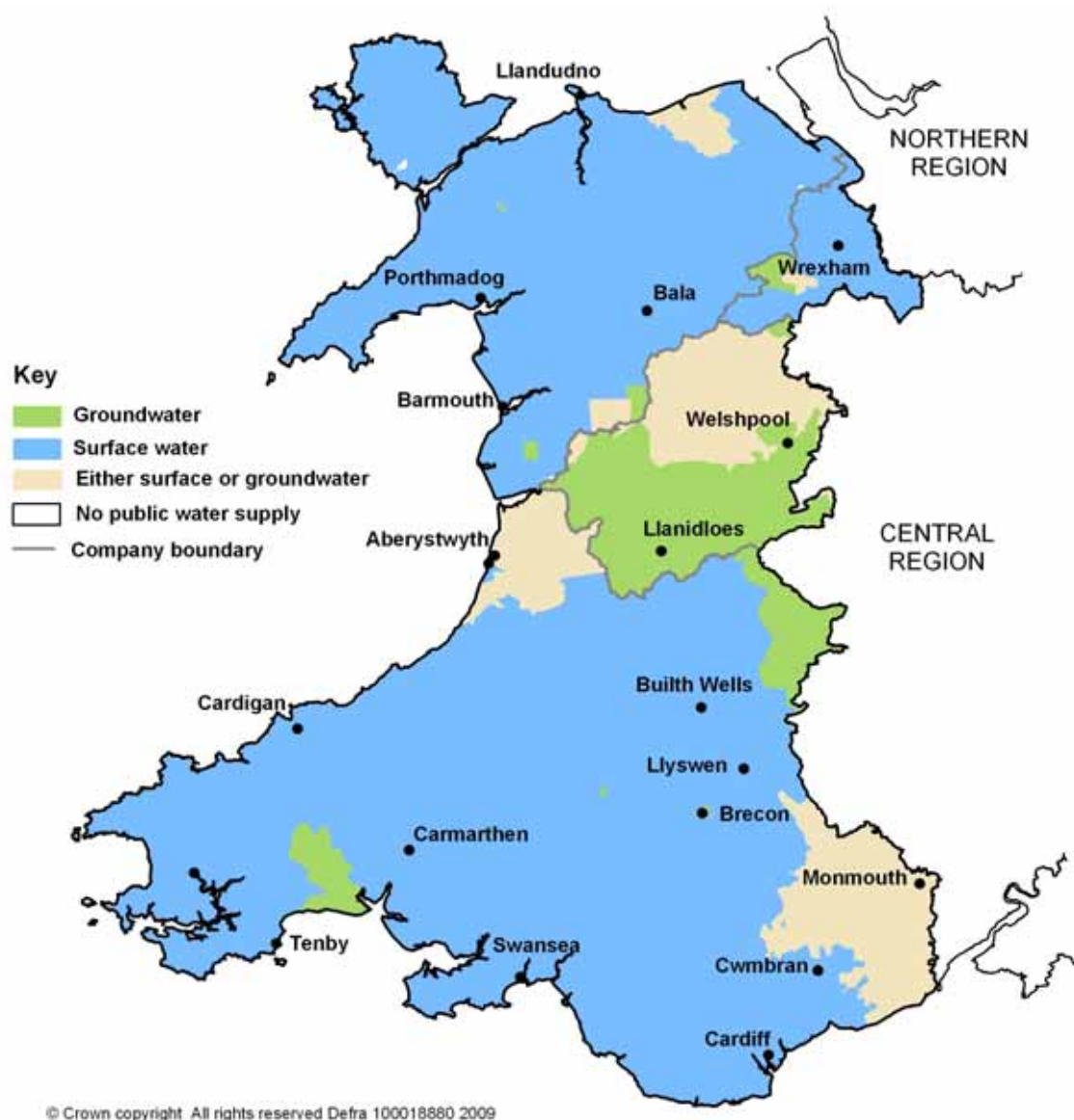
flushing programme. Overall, the Inspectorate received four complaints from consumers living in Wales compared to three in 2007.

During 2008, over 130,000 consumers in Wales benefited from improved drinking water quality through the completion by Dŵr Cymru Welsh Water of two legally binding programmes of work to secure compliance with drinking water standards for pesticides and turbidity at two works.

Water supply arrangements

Four water companies supply drinking water in Wales: Albion Water (ALB), Dee Valley Water (DVW), Dŵr Cymru Welsh Water (DWR) and Severn Trent Water (SVT). Severn Trent Water mainly supplies consumers in England, but it is included here because it also supplies water to consumers in the central eastern area of Wales.

Figure 1: Map illustrating sources of drinking water by zone across Wales



Much (93%) of the water supplied to consumers in Wales is surface water abstracted from rivers such as the Dee, Severn, Towy and Wye. The upland areas of Wales are important catchments for water

resources. Water is drawn from many reservoirs including the Alwen, Elan, Taff Fechan and Vyrnwy, some of which also supply consumers in England. For example, the Elan reservoir supplies the city of Birmingham and the Vyrnwy reservoir supplies consumers in North Cheshire and Merseyside. Across Wales, a small proportion (6%) of water supplies come from groundwater sources.

Summary facts about the drinking water supply infrastructure in Wales are given in Table 2 with outline geographical and demographic information.

Table 2: Key facts about the supply arrangements in Wales

Key facts			
Population supplied	2,923,922	Treatment works	90
Water supplied (l/day)	848 million	Service reservoirs	633
Number of local authorities	22	Water supply zones	104
Number of local health boards	22	Length of mains pipe (km)	27,491
Approximate number of private water supplies	3,951		
Area of supply		Water composition	
Anglesey, Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Cardiganshire, Carmarthenshire, Conwy, Denbighshire, Flintshire, Gwynedd, Merthyr Tydfil, Monmouthshire, Neath and Port Talbot, Newport, Pembrokeshire, Powys, Rhondda Cynon Taff, Swansea, Torfaen, Vale of Glamorgan, Wrexham County Borough.		Surface sources	93%
		Groundwater sources	6%
		Mixed sources	1%

Drinking water quality testing

Throughout 2008, water companies sampled drinking water across Wales to test for compliance with the standards in the drinking water regulations. Almost one-third of the tests were 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 four water companies carried out a total of 313,335 tests during 2008. Only 115 of these tests failed to meet the standards set down in the regulations.

Table 3: Number of tests carried out by companies in Wales

Company	Place of sampling			Number of tests per company	Estimate of population
	Water treatment works	Service reservoirs	Consumers' taps (zones)		
Albion Water	0 (0)	0 (0)	564 (1)	564	260
Dee Valley Water	9,556 (4)	9,444 (29)	7,210 (13)	26,210	159,000
Dŵr Cymru Welsh Water	45,312 (77)	123,460 (453)	86,160 (80)	254,932	2,711,000
Severn Trent Water	5,813 (2)	23,772 (57)	2,044 (10)	31,629	53,000
Wales overall	60,681 (83)	156,676 (539)	95,977 (104)	313,335	2,923,260

Numbers in brackets reflect the number of works, reservoirs or zones operated by that company in Wales in 2008. 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.

Results of interest are discussed in this report. A full summary of the results of testing by each company can be found on the DWI website (<http://www.dwi.gov.uk>) and on the CD accompanying this report. The tables summarising the results of testing provide the annual minimum, maximum and mean levels for individual parameters for each company.

Drinking water quality results

The key water quality results for Wales are presented in two tables, one showing 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.

A summary of the results of the tests from each company is presented on the Inspectorate's website <http://www.dwi.gov.uk> and is also available on the CD accompanying this report. Additionally, statistics describing the performance of each company supplying in Wales are summarised in *Annex 7*.

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 Wales.

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 (2002)* published by the Standing Committee of Analysts (SCA) which can be located on the Environment Agency's website at <http://www.environment-agency.gov.uk> under the 'Commercial Services' section.

Microbiological quality

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
Water leaving water treatment works				
<i>E.coli</i>	0/100ml	6,865	3	DWR (3)
Coliform bacteria	0/100ml	6,868	11	DVW (3), DWR (8)
<i>Cryptosporidium</i> *	< 1 oocyst per 10 litres. Treatment standard	7,654	0	Monitored at 20 works in Wales determined to be at risk out of a total of 90
<i>Clostridium perfringens</i>	0/100ml	3,175	4	DWR (4)
Turbidity**	1NTU	10,677	14	DVW (9), DWR (4), SVT (1)
Water leaving service reservoirs				
<i>E.coli</i>	0/100ml	26,145	3	DWR (3)
Coliform bacteria	0/100ml in 95% of tests at each reservoir	26,145	23	DVW (4), DWR (16) SVT (3) All 539 reservoirs in Wales met the 95% rule.
Water sampled at consumers' taps				
<i>E.coli</i>	0/100ml	7,918	2	DWR (2)
Enterococci	0/100ml	669	0	
Notes: *The standard for <i>Cryptosporidium</i> ceased to exist when regulations changed from 22 December 2007 but the regulatory monitoring related to <i>Cryptosporidium</i> risk assessments continued until 1 October. **Turbidity is a critical control parameter for water treatment and disinfection. Summary details of all microbiological tests undertaken by each water company can be found on the DWI website or on the CD accompanying this report.				

E.coli and coliforms at works

In 2008, a total of 6,865 tests at works were carried out by all the companies in Wales and *E.coli* was detected in only three samples (3 DWR). On detecting *E.coli*, companies are required to act promptly to protect public health. Their immediate response when finding *E.coli* at a

works is to sample again, and more widely, to confirm that water being received by consumers is safe. In 2008, these additional tests gave satisfactory results in all cases.

E.coli was detected in a sample from Glascoed works, near St. Asaph, in January and coliform bacteria were present in another sample collected in June. The investigation by Dŵr Cymru Welsh Water found that the contact tank roof was leaking. The company installed a new membrane on the roof. A pumping main prone to bursting was replaced at the same time. There have been no subsequent failures.

At Cwellyn works, near Caernarfon, *E.coli* occurred in a sample taken in March from one of two treated water sampling points at the site. A sample collected in August also contained coliform bacteria. There is a legally binding programme of work to make improvements at this works following enforcement action by the Inspectorate. These failures in 2008 serve to highlight the importance of Dŵr Cymru Welsh Water completing all the necessary work as soon as practicable (completion date March 2010).

E.coli was detected in a sample from Capel Curig works, near Betws-y-Coed, in August. The investigation by Dŵr Cymru Welsh Water found that earlier that day the entire works had been taken out of service to backwash a new granular activated carbon (GAC) filter at the works. The company has since fitted a second new GAC filter to enable the works to remain in supply while backwashing takes place.

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
Albion Water	0 – 0	0 – 0	0 – 12	0 – 4
Dee Valley Water	0 – 1,149	0 – 1,572	0 – 480	0 – 96
Dŵr Cymru Welsh Water	3 – 4,949	3 – 20,611	2 – 7,266	0 – 543
Severn Trent Water	0 – 767	0 – 3,962	0 – 160	0 – 26
Wales overall	3 – 6,865	3 – 26,145	2 – 7,918	0 – 669
Note: Results are shown as the number of positive tests – the total number of tests.				

Testing for coliform bacteria gives reassurance that water entering the 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 2008, this situation occurred at two out of the total of 90 works in Wales. These were Cwellyn North and Glascoed, both operated by Dŵr Cymru Welsh Water as described earlier in this section.

The Inspectorate has noted that coliform bacteria were found in 11 samples from treatment works in Wales during the year (3 DVW, 8 DWR) and this information will be taken into account during the Inspectorate's risk-based programme of technical audit.

Dŵr Cymru Welsh Water detected coliforms in a sample taken in October from Llyswen works, near Hay-on-Wye. During the investigation the company checked the treated water tank and found some minor defects. Remedial work was carried out to prevent any rainwater ingress and subsequent results have been satisfactory.

At Cefn Dryscoed works, near Glynneath, Dŵr Cymru Welsh Water detected coliforms in a sample of treated water in September following a period of heavy rainfall and a consequential deterioration in raw water quality. All further samples were satisfactory.

***Cryptosporidium* at works**

The regulations relating to *Cryptosporidium* monitoring of treated water changed with effect from 1 October 2008 when *Cryptosporidium* specific risk assessments and associated monitoring were replaced by comprehensive, multi-hazard, risk assessments for each treatment works and associated supply system. Under the new regime, raw water monitoring becomes a regulatory requirement.

In 2008, monitoring under the old regulations was required to be undertaken at 20 works (2 DVW, 17 DWR, 1 SVT).

All but one result met the former treatment standard of <1 oocyst per 10 litres and there were no reports of mains water supply-related outbreaks of cryptosporidiosis in Wales during 2008.

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 ultraviolet 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 2008, out of 3,175 samples taken in Wales, just four contained *Clostridium perfringens* (4 DWR).

A sample taken in January from Cwmystradllyn works, near Porthmadog, contained *Clostridium perfringens*. Dŵr Cymru Welsh Water reported that turbidity in the raw water was elevated at the time due to adverse weather conditions. All subsequent samples have given satisfactory results.

Dŵr Cymru Welsh Water also detected *Clostridium perfringens* in a sample taken in February from Llechryd works, near Cardigan. The company's checks found that the turbidity and colour of the raw water was elevated at the time due to adverse weather conditions. The works had also been shut down and restarted a number of times to facilitate ongoing refurbishment work at the site. All subsequent samples have given satisfactory results.

In March, Dŵr Cymru Welsh Water detected *Clostridium perfringens* in a sample from a consumer's tap in the Penarth/Barry zone which receives water from three different works (Llandegfedd, Llwynon and Court Farm works). The company's checks revealed no abnormal circumstances at these works at the time and all further samples have given satisfactory results.

Clostridium perfringens was detected in a sample collected in May from Pen Y Cefn works, near Dolgellau. In response, Dŵr Cymru Welsh Water made some minor adjustments to the works operating regime. The company has identified a risk at this site (Regulation 27) and a legally binding improvement programme to install additional treatment (coagulation and replacement filters) has been included in Dŵr Cymru Welsh Water's business plan (PR09) for delivery no later than 2014.

The Inspectorate notes that Dŵr Cymru Welsh Water carries out testing for *Clostridium perfringens* at consumers' taps, as well as at works and supply points. Guidance to companies is for monitoring to be at supply points (Information letter 10/2008) and this will be taken into account during the Inspectorate's forward programme of technical audits.

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. For information on tests taken at consumers' taps, see the heading *Turbidity* in the section titled *Chemical quality*.

Turbidity exceeded 1NTU on 14 occasions out of a total of 10,677 tests taken at works across Wales (9 DVW, 4 DWR, 1 SVT). This represents a good improvement in performance, particularly by Dee Valley Water and Dŵr Cymru Welsh Water (there were 39 unsatisfactory turbidity results reported in 2007). However, turbidity of >1NTU was reported by Severn Trent Water, in 2008, at its Clungunford works near Ludlow where results in the previous two years had been satisfactory.

Dee Valley Water's Legacy works, near Wrexham, continued to exhibit turbidity problems (three failures) in 2008. The original difficulties had been due to accumulated manganese deposits in the contact tank which the company drained and cleaned. However, in January, following a power failure, the lime dosing plant failed to restart and for a period this chemical was being manually dosed causing turbidity problems which persisted for at least six days until full plant control was reinstated. All results have been satisfactory for the remainder of the year.

Dee Valley Water's Llwyn Onn works, near Wrexham, has continued to exhibit turbidity problems for the third year in a row. Three high values occurred in February which the company attributed to a build up of lime deposits in the sample line. Regular weekly flushing of the line was instigated, however, further failures followed in May and November. The Inspectorate expects the company to take all possible steps to secure representative turbidity monitoring at this site and will initiate enforcement action if further failures occur.

All four occasions exhibiting turbidity >1NTU in samples taken by Dŵr Cymru Welsh Water were from single occasions at different treatment works. Checks by the company did not identify any ongoing water quality problems.

E.coli at service reservoirs

In 2008, across Wales, a total of 26,145 tests were carried out at service reservoirs by all the companies and *E.coli* was detected on just three occasions (3 DWR). This is a considerable improvement on the 10 failures reported at service reservoirs in Wales in 2007. On detecting *E.coli*, companies are required to act promptly to protect public health. The immediate response when finding *E.coli* at a service reservoir is to sample again, and more widely, to confirm that water being received by consumers is safe. In 2008, these additional tests all gave satisfactory results and there were no subsequent *E.coli* failures.

E.coli was detected on three occasions in January 2008 at three reservoirs within the same water supply system operated by Dŵr Cymru Welsh Water (Bryn Golau, near Holywell; Cilcain, near Mold, and Bryn Edwin, near Flint). This was notified to the Inspectorate as a water quality event and further details are given in *Annex 3*. Two of the reservoirs were removed from service and inspected. The Inspectorate was critical of the company for delaying the inspection of the third reservoir and for inconsistencies in the overall investigation into service reservoir failures that occurred in a similar time frame or in related parts of the network.

Dŵr Cymru Welsh Water completed outstanding work to improve the covers at Penmynydd service reservoir (south Anglesey) and following minor repairs on each compartment they were returned to supply in June 2008 and February 2009. There has been no repetition of the *E.coli* failures at this site reported in 2007.

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 2008, all 539 service reservoirs (including water towers) in Wales met the standard.

In August, Dŵr Cymru Welsh Water detected coliforms in a sample from Hengaer service reservoir, north east of Aberystwyth. An external inspection of the reservoir found two valve access covers which could allow ingress of water, as well as the sample tap being surrounded by overgrown plants. The company has since sealed the covers and dealt with the vegetation. This case highlights the importance of the role of

samplers being alert and reporting visible problems at a site promptly so action can be taken.

Dŵr Cymru Welsh Water found coliforms in May in a sample from Maerdy service reservoir, near Colwyn. This reservoir is due to be abandoned because of its age and design by the end of December 2009.

Coliforms were detected at Melin Y Coed service reservoir, near Llanrwst, in September. The site is located at the end of a long distribution system and experiences low turnover of water. Capacity for ozone treatment will be increased in 2009 at the Bryn Cowlyd works supplying the reservoir and the company expects this to improve water quality by better maintenance of chlorine residuals throughout the supply system.

The Inspectorate has noted that coliform bacteria were found in 23 samples from service reservoirs in Wales during the year (4 DVW, 16 DWR, 3 SVT) 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**

A total of 7,918 consumers' taps were tested in 2008 for *E.coli* and two were positive (2 DWR). There was no indication, from information gathered by the water company, of a faecal contamination event affecting other properties in these zones.

A sample taken by Dŵr Cymru Welsh Water from a consumer's tap in Flint/Connahs Quay zone in July contained *E.coli*. There was a similar isolated failure in July from a consumer's tap in the Llandudno/Colwyn zone. All further samples from these two properties and the upstream service reservoirs proved satisfactory. The company checked the works supplying these zones were operating normally at the time.

Like *E.coli*, the presence of Enterococci is indicative of faecal contamination and neither bacterium should be found in any sample. In 2008, all 669 tests for Enterococci at consumers' taps gave satisfactory results.

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 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	Total number of tests	Number of tests not meeting the standard	Additional information
Aesthetic parameters				
– colour	20mg/l Pt/Co scale	1,583	0	
– odour	No abnormal change	1,782	13	DWR (13)
– taste		1,639	1	DWR (1)
Aluminium	200µg/l	1,887	4	DWR (4)
Benzo(a)pyrene	0.01µg/l	676	1	DWR (1)
Fluoride	1.5mg/l	639	0	
Iron	200µg/l	2,407	10	DVW (2), DWR (8)
Lead (current standard)	25µg/l	670	0	
Lead (future standard)	10µg/l	670	5	DVW (1), DWR (4)
Manganese	50µg/l	1,828	3	DVW (2), DWR (1)
Nitrate	50mg/l	921	0	
Nitrite	0.5mg/l	919	1	DVW (1)
Pesticides – total	0.5µg/l	628	0	
Pesticide – individual (see note 3)	0.1µg/l	31,433	0	
pH (Hydrogen ion)	6.5 – 9.5	2,128	5	DVW (1), DWR (4)
Polycyclic Aromatic Hydrocarbons (PAH)	0.1µg/l	675	1	DWR (1)
Notes:				
1. For summary details of all tests undertaken by each water company refer to the DWI website or the CD accompanying this report.				
2. For comparison, 1mg/l is one part in a million, 1µg/l is one part in a thousand million.				
3. A further 3,145 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. From the start of this year companies have been required to report all positive detections of a taste and odour because the national standard was brought into line with the EU Drinking Water Directive with effect from 22 December 2007. Previously companies only reported on samples where a taste or odour was detected at a level of three dilutions or stronger.

In 2008, a total of 14 samples from consumers' taps in Wales exhibited a positive taste or odour. The standard for colour was met in all 1,583 samples.

The positive detections of taste and odour are summarised below in relation to their nature and cause as determined by the investigations carried out by companies. From this information it can be seen that many were confined to pipes or fittings in a single property. In other instances there was a problem with the way the water company followed the analytical method. The Inspectorate has issued guidance to companies to prevent these problems from arising in future years.

- Earthy/Musty: 2 (DWR): these descriptors relate to situations where harmless, but objectionable, substances are produced by the growth of algae in raw water storage reservoirs. Dŵr Cymru Welsh Water has a legally binding programme of work to remedy this problem at Talybont and Court Farm treatment works which supplies the two zones (Newport and Chepstow/Caldicot) where the failures occurred in 2008. The work involves the installation of coagulation at Talybont works (due for completion by December 2009), and the installation of GAC filters at Court Farm works, due for completion by March 2010.
- Sulphur: 9 (DWR): this descriptor relates to an analytical problem. The Inspectorate has issued guidance to companies and the matter will be dealt with by the relevant committee of the Standing Committee of Analysts.
- Solvent: (3 DWR): the company did not thoroughly investigate the cause of these unsatisfactory results (2 odour, 1 taste). Instead the Dŵr Cymru Welsh Water relied on an absence of consumer complaints from the zone and satisfactory follow-up samples. The Inspectorate is not satisfied that the company has acted to protect consumers to rule out any localised source of contamination with solvents or to verify that there is no

contravention of the Water Supply (Water Fittings) Regulations 1999 in relation to the pipes and fittings at the properties.

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 2008, a total of 1,887 samples were tested for aluminium in Wales. Albion Water, Dee Valley Water and Severn Trent Water achieved 100% compliance with the aluminium standard. Just four tests exceeded the standard (4 DWR).

Two samples from consumers' taps in Denbigh zone in January and February were directly linked to a notified water quality event at Alwen works operated by Dŵr Cymru Welsh Water where control of dosing of the aluminium coagulant was lost and the company failed to identify and fix the problem in a timely manner (see *Annex 3*).

There were two isolated failures of the aluminium standard in January and August in the Holywell/Mold zone and Vale of Glamorgan/Rhondda Valleys zone respectively. There were no related problems with water treatment and no planned work in distribution, therefore both were considered to be due to a localised disturbance of mains deposits dealt with by Dŵr Cymru Welsh Water by flushing and resampling. The sample taken in the Holywell/Mold zone also failed the iron standard, which the company attributed to the configuration of the network (a cul-de-sac) which encourages a build up of deposits.

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Fluoride

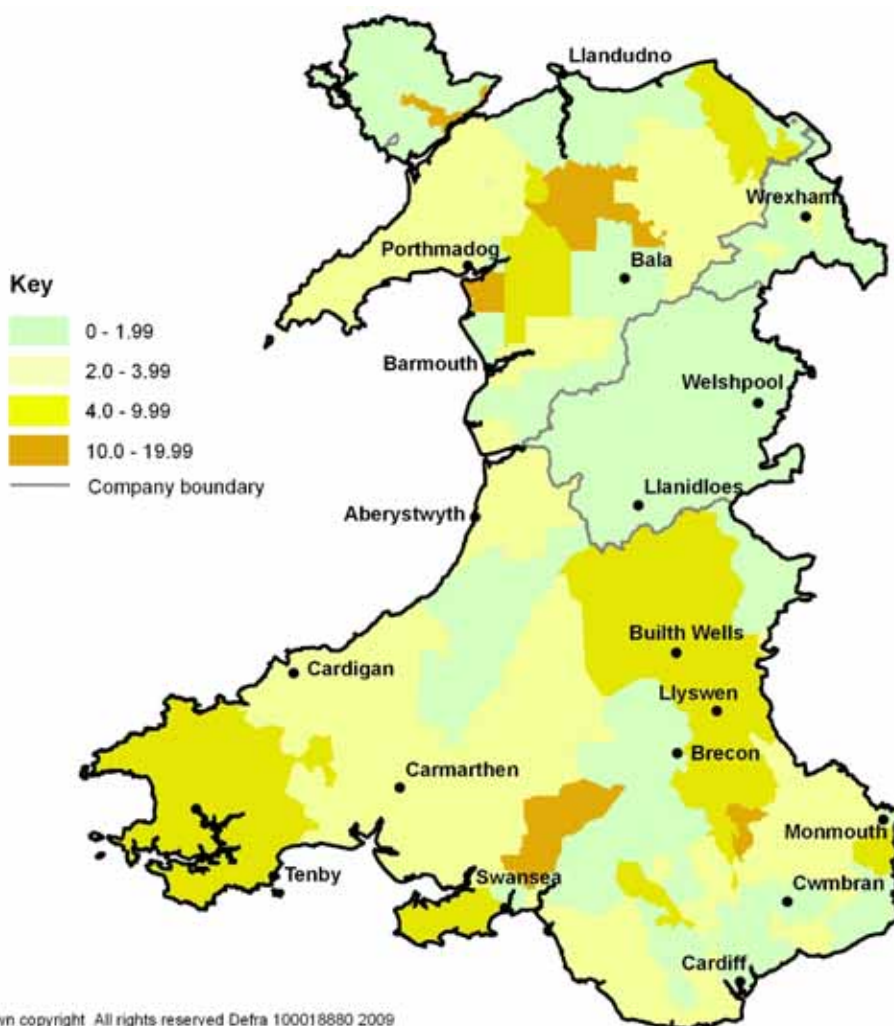
Traces of fluoride occur naturally in many water sources, particularly in groundwaters. Consumers can obtain specific information on the level of fluoride in the drinking water supply to their home or workplace from their water company.

Fluoride is not removed by conventional water treatment. Some companies fluoridate water supplies at the request of the local health authority as a protection against tooth decay. There are no fluoridation schemes in Wales. In 2008, all 639 tests for fluoride taken across Wales met the regulatory standard (1.5mg/l). See the DWI website <http://www.dwi.gov.uk> for more information on fluoridation.

Iron

Iron may be present naturally in raw water, iron compounds may be added as part of water treatment or it can be released as a consequence of the corrosion of iron mains. Effective water treatment prevents these problems arising at source. Nowadays, most samples failing the standard for iron are from places where the distribution network contains a large proportion of old cast iron pipes. When deposits in these pipes are disturbed by an operational problem (such as a burst main) they turn the water orange-brown. Elevated levels of iron 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. Discolouration of water supplies often prompts consumers to contact their water company. The rate of contact for each supply zone is mapped below in Figure 7.

Figure 7: Consumer contact rates per 1,000 population for black, brown or orange water



Most water companies have had legally binding undertakings to improve the condition of their distribution systems for water quality purposes; the Inspectorate monitors the progress of these programmes of mains renovation. Dee Valley Water and Severn Trent Water have already completed their strategic programmes. Dŵr Cymru Welsh Water has a continuing programme and while making progress in 2008 encountered various issues relating to highway access which may cause delays in delivery of the remainder of the work due for completion by September 2009.

Table 8: Progress with improvement programmes on distribution systems

Company	Length of main renovated in 2008	Length of main still to be renovated	Renovation completed	Completion due
Albion Water	None	None	N/A	N/A
Dee Valley Water	None	None	Sep 2004	N/A
Dŵr Cymru Welsh Water	371.1km	130.0km	N/A	Sep 2009
Severn Trent Water	None	None	Feb 2005	N/A
Wales overall	371.1km	130.0km		

Note: The lengths given here relate to zones which are wholly or mainly in Wales.

In 2008, there were 10 iron failures, a deterioration from the eight failures in 2007, Dee Valley Water company reported two failures of the iron standard, each of which was considered to be an isolated event. One occurred at a consumer's tap in April in the Rhos zone which the company identified as being caused by the poor condition of the service pipe feeding a few properties. The householders were given advice on replacing this pipe and the local authority copied in on this advice. In the other case, a failure in May in the Overton zone caused Dee Valley Water to accelerate plans to abandon the local main, which was completed in July.

In 2008, Dŵr Cymru Welsh Water reported eight failures of the iron standard, most of which were considered to be isolated events caused by a localised disturbance of the main dealt with by flushing of the main at the time and not indicative of a wider problem. A consumer's tap sample failing for iron in the Holywell/Mold zone was associated with a failure of the standard for aluminium. The company attributed these failures to the configuration of the network (a cul-de-sac) which encourages a build up of deposits.

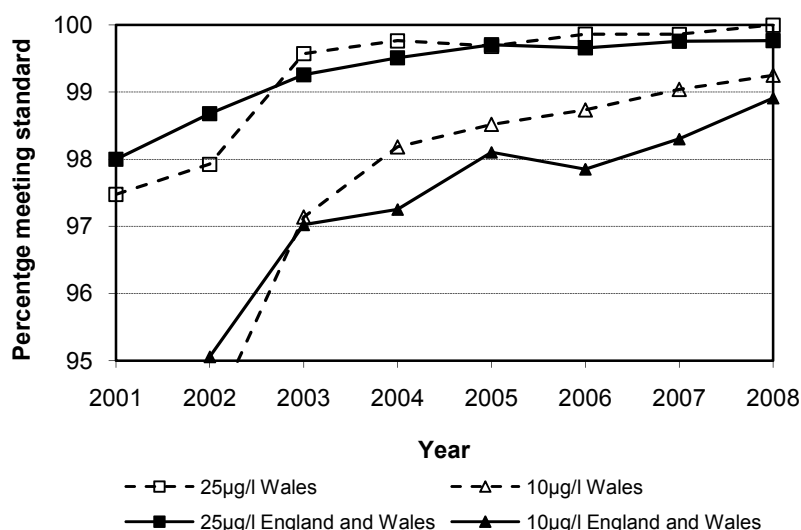
The Inspectorate expects companies to be using information about isolated failures and consumer complaints to inform their Distribution, Operation and Maintenance Strategies.

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 2008 has been added by the Inspectorate to that gathered in previous years to provide an updated picture of progress in Wales and for the industry, towards meeting the future standard for lead of 10µg/l by the end of 2013. Figure 9 shows that Wales achieved 100% compliance with the current standard for lead in 2008 and progress towards meeting the future standard remains above the industry average.

Figure 9: Percentage of tests meeting the current and future standard for lead between 2001 and 2008



Water companies notify both the consumer and the relevant local authority whenever a failure of the lead standard occurs. In 2008, there

were no failures for the current lead standard in Wales. However, out of a total of 670 samples there were five (DWR) which exhibited a lead value above the future standard of 10µg/l. The Inspectorate has issued guidance to companies reminding them of the need to notify local authorities of such results and to give advice to householders about the action they need to take to minimise exposure to lead.

During 2008, the company continued to work closely with residents in a housing development in Anglesey where plumbers working for a property developer had used lead solder which was banned for use on drinking water pipework in the early 1970s. The developer has since gone bankrupt. The company has worked with householders to ensure that appropriate remedial work is carried out and has resolved the issues in 31 of the 34 affected homes. Of the other three, two householders have refused access to do the required work, and a date is scheduled for the other. More widely, as a result of this event, Dŵr Cymru Welsh Water has introduced a policy of testing 5% of new domestic properties and all new industrial/commercial developments for the presence of lead solder.

In addition, during 2008, companies in Wales have responded to 152 consumer requests to check the level of lead in drinking water in their properties.

Manganese

Manganese occurs naturally in many sources of water. It can be removed from raw water by converting the soluble form to an insoluble precipitate (oxidation). Treatment can be simple to achieve (aeration), but for some waters more complex processes are needed. If effective treatment is not in place then black deposits may collect in the distribution pipes. When disturbed, such deposits may turn the water black. Even small traces of manganese are objectionable to consumers. Typical complaints relate to the staining of laundry or the discolouration of vegetables during washing or cooking. The purpose of the standard for manganese is to minimise these problems. In 2008, out of 1,828 tests there were just three reported failures of the manganese standard (2 DVW, 1 DWR).

In 2008, Dee Valley Water reported two failures in the Maelor zone in August and September. The company has confirmed the need for additional water treatment at the Llwyn Onn works to remove manganese in the raw water. A legally binding programme of work to deliver these improvements has been included in the company's business plan for delivery during the next asset investment period ending 2014. The single failure in the Maerdy/Porth zone operated by Dŵr Cymru Welsh Water

occurred in July, at a time when the company was carrying out mains renovation work in the area.

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 in to lakes, rivers and streams.

Nitrate levels can be reduced by water treatment or by blending with another, low-nitrate, water source. In 2008, all 921 tests for nitrate in Wales met the standard (50mg/l).

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 disinfection process. A number of supplies in Wales are chloraminated. Nitrite can also form in samples of water, after collection and before analysis, especially if the sample is not kept cool. In 2008, out of 919 tests carried out across Wales for nitrite there was a single failure in a consumer's tap sample (1 DVW) in the Saltney zone in July.

Dee Valley Water's investigation identified problems with the disinfection process at Boughton works supplying this zone. The company optimised the dosing ratio of chemicals at the works and no further failures have been reported since.

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 2008, all tests in Wales met the standard for total pesticides. Likewise there was 100% compliance (3,145 tests) for the four pesticides with a standard of 0.03µg/l. Furthermore, all 31,433 tests for individual pesticides met the standard of 0.1µg/l.

Dee Valley Water completed work in May 2008 at Boughton works, near Chester and all water leaving the works now receives granular activated carbon (GAC) treatment. This improvement addresses a known pesticide risk, for example, isoproturon was reported in a treated water sample in November 2007. In March 2008, Dŵr Cymru Welsh Water completed a legally binding programme of work to install GAC treatment to remove pesticides present in the raw water source at Bretton works, near Chester. These two schemes will benefit almost 150,000 consumers in Wales.

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.

In Wales, out of a total of 2,128 tests, the standard was exceeded on five occasions in 2008 (1 DVW, 4 DWR).

Dee Valley Water attributed a single failure in the Rhos zone during February to problems with chemical dosing at the works supplying the zone, due to the cold weather. Although this effect was not seen in a more widespread area, as might be expected if this was the cause, all further samples in the area have been satisfactory.

In March Dŵr Cymru Water detected low pH levels in a sample taken in the Holywell/Mold zone. No cause was found for this result, but after the company flushed the main all further samples were satisfactory and so it may have been due to low turnover of water in the main.

Dŵr Cymru Water did not find a cause for a failure in the Llyswen zone in April. However the works supplying the zone is set to shutdown at higher levels than those detected and so it is likely the low pH was due to local distribution issues.

Dŵr Cymru Water found no cause for a failure in the Preseli zone in May, and all further samples have been satisfactory.

In October a sample from a property supplied by a main with known pH problems in the Llan Y Mawddwy zone failed the standard. Low flows allow water to sit in contact with the material of the main causing high pH. Flushing resolved the situation on this occasion, but the company have identified that the main needs to be replaced as part of their renovation programme. Regular flushing will be undertaken until this is carried out.

Polycyclic aromatic hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are present in coal tar. Before 1970, coal tar was widely used to line iron pipes. Therefore, PAHs including benzo(a)pyrene may be present in the water as a result of degradation of these linings.

In 2008, out of 675 tests collected across Wales, just one test (1 DWR) failed the standard for PAH (0.1µg/l) and the same sample also failed the benzo(a)pyrene standard (1 DWR). The failure at a consumer's tap in the Merthyr/Abercynon zone in May 2008 could not be linked by the company to the presence of coal tar-lined mains in the area. Dŵr Cymru Welsh Water carried out a water fittings inspection at the property and found no irregularities. All further samples have given satisfactory results.

Consumer perceptions of drinking water quality

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. Table 10 shows the change in the rate of consumer contacts for the three main categories (appearance, taste and odour, and illness) since 2006.

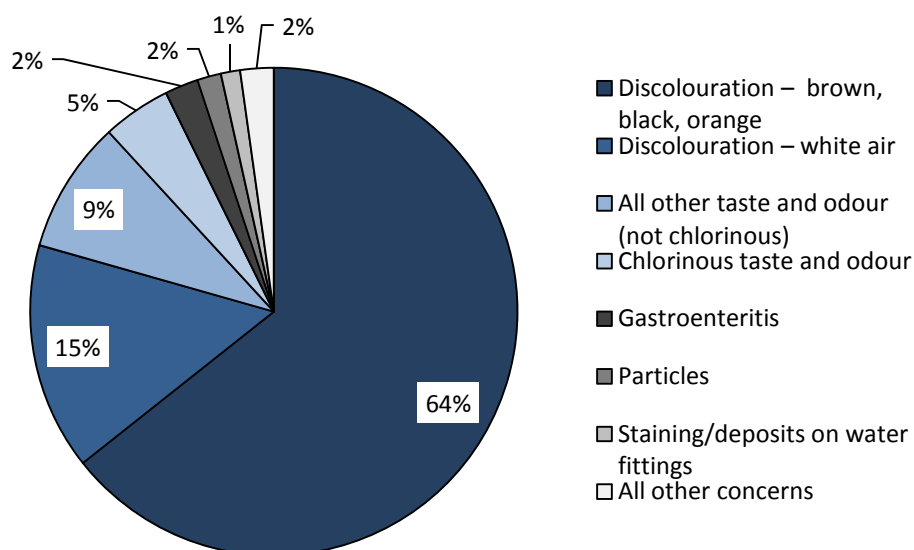
Table 10: Total contact rates of appearance, taste and odour, and illness

Company	Contacts per 1,000 population		
	2006	2007	2008
Dee Valley Water	2	2	3
Dŵr Cymru Welsh Water	6	5	5
Severn Trent Water	3	2	4
Wales overall	5	5	4

Albion Water supplies a single customer (a factory with approximately 260 employees). No contacts were reported in 2006 and 2007, but six contacts for chlorine taste and odour were received in 2008 and are possibly due to the commissioning of GAC at the supplying works.
 Dee Valley Water figures exclude consumers living in England.
 Dŵr Cymru Welsh Water figures exclude consumers living in England.
 Severn Trent Water figures are for Severn Trent Water customers living in Wales.

In Wales, the most frequently reported consumer concerns during 2008 were discolouration – brown, black, orange (64%), a white colour due to air (15%), non-chlorinous tastes or odours (9%) and chlorinous taste or odour (5%). Together these five categories comprised 93% of all consumer contacts about drinking water quality in 2008, however, over the last three years there has been an overall reduction (22%) of reported drinking water quality concerns in Wales from close to 17,000 in 2006 to just over 13,000 in 2008. Further information on key ongoing consumer concerns in Wales is given below.

Figure 11: Consumer concerns in Wales in 2008



Discoloured water

Discolouration contacts from consumers have fallen steadily across England and Wales, broadly in line with delivery by water companies of their Section 19 distribution refurbishment programmes and the introduction in parallel of Distribution, Operation and Maintenance Strategies (DOMS). In Wales, over the three-year period commencing 2006, the improvement in water quality has been verified by a reported 24% reduction in 'dirty water' complaints by Welsh consumers. As shown in Table 12, customers of Dŵr Cymru Welsh Water have experienced the greatest benefit to date. The picture is not so favourable for customers of Dee Valley Water where reports of dirty water have almost doubled in three years (336 compared to 191 in 2006) mainly due to increases in three zones (City, Southsea and Wrexham). Dee Valley Water are planning improvements to treatment processes at the Llwyn Onn and Legacy works to improve this situation, however, the Inspectorate expects the company to implement short-term remedies within their Distribution Operation and Management Strategies (DOMS) to reduce the impact for customers in the interim.

Table 12: Consumer contacts for brown, black or orange water 2006-08

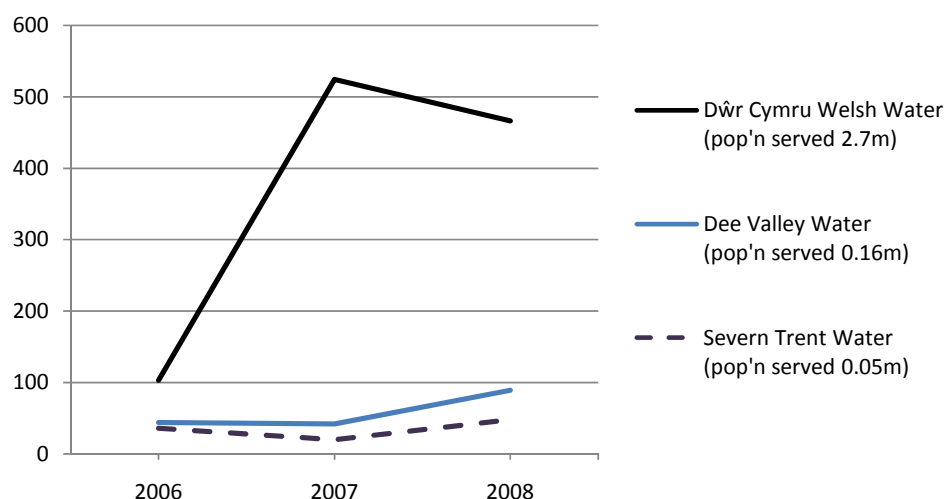
Company	Number of consumer contacts reporting brown, black or orange water		
	2006	2007	2008
Albion Water	0	0	0
Dee Valley Water	191	252	336
Dŵr Cymru Welsh Water	11,001	8,845	8,120
Severn Trent Water	80	54	89
Total	11,272	9,151	8,545
Albion Water supplies a factory (approximately 260 employees). Dee Valley Water figures exclude consumers living in England. Dŵr Cymru Welsh Water figures exclude consumers living in England. Severn Trent Water figures are for Severn Trent Water customers living in Wales.			

Chlorinous tastes and odours

Over the past three years, the proportion of contacts attributable to chlorinous tastes and odours across the industry has risen from 8% to nearly 13% of all consumer concerns (from 12,000 to 18,000 contacts). The reasons for this trend are twofold: investment by the companies has been effectively tackling the causes of discolouration, therefore dirty water complaints are declining in number as water mains are renewed or renovated and water quality is improved at source through enhanced water treatment, resulting in a more stable chlorine residual which is carried further through the network of pipes. These are the positive

benefits of water company investment, however, it does mean that some consumers will be experiencing fresh tap water with a trace of chlorine for the first time. Figure 13 illustrates the trend for companies in Wales. The Inspectorate expects companies to develop effective chlorine residual management strategies to minimise consumer contacts about chlorine.

Figure 13: Consumer contacts for chlorinous taste and odour 2006-2008



When the response of a company fails to provide the necessary reassurance or remedy then the consumer may turn to the Inspectorate for advice. As can be seen from Table 14, in 2008, there were four consumers living in Wales who complained directly to the Inspectorate, similar to the three received in 2007.

Table 14: Contacts from consumers received by the Drinking Water Inspectorate

Category	Number of contacts
Appearance	3
Taste and odour	0
Report of illness	0
Water quality concern	1
Number of contacts to DWI from consumers by company.	
DWR (4)	
Categories are as defined in Information Letter 1/2006.	

In November, the Inspectorate was contacted by a customer of Dŵr Cymru Welsh Water who was acting not only on his own behalf, but as the spokesperson for a group of residents in Abergavenny who had been experiencing 'dirty' water for a protracted period of time.

On investigation, the Inspectorate was able to establish that the water company knew about the problem which related to a cast iron water main. The company had put in place regular flushing, however, customers had continued to experience discoloured water to a greater or lesser degree for months, leading dissatisfied residents to form a group to petition the company for action. The matter was resolved after the company installed a hydrant to enable high velocity flushing. This case highlights the importance of companies proactively assessing the efficacy of maintenance strategies such as flushing programmes, taking care to keep customers informed and to analyse consumer contact data for verification purposes.

Incidents in 2008

The companies in Wales notified the Inspectorate of 54 events during 2008. The Inspectorate classified 22 as ‘incidents’ requiring a comprehensive report from the company and a full investigation by the Inspectorate, this compares to 18 in Wales in 2007.

Table 15: Water quality events in Wales in 2008

Water company	Number of events notified	Number classed as incidents
Albion Water	0	0
Dee Valley Water	4	0
Dŵr Cymru Welsh Water	49	21
Severn Trent Water	1	1
Wales overall	54	22

A summary of the nature, cause and duration of each incident, along with details of the Inspectorate’s findings are set out in *Annex 3*.

Most incidents were of relatively short duration and the company took action to inform stakeholders and safeguard consumers as appropriate.

Wider learning points from incident investigations in Wales in 2008 are highlighted by the following cases:

Elevated levels of aluminium and turbidity at Llyswen works

- There were three separate incidents in May, July and December associated with Llyswen works which supplies around 10,000 consumers in the Powys/Herefordshire border area, including the villages of Hay on Wye, Clyro, Glasbury, Painscastle, Talgarth and Bronllys. The works is one of several operated by Dŵr Cymru Welsh Water drawing water from the River Wye. Following heavy rainfall, raw water quality changed rapidly in the period 24 to 28

May causing a loss of control of the lime dosing system which in turn impacted adversely on coagulant control, resulting in elevated levels of aluminium and turbidity in treated water on 29 May. Further problems were experienced with the lime dosing in July and December, due to mechanical and electrical plant failure, with a similar adverse impact on treated water entering supply. The company has plans to replace the existing lime dosing system, but the Inspectorate recommended the need for improved interim maintenance. The Inspectorate noted that alarm deficiencies may have been a causative factor in the poor operational response to these events and recommended a thorough review of the process monitoring strategy, including alarms and alarm settings and water quality procedures for the site to ensure that appropriate and timely support is available.

Boil water advice in Tywyn, North Wales

- In August 2008, boil advice was issued for four days to around 4,821 consumers in the Tywyn area in North Wales. Heavy rain increased both colour and turbidity in the raw water entering Dŵr Cymru Welsh Water's Penybont works which impacted adversely on performance of the ultraviolet (UV) plant and the works shut down. Due to the need to maintain supplies to consumers, the works was restarted with the ultraviolet treatment stage bypassed. UV treatment was subsequently reinstated. Penybont works is classified as being at risk of *Cryptosporidium* with continuous monitoring in place.

Higher than normal levels of oocysts were identified in the treated water sample which included the period of time when UV treatment was bypassed. The Inspectorate noted that the company had not issued guidance to staff about how to respond in such circumstances. Instructions have since been issued. The Inspectorate was critical of the lack of prompt escalation to senior management prior to the decision to bypass treatment. The Inspectorate was very critical of Dŵr Cymru Welsh Water for waiting for the *Cryptosporidium* sample result before convening an incident management team and then making the decision to issue public health advice to consumers. There were errors in the delivery of boil water notices which were flagged up to the company by consumers living in two streets in Tywyn who received no leaflet.

Detection of *Cryptosporidium* at Mynydd Llandegai works

- Further problems with boil water advice were experienced by Dŵr Cymru Welsh Water later in August. On this occasion the company sought advice from local health professionals about unusually high *Cryptosporidium* sample results at Mynydd Llandegai works. Due to the fact that the source of the *Cryptosporidium* had not been identified it was decided to issue boil advice to consumers in a wider area, including the supply from the Capel Curig works which shares a common raw water supply with Mynydd Llandegai. Some rezoning was undertaken to minimise the area affected by the boil advice. Over the next few days it became apparent that the source of the oocysts was likely to be Ffynnon Llugwy, a raw water source common to both Mynydd Llandegai and Capel Curig. Identification of the oocysts has since identified that they were a species related to wildlife in the catchment. A UV plant was installed and commissioned at Mynydd Llandegai. Tankering was used as a means of supplying the consumers from Capel Curig works until supplies returned to normal. The Inspectorate was very critical of errors made in the process for issuing the boil advice, with some consumers receiving leaflets in error and others not receiving a leaflet when they should have. Legally binding programmes of work are being put in place to improve treatment and reduce the risk of *Cryptosporidium* associated with these water supplies.

During 2008, there were a relatively large number of incidents where the Inspectorate's assessment identified a common factor, namely the failure of Dŵr Cymru Welsh Water to comply with the requirements of Regulation 26, which relates to the duty of a water company to ensure that water is adequately treated and disinfected before it enters supply. Companies are under a duty to design and continuously operate adequate treatment processes for the specific source of water. This means that companies must have in place disinfection and treatment policies and procedures that are specific for each and every water treatment works. In addition to the above mentioned incidents, at two other Dŵr Cymru Welsh Water works, Broomy Hill (in England) and Pendine there was more than one incident during the year demonstrating that these requirements were not being met. Due to this lack of effective implementation of Regulation 26 (which came into force on 22 December 2007) the company has prioritised the development of site specific procedures for compliance with Regulation 26. The Inspectorate will take this information into account during its programme of technical audits in 2009.

The offence of failing to adequately treat or disinfect water is under consideration by the Inspectorate in connection with two incidents that occurred in Wales in 2008.

Local authority engagement

Public water supplies – risk assessments

Section 77 of the Water Act 1991 places a duty on local authorities to keep themselves informed about the quality of drinking water supplies to premises in their area. Until now, local authorities' routine involvement with public water supplies has mainly related to working level contacts with water companies about consumer complaints and the results of testing at consumers' taps. The amendment of the drinking water regulations in December 2007, which introduced a requirement for comprehensive risk assessments for each water supply system, introduced a new mechanism for local authority engagement with water companies about the safety and security of public water supplies in their area. By 1 October 2008, water companies were required to complete Regulation 27 risk assessments using water safety plan methodology for each water supply system. The output of this work was a Regulation 28 report to the Inspectorate and a plan for communicating the content of each risk assessment to relevant local authorities and local health protection professionals in the National Public Health Service for Wales.

A total of 796 Regulation 27 risk assessments are now in place across England and Wales. In *Annex 6* of this report we have listed, for each of the 22 local authorities in Wales, the number of risk assessments that cover all or part of their area. The Inspectorate encourages local authorities to check that companies have contacted them about each relevant risk assessment.

During 2009, the Inspectorate will be assessing each water company risk assessment. The Inspectorate has the power to issue notices to require improvements to be made and copies of any such notices will be sent directly to the relevant local authorities.

Private water supplies

Local authorities have direct responsibility for ensuring the wholesomeness and safety of private water supplies in Wales and can call on the Inspectorate for technical advice when required. In Wales, local authorities hold information regarding 3,951 private water

supplies. Table 16 provides information on the numbers of supplies grouped by volume of water supplied per day.

Table 16: Number of private water supplies supplying given volumes of water per day

	Number of private water supplies supplying volume indicated			
	<10m ³ per day	10m ³ – 99m ³ per day	100m ³ – 399m ³ per day	400m ³ – 1,000m ³ per day
Wales	3,562	355	4	30
England				
Central region	6,341	421	12	11
Eastern region	2,118	215	23	13
Northern region	5,496	352	19	15
Southern region	454	56	129	6
Thames region	1,056	206	126	5
Western region	8,414	550	27	5
Total for England	23,879	1,800	336	55
Total for England and Wales	27,441	2,155	340	85

Following a review of the Private Water Supplies Regulations 1991, the Department for the Environment, Food and Rural Affairs (Defra), issued a consultation document on proposed new regulations (the Private Water Supplies (England) Regulations 2009)². The consultation period ran from 11 August to 3 November 2008. The purpose of the change is to

² Consultation for England available at

<http://www.defra.gov.uk/corporate/consult/private-watersupplies/index.htm>

transpose the requirements of the 1998 EU Drinking Water Directive into law and to protect the health of consumers who rely on private water supplies for drinking and food preparation. The consultation recognised that existing arrangements for the safety and security of private water supplies were not adequate. Similar changes are proposed for Wales and the Welsh Assembly Government. The closing date for the consultation was 8 June 2009³.

Defra published the 105 responses received during the consultation period⁴. The key points made by respondents are:

- The maximum fees proposed were considered insufficient to cover local authority costs in carrying out risk assessments and monitoring.
- There is a need for guidance on the definition of private distribution system.
- The proposed timescale of six months for data collection by local authorities is too short.
- The 30 year retention period for data is too long and not consistent with other data collection requirements.
- Small shared domestic supplies was a category that posed a higher risk and the monitoring proposals for these were considered insufficient.

In parallel to the above activities, the Inspectorate has been working closely throughout the year with local authorities to develop the technical guidance that needs to be in place to enable implementation of the new private water supply regulations. A national stakeholder group was formed to identify and understand the issues which emerged during the consultation and to take forward the work of developing and disseminating best practice. Two key areas of work have been identified by the Inspectorate: developing with local authorities and software houses effective systems and methods for data capture and reporting, and national training tools and programs. Local authorities have requested web-based information and the Inspectorate is working with the Chartered Institute of Environmental Health and the Local Authorities Coordinators of Regulatory Services on putting this in place.

³ Consultation for Wales available at

<http://wales.gov.uk/consultations/environmentandcountryside/privatewater/?lang=en>

⁴ Summary Document available at

<http://www.defra.gov.uk/corporate/consult/private-watersupplies/summary-responses.pdf>

Through its role in the management of Defra's Water Quality and Health Research Programme the Inspectorate has identified, and will be commissioning appropriate research to improve the evidence base on risks relating to private water supplies.

For further information on the Water Supply (Water Quality) Regulations 2001 (amendment) Regulations 2007, or the microbiological and chemical parameters covered by the regulations please refer to the DWI website: <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: 020 7270 3370.

Annex 1

Further sources of information

The publication *Drinking water 2008* 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 monitoring data from 2008 under the following headings:

- Introduction to the report
- Summary of the Drinking Water Inspectorate's conclusions about drinking water quality
- Water supply arrangements
- Drinking water quality testing
- Drinking water quality results
- Consumer perceptions of drinking water
- Incidents in 2008
- Local authority engagement.

Each report begins with a short summary of the Inspectorate's conclusions about drinking water quality in 2008.

The reports and other content are published on the DWI website at <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 2008. They provide information on:

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

Incidents in England and Wales 2008

To promote shared learning, the Inspectorate has compiled a list of all incidents that occurred in 2008 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 report.

List of risk assessments by local authority

This is a reference list for local authorities letting them know how many risk assessments have been carried out by each water company supplying drinking water in their area.

Annex 2

Glossary and description of standards

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

1,2-Dichloroethane	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.
Acrylamide	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.
Aggressive	a term used to indicate that the water has a tendency to dissolve copper (and other metals) from the inner surface of a pipe or water fitting such as a tap.
Aesthetic	associated with the senses of taste, smell and sight.
Alkali	a solution containing an excess of free hydroxyl ions, with a pH greater than seven.
Aluminium	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.
Ammonium	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.
Analytical quality control (AQC)	the method used to ensure that laboratory analysis methods are performing correctly.

Antimony	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.
Aquifer	water-containing underground strata.
Arsenic	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.
Authorised departure	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.
Benzene	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.
Benzo(a)pyrene (BaP)	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.
Boron	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.
Bromate	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.

Bulk supply	water supplied in bulk, usually in treated form, from one water company to another.
Cadmium	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.
Chloramine	a substance formed by reaction between chlorine and ammonia, used as a disinfectant in distribution systems because of its long-lasting properties compared to chlorine.
Chloramination	the process of generating a chloramine disinfectant residual in water leaving a treatment works.
Chloride	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.
Chlorine residual	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.
Chromium	is not present in drinking water. A European health-based standard of 50µg/l applies.
<i>Clostridium perfringens</i>	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.
Coagulation	a process employed during drinking water treatment to assist with the removal of particulate matter.
Coliform bacteria	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.

Colony counts	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'.
Colour	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.
Communication pipe	the connection from the water main to the consumer's property boundary.
Compliance assessment	a comparison made by the Inspectorate of data gathered by water companies against standards and other regulatory requirements.
Compound	a compound consists of two or more elements in chemical combination.
Concessionary supplies	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.
Conductivity	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 μ S/cm.
Contact tank	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.
Contravention	a breach of a regulatory requirement.
Copper	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.

Cryptosporidium	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.
Cyanide	is not present in drinking water. A European health-based standard of 50µg/l applies.
Dead leg	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.
Distribution systems	a water company's network of mains, pipes, pumping stations and service reservoirs through which treated water is conveyed to consumers.
Drinking water standards	the prescribed concentrations or values listed in regulations.
EC Drinking Water Directive	Council Directive 98/83/EC December 1998 – setting out drinking water standards to be applied in member states.
Enforcement action	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.
Enterococci	see <i>Escherichia coli</i> .
Environment Agency	the Environment Agency is responsible for maintaining or improving the quality of fresh, marine, surface and underground water in England and Wales.
Epichlorhydrin	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.
Epidemiology	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.

<i>Escherichia coli</i> and Enterococci	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.
Filtration	the separation of suspended particulate matter from a fluid.
Fluoride	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.
Geosmin	a substance produced by the growth of algae, normally in surface waters which gives rise to a characteristic 'earthy' or 'musty' taste or odour.
Granular activated carbon	an adsorbent filtration media used to remove trace organic compounds from water.
Groundwater	water from aquifers or other underground sources.
Hydrogen Ion (pH)	gives an indication of the degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and 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.
Improvement programmes	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.
Incident	an event affecting or threatening to affect drinking water quality.
Indicator parameter	something that is measured to check that control measures, such as water treatment, are working effectively.

Indicator organism	an organism which indicates the presence of contamination and hence the possible presence of pathogens.
Information Letter	formal guidance to water companies given by the Inspectorate and published on the Inspectorate's website at www.dwi.gov.uk
Inspectorate	The Drinking Water Inspectorate.
Iron	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.
Lead	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 2013 onwards.
Manganese	is present naturally in many sources and is usually removed during treatment. A national standard of 50µg/l applies.
Mean zonal compliance percentage	a measure of compliance with drinking water standards introduced by the Inspectorate in 2004.
Mercury	is not found in sources of drinking water. A European health-based standard of 1µg/l applies.
Microbiological	associated with the study of microbes.
m³/d	cubic metre per day.
mg/l	milligram per litre (one thousandth of a gram per litre).
MI/d	megalitre per day (one MI/d is equivalent to 1,000 m ³ /d, or to 220,000 gallon/d).
µg/l	microgram per litre (one millionth of a gram per litre).

New regulations	the Water Supply (Water Quality) Regulations 2000 Amended 2007 in England; the Water Supply (Water Quality) Regulations 2001 Amended 2007 in Wales.
Nickel	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.
Nitrate	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.
Nitrite	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.
Odour	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.
Ofwat	the water industry's economic regulator.
Oocyst	the resistant form in which <i>Cryptosporidium</i> occurs in the environment, and which is capable of causing infection.
Organoleptic	characteristics of a substance as detected by our senses, for example taste, odour or colour.
Outbreak Control Team (OCT)	a team set up to investigate possible waterborne outbreaks of cryptosporidiosis, comprising members of the medical profession, as well as representatives of relevant local authorities and water companies.

Ozone process (ozonation)	the application of ozone gas in drinking water treatment.
Parameters	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.
Pathogen	an organism which can infect humans and cause disease.
PCV	see 'Prescribed concentration or value'.
Periodic review	the economic regulator's process of setting water prices.
Pesticides	any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
Pesticides – organochlorine compounds (aldrin, dieldrin, heptachlor, heptachlor epoxide)	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.
Pesticides – other than organochlorine compounds	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 pesticide 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.
Phosphate dosing	treatment of water that results in a protective film building up on the inside of pipes minimizing the likelihood of lead being present in drinking water supplied through lead pipes.
Plumbosolvency	the tendency for lead to dissolve in water.

Polycyclic aromatic hydrocarbons (PAHs)	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.
Powdered activated carbon (PAC)	powdered activated carbon is employed in treatment processes to remove pollutants.
Pre- and post- renovation assessment (PPRA)	a programme of assessment before and after mains renovation to demonstrate justification for the work, and the improvements achieved by the renovation.
Prescribed concentration or value (PCV)	the numerical value assigned to drinking water standards defining the maximal or minimal legal concentration or value of a parameter.
PR09	the periodic review process for setting water prices for 2010-2015.
Private supplies	water taken from private sources or supplied by non-licensed suppliers; supplies of water provided otherwise than by a statutorily appointed water undertaker.
Protozoan parasites	a single cell organism that can only survive by infecting a host.
Public Register	drinking water quality information made available to the public by water companies as required by regulations.
Public supplies	water supplied by a company licensed for that purpose.
Raw water	water prior to receiving treatment for the purpose of drinking.
Regulations	The Water Supply (Water Quality) Regulations 2000 Amended 2007 (England), 2001 Amended 2007 (Wales).
Remedial action	action taken to improve a situation.
Residual disinfectant	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.

Secretary of State	Secretary of State for Environment, Food and Rural Affairs.
Selenium	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.
Service connection	connection between the water company's main to a consumer's property.
Service pipe	the service pipe is the pipe that connects the consumer's property to the water company main. It comprises two parts – the communication pipe, which is the connection from the water main to the consumer's property boundary (normally at the outside stop tap), and the supply pipe, which runs from the boundary of the property to the consumer's inside stop tap.
Service reservoir	a water tower, tank or other reservoir used for the storage of treated water within the distribution system.
Sodium	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.
Springs	groundwater appearing at the surface at the outcrop of the junction of a permeable stratum with an impermeable stratum.
Statement of intent	formal written acknowledgement from a water company about action it plans to take to address an actual or potential regulatory breach.
Sulphate	occurs naturally in all waters and is difficult to remove by treatment. An indicator parameter with a guide value of 250mg/l.
Supply pipe	pipe connecting between the boundary of a consumer's property to the inside stop tap.
Supply point	a point other than a consumer's tap authorised for the taking of samples for compliance with the regulations.

Surface water	untreated water from rivers, impounding reservoirs or other surface water source.
Taste	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.
Technical audit	the means of checking that water companies are complying with their statutory obligations.
Tetrachloroethane and Trichloroethene	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.
Tetrachloromethane	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.
Time of supply	the moment when water passes from the water company's pipework into a consumer's pipework.
Total indicative dose	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.
Total organic carbon	represents the total amount of organic matter present in water. An indicator parameter with a guide value of 'no abnormal change'.
Toxicology	the study of the health effects of substances.
Treated water	water treated for use for domestic purposes as defined in the regulations.
Trihalomethanes	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.

Tritium	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.
Turbidity	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.
Vinyl chloride	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.
Water supply zone	a pre-defined area of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.
WHO	World Health Organisation.
Wholesome/wholesomeness	a legal concept of water quality which is defined by reference to standards and other requirements set out in the regulations.

Annex 3 Incidents in Wales in 2008

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
04 Jan 2008 For 1 day (DWR)	Lower Swansea Valley – Pontardawe and Clydach	18,500	Discolouration following burst main at Crai works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • The main was repaired and the system returned to normal operation, customers called back to check discoloured water has cleared <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Company commended for prompt response and repair of burst mains
15 Jan 2008 For 1 day (DWR)	Bryn Golau supplying Holywell Mold zone	2,000	Microbiological contamination at service reservoir	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Reservoir valved out of service and area fed on bypass, external and internal reservoir inspection carried out, sample survey undertaken <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • One of three separate E.coli detections from service reservoirs supplied by Alwen water treatment works over a very short space of time and in the same geographical area, critical that the internal inspections for compartments 1 and 2 at Bryn Edwin service reservoir were not undertaken promptly and that these delays were not communicated to the Inspectorate. Company reminded of need to keep Inspectorate up-to-date on progress with remedial actions • Recommended review of procedures to ensure that sampling regimes are appropriate and consistent • Advice given about dip sampling at an early stage following the notification of an E.coli contravention at a service reservoir and the value of enhanced monitoring pending the completion of all outstanding investigative and remedial actions

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
15 Jan 2008 For 1 day (DWR)	Cilcain SR supplying Holywell Mold zone	75	Microbiological contamination at service reservoir	See above
22 Jan 2008 For 1 day (DWR)	Bryn Edwin supplying Flint Connahs Quay zone	7,500	Microbiological contamination at service reservoir	See above
29 Jan 2008 For 18 hours (DWR)	Alwen works	32,000	Loss of control of coagulation following power failures	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Repaired faulty equipment <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Critical that the company restarted the plant without correcting the faults which led to elevated aluminium in the water supplied, the company should have shut down this works at an early stage, while investigations into water quality alarms were made on site • Recommended contingency plans for all strategic works where rezoning is not a practicable option to support a works shutdown
21 Feb 2008 For 1 day (DWR)	St Mellons and Rumney	3,625	Discolouration following planned work on distribution system	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Flushing carried out in affected areas, sampling survey undertaken, information issued to customers, valve labelling error corrected on geographical information systems <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Incident was due to inadequate labelling of valves

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
12 Mar 2008 For 1 day (DWR)	Cwellyn works supplying Bangor Caernarfon and South Anglesey	75,000	<i>E.coli</i> in treated water leaving works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampled affected area and investigated works <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate treatment process – clarification absent • Inadequate treatment process – filtration • Works is vulnerable to turbidity and Cryptosporidium breakthrough under certain raw water conditions due to the positioning of the raw water inlet and the lack of a coagulation stage • Works prone to turbidity spikes following filter washing due to the fact that there is no facility to run to waste • Required the company to enter into a legally binding programme of work to improve arrangements at the site to reduce risks to water quality
19 Apr 2008 For 1 day (DWR)	Prestatyn, Cyn berth, Meliden	10,000	Discolouration following planned work on the distribution system	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampled affected area, rezoned area (brought in water from different source), review of procedures <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate procedures

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
29 May 2008 For 1 day (DWR)	Llyswen works supplying rural areas of Powys and Herefordshire, including Hay-on-Wye, Clyro, Glasbury, Painscastle, Talgarth and Bronllys	16,000	Elevated turbidity and aluminium in treated water leaving the works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Rectified problems with lime dosing plant, optimised treatment process, sampling survey, plans in place to replace existing lime dosing system <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended that the company reviews the monitoring strategy at this site and associated alarms and alarm settings • Recommended that the company reviews its water quality procedures for all water treatment works to ensure that appropriate, prompt and effective support is provided in response to site issues
12 Jun 2008 For 1 day (DWR)	Llannerch works, Abergel, Rhyl and Prestatyn areas	200,800	Failure of chlorination	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Chlorination reinstated, sampling survey undertaken, investigation undertaken into cause of disinfection failure <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Highly critical that there was no site specific disinfection strategy in place as required by Regulation 26 however it was noted a company wide review of compliance with Regulation 26 was underway • Recommended that the company review what measures can be put in place for early identification of telemetry signals that are 'frozen' or 'flatlining' and implement those where appropriate • Recommended that the company review in detail the procedures for testing monitors, including those steps to be taken on completion of testing to confirm the software is operating effectively

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
29 Jun 2008 For 1 day (DWR)	Builth works supplying Builth Wells and surrounding area	6,300	Elevated turbidity and aluminium levels in water leaving works at Builth	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Optimised treatment process, sampling survey, rectified problems with coagulant dosing instrumentation (streaming current detector), repaired burst main on outlet of service reservoir in distribution, tankering undertaken to maintain supplies to local distribution system <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Highly critical of significant increase in flow through the works without consideration of the impact on final water quality and felt the need to remind company of duty to undertake an adequate investigation into the cause and extent of any operational failure, or apprehended failure, and take such steps as necessary to ensure the water is wholesome • Recommended a full risk assessment on all options considered in response to this incident and provide details in final report to the Inspectorate • Recommended that the company acts to ensure satisfactory re-sample results are obtained for all parameters which contravene a regulatory standard during an incident • Recommended that samples be taken for all appropriate parameters during a water quality incident to ascertain the full extent of the impact on water quality

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
10 Jul 2008 For 1 day (DWR)	Maerdy works Maerdy and Porth areas	47,000	Elevated iron and turbidity in treated water leaving works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampling survey, treatment process optimised, review of options undertaken for operational improvements at works <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended review of the operation of the emergency shutdown system to ensure that shutdown is triggered promptly once predefined target settings have been breached • Recommended a review of the options available for operational improvements at works, including consideration of a run to waste facility to ensure that the plant can be restarted and the treatment process stabilised prior to pumping into supply • Advice given about decision making process to ensure triggers are set for ascertaining when remedial actions are not proving to be effective and when additional support and/or actions may be required
10 Jul 2008 For 1 day (DWR)	Llyswen works supplying rural areas of Powys and Herefordshire, including Hay- on-Wye, Clyro, Glasbury, Painscastle, Talgarth and Bronllys	62,500	Elevated aluminium and turbidity in treated water leaving works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Rectified problems with lime dosing plant, optimised treatment process, undertook sampling survey, plans in place to replace existing lime dosing system <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended review of monitoring strategy at this site and associated alarms and alarm settings • Recommended review of water quality procedures for all water treatment works to ensure that appropriate, prompt and effective support is provided in response to site issues

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
11 Jul 2008 For 2 days (DWR)	Pendine works supplying Pendine, Whitland, St Clears, Laugharne and parts of rural South West Carmarthenshire	7,781	Elevated turbidity in treated water leaving works.	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampling survey undertaken, treatment process optimised, review of the management of the raw water reservoir to be undertaken, raw water reservoir taken out for cleaning <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Critical of methods for algal control in the raw water reservoir which were ineffective although action was taken to rectify this • Recommended review of the raw water protection measures at Morfa Bychan borehole • Recommended planned filter refurbishment be undertaken as soon as practicable • Recommended review of all actions considered and taken during the course of this and the other incident on 6 August to ensure that any learning points are incorporated in company procedures
06 Aug 2008 For 2 days (DWR)	Pendine works supplying Pendine, Whitland, St Clears, Laugharne and parts of rural South West Carmarthenshire	7,781	Elevated turbidity and iron in water leaving works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampling survey undertaken, treatment process optimised, review of the management of the raw water reservoir to be undertaken, raw water reservoir taken out for cleaning <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • See incident on 11 July 2008

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
09 Aug 2008 For 3 days (DWR)	Penybont works supplying Tywyn, Aberdovey and surrounding areas	7,781	Boil notice for consumers supplied by Penybont works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Reinstated UV treatment at the works, boil advice issued on receipt of Cryptosporidium sample results, boil advice lifted following confirmation that all non-UV treated water had passed through the distribution system, introduced additional guidance and modified works procedures <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Highly critical that guidance on operation of the works was not in place at the time of the incident, highly critical of lack of prompt escalation, very critical that the issue of the boil advice was delayed because set up of Incident Management Team was delayed • Recommended procedures be put in place to ensure that such incidents are escalated promptly to Senior Manager level • Recommended consultation of key stakeholders occurs at all stages where key public health decisions are considered • Recommended investigation into reason why boil advice notices were not delivered to two specific streets in Tywyn and if necessary update procedures and records for the local area

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
27 Aug 2008 For 20 days (DWR)	Mynydd Llandegai works supplying parts of North Gwynedd	66,550	Issue of boil advice due to <i>Cryptosporidium</i> in raw water	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Rezoning, boil advice issued, catchment and site investigations to establish source of oocysts, UV treatment installed, boil advice lifted following successful commissioning of UV plant and confirmation that only UV treated water remained in supply <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • The investigation into the source of <i>Cryptosporidium</i> was thorough, problems with issue of boil advice • Criticism made regarding slow progress with existing plans to install coagulation at the works
05 Nov 2008 For 3.5 hours (DWR)	Pontsticill works	100,000	Loss of coagulation at works	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampling survey undertaken, changes made to procedures, review of automatic changeover of coagulant tanks for all works <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Assessment ongoing
12 Nov 2008 For 1 day (DWR)	Individual property near Coastlands Oxwich Bay	3	Property connected to sewer not water main	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Carried out investigation on site, sampling undertaken, new connection procedures modified to include additional checks <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Assessment ongoing

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
14 Nov 2008 For 12 hours (SVT)	Llandinam Borehole pumping station and Llandinam service reservoir between Newtown and Llandinam, Wales	19,557	Loss of supplies due to service reservoir running dry	<p>Severn Trent Water action:</p> <ul style="list-style-type: none"> • Provided an alternative supply by tanker/bowser • Repaired faulty equipment • Rezoned area (brought in water from different source) • Review of procedures • Sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Failure to respond to original alarm indicating loss of telemetry and inadequate procedures
27 Nov 2008 For 1 day (DWR)	Hirwaun works, Hirwaun, near Merthyr Tydfil	12,195	Loss of effective filtration due to maintenance activities	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> • Sampling survey undertaken, reduced flow through works, rezoning undertaken to minimise area supplied, filters returned to supply, report commissioned into options for filter refurbishment <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Critical that the company failed to report this event to Inspectorate for four days. • Recommended full, documented risk assessment is undertaken in advance of any significant operational change at a water treatment works

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
15 Dec 2008 For 6 hours (DWR)	Llyswen works supplying rural areas of Powys and Herefordshire, including Hay-on-Wye, Clyro, Glasbury, Painscastle, Talgarth and Bronllys	10,000	Elevated turbidity in treated water	<p>Dŵr Cymru (Welsh Water) action:</p> <ul style="list-style-type: none"> Rectified problems with lime dosing plant, optimised treatment process, undertook sampling survey, plans in place to replace existing lime dosing system <p>DWI comments and findings:</p> <p>See incidents on 29 May and 10 July</p>

Note: A complete table of incidents in England and Wales in 2008 can be found on the CD in the folder. It is named **Incidents in England and Wales 2008.pdf**. It is also available on the DWI website at <http://www.dwi.gov.uk>

Annex 4

Improvement programmes in Wales

Company	Parameter or hazard	Site	Status	Construction due for completion
Dŵr Cymru Welsh Water	Iron, Manganese, Aluminium and Turbidity	Work on distribution system	Ongoing	31-Mar-10
Dŵr Cymru Welsh Water	Lead	Talybont	Ongoing	31-Dec-09
Dŵr Cymru Welsh Water	Manganese	Crai	Ongoing	31-Mar-10
Dŵr Cymru Welsh Water	Pesticides	Bretton	Completed 26-Mar-08	
Dŵr Cymru Welsh Water	Taste and odour	Talybont	Ongoing	31-Dec-09
Dŵr Cymru Welsh Water	Taste and odour	Court Farm	Ongoing	31-Mar-10
Dŵr Cymru Welsh Water	Turbidity	Pen-Y-Bont	Completed 30-Dec-08	

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 2008

Name	Licensed supplier	Original supplier*	Status
Buxted Chicken, Flixton	Anglian Water	Essex and Suffolk Water, Eastern region	Supplying water
Fairfield Park and Lower Wilbury Farm, Arlesey	Three Valleys Water	Anglian Water, Eastern region	Supplying water
Northern Foods (Bowyers), Trowbridge	Wessex Water	Wessex Water, Western region	Supplying water
Shotton Paper Works, Shotton	Albion Water	Dŵr Cymru Welsh Water, Wales	Supplying water
Tidworth near Andover	Thames Water	Wessex Water, Western region	Supplying water
Wynyard Business Park, near Wolverston	Hartlepool Water	Northumbrian Water, Northern region	Supplying water
Old Sarum, The Portway	SSE Water	Wessex Water, Western region	Supplying water
Longcroft 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

New inset appointments in place for 2009

Name	Potential Licensed supplier	Original supplier*	Status
Tidworth near Andover	Veolia Water	Wessex Water, Western region	Appointment granted
Media City, Manchester	Peel Utilities	United Utilities, Northern region	Appointment granted
Valleywood near Llanilid	SSE Water	Dŵr Cymru Welsh Water, Wales	Appointment granted
Hale Village, Tottenham	SSE Water	Thames Water, Thames region	Appointment pending
Great Billing Way, Northampton	Independent Water Networks Ltd	Anglian Water, Eastern region	Appointment granted

*Original supplier at time of privatisation in 1989

Water supply license applications to date

Name of company	License type	Date license granted by Ofwat	Status
Aquavitae	Combined	1 December 05	Not yet operating
Watercall Ltd	Combined	1 December 05	Not yet operating
Severn Trent Water Select Ltd	Combined	1 December 05	Not yet operating
YorWater Ltd	Retail	21 March 06	Not yet operating
Satec Ltd	Combined	24 May 06	Not yet operating
UU Water Sales Ltd	Combined	3 January 07	Not yet operating
Osprey Water Services Ltd	Combined	3 January 07	Not yet operating

Annex 6

Regulation 27 risk assessments by local authority

Local authority	Company	Number of Regulation 27 risk assessments
Blaenau Gwent County Council	Dŵr Cymru Welsh Water	1
Bridgend County Borough Council	Dŵr Cymru Welsh Water	1
Caerphilly County Borough Council	Dŵr Cymru Welsh Water	2
Cardiff Council	Dŵr Cymru Welsh Water	1
Carmarthenshire County Council	Dŵr Cymru Welsh Water	3
Ceredigion County Council	Dŵr Cymru Welsh Water	2
Cheshire West and Chester Council	Dee Valley Water Dŵr Cymru Welsh Water	2 2
Conwy County Borough Council	Dŵr Cymru Welsh Water	4
Denbighshire County Council	Dee Valley Water Dŵr Cymru Welsh Water	2 2
Flintshire County Council	Albion Water Dee Valley Water Dŵr Cymru Welsh Water	1 4 2
Forest of Dean District Council	Dŵr Cymru Welsh Water	1
Gwynedd County Council	Dŵr Cymru Welsh Water	6
Isle of Anglesey County Council	Dŵr Cymru Welsh Water	2
Merthyr Tydfil County Borough Council	Dŵr Cymru Welsh Water	1
Monmouthshire County Council	Dŵr Cymru Welsh Water	3
Neath and Port Talbot County Borough Council	Dŵr Cymru Welsh Water	1
Newport City Council	Dŵr Cymru Welsh Water	1
Pembrokeshire County Council	Dŵr Cymru Welsh Water	1
Powys County Council	Dŵr Cymru Welsh Water	2
Rhondda Cynon Taff County Borough Council	Dŵr Cymru Welsh Water	2
Swansea City and Borough Council	Dŵr Cymru Welsh Water	1
Torfaen County Borough Council	Dŵr Cymru Welsh Water	2
Vale of Glamorgan Council	Dŵr Cymru Welsh Water	2
Wrexham County Borough Council	Dee Valley Water	4

Annex 7

Water company data summary tables

Albion Water

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	0	Water supplied (l/day)	43,000
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)	0	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	260	Flintshire	
Number of local authorities	1		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	100%	99.38%	100%	99.96%
Water treatment				
Process Control Index	N/A	N/A	N/A	99.98%
Disinfection Index	N/A	N/A	N/A	99.93%
Distribution systems				
Distribution Maintenance Index	100%	100%	100%	99.85%
Reservoir Integrity Index	N/A	N/A	N/A	99.96%
Building water systems				
Parameters influenced by domestic water systems	100%	100%	100%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	0	0	0	N/A
Rate per 1,000 population	0	0	0	1.22
Acceptability of water to consumers				
Total number	0	0	6	N/A
Rate per 1,000 population	0	0	23.08	2.55
Complaints to the Drinking Water Inspectorate				
No consumers of Albion Water directly contacted DWI in 2008.				

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

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

Dee Valley Water plc

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	6	Water supplied (MI/day)	66
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)	1,960	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	260,710	Cheshire, Flintshire, Denbighshire	
Number of local authorities	4		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.99%	99.97%	99.92%	99.96%
Water treatment				
Process Control Index	100%	99.92%	99.99%	99.98%
Disinfection Index	99.38%	99.22%	99.77%	99.93%
Distribution systems				
Distribution Maintenance Index	99.92%	100%	99.61%	99.85%
Reservoir Integrity Index	99.94%	99.85%	99.88%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.96%	99.92%	99.84%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	260	232	202	N/A
Rate per 1,000 population	1	0.89	0.77	1.22
Acceptability of water to consumers				
Total number	452	493	689	N/A
Rate per 1,000 population	1.74	1.89	2.64	2.55

Complaints to the Drinking Water Inspectorate

No consumers of Dee Valley Water plc directly contacted DWI in 2008.

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

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

Dŵr Cymru Welsh Water

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	87	Water supplied (MI/day)	840
Number of service reservoirs	557	Percentage from surface sources	~97
Number of water supply zones	92	Percentage from ground sources	~3
Length of mains pipe (km)	27,363	Percentage from mixed sources	<1
Population served		Area of supply	
Population supplied	2,882,000	Conwy, Anglesey, Blaenau Gwent, Bridgend, Gwynedd, Caerphilly, Cardiff, Cardiganshire, Carmarthenshire, Denbighshire, Flintshire, Merthyr Tydfil, Monmouthshire, Neath and Port Talbot, Newport, Pembrokeshire, Powys, Rhondda Cynon Taff, Swansea, Torfaen, Vale of Glamorgan, part of Herefordshire	
Number of local authorities	23		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.95%	99.95%	99.95%	99.96%
Water treatment				
Process Control Index	99.94%	99.84%	99.99%	99.98%
Disinfection Index	99.87%	99.90%	99.88%	99.93%
Distribution systems				
Distribution Maintenance Index	99.70%	99.84%	99.83%	99.85%
Reservoir Integrity Index	99.97%	99.91%	99.95%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.92%	99.89%	99.84%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	1,576	4,476	2,654	N/A
Rate per 1,000 population	0.55	1.52	0.9	1.22
Acceptability of water to consumers				
Total number	17,312	14,682	13,301	N/A
Rate per 1,000 population	6.00	4.98	4.5	2.55
Complaints to the Drinking Water Inspectorate				
A total of 4 consumers of Dŵr Cymru Welsh Water directly contacted DWI in 2008.				

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

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

Severn Trent plc

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	184	Water supplied (MI/day)	2,002
Number of service reservoirs	667	Percentage from surface sources	63
Number of water supply zones	208	Percentage from ground sources	34
Length of mains pipe (km)	46,484	Percentage from mixed sources	3
Population served		Area of supply	
Population supplied	7,369,000	Derbyshire, Nottinghamshire, Leicestershire, Warwickshire, Gloucestershire, Worcestershire, Shropshire, Staffordshire, West Midlands, Powys	
Number of local authorities	68		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.98%	99.96%	99.97%	99.96%
Water treatment				
Process Control Index	99.97%	99.92%	>99.99%	99.98%
Disinfection Index	99.97%	99.98%	99.98%	99.93%
Distribution systems				
Distribution Maintenance Index	99.92%	99.86%	99.94%	99.85%
Reservoir Integrity Index	99.93%	99.95%	99.96%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.82%	99.84%	99.87%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	827	801	806	N/A
Rate per 1,000 population	0.11	0.11	0.11	1.22
Acceptability of water to consumers				
Total number	13,983	13,250	12,329	N/A
Rate per 1,000 population	1.86	1.81	1.67	2.55
Complaints to the Drinking Water Inspectorate				
A total of 10 consumers of Severn Trent plc directly contacted DWI in 2008.				

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

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



guardians of drinking water quality

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