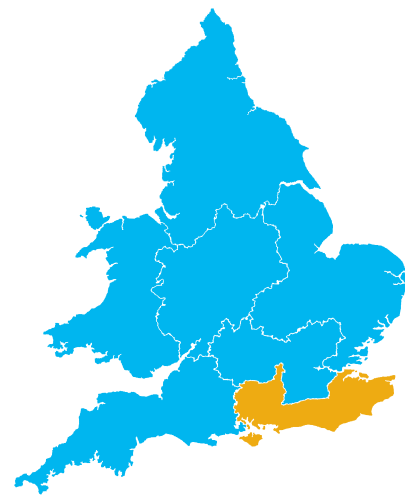


Drinking water 2008

Southern region of England

July 2009

A report by the Chief Inspector of Drinking Water





Drinking water 2008

Southern region of England



Published by
Drinking Water Inspectorate
55 Whitehall
London
SW1A 2EY

Tel: 020 7270 3370

Website: <http://www.dwi.gov.uk>

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ISBN: 978-1-905852-34-5

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

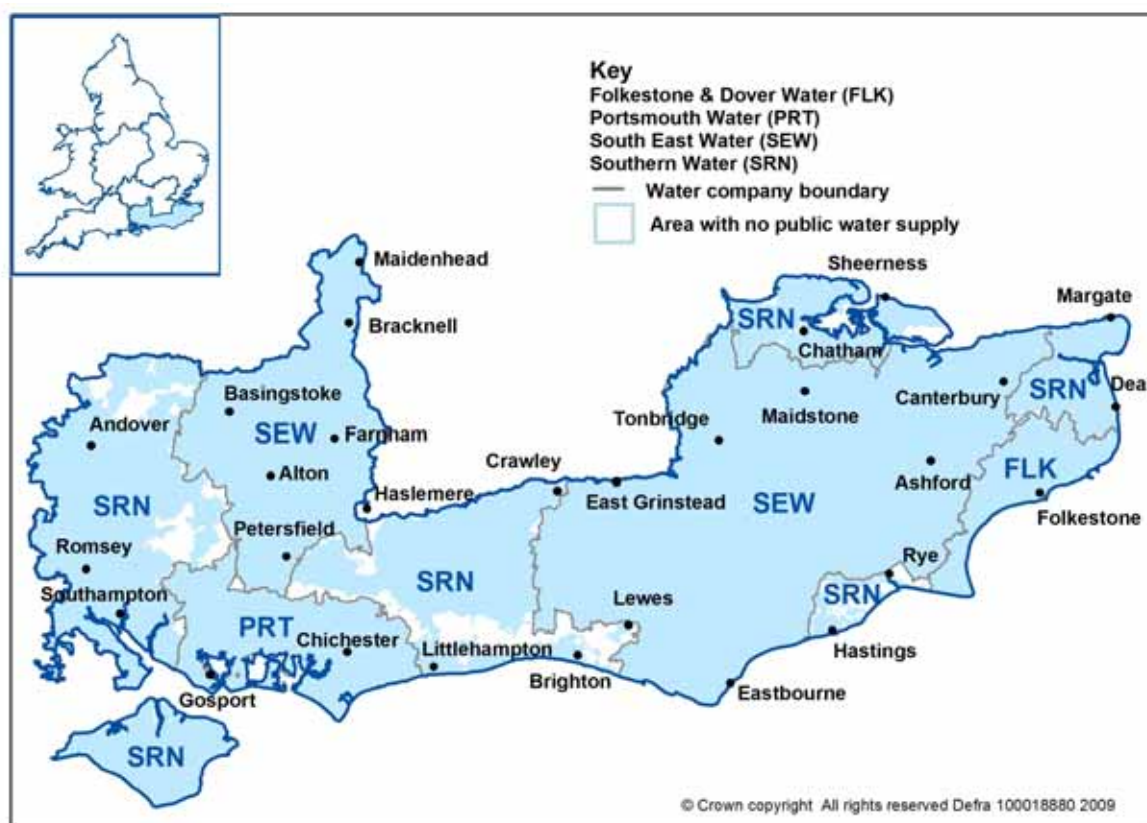
This part describes drinking water quality in the Southern region. The Inspectorate also publishes a series of companion reports for other regions of England (Central, Eastern, Northern, Thames and Western regions) and a separate report for Wales.

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 the Southern region

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 the Southern region, which is served by four water companies (Folkestone and Dover Water, Portsmouth Water, South East Water and Southern Water) delivering public water supplies to about five million consumers. Since the publication of *Drinking Water 2007*, there has been a change in the structure of the water industry serving the region, with the merger of South East Water and Mid Kent Water to create one company with a single operating license.



The results of testing in 2008 demonstrated that the overall quality of drinking water quality in the Southern region was good. The figure for compliance with drinking water standards at consumers' taps was 99.95% compared to 99.96% in 2007. This figure is made up of 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 fewer microbiological failures generally, but more samples exceeded the specification for turbidity compared to 2007. No samples contained *E.coli* in 2008. The number of samples containing coliform bacteria was 13 (down from 20 in 2007). 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. In 2008, a turbidity value of >1NTU prompted investigations at 23 out of a total of 228 works in the region. At Beauport Hastings works, operated by Southern Water, the turbidity was out of specification several times in the year. Turbidity monitoring is an important water safety control measure and the Inspectorate expects companies to prioritise the installation, maintenance and management of turbidity monitors in accordance with regulatory risk assessments.

The microbiological quality of treated water stored in service reservoirs across the region improved in 2008, as evidenced by 25 positive samples in 2008 compared to 33 in 2007 and fewer samples contained *E.coli*. 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 therefore that during the year the Inspectorate had to initiate enforcement action to require South East Water to identify the root cause of repeated failures at Stocks reservoir.

During 2008 there has been an increase in the number of failures of the iron standard across the region (22 in 2008 compared with 14 in 2007). These failures have occurred after the completion of long-term strategic mains renovation programmes of work. Therefore it is important that companies use this information to inform their Distribution, Operation and Management Strategies.

Companies across the Southern region have made limited progress towards achieving the future lead standard of 10µg/l. The numbers of samples meeting the future standard has not improved since 2007. In addition to optimising phosphate dosing treatment for lead, there is a need for companies in the region to develop effective plans to secure compliance with the 10µg/l standard by 2013.

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.

During 2008, metaldehyde, the active ingredient of some slug pellets, has been identified by South East Water and Southern Water as a new pesticide hazard in some water sources in the region. A similar situation has been reported elsewhere in the country by Anglian Water, Bristol Water, Essex and Suffolk Water, Severn Trent Water, South Staffordshire Water, Sutton and East Surrey Water, Three Valleys Water, Thames Water and Wessex Water. The Health Protection Agency has 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 in the Southern region.

In 2008, companies in the Southern region notified the Inspectorate of 42 events of which 23 were classified as water quality incidents requiring an independent investigation by the Inspectorate. Overall, there were more incidents in 2008 compared to the 14 reported in 2007. There was a rise in the number of incidents causing discoloured water due to procedural failures with the risk assessment of planned work on the distribution system, as illustrated by the case review of the incident which occurred in South East Water's Greatham zone, in November, in Hampshire. Additionally, there were a number of incidents at works operated by Southern Water and South East Water which have led to the Inspectorate not being fully satisfied that companies have taken sufficient action in a timely way to ensure that all their works are fully compliant with the treatment and disinfection requirements of the regulations. A summary of the nature, cause and duration of all incidents in the region in 2008 is set out in *Annex 3*.

The Inspectorate completed five audits in the Southern region during 2008 and the findings were generally satisfactory in respect of three sites. However, recommendations for improvement were made in respect of Pembury works operated by South East Water and enforcement initiated in respect of disinfection arrangements at Twyford works operated by Southern Water.

Fewer consumers in the Southern region reported a problem with the quality of drinking water quality at the tap in their home or workplace (2 per 1,000 population). In particular there was a 16% reduction in the number of consumers reporting problems with the appearance of their water, caused by disturbance of mains deposits or aeration. Also, there was a drop in the number of consumers living in the Southern region who had reason to complain about the handling of their drinking water quality complaint to the Inspectorate (13 compared to 15 in 2007). The report contains a review of one case of a consumer served by South East Water

which highlights the importance of companies having arrangements in place for customers to be advised promptly by a water quality scientist.

In 2008, a general theme arising from the work of inspectors in the region was the recurrence of known problems at the same operational site. The Inspectorate is concerned about the extended time sometimes taken by companies to establish the root cause of a water quality deficiency. Illustrative of this concern is the case history outlining ongoing problems at Southern Water's Twyford works. This spanned two years and involved multiple site visits and investigations. Similarly, an extended period was taken to identify the cause of unsatisfactory turbidity results at Bray works operated by South East Water.

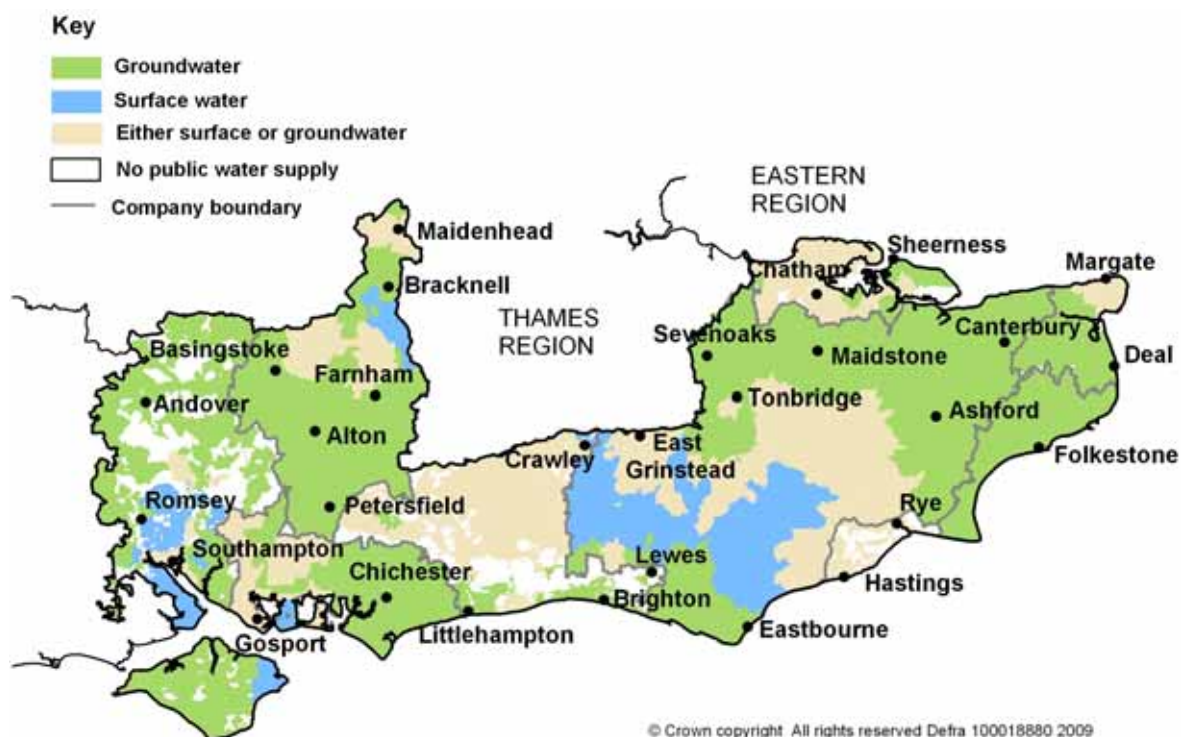
In previous reports the Inspectorate has highlighted the complexity of the supply arrangements in the Southern region, especially with regard to arrangements for bulk supplies (where water is imported or exported across water company boundaries). In 2008, there was a further incident involving a bulk supply in the Burham area of Kent. The Inspectorate will take an increasingly tough line with companies where it is clear that they need to do better when building effective joint risk management and risk communication processes to ensure that water quality risks are proactively addressed and minimised. The Inspectorate will be focusing on these issues when carrying out detailed assessments of the companies' water safety plan methodology and Regulation 28 risk assessment report produced during 2008.

During 2008, at least 79,000 consumers in the Southern region benefited from improved drinking water quality through the completion by companies of two legally binding programmes of work for *Cryptosporidium*.

Water supply arrangements

Four water companies supply drinking water in the Southern region: Folkestone and Dover Water (FLK), Portsmouth Water (PRT), South East Water (SEW) and Southern Water (SRN).

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



Much of the water supplied to consumers in the region is derived from groundwater (58%) with most boreholes drawing water from the chalk aquifers of the North and South Downs. Most companies also abstract water from the green sandstone aquifers, while South East Water abstract from the Ashdown sandstones to supply the Weald area. Folkestone and Dover Water relies exclusively on groundwater, mostly from the chalk aquifers, with the Denge peninsula supplied by abstractions from a shallow gravel aquifer. Surface water also provides a valuable source of water (26%) in the region with river abstractions from the Great Stour, Itchen, Medway, Ouse (Sussex), Test, Thames, Wallers Haven, Western Rother and the River Yar on the Isle of Wight. Water is also drawn from the following reservoirs: Ardingley, Arlington, Bewl, Darwell, Powdermill and Weirwood. Due to the complex supply arrangements in the region, a relatively high proportion (16%) of water supplies can be drawn from either surface or groundwater sources.

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

Table 2: Key facts about the Southern region supply arrangements

Key facts			
Population supplied	5,154,240	Treatment works	228
Water supplied (l/day)	1,329 million	Service reservoirs	486
Number of local authorities	32	Water supply zones	193
(with a further 16 partially covering the region)		Length of mains pipe (km)	32,084
Approximate number of private water supplies	645		
Area of supply		Water composition	
Berkshire (part), East Sussex, Hampshire (part), Isle of Wight, Kent (part), Surrey (part), West Sussex (part)		Surface sources	26%
		Groundwater sources	58%
		Mixed sources	16%

Drinking water quality testing

Throughout 2008, water companies sampled drinking water across the region to test for compliance with the standards in the drinking water regulations. More than 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 469,620 tests during 2008. Only 200 of these tests failed to meet the standard set down in the regulations.

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.

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

Company	Place of sampling			Number of tests per company	Estimate of population
	Water treatment works	Service reservoirs	Consumers' taps (zones)		
Folkestone and Dover Water	8,647 (18)	3,105 (12)	4,528 (6)	16,280	159,000
Portsmouth Water	13,090 (19)	9,330 (30)	14,772 (13)	37,192	663,000
South East Water	51,208 (93)	68,226 (228)	70,315 (91)	189,749	2,001,240
Southern Water	79,412 (92)	64,767 (206)	82,220 (83)	226,399	2,331,000
Region overall	152,357 (222)	145,428 (476)	171,835 (193)	469,620	5,154,240

Note: Numbers in brackets reflect the number of works, reservoirs or zones operated by that company in the region in 2008. Some companies are permitted to carry out some tests on samples taken from supply points rather than from consumers' taps.

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 the Southern region 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 in the region are summarised in *Annex 7*.

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	20,898	0	
Coliform bacteria	0/100ml	20,904	13	SEW (2), SRN (11)
<i>Cryptosporidium</i> *	< 1 oocyst per 10 litres. Treatment standard (see note)	6,511	0	Monitored at 43 works in the region determined to be at risk out of a total of 228
<i>Clostridium perfringens</i>	0/100ml	2,682	7	SEW (2), SRN (5)
Turbidity**	1NTU	21,127	38	FLK (4), SEW (22), SRN (12)
Water leaving service reservoirs				
<i>E.coli</i>	0/100ml	24,324	1	SEW (1)
Coliform bacteria	0/100ml in 95% of tests at each reservoir	24,331	25	SEW (20), SRN (5) One reservoir from a total of 476 did not meet the annual 95% compliance rule; Stocks reservoir 2 (SEW)
Water sampled at consumers' taps				
<i>E.coli</i>	0/100ml	13,696	3	PRT (1), SEW (2)
Enterococci	0/100ml	1,407	2	SEW (2)
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.				

To protect public health, microbiological standards have to be met at each individual treatment works and service reservoir. The results confirm the overall microbiological safety of drinking water supplies in the region. The significance of the individual test results for each microbiological parameter at each location varies and a single positive result cannot be interpreted without other information. All companies are expected to follow best practice as set out in *The Microbiology of Drinking Water (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.

***E.coli* and coliforms at works**

In 2008, a total of 20,898 tests at works were carried out by all the companies across the Southern region and *E.coli* was not detected in any of these samples.

Testing for coliform bacteria gives reassurance that water entering supply was treated adequately to remove bacterial and viral pathogens. Repeated occurrences of coliform bacteria in samples from the same or related sites in one year are thus of concern and require action to be taken. In 2008, this situation occurred at two works operated by Southern Water (Hardham/Hardham High and Balsdean Rottingdean) A two further works operated by South East Water there were instances when the standard for coliform bacteria was not met (Bewl Bridge, Halling New).

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
Folkestone and Dover Water	0 – 1,421	0 – 621	0 – 408	0 – 44
Portsmouth Water	0 – 2,009	0 – 1,541	1 – 1,714	0 – 112
South East Water	0 – 6,329	1 – 11,371	2 – 5,473	2 – 667
Southern Water	0 – 11,139	0 – 10,791	0 – 6,101	0 – 584
Region overall	0 – 20,898	1 – 24,324	3 – 13,696	2 – 1,407
Note: Results are shown as the number of positive tests – the total number of tests.				

In early March, coliforms were detected in a series of samples collected from a number of Southern Water sites. The results on two consecutive days from Hardham High and Hardham respectively led the company to clean out the common treated water storage tank and associated pipes. Single positive samples at Goldstone Hove works, Northbrook Worthing works and Findon Road works resulted in checks of the treatment processes. The company found minor issues with the Clearwater tank at Northbrook Worthing works which were rectified. No other deficiencies were found.

At Balsdean Rottingdean a loose and leaking sample tap was found and rectified. The other detection of coliforms in early March occurred at Weirwood Forest Row works. The company investigation identified that filters had not been backwashed due to problems with the control system. These issues were subsequently resolved.

A further sample collected from Balsdean Rottingdean works in September contained coliforms. On this occasion the company's investigation found that raw water quality in the borehole source had deteriorated following heavy rainfall. Although Southern Water concluded that the UV disinfection system was operating normally at the time, the checks identified some damage and integrity defects at the downstream phosphate dosing tank. Since repairs were made to the tank there have been no further failures at this works.

As a consequence of this series of coliform positive samples, which were all from sites in the Sussex area, Southern Water carried out an audit of its sampling/analysis procedures. The Inspectorate subsequently carried out an independent technical audit of the company's external analytical services provider (Eurofins) and the details of this audit can be found in Table 16.

Southern Water's investigation of a coliform failure at Newmarket Lewes works in June 2008 found damage to the quartz sleeve on one of the UV disinfection modules. The company isolated the unit and carried out repairs and results have been satisfactory since then.

In April there was a failure at South East Water's Bewl Bridge works in Kent. This coincided with two other coliform failures in the area supplied by this works (Tonbridge in Kent). In *Drinking Water 2007*, the Inspectorate reported on issues at Bewl Bridge Works. Throughout 2008, South East Water has continued to make improvements to the monitoring and treatment arrangements at this site, including a new ozone plant. The Inspectorate audited the works in August 2008 and the findings are reported in Table 16.

Overall, in 2008, the Inspectorate was aware of coliform bacteria in 13 samples from treatment works in the Southern region and this information will be taken into account during the Inspectorate's ongoing risk-based programme of technical audit.

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 22 works (12 SEW, 8 SRN, 2 PRT) out of the 228 works in the region.

All results 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 the region during 2008.

In 2008, Portsmouth Water completed two improvement schemes to reduce the risk of *Cryptosporidium* by installing membrane treatment at Soberton works (April) and Fishbourne works (June). As a consequence of an incident in November 2008, Southern Water has fast tracked an engineering scheme which was submitted to the Inspectorate as part of the periodic review process. This scheme is designed to reduce the risk of *Cryptosporidium* at Matts Hill works and is due for completion in 2010. The incident investigation is currently ongoing. Details of this incident can be found in *Annex 3*.

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 2,682 samples taken in the region, only seven contained *Clostridium perfringens* (2 SEW, 5 SRN).

At Southern Water's Burham works, *Clostridium perfringens* was detected twice in 2008. After the first occasion in January, checks by the company identified an associated disturbance in the operation of the coagulation process (clarifiers) on site. Although turbidity readings were normal it was acknowledged that treatment was suboptimal, which is reflected in the fact that a second sample was positive for *Clostridium perfringens* in June. Samples have been satisfactory for the rest of the year, but the Inspectorate has noted the situation and this will be taken into account in the risk-based approach to technical audit.

Single positive samples were recorded at two other Southern Water works (Fawkham Longfield and Hardham High) in June. Checks did not identify any specific cause and results have been satisfactory since.

In July 2008, *Clostridium perfringens* was detected in a sample from Totford works. Southern Water's review identified that the works was not in operation at the time the sample was collected. The Inspectorate has reminded the company of the importance of adapting their monitoring programme to ensure samples are representative of water being supplied. The company has since modified its procedures to prevent samples being taken when works are not in service.

South East Water reported *Clostridium perfringens* in two samples during 2008. These samples were collected from consumers' taps. At the time the company found no treatment issues at the Barcombe Mills works serving the Cottage Hill zone in February or the Forstal works and the Southern Water bulk supply serving the Burham zone in December. Despite a lack of evidence, the company attributed the failure in December to consumer tap hygiene. The Inspectorate is critical of companies when they follow coliform protocols to investigate detections of *Clostridium perfringens* in samples from consumers' taps – these two indicator organisms serve different purposes and companies are expected to understand and follow the science as set out in *The Microbiology of Drinking Water 2004*.

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*

In *Drinking Water 2007*, the Inspectorate reported that there had been a significant decrease in the number of turbidity measurements not meeting the specification for turbidity to 31 in 2007. This improvement did not continue into 2008 because across the region there were 38 occasions when the specification for turbidity was exceeded at treatment works (4 FLK, 22 SEW, 12 SRN). The change for the worse was most notable in respect of South East Water sites.

Denge works in Kent, operated by Folkestone and Dover Water, exceeded the turbidity specification on three occasions in 2008. The raw water source at this works comprises a series of shallow boreholes situated in a

seaside catchment. The catchment setting is unusual and raw water quality has been deteriorating since 2007. Treatment currently consists of pressure filtration, UV disinfection and chlorination. There is reverse osmosis treatment on site for a dedicated commercial (non-domestic) supply to a power station. Due to the heightened risk to the public water supply provided by this works, the Inspectorate has supported the company's long-term risk mitigation control measure (in the company's PR09 business plan) to install additional treatment to secure compliance in the future with standards for turbidity, iron and manganese. Interim control measures by the company include the installation of additional on line monitors and optimisation of disinfection through a chlorine demand study. The Inspectorate carried out an independent technical audit at this site in October 2008 (see Table 17 for further details).

A shutdown at Folkestone and Dover Water's Rakeshole South works in June, due to a power failure causing a fault in pumping and telemetry on start up, resulted in turbidity readings outside the specification. The investigation identified that the action of two pumps starting simultaneously creates rapidly changing flow conditions. The control software has been modified since to prevent a recurrence of similar conditions.

There were six occasions during 2008 when the turbidity specification of 1NTU was exceeded at South East Water's Bray works in Berkshire. Due to a strategic trunk main development for the Surrey Hills reservoir, the works was taken out of service on several occasions and it was the changes of flow relating to these operational circumstances that were the root cause of the turbidity problems. The surge vessel on site was not capable of mitigating the effect of the flow changes causing disturbance of deposits in the sample line, which itself was in a suboptimal location to provide samples representative of the water entering supply. The company has now relocated the sample point and cleaned out the surge vessel. The Inspectorate is critical of the company for the length of time taken to understand the meaning of the turbidity failures and make the necessary improvements to prevent any recurrence.

High turbidity results in March and May led South East Water to investigate the situation under different pumping regimes at Holywell Haywards Heath works. This activity led to the discovery of an unacceptably long sample line, the design of which facilitated the accumulation of historic deposits. Under certain pumping conditions such deposits would be disturbed. The company has since relocated the sample point.

Twice in August the turbidity exceeded 1NTU at Cramptons Road works. This situation also occurred in 2005. The works is used at times of high demand and South East Water has attributed the turbidity problems to start

up of the works because there are no facilities to run water to waste initially. The company has carried out a review of the surge protection on site and the influence this may be having on the sampling line. The situation at this site will be taken into account during the Inspectorate's technical audit programme.

In *Drinking Water 2007*, the Inspectorate reported on high turbidity results on three occasions at Hazard Green works. South East Water attributed the problem to deposits in the sample line and subsequently moved the sample tap. Following a recurrence of the problem in June 2008 the Inspectorate carried out a technical audit of the site in July. This revealed that a new works was being built alongside the existing works. There was some evidence that the turbidity issues had arisen as a consequence of adjustments to the operating regime during commissioning of the new works. The company has acted on the audit findings and turbidity results have been satisfactory since (for further details see the *Technical audit activity in the region* section).

At Pembury works (SEW) turbidity results were out of specification on three occasions in 2007 and again in August 2008. On investigation the company identified problems with the arrangements for pH correction as part of the coagulation process. An independent technical audit by the Inspectorate in September confirmed inadequate chemical mixing arrangements resulting in carry over of floc together with suboptimal monitoring arrangements at the DAF plant. If turbidity problems persist following the short-term remedies initiated by the company, the Inspectorate will consider the need for enforcement action.

There have been ongoing turbidity failures at Southern Water's Beauport Hastings works (three occasions in 2007 and four occasions in 2008). The turbidity is due to the deposition of crandalite, a mineral which is known to form under specific circumstances, in this instance, the dosing of phosphate to control plumbosolvency into water which has been treated first with an aluminium flocculant. Crandalite is a compound containing both calcium and aluminium. The Inspectorate considers it unfortunate that the company was not aware of the crandalite risk when designing the new works construction which commenced during 2007. The company has an action plan in place to make adjustments to address the matter. The Inspectorate reminds companies of their responsibility to ensure that comprehensive risk assessment, based on a thorough knowledge of water chemistry, is undertaken in association with the design of any new or modified water treatment.

A high turbidity value was obtained at Matts Hill Hartlip works (SRN) in May and November 2008 and these were linked to a deterioration in raw water quality due to episodes of heavy rainfall.

E.coli at service reservoirs

In 2008, across the region, a total of 24,324 tests were carried out at service reservoirs and *E.coli* was detected on only one occasion (SEW). 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 May, a sample from Southview reservoir contained coliforms, follow-up samples taken by South East Water were free from coliforms, however, the confirmatory tests carried out on the organisms grown from the original sample were subsequently confirmed as *E.coli*. When this information became known to the company additional samples were collected and the company chlorinated the reservoir. The Inspectorate was critical of South East Water for its approach to reporting this situation.

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. The Inspectorate is pleased to report a general improvement in microbiological quality at service reservoirs operated by South East Water and Southern Water (25 detections of coliforms compared to 33 in 2007). In 2008 only one reservoir (Stocks service reservoir No. 2) failed to meet standard.

Following an incident in 2007, South East Water took Stocks reservoir out of service following the detection of *E.coli*. The reservoir was returned to service after suspected integrity defects were remedied by replacing the external roof membrane. However, unsatisfactory samples have continued to occur and the Inspectorate initiated enforcement action in 2008 to require the company to investigate the cause of the ongoing failure to meet the coliform standard.

In October 2008, coliforms were detected in a sample from Best Beech service reservoir and in follow-up samples collected from two consumer's taps in the zone fed by the reservoir. The situation was notified to the Inspectorate as a water quality event. A further failure occurred at the reservoir in November. The Inspectorate recommended that South East Water revised its arrangements for prioritising reservoir inspection and cleaning to ensure that microbiological results are taken into account in the decision making process. Best Beech reservoir was removed from service and cleaned in December 2008 and results have been satisfactory since that time.

Following a coliform failure at Piddinghoe reservoir number 2 in May 2008, South East Water identified a *Cryptosporidium* risk at the works supplying the reservoir in June. The Cow Wish Bottom borehole is being continuously monitored by South East water for *Cryptosporidium* and despite an increase in abstraction of water at this site, there have been no further detections of *Cryptosporidium*. Piddinghoe reservoir was cleaned and returned to service in April 2009.

A coliform failure at St Francis reservoir (SEW) in June was linked to a known problem. The sampling pump was found to be corroded during a reservoir inspection in August 2007. The company has a programme in place to complete this work as part of a wider programme of minor repairs at a number of service reservoirs.

A coliform failure in a sample from Ewshot No. 1 reservoir (SEW) in September was linked in time with a coliform failure in a sample from Hale Tower (SEW) and this was notified to the Inspectorate as a water quality event. The situation was complicated by the occurrence upstream of a burst main (Surrey Hills reservoir) and elevated turbidity results at Bray works. A presumptive *E.coli* result reported by the laboratory to the company at the time did not confirm and subsequent results have been satisfactory.

A number of coliform positive samples in 2008 were taken from reservoir sites served by Bewl Bridge works. The Inspectorate has independently assessed the situation and engaged South East Water in discussions about the need to improve water quality. Actions being taken by the company include optimisation of the operation of filters and improvements in residual chlorine dosing.

Between July and September, two coliform failures occurred at Fairlight Ore New reservoir. Southern Water's investigation found a fault with the on-site generation of sodium hypochlorite (the OSEC plant) and took action to restore the situation to normal.

A single coliform failure occurred at Perry Hill reservoir in August. Southern Water established that the sampler had used an alternate sampling location because of a problem with the on-site power supply to the pumps serving the 'normal' compliance sample tap. The alternate sample location used by the sampler was unsuitable as the tap was exposed and covered in vegetation.

The Inspectorate has noted that coliform bacteria were found in 25 samples from service reservoirs in the Southern region during the year 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 13,696 consumers' taps were tested in 2008 for *E.coli* and three were positive (1 PRT, 2 SEW). There was no indication, from information gathered by the two water companies, of a faecal contamination event affecting other properties in these zones.

A sample collected by South East Water from a tap in a property in the Butlers Green zone in September contained *E.coli*. Checks at the treatment works and upstream service reservoirs proved to be satisfactory. Although the cause was attributed to tap hygiene, the company did not act to protect the consumer during the period of investigating the failure. The Inspectorate was critical of South East Water for the time taken to write to the consumer with advice to prevent a recurrence.

In October, a consumer's tap sample collected by South East Water in the Blatchington zone in East Sussex contained *E.coli*. The results were satisfactory from follow-up samples from the upstream works and reservoir and from neighbouring properties. The company concluded that the failure was due to the internal plumbing within the property.

A sample taken in the Walderton zone near Chichester in September contained *E.coli*. Portsmouth Water checked the upstream treatment works and confirmed there were no treatment issues. Further samples from the works, an upstream reservoir, and other properties in the street were all free from coliforms and *E.coli*. The tap was fitted with an anti-splash device and a second sample taken five weeks later also failed the standard for *E.coli*. There was a period of enhanced monitoring after the anti-splash device was removed from the tap at the consumer's request. All further results were satisfactory.

Like *E.coli*, the presence of Enterococci is indicative of faecal contamination and neither bacterium should be found in any sample. In 2008, companies in the Southern region carried out 1,407 tests for Enterococci at consumers' taps. Only two samples (SEW), each in a different zone, were positive. There was no indication, from information gathered by South East Water of a faecal contamination event affecting other properties in these zones.

A sample from a property in South East Water's Wych Cross zone in February contained Enterococci. All further samples from the works, the service reservoir and the property were satisfactory. A similar failure occurred in the company's Cuckfield zone in August. The Inspectorate was critical of the company's response, concluding that too few follow-up samples had been taken to verify water quality within the zone. The company has since reviewed its arrangements for responding to detections of Enterococci.

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	2,881	0	
– odour	No abnormal change	2,711	8	SEW (7), SRN (1)
– taste		2,722	3	SEW (1), SRN (2)
Aluminium	200µg/l	2,535	3	PRT (1), SRN (2)
Antimony	5µg/l	1,405	1	SEW (1)
Copper	2mg/l	1,404	1	SEW (1)
Fluoride	1.5mg/l	1,405	0	
Iron	200µg/l	3,407	22	SEW (13), SRN (9)
Lead (current standard)	25µg/l	1,427	3	PRT (1), SEW (2)
Lead (future standard)	10µg/l	1,427	17	PRT (2), SEW (8), SRN (7)
Manganese	50µg/l	2,545	1	SEW (1)
Nickel	20µg/l	1,404	2	SEW (1), SRN (1)
Nitrate	50mg/l	1,410	0	
Nitrite	0.5mg/l	1,408	0	
Pesticides – total	0.5µg/l	1,447	0	
Pesticide – individual (see note 3)	0.1µg/l	54,961	1	Isoproturon SRN (1)
Tetrachloroethene and Trichloroethene	10µg/l	1,376	1	PRT (1)
Trihalomethanes total	100µg/l	1,415	1	SRN (1)
Turbidity (at consumers' taps)	4NTU	3,290	1	SEW (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 5,488 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 11 samples from consumers' taps in the Southern region exhibited a positive taste or odour. The standard for colour was met for all 2,881 samples taken across the region.

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 arising in future years.

- Bitter/Flat: This type of taste was reported from a consumer's tap sample collected in November from the Twyford Zone. A water softener was fitted in the premises and Southern Water advised the consumer to ensure that a mains fed tap was also available for drinking water in the kitchen.
- Earthy/Musty: Three samples from different zones (2 SRN, 1 SEW) exhibited an earthy taste/odour and six samples from different zones (6 SEW) were reported as having a musty taste/odour. The companies did not attribute any of the earthy taste/odour to a known problem of algal growth in raw water sources, therefore it is probable that the cause was due to the growth of harmless fungi as a consequence of the design or maintenance of the plumbing in the properties that were sampled. Companies are encouraged to explore the origin of these types of failure to ensure that raw water conditions are not a contributory factor.
- TCP: In the Southern region one consumer's tap sample exhibited an 'antiseptic'/TCP odour. This failure occurred in South East Water's Hogs Back zone in November. Normally antiseptic/TCP tastes or odours are due to a reaction between the low level of chlorine in the mains water supply and an unapproved material; the remedy is to advise the householder about typical causes, for example, certain types of kettle, appliance hoses, tap washers etc.

At the present time companies in the Southern region do not have any current or proposed programmes of work to address a known taste or odour problem.

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 2,535 samples were tested for aluminium in the Southern region. South East Water and Folkestone and Dover Water achieved 100% compliance with the aluminium standard. Just three tests exceeded the standard (1 PRT, 2 SRN) and none of these were linked to process control at the works.

The single exceedences for aluminium which occurred in consumer tap samples in the Portsmouth South zone in July (PRT) and the Brighton Middle Service 2 zone in September (SRN), did not occur in association with planned work on the distribution system, therefore in each case the failure was assumed to have arisen from a localised disturbance of mains deposits derived from historic carry over of aluminium floc from the works. The failure occurring in the Adisham zone in November (SRN) was in a zone where the supplying works does not use aluminium as a coagulant. The company are monitoring this zone for further failures and have examined the influence on this area of distribution from historic deposits from other areas in the distribution network.

Antimony

Antimony is not normally found in water sources. Trace concentrations in drinking water can be derived from brass tap fittings and from solders. In 2008 a total of 1,405 tests were carried out for antimony and all but one met the standard (5µg/l).

A level of 25.25µg/l of antimony was reported in a sample from a consumer's tap in the Itchel water quality zone during January. South East Water's investigation determined that the supply pipe to the property was plastic and the water fittings did not point to an obvious source of the antimony. A further sample taken after flushing of the tap was free from antimony. The company worked with local health professionals to provide advice to the consumer and encourage them to investigate further the internal plumbing fixtures and fittings.

Copper

Copper in drinking water usually derives from copper pipes and fittings in household plumbing. In general, water supplies in the UK are not aggressive towards copper, but there can be occasional problems with new plumbing installations. In 2008, a total of 1,404 tests were carried out for copper across the region and all but one met the standard of 2mg/l (SEW).

A level of 3.57mg/l copper was reported in a sample from a consumer's tap in the Surrey Hills zone in August. The property from which the sample was taken was being used as a dental practice. The company took samples from neighbouring properties and from within the dental practice after flushing of the pipework. All these samples yielded satisfactory results.

Fluoride

Traces of fluoride occur naturally in many water sources, particularly in groundwaters. For example, fluoride is found in the north east Kent coastal area around Whitstable and Herne Bay. 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 were no fluoridation schemes in operation in the Southern region and all 1,405 tests taken for fluoride during 2008 across the region met the regulatory standard (1.5mg/l). However, in May 2008 the South Central Strategic Health Authority announced its plans for a new fluoridation scheme for Southampton and the surrounding area. The consultation finished in December 2008 and a decision to proceed with a scheme for dosing of fluoride to parts of Southampton and south west Hampshire by Southern Water was announced on 26 February 2009. Due to the work required to establish the scheme it is anticipated that it will be no earlier than 2010 before fluoride is added to the local water supply.

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.

South East Water are constructing a new main from Borough Green to Trosley works. This is due to be completed in December 2009. South East Water are investigating the need for mains renovation in the Greatham and Headley zones and work has been undertaken to carry out flushing to remove historic manganese deposits. The Inspectorate is monitoring the effectiveness of this work, following two events in 2007 and a further event in 2008 which resulted in discolouration in Greatham zone. The company has been sampling the area extensively since this renovation work and have also been monitoring levels of consumer complaints relating to discolouration in the supply area. The company will report their findings to the Inspectorate as part of this programme of work.

In 2008, there were 22 failures of the iron standard at consumers' taps (13 SEW and 9 SRN), each of which was considered to be an isolated event 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.

In May 2008, South East Water reported a failure of the iron standard in the Burham zone which was also associated with failures of other standards (manganese, odour and turbidity). The company identified that the consumer's galvanised iron supply pipe was in poor condition and the property was located at the terminal end of a water main. Conditions of low flow probably encouraged the accumulation of corrosion deposits. The company flushed the main and provided advice to the consumer. The main was subsequently replaced.

There were a number (13) of other isolated iron failures in zones supplied by South East Water which the company attributed either to galvanised supply pipes as described above or to the presence of cast iron mains. The company has used the data from the monitoring programme to update its Distribution, Operation and Management Strategies (DOMS).

In 2008, Southern Water reported nine failures of the iron standard. Failures in the Broadwater zone in February and Rownhams zone in September were found to be due to the consumer's galvanised iron supply pipe. Two failures in the same zone (Woolmans Wood) in February and May identified the need for the company to take remedial action in an area where historic deposits have accumulated. The Inspectorate is closely monitoring the company's actions to remedy this cause of iron failures.

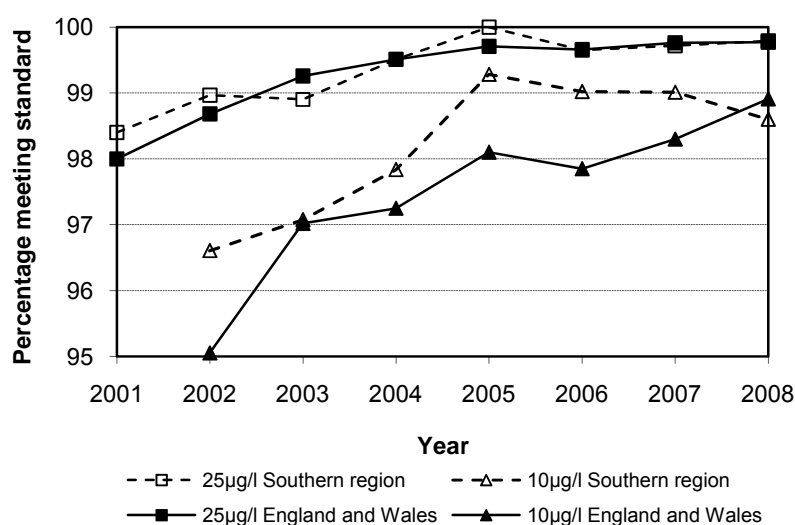
Southern Water's Wigmore zone is identified by the company in its Distribution, Operation and Maintenance Strategies for failures of several standards (aluminium, pH, antimony and nickel). In October 2008, a sample failed the standard for iron. The company has since put in place an action plan for improving water quality in this zone, this may include further strategic flushing or replacement of the mains in the area.

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 the region and for the industry, towards meeting the future standard for lead of 10µg/l by the end of 2013. Figure 7 shows that there has been no progress towards meeting the future lead standard in the past three years, although the regional performance is below the national picture.

Figure 7: 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, the Inspectorate was notified of three failures in the region (PRT 1 SEW 2).

The standard for lead (25µg/l) was exceeded in samples collected from consumers' taps in the Windover zone (SEW) in January and the Butlers Green zone in April. In both cases South East Water found the cause to be lead pipes. Flushing was not effective in reducing the level of lead in water samples from the property in the Windover zone and the company has issued specific advice to the householder on the need to replace the service pipe.

In addition, during 2008 companies in the region have responded to 126 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, there was a single failure of the manganese standard reported by South East Water in the Burham zone in May.

This was associated with failures of other standards (iron, turbidity and odour). For details of the cause and action taken by the company see the *Iron* section.

Nickel

Nickel may be present in coatings on modern tap fittings. In 2008, a total of 1,404 tests were carried out for nickel and all but two met the standard of 20µg/l (1 SEW, 1SRN). A level of 32.1µg/l of nickel was reported in a sample from a consumer's tap in the Lasham zone. South East Water took follow-up samples after extended flushing. The results were satisfactory and the company provided the consumer with advice on how to prevent a recurrence.

A sample collected from a consumer's tap in the Fairlight zone (SRN) in August contained 42.90µg/l of nickel. Southern Water attributed this failure

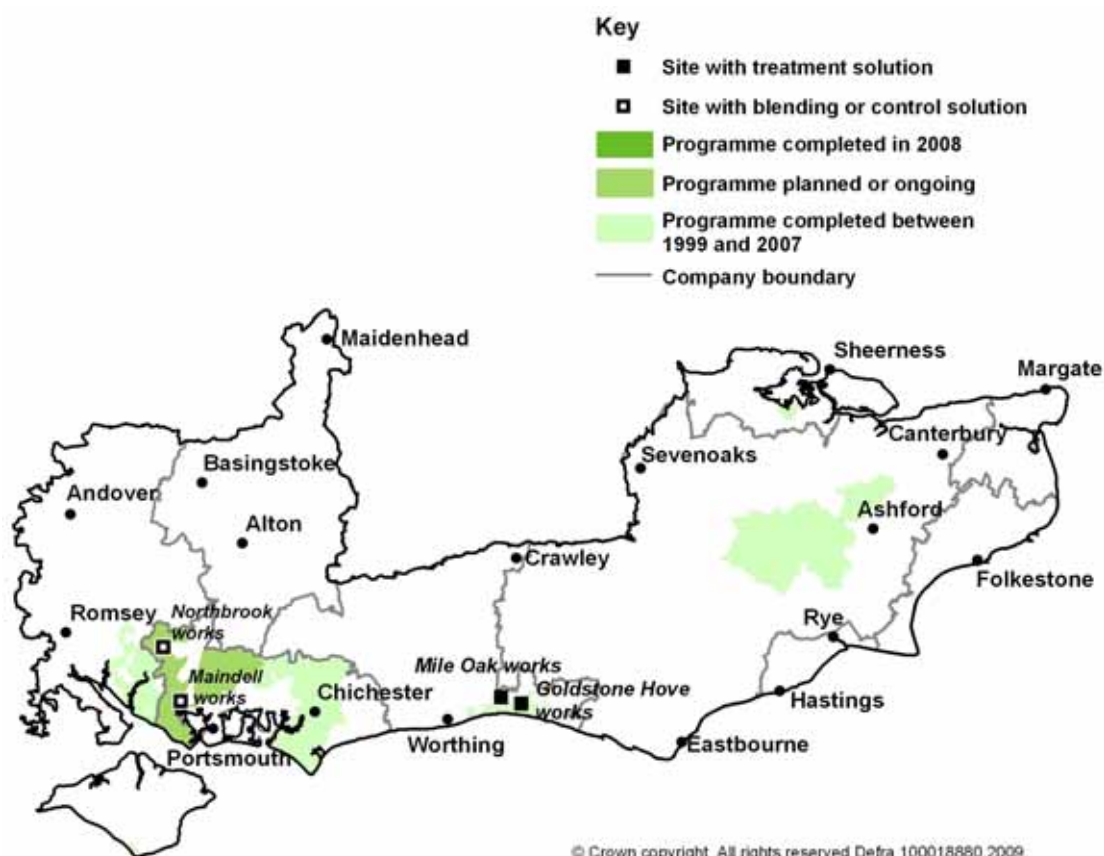
to nickel coated water fittings in the property. This consumer was provided with advice from Southern Water on how nickel may affect water quality.

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 of the 1,410 tests for nitrate across the Southern region met the nitrate standard (50mg/l).

During 2008, Portsmouth Water was carrying out improvement works blending to address nitrate in the source water at Maindell and Northbrook works. This was identified as a result of monitoring by the company which showed that water supplying these works was likely to exceed the standard for nitrate and the current treatment in place was unlikely to be able to deal with the increase. Both programmes of work are behind schedule, but should be completed by June 2009. Once finished these works will result in improved water quality to over 153,000 people in Fareham, Gosport and Northbrook zones.

Figure 8: The extent of nitrate improvement programmes



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. Nitrite can also form in samples of water, after collection and before analysis, especially if the sample is not kept cool. No company in the Southern region practices chloramination, however, South East Water receives a bulk supply of treated water with a chloramines residual from Sutton and East Surrey water. This treated water originates from Bough Beech works and supplies around 200 consumers living in Furnace Wood.

In 2008, all 1,408 tests carried out across the region for nitrite met the standard.

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 the region met the standard for total pesticides (0.5µg/l). Also there was 100% compliance (5,488 tests) for the four pesticides with a standard of 0.03µg/l. Out of a total of 54,961 tests for individual pesticides (standard of 0.1µg/l) there was a single failure reported by Southern Water. The circumstances and substances involved are summarised below.

Isoproturon

Isoproturon is a widely used herbicide for the control of annual weeds in cereal crops. The standard is 0.1µg/l.

In January 2008, Isoproturon at a level of 0.16µg/l was detected in a sample from Beacon Lane Woodnesborough works (near Sandwich in Kent). Isoproturon has not been detected previously at this works nor was it found in investigational samples at the time and all subsequent samples have been free from isoproturon. Southern Water has been working with

the Environment Agency to understand the potential sources of isoproturon in the catchment area.

Tetrachloroethene and trichloroethene

These solvents may occur in groundwater in close proximity to certain types of industrial sites. The common use of these solvents is dry cleaning of clothes. Conventional water treatment does not remove solvents from water. The standard of 10µg/l relates to the sum of the detectable concentrations of both compounds.

In 2008, a total of 1,376 tests were carried out and all but one met the standard (PRT). In October, a combined tetrachloroethene/trichloroethene value of 13.11µg/l was detected in a sample collected from a tap in the Portsmouth North zone. On investigation, the analytical sample results appeared unusual due to the absence of trihalomethanes which are normally present in samples from the zone. Portsmouth Water reviewed the results with the analytical service provider, but there was no conclusive evidence of an error in the analysis. All subsequent samples were satisfactory and the company have concluded that the original sample results were not representative of the water supply.

Trihalomethanes

Trihalomethanes (THMs) arise when chlorine is added to water containing naturally occurring organic substances. Treatment processes are optimised by water companies to minimise their production. In 2008, only one of the 1,415 tests exceeded the standard in the Southern region (SRN).

In May, a sample taken from the Cooks Castle zone near Wroxhall exhibited a value of 370µg/l. Southern Water's investigation concluded this result was anomalous and not representative of the water supply. Follow-up samples were satisfactory and there have been no failures in this zone over the past two years.

The company has taken in the region of 600 samples per year in both 2006 and 2007, and these samples all met the standard of 100µg/l for trihalomethanes as sampled at consumers' taps.

Turbidity

Turbidity is the cloudiness of water as determined by measuring the degree of scattering of a beam of light as it passes through the water. Turbidity may be measured by on-line instruments, usually located at a water treatment works, in addition to tests carried out on samples sent to

a laboratory. The national turbidity standard for water at the consumer's tap is 4NTU. Failures of this standard are usually associated with the disturbance of sediment within water mains.

Additionally, and importantly, water companies must measure turbidity at the water treatment works. Treated water entering the distribution system must not exceed the regulatory turbidity specification of 1NTU.

The following discussion focuses on the results of samples taken from consumers' taps. For information on tests taken at water treatment works, see the heading *Turbidity* in the section titled *Microbiological quality*.

In 2008, a total of 3,290 samples from consumers' taps across the region were tested for turbidity and all but one met the standard of 4NTU. This failure occurred in South East Water's Burham zone, the value of 13.55NTU was associated with failures of other standards (odour, iron and manganese). The cause was a long run of galvanised pipe in poor condition as described in the *Iron* section.

The number of turbidity failures in the Southern region is unchanged over past two years. The Inspectorate expects companies to use monitoring data to inform their Distribution, Operation and Maintenance Strategies and to specifically prioritise low flow locations for regular flushing.

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 9 shows the change in the rate of consumer contacts per 1,000 population for the three main categories (appearance, taste and odour, and illness) since 2006.

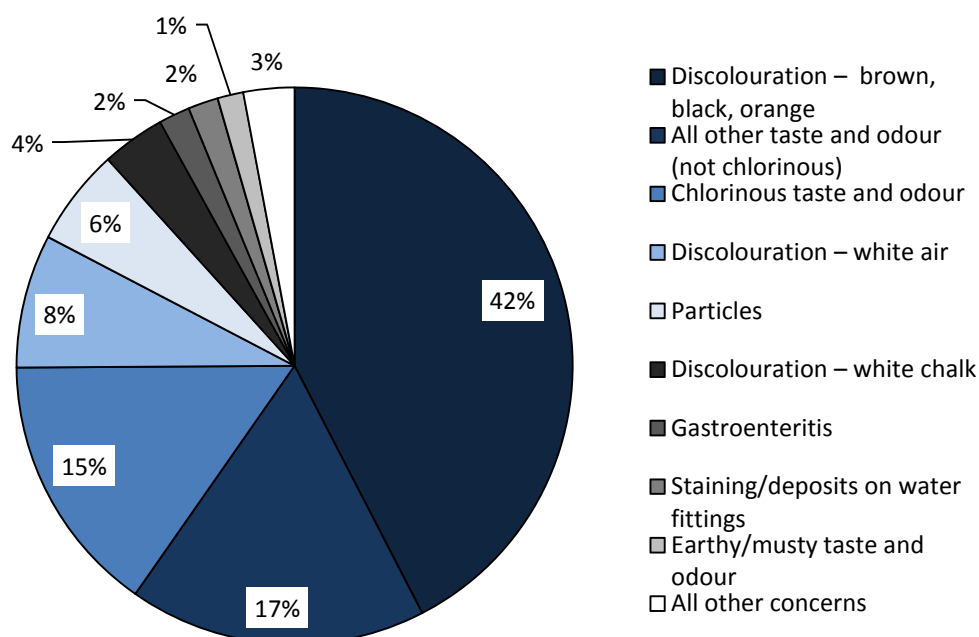
Table 9: Total contact rates of appearance, taste and odour, and illness

Company	Contacts per 1,000 population		
	2006	2007	2008
Folkestone and Dover Water	1	2	2
Mid Kent Water	1	2	(see note)
Portsmouth Water	0.3	0.5	1
South East Water (pre merger)	3	2	(see note)
South East Water (post merger)	(see note)	(see note)	2
Southern Water	2	2	1
Region overall	2	2	2

Mid Kent Water joined with South East Water.
Figures above 0.5 are round to the nearest whole number.

In the Southern region, the most frequently reported consumer concerns during 2008 were discolouration – brown, black or orange (42%), non-chlorine taste/odour (17%), chlorinous taste/odour (15%), discolouration – white due to air (8%) and particles (6%). Together, these constituted 88% of all consumer contacts about drinking water quality in 2008.

Figure 10: Consumer concerns in the Southern region in 2008



Over the last three years there has been a 25% reduction in appearance contacts across the Southern region. The main contributor to this change has been fewer reports of 'dirty' water or white water. The effect of this improvement has been to raise the profile of reports of an objectionable taste or odour, particularly those relating to chlorine. Further detail on these categories is provided below.

Discoloured water

Contacts due to brown, black or orange discolouration caused by deposits of iron, aluminium or manganese are fewer in number nationally, demonstrating the benefits of over a decade of investment in distribution renovation by the water companies. These programmes of work were completed in the Southern region in 2006 and have been replaced by ongoing Distribution, Operation and Maintenance Strategies (DOMS). In the Southern region over the period 2006 to 2008 the beneficial impact of DOMS is confirmed by the 24% reduction in the number of brown, black

or orange discolouration contacts. As shown in Table 11 below, it is consumers of South East Water and Southern Water who have benefited the most.

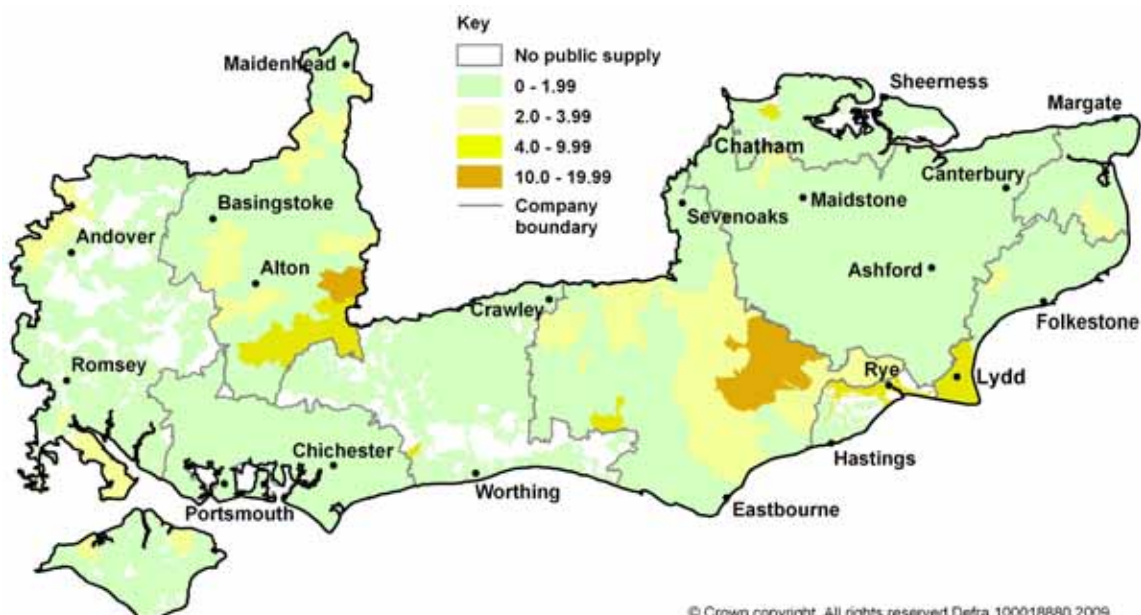
Table 11: Consumer contacts for brown, black or orange water 2006-08

Company	Number of consumer contacts reporting brown, black or orange water		
	2006	2007	2008
Folkestone and Dover Water	60	130	86
Mid Kent Water	358	513	(see note)
Portsmouth Water	35	29	45
South East Water (pre merger)	2,472	1,405	(see note)
South East Water (post merger)	(see note)	(see note)	1,730
Southern Water	2,227	2,536	1,644
Total	5,152	4,613	3,505

Mid Kent Water joined with South East Water

The Inspectorate receives contact data for each zone and Figure 12 illustrates the rates of consumer contacts across the Southern region.

Figure 12: Consumer contact rates per 1,000 population for brown, black or orange water



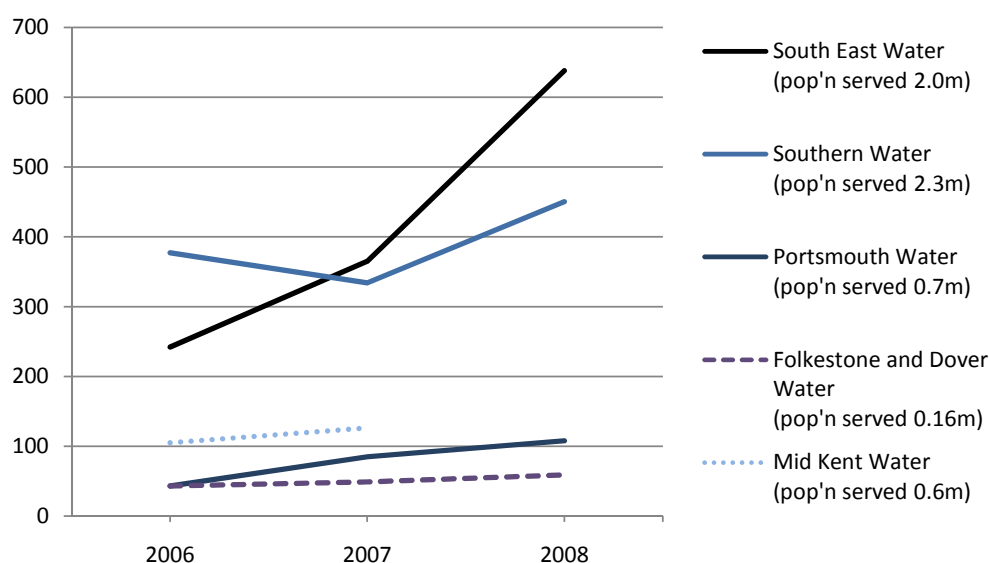
White water

The occurrence of white water contacts due to entrained air has fallen from more than 1,000 in 2006 to under 650 in 2008 across the region. The greatest improvement (a reduction of 42%) has been made by South East Water.

Chlorinous taste and odour

Over the past three years, the proportion of contacts attributable to chlorinous taste and odours across the industry has risen from 8% to nearly 13% of all consumer concerns (from over 12,000 to nearly 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 the Southern region. 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, the consumer may turn to the Inspectorate for advice. As can be seen from Table 14, in 2008 there were 13 consumers living in the region who complained directly to the Inspectorate, slightly fewer than the 15 complaints received in 2007. Consumers who turn to the Inspectorate often display a lack of trust in their water company. The action taken by the Inspectorate involves obtaining information from the company and providing the consumer with an independent opinion on the matter. Where necessary, the Inspectorate will recommend the company takes further action.

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

Category	Number of contacts
Appearance	4
Taste and odour	5
Report of illness	3
Water quality concern	1
Number of contacts to DWI from consumers by company. FLK (1), SEW (8), SRN (4)	
Categories are as defined in Information Letter 1/2006.	

Almost two-thirds of the complainants in 2008 were customers of South East Water. The following case highlights the importance of companies ensuring that they have appropriate communications protocols in place in support of the drinking water quality monitoring programme.

In June, South East Water detected coliforms in a random compliance sample from a consumer's tap in East Sussex. The company took further samples from the property over a protracted period of time. The repeated sampling visits caused the consumer to telephone the company for information. Instead of being given an explanation, the customer was told to put her concerns in writing to the company. It was this response that made her turn to the Inspectorate for help. Following the Inspectorate's intervention the company admitted that it had failed to write to the consumer with information at the time of the first unsatisfactory result (as required by the regulations).

Incidents in 2008

Companies in the Southern region notified the Inspectorate of 42 events during 2008. The Inspectorate classified 23 as 'incidents' requiring a comprehensive report from the company and a full investigation by the Inspectorate. This compares to 14 incidents in the region in 2007.

Table 15: Water quality events in the region in 2008

Water company	Number of events notified	Number classed as incidents
Folkestone and Dover Water	1	1
Portsmouth Water	3	0
South East water	21	10
Southern Water	17	12
Region overall	42	23

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 the region in 2008 are highlighted by the following cases:

Loss of disinfection at Burham works

- There was a failure of chlorination at Southern Water's Burham treatment works in February 2008 when a hypochlorite tank ran low. This works, located near Rochester in Kent, supplies a population of approximately 340,000 in the Medway Towns, Gravesend and surrounding area. Operators did not act on the initial alarm relating to the loss of chlorine dosing therefore the problem continued until there was a second alarm triggered by low chlorine in treated water leaving the works.

At the time of the incident the works was operating with only one hypochlorite tank. Normally, the works operates with two tanks, one duty and one standby; however, the second tank was undergoing commissioning tests. The Inspectorate was critical that the risk of reliance on a single tank had not been adequately assessed in advance and appropriate mitigation measures put in place by the company. Companies need to reinforce the need for extra vigilance by operators whenever there are unusual operating circumstances.

Forest Row coliform failures

- A routine sample taken from Forest Row, in Sussex, in early May, contained coliform bacteria. Follow-up sampling by South East Water identified a wider problem eventually traced to the poor condition of the local water main, low turnover of water and low chlorine levels. The main was eventually replaced. The Inspectorate was critical of the time taken by the company to communicate the action being taken by the company to consumers and for poor customer liaison. The action taken by the company to replace the main was robust, however, the actions being taken to keep consumers informed could

have been improved. One customer complained directly to the Inspectorate (see section *Customer perceptions of drinking water quality*). Companies need to ensure that there is always a water quality scientist available to speak to consumers who make contact with the company about sample results.

Tonbridge detection of Cryptosporidium

- South East Water's Tonbridge works supplies water to around 14,000 consumers in the Tonbridge area of Kent. *Cryptosporidium* oocysts were detected in treated water leaving the works on two consecutive days in November 2008. The works was classified as being at high risk for *Cryptosporidium* and the situation was being managed in the short term by continuous monitoring with a plan to install UV disinfection in the longer term. The oocysts were detected at a time of high flow in the nearby River Medway and elevated turbidity at the works. The company investigation report highlighted a potential for surface water ingress due to structural defects in tanks on site, including the contact tank. The Inspectorate was critical of the company for not remedying these defects and for not reviewing and improving the provision of on line monitors to provide information on the quality of water entering the works and at the various stages of treatment. The company was required to provide a detailed plan highlighting timescales for the installation of UV, repair of the tanks, provision of improved monitoring arrangements, borehole integrity checks and acquisition of catchment and hydraulic data. Companies need to ensure that events and incidents automatically trigger a review and updating of Regulation 27 risk assessments with appropriate reporting to management to bring forward the timing of work to remedy known defects.

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

Technical audit activity in the region

The Inspectorate has operated a risk-based approach to technical audit since 2005. In line with better regulation principles, no technical audit takes place without a reason and those that are carried out are targeted on the basis of an assessment of risk.

The Inspectorate's tool for generating the technical audit programme looks at the critical components of the safe management of drinking water supplies including information on water quality monitoring, incident

assessments, previous audits, consumer complaints and other relevant intelligence. Through this ranking of all relevant water company assets, procedures and practices, inspectors are able to prioritise and focus their technical audit work where it will have most benefit.

Information on the key findings of the technical audits undertaken during 2008 in the Southern region is set out in Table 16.

Table 16: Summary of the Inspectorate’s technical audits in the region

Site name	Audit topic	Main findings from audit
Folkestone and Dover Water		
Denge works	Turbidity	Generally satisfactory. Recommendations were made relating to: <ul style="list-style-type: none"> • maintenance frequencies • the security of raw water sampling facilities • improvements required for treatment to deal with current raw water characteristics. • on line monitoring • chlorine demand
Southern Water		
Twyford works	Microbiology	Unsatisfactory. Recommendations were made relating to: <ul style="list-style-type: none"> • chlorine concentration/time (CT) • potential reservoir ingress problems • reiteration of requirement to update site schematic, first made in relation to an incident • enforcement action initiated requiring company to enter into a legally binding agreement to deliver solutions within specified timescales
South East Water		
Hazards Green works	Turbidity	Generally satisfactory. Recommendations were made relating to: <ul style="list-style-type: none"> • chemical delivery and dosing • the management of filter media • monitoring for animalcules on GAC filters • handheld equipment for calibration • recording of information on record sheets
Pembury works	Turbidity, pH correction and chlorination	Unsatisfactory. Recommendations were made relating to: <ul style="list-style-type: none"> • site schematics • alarms • plant control and management • filter backwashing • monitor maintenance • pH correction • record keeping • operator knowledge
Bewl Bridge works	Coliforms and GAC filter management	Generally satisfactory. Recommendations were made relating to: <ul style="list-style-type: none"> • the management of the filter media • monitoring for animalcules • labelling of chemicals • standby ozone generation

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 Health Protection Agency.

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 48 local authorities in the Southern region, 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 the region and can call on the Inspectorate for technical advice when required. In the Southern region, local authorities hold information regarding 645 private water supplies. Table 17 provides information on the numbers of supplies grouped by volume of water supplied per day.

Table 17: 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
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
Wales	3,562	355	4	30
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 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

² Consultation for England available at <http://www.defra.gov.uk/corporate/consult/private-watersupplies/index.htm>

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.

Through its role in the management of Defra's Water Quality and Health Research Programme the Inspectorate has identified, and will be

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>

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 2000 (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 for the region
- Summary of the Drinking Water Inspectorate's conclusions about drinking water quality in the region
- Water supply arrangements
- Drinking water quality testing
- Drinking water quality results
- Consumer perceptions of drinking water
- Incidents in 2008
- Technical audit activity in the region
- Local authority engagement.

Each report begins with a short summary of the Inspectorate's conclusions about drinking water quality in the region 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 regional 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.
<i>Cryptosporidium</i>	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 the Southern region 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
<p><u>Repeated incidents in 2008</u></p> <p>15 Jan 2008 For 1 day (SRN)</p> <p>22 Feb 2008 For 1 day (SRN)</p> <p>24 Feb 2008 For 1 day (SRN)</p> <p>29 Mar 2008 For 1 week (SRN)</p>	<p>Twyford works, Twyford, Fair Oak and Hedge End, Hampshire</p>	<p>149,174</p>	<p>Repeated bacteriological failures</p>	<p>Southern Water action:</p> <ul style="list-style-type: none"> • The company increased the chlorine residual at the works, carried out an audit of the works and sample the distribution system • Sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Routine scheduled maintenance on a critical monitor was not undertaken in accordance with the company's own procedures. Recommended that critical monitors are routinely serviced and calibrated in accordance with the company's maintenance procedures • Recommended action to ensure that water is being adequately disinfected • Recommended CCTV inspection of the contact main to assist in investigations • Enforcement action initiated to require the company to enter into a legally binding agreement to make improvements in a required timescale

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
28 Feb 2008 For 0.5 hours (SRN)	Burham works, near Rochester, Kent	340,000	Chlorination failure	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Action taken to reinstate chlorine dosing <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended proposed temporary and permanent changes to the treatment process be carried out as soon as possible in line with control measures in updated risk assessment • Recommended Southern Water discusses its procedures with Mid Kent Water (South East Water) to ensure that issues affecting the quality of water supplied via the bulk supply are notified in a timely manner • Advice given about alarm handling and incident sampling
29 Feb 2008 For 8 hours (SEW)	Burham zone – Snodland, Leybourne, Larkfield, East Malling Aylesford and Barming, including Maidstone Hospital in Kent	39,489	Low residual chlorine in bulk supply from Southern Water	<p>South East Water action:</p> <ul style="list-style-type: none"> • Reviewed procedures <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate procedures, delayed sampling response • Recommended formal procedure for reporting and acting upon issues with bulk supply 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
23 Apr 2008 For 1 day (FLK)	Folkestone (Seabrook) and Hythe areas in Kent.	1,275	Loss of supplies/poor pressure due to burst mains	<p>Folkestone and Dover Water action:</p> <ul style="list-style-type: none"> • Flushed mains <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate procedures, electrofusion of this fitting was incorrectly carried out • Recommended that the company puts in place a formal mechanism for audit and monitoring of work carried out by external contractors including staff training and monitoring of the contractors, competence to complete key tasks • Recommended review of arrangement for accepting incoming customer calls out of office hours • Recommended company works with the contractor to put in place a suitable procedure which covers this type of mains laying activity
29 Apr 2008 For 9 hours (SEW)	Hazards Green WTW. Boreham Street, Ashburnham, Kent.	1,500	Loss of supplies/poor pressure due to mains burst	<p>South East Water action:</p> <ul style="list-style-type: none"> • Flushed mains, • Sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate company risk assessment in respect of wider impact of actions taken to reduce pressure in one area of distribution system • Recommended guidance be given to third party contractors in the compilation of these types of documents to ensure that all risks are adequately identified and documented

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
11 May 2008 For 48 hours (SEW)	Several properties on Ashdown Road, Forest Row. East Sussex	7,595	Coliform bacteria in distribution	<p>South East Water action:</p> <ul style="list-style-type: none"> • Flushed mains, increased chlorine residuals at service reservoir and replaced the main supplying the Ashdown road area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Did not keep customers informed • Inadequate procedures • Recommended reviews of policy for contacting consumers in writing, in particular when an incident is underway • Required preparation of report on learning points, detailing changes to company-wide procedures/policies, in particular those focusing on consumer communications as a result of this incident
22 May 2008 For 48 hours (SEW)	Area supplied by Bewl WTW, Kent	12,567	Coliforms in distribution system	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area • Flushed mains, increased chlorine residuals at service reservoir; proposal for long-term action, includes installation of chlorine booster <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate investigation into root cause, noted that there is a loss of chlorine residual within Stocks reservoir relative to other assets

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
28 May 2008 For 2 days (SRN)	Areas supplied by Testwood WTW, Hampshire	60,000	Metallic taste or odour due to raw water deterioration	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Blended supply with another source, sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate training/competence of staff • Inadequate treatment (clarification and filtration) • Recommended improvements were made to coagulation control and the SCADA system which controls the works • Recommended that iron monitors on site were linked to telemetry control for increased visibility of monitoring and processes on site
17 Jun 2008 For 24 hours (SEW)	Blatchington WQ zone and Piddinghoe reservoir Eastbourne West Sussex	Up to 50,757 supplied by zone	<i>Cryptosporidium</i> in treated water	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area, shut down treatment works for short period and instated continual monitoring upon restart • Reviewed procedures, reclassified this site as Very High risk for <i>Cryptosporidium</i>, Regulation 27 risk assessment shows these as unacceptable risks <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate treatment process (filtration); potential breach of Regulation 26 • An action plan which details the proposed timescales for the installation of UV treatment and extra monitoring for turbidity has been requested from the company

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 1 day (SRN)	Angmering works, West Sussex	22,800	Loss of disinfection (UV)	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Increased chlorine residuals at treatment works • Repaired faulty equipment • Retrained staff <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate communication caused delay in response • Inadequate training/competence of staff • Inadequate treatment process (disinfection) • Recommendations relating to disinfection and auto shutdown
02 Oct 2008 For 2 days (SEW)	Buckhurst zone Wokingham	57,000	Discolouration due to planned work on distribution	<p>South East Water action:</p> <ul style="list-style-type: none"> • Review of procedures • Sampled affected area • Flushed mains <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate risk assessment • Recommended review of risk assessment for commissioning of water mains to ensure that in all projects of this type and scale that a site visit is mandatory prior to commissioning and information pertaining to site visits (including changes to drawings, observations, site specific instructions) are reviewed and further authorised prior to final commissioning of the main • Recommended review of arrangements to ensure that for large scale operations there is downstream verification of the operation to enable early identification of water quality issues

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
22 Oct 2008 For 4 hours (SRN)	Brede WTW Hastings, Sussex	103,000	Chlorination failure	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Repaired faulty equipment, sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inappropriate response to alarms leading to delays in response to the incident
28 Oct 2008 For 48 hours (SEW)	Best Beech service reservoir Wadhurst, Sussex	2,030	Coliforms	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area • By-passed service reservoir • Increased chlorine residuals at service reservoir <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate investigations into root cause, company not able to demonstrate how failures modify maintenance regime • Recommended that where there are repeat failures at a service reservoir, sites are prioritised in maintenance programme for cleaning and inspection
05 Nov 2008 For 1 day (SRN)	Darland and Wigmore zones – near Sittingbourne in Kent	133,000	Turbidity >1NTU	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Sampled affected area • Review of procedures <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate procedures • Inadequate treatment process (filtration) • Inadequate communication caused delay in response • Investigation ongoing

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
12 Nov 2008 For 48 hours (SEW)	Tonbridge works Bloodshot zone Tonbridge in Kent	1,000	<i>Cryptosporidium</i> in treated water leaving the works	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area • Shut down treatment works <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate treatment process (filtration) • Required a detailed action plan highlighting timescales for replacement or repair of the tanks, installation of UV and details of monitoring which is being carried out in the interim period to quantify the ongoing risk (in particular the risk posed to the works by contaminants in catchment) • Recommended review of the integrity of the supplying boreholes (Greensands and Chalk) and review of the catchment and hydraulics which may influence the boreholes
14 Nov 2008 For 4 weeks (SEW)	Bewl works Kent and Barcombe WTW in Sussex	325,877	Pesticide metaldehyde in treated water	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area, raw water monitoring of the area and company working with stakeholders on catchment controls <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • The Inspectorate has initiated enforcement action requiring the company to enter into a legally binding agreement to take action to investigate and mitigate against further failures of the pesticide standard

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
16 Nov 2008 For 2 days (SRN)	Hastings area in East Sussex	61,000	Discolouration due to mains burst	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Rezoned area (brought in water from different source), sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Inadequate risk assessment; company did not follow its own procedures in an area identified as being at high risk of discolouration • Recommended all appropriate risk assessments are completed prior to the operation of boundary valves • Recommended that where appropriate, modelling is conducted in advance of operation of valves • Required updated Regulation 28 report
20 Nov 2008 For 8 hours (SEW)	Liss, Hawkley, Liphook, Bramshott, Empshott, Rake, Sheet and Greatham in Hampshire	21,255	Discolouration due to planned work on distribution system	<p>South East Water action:</p> <ul style="list-style-type: none"> • Sampled affected area • Flushed mains <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended that DOMs strategy updated • Risk assessment process reviewed including tools used and staff training
01 Dec 2008 For 1 day (SRN)	Matts Hill Works Near Sittingbourne in Kent	133,000	<i>Cryptosporidium</i> in treated water	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Shut down treatment works • Sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Ongoing

Date and duration (Company)	Area	Estimate of population affected	Nature and cause of the incident	Main actions and findings from the Inspectorate investigation
19 Dec 2008 For 1 day (SRN)	Brede works, Beauport and Burham, Sussex and Kent area	163,000	Pesticide (metaldehyde)in raw water	<p>Southern Water action:</p> <ul style="list-style-type: none"> • Reviewing pesticide usage in the catchments • Company instigated monitoring programme for 2009 • Review of relevant Regulation 27 risk assessment • Sampled affected area <p>DWI comments and findings:</p> <ul style="list-style-type: none"> • Recommended closer liaison with the Environment Agency • Initiated enforcement action, enabling the company to take action to control risk through catchment management

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 the region

Company	Parameter or hazard	Site	Status	Construction due for completion
Portsmouth Water	<i>Cryptosporidium</i>	Fishbourne	Completed 18-Jun-08	
Portsmouth Water	<i>Cryptosporidium</i>	Soberton	Completed 22-Apr-08	
Portsmouth Water	Nitrate	Maindell	Ongoing Delayed	31-May-09
Portsmouth Water	Nitrate	Northbrook	Ongoing Delayed	28-Feb-09
South East Water	Iron	Trosley and Borough Green	Ongoing	31-Dec-09
South East Water	Iron	Greatham and Headley	Ongoing	No construction – investigations only

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 Wolveston	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
Adur District Council	Southern Water	22
Arun District Council	Portsmouth Water	1
	Southern Water	11
Ashford Borough Council	Folkestone and Dover Water	1
	Southern Water	11
Basingstoke and Dean Borough Council	South East Water	5
	Southern Water	8
Bracknell Forest Borough Council	South East Water	5
Brighton and Hove City Council	Southern Water	14
Canterbury City Council	Folkestone and Dover Water	2
	South East Water	11
	Southern Water	1
Chichester District Council	Portsmouth Water	3
	South East Water	4
	Southern Water	4
Crawley Borough Council	South East Water	2
	Southern Water	2
Dartford Borough Council	South East Water	2
Dover District Council	Folkestone and Dover Water	3
	Southern Water	9
East Hampshire District Council	Portsmouth Water	3
	South East Water	13
Eastbourne Borough Council	South East Water	8
Eastleigh Borough Council	Portsmouth Water	1
	Southern Water	5
Fareham Borough Council	Portsmouth Water	4
	Southern Water	3
Gosport Borough Council	Portsmouth Water	1
Gravesham Borough Council	South East Water	2
	Southern Water	9
Guildford Borough Council	South East Water	3
Hart District Council	South East Water	9
Hastings Borough Council	Southern Water	2
Havant Borough Council	Portsmouth Water	5
Horsham District Council	Southern Water	4
Isle of Wight Council	Southern Water	11
Lewes District Council	South East Water	5
	Southern Water	9
Maidstone Borough Council	South East Water	16
	Southern Water	6
Medway Council	Southern Water	13
	South East Water	5
Mid Sussex District Council	South East Water	11
	Southern Water	2
New Forest District Council	Southern Water	1

Local authority	Company	Number of Regulation 27 risk assessments
Portsmouth City Council	Portsmouth Water	2
Rother District Council	South East Water Southern Water	4 2
Royal Borough of Windsor and Maidenhead	South East Water	5
Rushmoor Borough Council	South East Water	4
Sevenoaks District Council	South East Water	6
Shepway District Council	Folkestone and Dover Water South East Water	4 4
Southampton City Council	Southern Water	5
Surrey Heath Borough Council	South East Water	3
Swale Borough Council	South East Water Southern Water	6 11
Tandridge District Council	South East Water	4
Test Valley Borough Council	Southern Water	11
Thanet District Council	Southern Water	11
Tonbridge and Malling Borough Council	South East Water Southern Water	16 13
Tunbridge Wells Borough Council	South East Water	6
Waverley Borough Council	South East Water	6
Wealden District Council	South East Water	9
Wiltshire Council	Southern Water	3
Winchester City Council	Portsmouth Water Southern Water	5 9
Wokingham District Council	South East Water	5
Worthing Borough Council	Southern Water	9

Annex 7

Water company data summary tables

Folkestone and Dover Water Services Ltd

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	18	Water supplied (MI/day)	45
Number of service reservoirs	12	Percentage from surface sources	0
Number of water supply zones	6	Percentage from ground sources	100
Length of mains pipe (km)	110	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	159,000	Kent	
Number of local authorities	4		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.95%	100%	100%	99.96%
Water treatment				
Process Control Index	100%	100%	100%	99.98%
Disinfection Index	99.86%	99.76%	99.93%	99.93%
Distribution systems				
Distribution Maintenance Index	99.30%	100%	100%	99.85%
Reservoir Integrity Index	100%	100%	100%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.95%	99.94%	99.96%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	29	45	31	N/A
Rate per 1,000 population	0.19	0.28	0.2	1.22
Acceptability of water to consumers				
Total number	189	285	257	N/A
Rate per 1,000 population	1.21	1.80	1.62	2.55
Complaints to the Drinking Water Inspectorate				
A total of 1 consumer of Folkestone and Dover Water Services Ltd 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.

Portsmouth Water Ltd

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	19	Water supplied (MI/day)	179
Number of service reservoirs	31	Percentage from surface sources	42
Number of water supply zones	13	Percentage from ground sources	58
Length of mains pipe (km)	3,278	Percentage from mixed sources	0
Population served		Area of supply	
Population supplied	663,000	Hampshire, West Sussex	
Number of local authorities	9		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.96%	99.97%	99.95%	99.96%
Water treatment				
Process Control Index	99.98%	100%	99.99%	99.98%
Disinfection Index	99.97%	100%	100%	99.93%
Distribution systems				
Distribution Maintenance Index	100%	99.95%	100%	99.85%
Reservoir Integrity Index	99.94%	100%	100%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.86%	99.79%	99.89%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	148	242	329	N/A
Rate per 1,000 population	0.22	0.37	0.50	1.22
Acceptability of water to consumers				
Total number	214	333	427	N/A
Rate per 1,000 population	0.32	0.50	0.65	2.55

Complaints to the Drinking Water Inspectorate

No consumers of Portsmouth Water Ltd 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.

South East Water Ltd

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	96	Water supplied (Ml/day)	543
Number of service reservoirs	237	Percentage from surface sources	25
Number of water supply zones	91	Percentage from ground sources	70
Length of mains pipe (km)	14,096	Percentage from mixed sources	5
Population served		Area of supply	
Population supplied	2,001,240	Parts of West Sussex, East Sussex, Kent, Hampshire, Berkshire and Surrey	
Number of local authorities	30		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.95%	99.95%	99.93%	99.96%
Water treatment				
Process Control Index	99.96%	100%	100%	99.98%
Disinfection Index	99.91%	99.94%	99.92%	99.93%
Distribution systems				
Distribution Maintenance Index	99.87%	99.79%	99.75%	99.85%
Reservoir Integrity Index	99.91%	99.86%	99.91%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.62%	99.52%	99.71%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	2,058	2,361	1,313	N/A
Rate per 1,000 population	1.44	1.61	0.65	1.22
Acceptability of water to consumers				
Total number	4,306	2,985	4,321	N/A
Rate per 1,000 population	3.01	2.03	2.12	2.55
Complaints to the Drinking Water Inspectorate				
A total of 8 consumers of South East Water Ltd 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.

Southern Water Services Ltd

Water supply arrangements

Company assets		Water supplied	
Number of treatment works	95	Water supplied (MI/day)	562
Number of service reservoirs	206	Percentage from surface sources	22
Number of water supply zones	83	Percentage from ground sources	48
Length of mains pipe (km)	13,600	Percentage from mixed sources	30
Population served		Area of supply	
Population supplied	2,331,000	Isle of Wight and parts of Kent, Sussex and Hampshire	
Number of local authorities	28		

Drinking water quality summary data

	Company figure			Industry average
	2006	2007	2008	2008
Overall drinking water quality*	99.95%	99.94%	99.97%	99.96%
Water treatment				
Process Control Index	99.95%	>99.99%	99.94%	99.98%
Disinfection Index	99.72%	99.94%	99.93%	99.93%
Distribution systems				
Distribution Maintenance Index	99.96%	99.85%	99.88%	99.85%
Reservoir Integrity Index	99.97%	99.96%	99.98%	99.96%
Building water systems				
Parameters influenced by domestic water systems	99.84%	99.75%	99.94%	99.88%

Consumer contacts

	Company figure			Industry average
	2006	2007	2008	2008
Informing consumers				
Total number	513	343	298	N/A
Rate per 1,000 population	0.22	0.15	0.13	1.22
Acceptability of water to consumers				
Total number	3,748	4,167	3,260	N/A
Rate per 1,000 population	1.62	1.8	1.4	2.55
Complaints to the Drinking Water Inspectorate				
A total of 4 consumers of Southern Water Services Ltd 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.



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