

Eastern Region



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Key facts:		
Population supplied	6,251,000	No. of Treatment Works
Amount of water supplied l/day:	1,909,000,000	No. of Service Reservoirs
Local Authorities	54	No. of Water Supply Zones
Health Authorities (Primary Care Trusts)	46	Length of mains pipe (km)
Area of supply		Water Composition
Bedfordshire (part), Buckinghamshire (part),		surface sources
Cambridgeshire, Essex (part), Humberside (part),		ground water sources
Leicestershire (part), Lincolnshire, Outer London (part),		mixed sources
Norfolk, Northamptonshire, Nottinghamshire (part),		
Suffolk		

Overview

Four water companies supply drinking water in the eastern region; Anglian Water (ANG), Cambridge Water (CAM), Essex & Suffolk Water (ESK) and Tendring Hundred Water (THD).

Much of the eastern region is rural with a relatively low population density. It is an important agricultural area with East Anglia and Lincolnshire having large areas of land used for arable farming. Population centers include Bedford, Cambridge, Grimsby, Ipswich, Kings Lynn, Lincoln, Northampton, Milton Keynes, Norwich and Peterborough. Tourism has a seasonal impact on water supply demand in coastal resorts such as Great Yarmouth and Skegness. In the urban south of the region, local water resources are supplemented. For example, Essex and Suffolk Water import water from the Thames region and from Anglian Water. Much work has been undertaken to identify water quality risks relating to agriculture (nitrate, pesticides) and treatment improvement schemes are either in place or planned to maintain the region's high quality of drinking water for the future.

Water sources

About half of the water supplied in the region is surface water (52%), abstracted from rivers such as the Blackwater, Bure, Chelmer, Colne, Nene, Great Ouse, Stour, Waveney, Welland and Wensum. There are a number of reservoirs in the region including; Abberton, Alton, Ardeleigh, Covenham, Grafham, Hanningfield, Ravensthorpe and Rutland. Essex & Suffolk Water also abstract water from Ormesby Broad (Norfolk), Lound Ponds and Fritton Lake (Suffolk).

Groundwater provides a significant resource in the region (35%). All companies in the region draw most of their groundwater from boreholes in the East Anglian or Northern Chalk aquifer. For Anglian Water the Sherwood Sandstone aquifer is also an important resource. Cambridge Water draws all its supplies from the ground, with a small amount abstracted from the Lower Greensand. Essex & Suffolk Water abstract some water from the Crag sands and gravel deposits in Suffolk. Across the region a further small proportion is from a mixture of surface and groundwater sources (13%).

Water source has an important impact on the properties of a drinking water supply, such as taste, hardness, acidity (pH) and mineral content. For example, water taken from chalk and limestone rocks is likely to contain more calcium and magnesium. These minerals make the water hard and cause scale to form in kettles and hot water systems. The appearance of scale varies according to the source. A chalk-derived groundwater supply will form a white and strongly adherent deposit whereas moderately hard surface water forms looser creamy brown flakes of scale where the colour is caused by the presence of iron or naturally occurring humic acids. Where supplies come from a mix of ground and surface water consumers may notice changes in the nature of the hardness deposits that form in their kettles. Some sources in the region are rich in iron and manganese and some consumers have been troubled by brown or black deposits built up over time in the mains.

In the eastern region there are some rural areas where there are no public water supplies. For example, in Breckland and Broadland where the Local Authorities are each aware of over 650 private water supplies, whilst in North Norfolk there are more than 350 private water supplies. Information on the regulation of private water supplies is given in Part 4 of the full report.

Drinking water quality testing

Throughout 2004, water companies sampled drinking water across the region to test for compliance with the standards in the Water Supply (Water Quality) Regulations 2000. More than one third of the tests were carried out on drinking water drawn from consumers' taps selected at random. The rest were taken from fixed locations; water treatment works, treated water (service) reservoirs or supply points. Collectively the four water companies carried out a total of 485,159 tests during 2004.

Table 1.2.1: Number of tests carried out by companies in the region

Place of sampling	Anglian Water	Cambridge Water	Essex & Suffolk Water	Tendring Hundred Water	Total
Water treatment works	81,225 (147)	6,821 (22)	29,593 (25)	3,860 (3)	121,499 (197)
Service reservoirs	103,191 (382)	8,655 (33)	28,556 (110)	2,065 (8)	142,467 (533)
Consumers' taps (zones)	149,622 (162)	8,799 (8)	58,692 (51)	4,080 (4)	221,193 (225)
Number of tests per company	334,038	24,275	116,841	10,005	485,159
Estimate of population	4,074,000	290,900	1,738,700	147,700	6,251,000

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

The regulations require companies to test for specified parameters at prescribed frequencies. Most of the testing is for parameters with European or National standards (mandatory quality standards) and these results are discussed here. Water companies are also required by the regulations to test for indicator parameters such as ammonium, sulphate and colony counts. A summary of the results of testing by each company, including the indicator parameters, are reported in Part 3 of the full report.

Nearly all the tests met the relevant mandatory quality standards (119 failures out of a total of 230,051 tests) demonstrating the good quality of drinking water in the region. For compliance monitoring purposes, company water supply areas are divided into zones based on population (maximum 100,000). Across the region as a whole, companies achieved a mean zonal compliance of 99.95%.

Compliance for each company individually is reported in Part 3 of the full report. The tables below look at some of the key regional results in more detail.

Drinking water quality results

The key water quality results for the eastern region are presented in two tables, one showing results for microbiological parameters (Table 1.2.2), the other dealing with chemical and physical parameters (Table 1.2.4). The microbiological quality of water is discussed first.

Microbiological quality

Table 1.2.2: Microbiological parameters

Test parameter	Current standard	Total number of tests	No. of tests not meeting the standard	Additional information
Water leaving water treatment works				
<i>E.coli</i>	0/100ml	16,875	0	
Coliform bacteria	0/100ml	16,875	10	ANG (3), CAM (3), ESK (4)
<i>Cryptosporidium</i>	<1 oocyst per 10 litres Treatment Standard	3,115	0	Monitored at 9 works in the region determined to be at risk, out of a total of 197.
Water leaving service reservoirs				
<i>E.coli</i>	0/100ml	28,508	0	
Coliform bacteria	0/100ml 95% compliance required for each reservoir	28,508	22	All 533 reservoirs met the annual 95% compliance rule. ANG (12), CAM (1), ESK (9)
Water sampled at consumers' taps				
<i>E.coli</i>	0/100ml	17,107	8	ANG (4), CAM (1), ESK (2), THD (1)
Enterococci	0/100ml	1,860	1	New parameter in the 2000 Regulations ² . ESK (1)

Notes for table 1.2.2:

1. For summary details of all tests undertaken by each water company refer to Part 3 of the full report.
2. The new Water Supply (Water Quality) Regulations 2000 came into force on 25 December 2003.

To protect public health, microbiological standards have to be met at each individual treatment works and service reservoir. The microbiological results confirm the overall 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. In 2004, the Inspectorate issued guidance on this subject to companies (Information Letter 6/2004). 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). Further information on the SCA is given in Part 4 of the full report.

Table 1.2.3: Detection of *E.coli* and Enterococci in samples collected from treatment works, service reservoirs and consumers' taps.

Company	Enterococci at consumers' taps	<i>E.coli</i> at consumers' taps	<i>E.coli</i> in water leaving treatment works	<i>E.coli</i> in water leaving service reservoirs
Anglian Water	0/1,387	4/11,454	0/11,031	0/20,652
Cambridge Water	0/60	1/789	0/1,027	0/1,731
Essex & Suffolk Water	1/381	2/4,492	0/4,190	0/5,712
Tendring Hundred Water	0/32	1/372	0/627	0/413
Region Total	1/1,860	8/17,107	0/16,875	0/28,508

Note: Results are shown as the number of positive samples/the total number of samples.

Enterococci and *E.coli* at consumers' taps

Enterococci is a new standard in the regulations. Like *E.coli* its presence is indicative of faecal contamination and neither bacterium should be found in any sample. In 2004, the companies carried out 1,860 tests for Enterococci at consumers' taps. Only one sample was positive (1 ESK). There was no indication, from information gathered by Essex and Suffolk Water, of a faecal contamination event affecting other properties in the zone. The findings of the investigation by the company point to an error in the sampling/analysis process.

A total of 17,107 consumer tap samples were tested in 2004 for *E.coli* and eight were positive (4 ANG, 1 CAM, 2 ESK and 1 THD). There was no indication, from information gathered by the four water companies, of a faecal contamination event affecting other properties in these zones. In some, but not all, cases the company investigation found evidence of unhygienic tap conditions. One sample collected

from the Grantham zone in September had been taken from an outside tap. Regulatory samples should be collected from inside a property. Refresher training in sampling procedures was given to relevant staff by Anglian Water.

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

In 2004, across the region, a total of 45,383 samples were collected at works and service reservoirs by the four water companies. *E.coli* was not detected in any of the samples.

Coliform bacteria at service reservoirs

Testing for coliform bacteria at service reservoirs 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 samples collected weekly from each service reservoir throughout one year are free from all coliform bacteria. In 2004, all 533 service reservoirs and water towers in the region met the standard.

The Inspectorate has noted that coliform bacteria were found in 22 samples in the eastern region during the year and this information will help inform the Inspectorate's risk-based programme of technical audit.

In September, Anglian Water reported two failures at the Guilsborough Reservoir. The reservoir was removed from service and inspected. Following minor repairs to the sealant on part of the roof at the base of an air vent, all samples taken have proved satisfactory.

Two failures reported by Essex & Suffolk Water were not from a service reservoir but from a customer's property (petrol filling station) situated close to a bulk supply point. The sample point was an unprotected external tap which was not fitted with a non-return valve. The company needs to review its sampling and reporting procedures for bulk supplies.

Coliform bacteria at works

Testing for coliform bacteria at works gives reassurance that water is being treated adequately to remove bacterial and viral pathogens. Repeated occurrences of coliform bacteria in samples at the same works in one year are of concern and require action to be taken. In 2004, this situation did not occur at any of the 197 works in the region.

***Cryptosporidium* at works**

The regulations require monitoring for this parasite at works assessed to be at risk by the water company. For more information on the *Cryptosporidium* regulations see Part 5 of the full report. In 2004, monitoring was required to be undertaken at nine works (ANG 5, ESK 4). All results met the regulatory treatment standard of <1 oocyst per 10 litres and there were no reports of mains water supply related outbreaks of cryptosporidiosis in the region.

Chemical quality

New and revised regulatory requirements for chemicals

The regulations introduce three new chemical parameters (1, 2-dichloroethane, benzene and bromate) as well as revised standards for nine other parameters, eight of which have become more strict. Details of these changes are shown in Table 1.2.4. All tests in the region met the standards for 1, 2-dichloroethane, antimony, arsenic, benzene, boron, bromate, tetrachloroethene and trichloroethene. The results for the remaining five parameters (copper, lead, nickel, nitrite and polycyclic aromatic hydrocarbons) are explained in specific sections below.

Table 1.2.4: Chemical and physical parameters

Parameter	Current standard	Total number of tests	Number of tests not meeting the standard	Additional Information
1, 2-Dichloroethane	3.0 µg/l	1,519	0	This was a new parameter in the 2000 Regulations.
Aluminium	200 µg/l	3,982	0	
Antimony	5.0 µg/l	1,645	0	The standard prior to 25/12/03 was 10 µg/l
Arsenic	10.0 µg/l	1,636	0	The standard prior to 25/12/03 was 50 µg/l
Benzene	1.0 µg/l	1,520	0	This was a new parameter in the 2000 Regulations.
Benzo(a)pyrene	0.01 µg/l	1,878	1	ANG (1)
Boron	1.0 mg/l	1,494	0	The standard prior to 25/12/03 was 2.0 mg/l
Bromate	10.0 µg/l	1,913	0	This was a new parameter in the 2000 Regulations.
Copper	2.0 mg/l	1,853	1	The standard prior to 25/12/03 was 3.0 mg/l. ANG (1)
Fluoride	1.5 mg/l	1,653	0	
Iron	200 µg/l	4,338	16	ANG (13), ESK (3)
Lead	25.0 µg/l	1,857	2	The standard prior to 25/12/03 was 50 µg/l. ANG (1), ESK (1)
Manganese	50.0 µg/l	3,925	2	ANG (1), ESK (1)
Nickel	20.0 µg/l	1,900	37	The standard prior to 25/12/03 was 50 µg/l. ANG (34), ESK (3)
Nitrate	50.0 mg/l	4,314	4	CAM (4)
Nitrite	0.5 mg/l	4,346	1	The standard prior to 25/12/03 was 0.1 mg/l. ESK (1)
Individual pesticides (see note 3)	0.1 µg/l	28,939	7	Trietazine. ANG (7)
Polycyclic Aromatic Hydrocarbons(PAH)	0.1 µg/l	1,877	1	The standard prior to 25/12/03 was 0.2 µg/l. ANG (1)
Tetrachloroethene & Trichloroethene	10.0 µg/l	1,663	0	The standard prior to 25/12/03 for Tetrachloroethene was 10 µg/l, and for Trichloroethene was 30 µg/l. The new standard applies to the sum of the two substances.
Total Pesticides	0.5 µg/l	1,610	0	
Trihalomethanes total	100 µg/l	1,973	1	ESK (1)
Turbidity	4 NTU	4,491	2	ANG (1), ESK (1)

Notes for table 1.2.4:

1. For summary details of all tests undertaken by each water company refer to Part 3 in the full report.
2. For comparison, 1 mg/l is one part in a million, 1 µg/l is one part in a thousand million.
3. A further 1,216 tests were carried out for aldrin, dieldrin, heptachlor, heptachlor epoxide, all of which met the relevant standard.

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 2004, a total of 3,982 samples were tested for aluminium in the eastern region. All companies in the region achieved 100% compliance with the aluminium standard. This demonstrates that companies in the region achieved a high standard of water treatment process control.

Fluoride

In 2004, all 1,653 tests for fluoride taken in the region met the regulatory standard (1.5 mg/l). Traces of fluoride may occur naturally in many water sources, particularly in groundwater. For example, fluoride is found in water in some parts of north Essex, Suffolk, Redbridge and in a small part of Lincolnshire, near Spilsby. Fluoride is not removed by conventional water treatment. Some companies artificially fluoridate water supplies at the request of the local health authority as a protection against tooth decay. In the eastern region Anglian Water adds fluoride on this basis to water supplies in parts of Bedfordshire (including Bedford town), Lincolnshire (in the west and north west) and Nottinghamshire (in the area around Retford). Consumers can obtain information on the level of fluoride in their drinking water from their water company. For more information on fluoridation please refer to our website and Part 4 in the full report.

Metals including Lead

A common source of some metals (antimony, copper, nickel and lead) is pipes and water fittings installed in consumers premises (e.g. brass fittings and solder used to make joints). During 2004, antimony was not found at levels above the standard anywhere in the region. The standard for copper was exceeded just once (ANG), the standard for nickel was exceeded 37 times (ANG 34, ESK 3) and two tests did not meet the lead standard (none of these were in the areas supplied by Cambridge Water and Tendring Hundred Water).

In 2004, a total of 1,853 tests were carried out for copper and all but one met the standard (2.0 mg/l). A level of 2.05 mg/l copper was reported in a sample from a consumers' tap in the Braintree north zone. Samples from neighbouring properties and the treatment works were satisfactory. A water fittings inspection by Anglian Water at the property found that the plumbing arrangements complied with the water fittings regulations. Occasional high results, such as occurred in this case, are not

uncommon where taps are used infrequently or there is long run of copper pipe with no other draw off points before the tap.

Nickel occurs widely in the environment. It is a natural constituent of food and water. Traces found in drinking water usually emanate from protective coatings on modern tap fittings. A standard is set for nickel because it is known to cause skin sensitisation (dermatitis) although these effects are not normally severe and the standard for drinking water includes a large margin of safety. In 2004, out of 1,900 tests for nickel, 37 did not meet the standard (ANG 34, ESK 3). In six cases, the investigation by the company pointed to the consumer's water fittings as the cause, with new kitchens recently installed at two properties, whilst at a third property, a pump was thought to be the likely source of contamination. Customers were given advice and the local authority was informed. The remaining 31 failures were reported by Anglian Water as being due to naturally occurring nickel in groundwater sources. For more information on how the company is addressing this issue please refer to the section below on "Issues of local interest".

Meeting the lead standard is a more complex matter because although some lead pipes are owned by water companies, most belong to consumers (i.e. building owners). Some lead in drinking water is due to the use of solder containing lead on copper pipes not owned by the water company (the use of lead solder on copper drinking water pipes has been banned since the early 1970's). Under the new regulations all companies in the region have had to carry out a programme of measures (water treatment) to reduce the tendency of water supplies to pick up lead from pipes and fittings. Where necessary, all companies in the region have now installed appropriate treatment in accordance with the requirements of the initial regulatory programme. In 2004, the Inspectorate completed a technical audit of these control measures, and the outcome, for each company in the eastern region, was satisfactory.

When the lead standard is exceeded in consumer tap samples, companies take action to identify the cause and safeguard the health of consumers. In 2004, the following actions were taken in response to the two tap samples that did not meet the standard:

- Company-owned lead communication pipe to the property to be replaced (ANG 1)
- Company pipe not lead, customer advised to change their own lead pipe (ESK 1)

Nitrate and nitrite

Nitrate occurs naturally in all source waters due to the natural 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 2004, a total of 4,314 tests were carried out and all but four in the Cambridge Water area met the standard (50 mg/l). There were three failures at the Sawston zone, between February and June, with a maximum recorded value of 52.4 mg/l. Sawston zone is supplied by the Brabraham works. Cambridge Water completed a programme of improvement at this works in September and there have been no further failures in zones served by the works since. The fourth failure was in the Odsey zone in May (54.2 mg/l). The source for this zone is a bulk supply from Three Valleys Water. An improvement programme was completed in March 2004 to facilitate improved blending of the water. The failure was related in time to an increase in output at the works operated by Three Valleys Water, to overcome pressure problems in the district. The problem was short lived and no further failures were recorded in 2004.

In 2004, the Inspectorate confirmed the need for additional treatment at 15 Anglian Water works (Barrow, Birchmoor, Caister St. Edmunds, Isleham, Lower Links, Lyng Forge, Marham, Moulton, Nunnery Lodge/Barnham Cross, Ordsall Road Retford, Ringstead, Risby, Twelve Acre Wood/Eriswell, Two Mile Bottom and Whitton/Westerfield) because the water quality information indicated a likelihood of failing the nitrate standard in the longer term. Blending schemes are to be installed at one Cambridge Water works (Fowlmere) and six works operated by Anglian Water (Bircham, Clay Hall, Colney, Fring, Kings Road Rushbrook and Riddlesworth), with improvements to existing blending arrangements at a further four works (Congham, Gayton, Houghton St. Giles and Wighton).

Nitrite can be formed when chloramine is used as the residual disinfectant to maintain the microbiological quality in the distribution network. Most supplies in the region are not chloraminated. 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. In 2004, all but one of the 4346 tests carried out across the region for nitrite met the standard. The single failure was investigated by Essex & Suffolk Water who found that a water softener was fitted upstream of the consumer's tap in the property in the Seven Kings zone. A sample taken from another tap fed direct off the mains supply gave satisfactory results.

Pesticides and related products

This group of substances, generically called pesticides, includes organic chemicals with a wide range of uses such as weed killers, insecticides and fungicides. Water sources may contain traces of pesticide residues as a result of agricultural use (pest control on crops) and non-agricultural use (herbicide for weed control on highways etc.). Water companies are required to assess the risk to drinking water from pesticide use in their catchments and to test the water for those individual pesticides that might be present. There are standards for individual pesticides as well as a standard for total pesticides.

In 2004, none of the tests in the region exceeded the standard for total pesticides. Likewise there was 100% compliance (1216 tests) for the four individual pesticides with a standard of 0.03 µg/l. Out of a total of 28,939 tests for individual pesticides (with a standard of 0.10 µg/l) just seven exceeded the standard for trietazine (ANG 7).

When herbicides are first detected, water companies take action to protect consumers, enhance their monitoring programme and, where appropriate, pass details to the Environment Agency.

The herbicide trietazine is a selective herbicide of low solubility, approved for use in the UK but available only as a formulation in conjunction with linuron, simazine or trifluralin or terbutryn. Trietazine is used in the control of weeds in potatoes and pea crops. In 2004, Anglian Water detected the substance at levels above the standard on seven occasions in samples from Riddlesworth works near Thetford. This is a groundwater source and the works has no treatment to remove herbicides. The maximum value recorded in water leaving the works was 0.13 µg/l in August, the standard of 0.10 µg/l includes a built in margin of safety. Samples from Kenninghall Tower, where water from Riddlesworth works blends with water from East Harling works were satisfactory. However, not all of the water supplied from Riddlesworth is blended before it is supplied to consumers. The company has initiated enhanced monitoring at the works. In 2004, the Inspectorate confirmed the need for additional treatment. The company have submitted a proposal to install granular activated carbon (GAC) filters with a completion date of December 2006

Trihalomethanes

Trihalomethanes (THMs) arise when chlorine is added to water containing naturally occurring organic substances. Treatment processes need to be optimised to minimise their production. For more information on THMs and how the level of THMs is controlled by water companies please refer to our website.

In 2004, out of 1,973 tests, only one exceeded the standard in the region. Anglian Water, Cambridge Water and Tendring Hundred Water all achieved 100% compliance with the standard. The failure (110 µg/l) in a sample collected by Essex & Suffolk Water in their Thames zone in April was due to a change in the quality of the raw water (bromide level) supplying Chigwell works. Raw water for Chigwell is obtained from a storage reservoir fed from the River Lee. The Environment Agency and Thames Water (who operate this works) traced the higher than normal level of bromide to a discharge

into the River Lee upstream of the reservoir intake. The situation continues to be monitored by both companies but remedial action appears to have been effective with all further samples in 2004 giving satisfactory results.

Essex & Suffolk Water completed an improvement programme at the Lound treatment works in 2004 to secure compliance with the THM standard. This will provide a benefit to an estimated 92,000 people in the Barsham and Lowestoft area.

Water quality in distribution

Iron and manganese may be present naturally in raw water. Iron compounds may also be added as part of water treatment or can be released as a consequence of the corrosion of iron mains. The most severe problems tend to be where the distribution network contains a large proportion of old cast iron mains. Effective water treatment reduces iron and manganese at source but, if treatment is inadequate or if corrosion of pipes occurs, deposits containing iron and manganese may accumulate in distribution pipes. When these deposits are disturbed, they may cause orange-brown or black discolouration of the water. Elevated levels of iron and manganese can also result in breaches of the turbidity standard. Another less frequent problem which may arise in a distribution network is the presence of polycyclic aromatic hydrocarbons (PAHs). Before 1970, coal tar was widely used to line iron pipes; PAHs, including benzo(a)pyrene, may be present in the water as a result of leaching from or degradation of these linings.

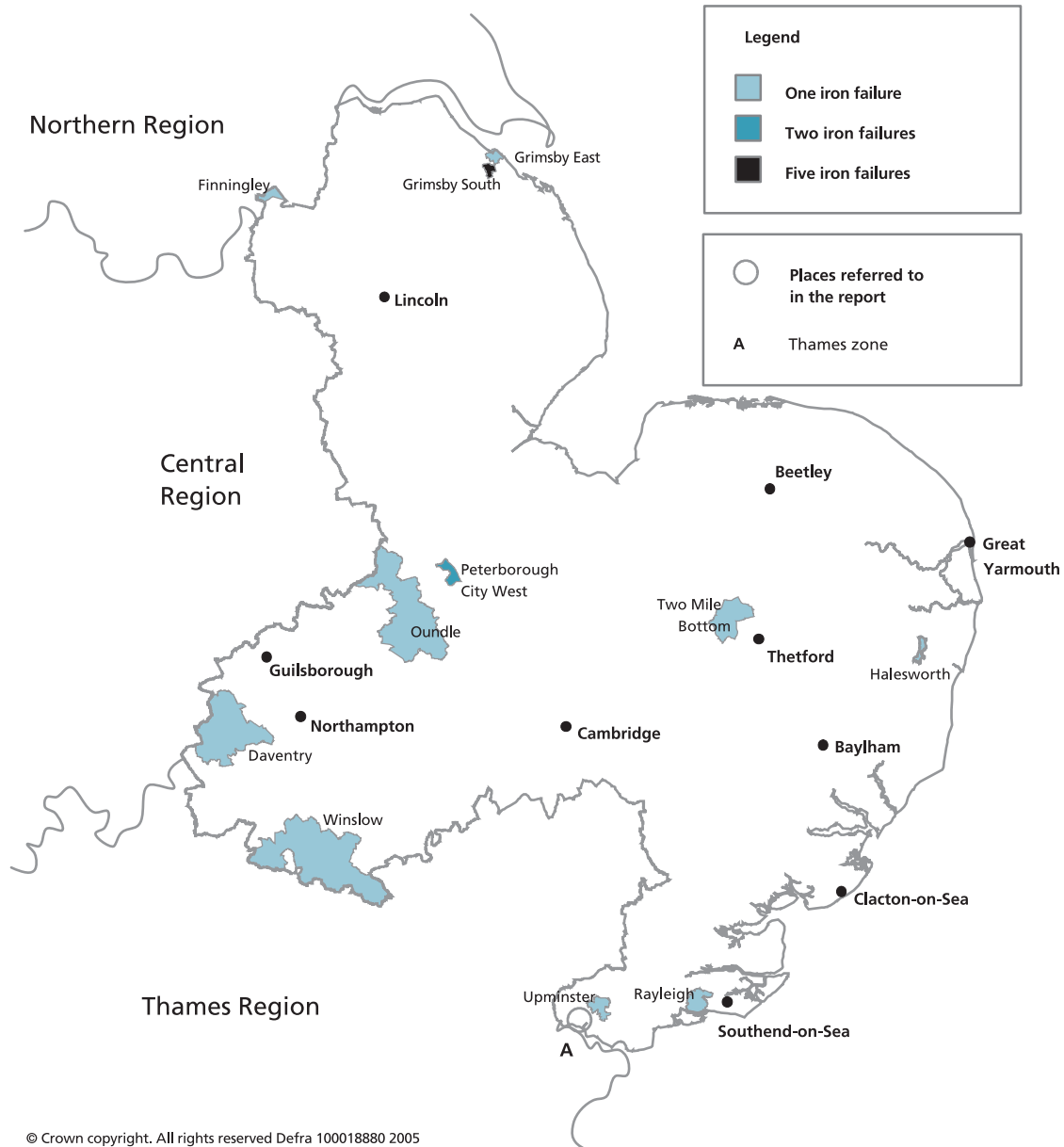
Table 1.2.5: Compliance by company with the standards for iron, manganese, turbidity and benzo(a)pyrene.

Company	Parameter			
	Iron	Manganese	Turbidity	Benzo(a)pyrene
Anglian Water	99.53%	99.97%	99.97%	99.4%
Cambridge Water	100%	100%	100%	100%
Essex & Suffolk Water	99.43%	99.96%	99.96%	100%
Tendring Hundred Water	100%	100%	100%	100%
Eastern region overall	99.54%	99.97%	99.97 %	99.96%

Note: For more information on % parameter compliance please refer to Annex 3 of the full report.

Figure 1.2.6: shows the distribution of iron failures in zones across the region. The map highlights a small number of areas where the standard for iron (200 µg/l) was exceeded on more than one occasion in 2004.

Figure 1.2.6: Zones in the eastern region with iron failures in 2004



Anglian Water and Essex & Suffolk Water have both had substantial long-term programmes of work to line or replace cast iron mains. Each company is committed to a legally binding programme of improvement work under Section 19 of the Water Industry Act 1991. The strategic programme in Anglian Water was largely complete in 2002, but there is a small length still outstanding where the company has had particular difficulty in completing a scheme. Essex and Suffolk Water have further work to deliver over the next two years. Table 1.2.7 below summarises the progress made with these programmes during 2004 and shows the work which remains outstanding.

Table 1.2.7: Progress with distribution system improvement programmes

Company	Length of main renovated or replaced in 2004	Length of main still to refurbish or replace	Date for completion
Anglian Water	None	2,7 km	September 2002
Cambridge Water	None	None	N/A
Essex & Suffolk Water	85.7 km	197.4 km	December 2006
Tendring Hundred Water	None	None	N/A
Region Total	85.7 km	200.1 km	

The Inspectorate monitors the progress of this work. During the life of their Section 19 agreements, companies have to meet an 'estimated likely maximum deviation of quality' for each parameter specified. These are limits which may be exceeded no more than once in each calendar year in any water supply zone covered by the agreement. The parameters may include iron, manganese, turbidity or aluminium. Companies are required to monitor these parameters at an agreed frequency and, if these rules are broken, take action to protect consumers in consultation with the health authority and inform the Inspectorate.

In 2004, both Cambridge Water and Tendring Hundred Water achieved 100% compliance with the iron and manganese standard.

In the Anglian Water supply area, 13 samples exceeded the iron standard. Five of these were in the Grimsby South zone. The company has entered into a separate Section 19 agreement to address problems in this zone. A failure in December in this zone was above the 'maximum permitted deviation' and the company undertook flushing of the mains to alleviate the local problem in the interim. Two failures occurred in the Peterborough City West zone (March and October). The Inspectorate has initiated enforcement action in respect of the iron standard in this zone, and is in discussion with the company concerning the detail of a Section 19 agreement. In the Grimsby East zone, a sample in February also failed the Manganese standard by a small margin. The sample was collected from the last property on a dead end cast iron main; the pipe was flushed to remove deposits and subsequent samples were satisfactory. Two iron failures in other zones were also detected in samples taken from dead end cast iron mains and similar remedial action was taken. The remaining failures were one-off occurrences in different zones.

Essex & Suffolk Water reported three failures of the iron standard and one failure of the manganese standard. All three iron failures were isolated occurrences in zones covered by a Section 19 agreement. In the Upminster zone the sample also failed the manganese standard. In the Upminster and Rayleigh zones, the level recorded was above the 'maximum permitted deviation'. In the Halesworth zone the company has implemented a programme of regular flushing to address the problem. In October 2004,

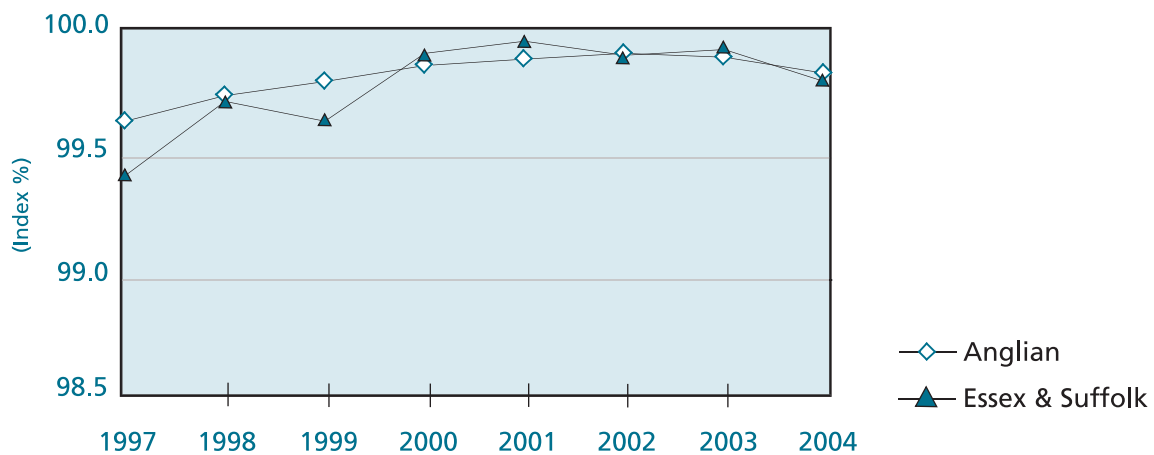
the Inspectorate's technical audit identified that a shortfall in the company's programme of work in 2003 would not be rectified and there was a need for the company to commit to a replacement agreement. The company have offered a replacement agreement to reflect the current situation and to complete the programme.

In 2004, throughout the region, just one test failed the standard for PAH. This sample, taken in the Spilsby zone (ANG) in January, also exceeded the standard for benzo(a)pyrene. All investigative samples from points in nearby properties and upstream were satisfactory.

Overall, it is clear that the Section 19 improvement programmes to line or replace water mains are necessary and have delivered measurable benefits to consumers across the region. The trend between 1997 and 2004 is illustrated in the graph (Figure 1.2.8) for those companies in the region that have had legally binding improvement programmes for their distribution systems between April 2000 and December 2004.

Figure 1.2.8: Trends in operational performance

Note: Trends relate to results for the three parameters iron, manganese and turbidity.



Incidents in 2004

The companies in the eastern region notified the Inspectorate of 58 events during 2004. The Inspectorate classified five as 'incidents' requiring a comprehensive report from the company and a full investigation by the Inspectorate. A summary of the nature, cause and duration of each incident, along with details of the Inspectorate's findings are set out in Table 3.5 of the full report.

Table 1.2.9: Water quality events in the region in 2004

Company	No. of events notified	No. classed as incidents
Anglian Water	40	1
Cambridge Water	0	0
Essex & Suffolk Water	18	4
Tendring Hundred Water	0	0
Region Total	58	5

Each incident was of relatively short duration and the company took action to inform and safeguard consumers and other stakeholders as appropriate.

Learning points from incident assessments completed in the region in 2004 are highlighted in the following examples;

- In Romford, Essex, in June up to 250 people were advised to boil their water for a period of three days, following a burst main. The company acted quickly to investigate the problem and take samples. The Inspectorate was pleased to note that the company recognised the need to model alternative supply arrangements to aid management of supplies under future similar circumstances.
- In Bury St Edmunds, in November, five people were advised to boil their water when a burst main resulted in microbiological contamination of the supply. The company acted quickly to resolve the problem. The Inspectorate recommended that the company put procedures in place to ensure that samples are taken from appropriate downstream locations after a mains repair.
- In Writtle, Essex, in November, approximately 1,000 people were advised to boil their water for one day as a precaution, when a ball valve stuck open at a reservoir, resulting in the loss of supplies. The company undertook a sampling programme once supplies were restored. The Inspectorate recommended that the company review their maintenance programme for ball valves in critical reservoirs.

On the 26 March 2004, Anglian Water appeared before Cromer magistrates and pleaded guilty to two charges of supplying water unfit for human consumption to up to 30 properties contrary to Section 70(1) of the Water Industry Act 1991. The incident affected a number of consumers in the village of Northrepps, Norfolk, in April 2002, who experienced discoloured water or an unusual taste/odour for a period of at least three days. The company was fined £ 3,750, with £ 11,106 in costs awarded. The incident occurred after planned flushing of the Roughton to Northrepps main. Samples showed high levels of iron, manganese, aluminium, PAH and turbidity. Qualitative odour tests confirmed the presence of an "organic solvent-like" odour and consumers described the water as smelling of tar or creosote. The provision of an alternative supply was limited to giving bottled water to those who requested it.

The company stopped the planned flushing work after the first consumer complaint was received. The investigation revealed that a valve was mistakenly opened allowing stagnant water contained in a section of 4 inch diameter main to enter the supply. The company took 18 days to discover the valve was open (when returning the system to its usual configuration). The company has since amended its procedures to include a check on the valve status when planning work on the distribution system. The Inspectorate was critical of the fact that the company did not review the work it had carried out on the distribution system immediately on receipt of complaints from consumers. The Inspectorate recommended that the company puts in place the means to examine all relevant information at the time of an event so that all appropriate actions are taken without delay. The Inspectorate also recommended that the company obtains expert advice whenever analytical data indicates that substances of potential health concern could be in the water supply.

The offence of supplying water unfit for human consumption is not under consideration by the Inspectorate in connection with any of the incidents that occurred in the region in 2004.

Issues of local interest

In 2004, nickel was detected in six out of 26 samples from the Baylham Kirbyrise zone (Suffolk) and in all 25 samples taken from the Beetley zone (Norfolk). The maximum value recorded was 35.7 µg/l compared to the standard (20.0 µg/l). Nickel is naturally occurring in the water source and comes from the drift deposits overlying the chalk aquifer in the area. In December 2003, following consultation with the local health authority, the company was granted authorised departures to supply water in these zones containing nickel at levels above the standard for a maximum period of three years. Various water treatment approaches have been evaluated but none were sufficiently robust and a blending scheme has been chosen as the most sustainable solution. This will involve laying new mains from other nearby works where the sources do not contain significant amounts of nickel. Anglian Water has entered in to a legally binding agreement to complete this work by December 2006.

Consumer contacts about drinking water quality

(as received by companies)

When consumers are concerned about their drinking water quality their first point of contact is the water company. The most usual form of contact is a telephone call but some consumers will write or email. All companies record these contacts in a broadly similar way and, this year, for the first time, companies have provided a summary of this information to the Inspectorate.

In the eastern region, the aspects of drinking water quality of greatest concern to consumers are appearance and taste. Table 1.2.10 illustrates the scale of these problems. Just over one quarter (28%) of consumer contacts across the region were about the water being discoloured orange-brown or black with the highest rate of contact (40%) being in the area served by Essex and Suffolk Water. This reflects the fact that the company has yet to complete work to renovate or replace old water mains.

About one third of consumer contacts were about an objectionable taste or odour in drinking water. Sometimes, but not always, unpleasant tastes and odours occur as a consequence of the condition or nature of a consumers' plumbing or water fittings. However taste and odour complaints can also indicate the need for companies to pay closer attention to aspects of their water supply operations. In the eastern region, particularly in the area served by Anglian Water and Tendring Hundred Water the information received by the Inspectorate suggests that residual chlorine control may merit closer attention. The relative proportion of taste and odour complaints reported by a company will help inform the Inspectorate's technical audit programme going forward.

One quarter of consumer contacts in the region called their water company because at some time during the year their water appeared white. When the consumer fills a glass of water from the tap it appears milky due to the presence of millions of tiny bubbles of air. As the bubbles rise to the surface, the water in the glass clears gradually from the bottom upwards. Air can become entrained in water by pumps. Sometimes the problem is due to pumps located inside buildings (typically large high rise blocks of flats) but equally water company operations can give rise to aeration incidents affecting many consumers at a time. The Inspectorate is of the opinion that water companies do not give sufficient attention to the causes and remedies of white water, even though it is clearly an issue that concerns consumers when it occurs.

Table 1.2.10: Consumer contacts about drinking water quality

Company	Consumer contacts about drinking water quality	% consumer contacts relating to discoloured drinking water	% consumer contacts relating to taste and odour	% consumer contacts relating to white water	Rate of contacts per 1,000 population
Anglian Water	9,969	25%	36%	26%	2 per 1,000
Cambridge Water	405	25%	25%	27%	1 per 1,000
Essex & Suffolk Water	2,061	40%	20%	18%	1 per 1,000
Tendring Hundred Water	126	29%	37%	See note	< 1 per 1,000
Region Total	12,561	28%	33%	25%	1 per 1,000

Note: Tendring Hundred do not record white water contacts separately from other discoloured water contacts.

Inspectorate's technical audit programme

Information on the Inspectorate's technical audit programme is in Part 2 of the full report.

Local Authority Consultation

Section 77 of the Water Act 1991 places a duty on local authorities to keep themselves informed about the quality of the public water supplies provided to premises in their area. In January 2005, the Chief Inspector wrote to all local authority Chief Environmental Health Officers inviting their views on drinking water quality and the extent to which they are involved in local drinking water quality issues. A summary of the national picture is set out in Annex 2.

In the eastern region 22 out of a total of 54 local authorities gave their views.

- 21 indicated that they were *satisfied* with the quality of the public water supply.
- 1 indicated that they were *generally satisfied* with the quality of the public water supply.
- No Local Authorities indicated that they were *dissatisfied* with the quality of the public water supply.
- 17 favoured reporting on water quality regionally
- Some indicated that they wished to see more information on local quality issues and consumer complaints in the Inspectorate's report.

Comments by local authorities included:

- The water company are very efficient at detecting problems, keeping me informed and resolving problems.
- Would like the role of local authorities to be better recognised, as they are often the first point of call for the public.
- Support regional reporting as there are three companies serving our district, so a more regional approach would give a good comparison.
- Support regional reporting as it would help identify variations.
- Display of trend information for the region would be useful.
- Interested in information on fluoridation.
- Interested in *Cryptosporidium*, as this has caused some concern in large food manufacturing businesses.
- Information on any reported problems or clusters of complaints and a comparison of how the level of issues compares to the industry norm would be useful.

It is reassuring to note that the majority of local authorities who responded were meeting regularly with the water company to review water quality issues.

For further information on the Water Supply (Water Quality) Regulations 2000, or the microbiological and chemical parameters covered by the regulations please refer to our website, www.dwi.gov.uk.

If you have a need for more specific information than that on our website, please contact us on our enquiry line: 0207 082 8024.