

5 JURISDICTIONAL APPROACHES TO WATER INDUSTRY REFORM AND QUALITY

Reform of the metropolitan water industries of four Australian jurisdictions — New South Wales, Victoria, South Australia and the Australian Capital Territory — and the implications for quality, is discussed below. Reform of the UK water industry and the implications for quality is then discussed. The chapter also reports results of selected quality indicators published by individual utilities.

5.1 New South Wales — Sydney and the Hunter

Overview of reform

The two major urban water authorities in NSW are Sydney Water Corporation (SWC) and Hunter Water Corporation (HWC). The HWC and later the SWC (previously Sydney Water Board), were established under the New South Wales *State-Owned Corporations Act 1989* in January 1992 and 1995 respectively. The NSW water corporatisations followed the NZ approach which involves the creation of a new legal entity. The NSW State-Owned Corporations Act is used to form companies and to then ‘vest’ the relevant authority in the company.

Regulatory and operational functions began to be separated at the time of corporatisation. The Environment Protection Agency (EPA) and the Government Pricing Tribunal were established for the purpose of separating delivery functions from regulatory and policy functions, with the water authorities required to meet standards developed elsewhere. This separation of functions offers a theoretical advantage in terms of water quality.

Regulator

The Independent Pricing and Regulatory Tribunal (IPART) is the economic regulator for several NSW water companies, including SWC and HWC. Its predecessor, the Government Pricing Tribunal of New South Wales (the Tribunal), commenced operations on 1 July 1992 under the *Pricing Tribunal Act 1992*. The Tribunal’s role was to regulate the prices for declared monopoly services supplied by NSW government agencies. In January 1996 the legislation

was substantially amended and expanded to provide a wider role for the Tribunal in competition policy reform under the name of IPART.

IPART is required to consider consumer protection through, inter alia, standards of service and standards of quality, reliability and safety. Its legislation also requires it to seek public participation and to report compliance by the water companies (IPART, 1997, p. 49).

Water quality

Standards and associated licence conditions continue to evolve in NSW. Regulatory responsibility for drinking water quality was removed from the NSW water utilities and placed with the Department of Health in 1993-94. Compliance with water quality standards and reliability of supply is monitored. NSW water quality objectives are being developed consistent with the National Water Quality Management Strategy (NWQMS) discussed at Appendix A. SWC and HWC are required by their operating licences to meet the 1996 NHMRC Drinking Water guidelines which form part of the Strategy.

Sydney's water supply system draws on raw water that is of good quality by world standards. But those required standards are rising while the quality of Sydney's raw water is under increasing stress. The SWB reported:

...while Sydney's water currently meets the 1980 National Health and Medical Research Council guidelines, the goal is to meet the more stringent 1987 guidelines by mid-1996. In 1989, 50 per cent of the samples tested failed to comply with the 1987 guidelines. At the customer's tap these levels had fallen to 98 per cent for the 1987 guidelines and 74 per cent for the 1980 guidelines respectively (SWB, 1994).

According to SWB's engineers, difficulties in meeting water quality requirements arose because of:

- the increasing age of substantial parts of the distribution system with consequent difficulties of cleaning and maintaining certain parts of it;
- inadequacy of existing facilities to cope with pressures from natural events such as floods and bushfires and the resultant damage to water quality;
- increasing urbanisation and the effect on some catchment areas; and
- the natural build-up of iron and magnesium in the water storages (Chapman and Cuthbertson, 1996).

As recently as 1989, when the SWB developed a Drinking Water Quality Strategy for upgrading its systems, there was little treatment beyond screening, disinfection and fluoridation. The decision to install treatment plants to filter

and further treat water at Prospect, Macarthur, Illawarra and Woronora was part of a strategy to meet the 1987 NHMRC guidelines by 1996 and ensure that Sydney was 'positioned to meet community based water quality standards predicted for ten years from now' (SWB, 1992, p. 4). The SWB has established that Sydney consumers were willing to pay to maintain the quality of drinking water (discussed in chapter 4).

Water quality under contracting arrangements

The use of private sector financing arrangements is increasing in NSW. Build, own operate contracts are in place for water filtration plants at Prospect, Woronora, Dapto and Macarthur (see box 5.1).

Box 5.1 Regulating quality under a BOO scheme

The SWB switched to a private build, own and operate (BOO) system for water treatment, while retaining raw water harvesting, storage and delivery of treated water. With an estimated capital value of around A\$520 million this broke new ground in the SWB's commercialisation and contracting out arrangements.

The SWB had recognised the need to upgrade drinking water standards but faced major capital works outlays in waste water treatment. This increased the attractiveness of privatised treatment plants. The natural monopoly arguments for a single publicly-owned distributor did not apply when it came to treatment. And the SWB identified net present value cost savings of \$600 million under the BOO treatment scheme compared with a publicly-financed treatment scheme (in addition to the benefits identified in the Dwyer-Leslie cost-benefit study referred to in chapter 4). Moreover, the SWB had little experience in filtration systems compared with the 17 consortia already in the market.

Under the BOO scheme, the risk of reduced quality performance lies essentially with the water treatment company. In the event that quality standards are not reached, Sydney Water has recourse to three measures: tariff reduction or non-payment; step-in rights; and termination of the contract. Monitoring provisions give SWC the right to satisfy itself that the plant is being operated and maintained in accordance with the Water Filtration Agreement. If failure is detected, the company is issued with notification and must respond with an agreed action plan. The company is required to carry out approved quality tests, the results of which are subject to audit, and SWC has the right to conduct its own tests. Disputes over results are settled by a third party. A monitoring committee consisting of two SWC representatives monitors the performance of the project and the operation of the agreement. The committee's decisions are contractually binding.

Source: Chapman and Cuthbertson 1996, p. 48.

Service quality

The operating licences of the water companies specify the standards for service quality. For HWC, service standards were included in a 1994-95 package of regulatory reform. SWC was placed under a similar regulatory regime, including service standards, upon corporatisation in January 1995. For instance, SWC must ensure that it complies with the standards for water quality set out in its Operating Licence and, as at February 1996, is subject to an annual audit of its performance in relation to its Licence. The report of the Licence Regulator and the audit report are submitted to the Parliament at the end of each financial year. Obligations to customers are specified in the customer contracts while responsibility for ensuring that these obligations are met resides in a Board. The New South Wales Government is required to provide any special directions in writing.

The SWC and HWC customer contracts provide legal redress to customers should the water companies not meet their commitments:

Sydney Water ensures that where it is not able to supply customers with water ... services, they may be entitled to a rebate of part of their service availability charges. In the case of interruptions to water supply of greater than one hour which have not been notified in accordance with clause 4.1 customers will receive a rebate. Customers are entitled to an automatic 10 per cent rebate on their water ... availability charge if they experience a discontinuity in the supply of water or sewerage service due to a problem in Sydney Water's water ... system.

Hunter Water ensures that for owners of properties with standard connections to the Corporation's services, a rebate, equivalent to the costs associated with the standard connection fees for ... a water ... service, will be provided if specific service standards are not maintained (cited in Asher, 1995, p. 3).

Summary of results

Independent audits are undertaken of performance against the targets in SWC's and HWC's operating licences each calendar year. Table 5.1 shows the results for SWC for the 12 months ended December 1995 compared with the six months to June 1996. In all but customer service SWC has done better than the targets. The first audit under the operational licence suggested improvement in dealing with customer complaints, and that the water pressure standard needed clarification.

Table 5.1 Operating licence performance of Sydney Water Corporation

<i>Indicator</i>	<i>Target</i>	<i>Results</i>	
		<i>1995</i>	<i>First half of 1996</i>
Water quality	Meet the 1980 NHMRC guidelines for bacterial counts (total coliforms and E.Coli). 100% of all samples must comply with the maximum levels of a range of specific trace elements and metals.	All water samples met health related requirements of the NHMRC. 100% compliance for trace elements and metals.	All water samples met health related requirements of the NHMRC. 100% compliance for trace elements and metals.
Water pressure	At least 98% of customers in any one year must have normal water pressure available (in excess of 15 meters) except in special designated areas. Short term pressure fluctuations such as a burst water main are not included.	Standard achieved for 99.4% of customers.	Standard achieved for 99.8% of customers.
Customer service	Customer complaints to receive a response within two working days for complaints made by telephone or face-to-face, and within five working days to written complaints. To provide 48 hours notice to residential customers and seven days notice to commercial and industrial customers of planned interruptions to water services.	98.33% of complaints were responded to within the required times. 99.68% of customers received the required notice.	100% compliance with response to complaints. 99.36% of customers received the required notice.
Water continuity	At least 95% of customers for any one year must not experience any discontinuity in their water supply of more than 6 hours on any one occasion.	99.44% of customers did not experience discontinuity.	99.78% of customers did not experience discontinuity.

Source: Sydney Water Corporation *Annual Report 1996*, pp 10-11.

SWC's latest customer service survey shows that three out of four customers rate the service of the customer centres as very good to excellent and two out of three rate the emergency service equally highly (SWC, 1996).

5.2 Victoria — Melbourne

Overview of water industry reform

The Victorian government restructured its water industry by separating water functions from local government and incorporating these into State-owned and corporatised water authorities.

The new regional water authorities operate under renewable licences for defined geographic areas (State Government of Victoria 1995, p. 9). The licences constitute agreements between the government and the licensees and require the licensees to deliver specified services subject to certain terms and conditions; licensees are subject to existing legislation, such as the Health Act, the Environment Protection Act, the Land Acquisition and Compensation Act, the Catchment and Land Protection Act, the Planning and Environment Act and the Subdivision of Land Act.

The initial licences were issued in December 1994 to three state-owned metropolitan companies — Yarra Valley Water (YVW), South East Water (SEW) and City West Water (CWW) — created under the *State Owned Enterprises Act* 1992 to assume responsibility for the retail supply of water. The principal conditions of the licences cover: provision of services; performance standards (eg water quality, effluent discharge, service interruptions, water pressure and customer protection); regulation of pricing; customer service guarantee; customer liaison; and penalty provisions.

Although the metropolitan water companies do not compete directly for each other's customers, they 'compete by comparison' (yardstick competition). Customers are able to compare the performance, quality and service of their business with those in the neighbouring regions to ensure that they get a fair deal. The system of licences thus encourages more accountable and customer-oriented service provision and sets the performance standards for the industry.

Victoria is concerned with establishing a national format for performance monitoring. Victorian authorities report on a range of financial and non-financial performance indicators as part of the business planning and annual reporting cycle.

Regulators

Several agencies have roles in the reformed water industry:

- The Department of Conservation and Natural Resources advises the Minister for Natural Resources on policy aspects and monitors use and protection of assets and natural resources.
- Licensed water agencies are regulated by the Office of the Regulator-General (the Office) in the areas of competition and efficiency.

The Regulator-General monitors customer service standards to ensure that customer interests are protected. A customer contract requires the businesses to meet certain obligations to customers and requires customers to meet their obligations such as paying their bills. With a fixed price, quality and service standards, the independent companies can only increase their profits by maximising efficiency and performance.

According to its latest Annual Report, the Office's recent work in relation to water has focused on non-pricing issues such as:

development of operational audits to assist the retail companies to identify and address areas of potential non-compliance with their licence obligations and to assist the Office to carry out its compliance, enforcement and comparative reporting roles (Office of the Regulator General, Victoria, 1997, p. 14).

The audits will focus on the:

- reliability and quality of water;
- access to services for customers experiencing difficulties in paying their water bills;
- complaint handling, escalation and resolution and the handling of customer feedback generally; and
- liability in respect of implied contractual obligations.

Water quality

Victoria has adopted performance standards and a formal 'benchmark competition' approach to achieving quality through publication of comparisons across the regional monopolies by the government. Each retail company has water samples tested for the presence of organisms and substances which have implications for public health, aesthetic qualities and for other properties (such as pH). The companies report to the Office of the Regulator General on the results of testing.

The customer contracts require the metropolitan retail water companies to provide customers with water which is:

clear, free from odour and objectionable taste; complies with the 1997 Guidelines and the *Victorian Health (Quality of Drinking Water) Regulations 1991*, and is a quality not less than that provided by Melbourne Water Corporation before 1 January 1995 (Office of the Regulator General, 1995, p. 5.1).

A strategy has been adopted to improve drinking water quality across regional Victoria. Results show an improvement of microbiological quality, from 49 per cent of samples conforming to WHO drinking water quality guidelines in 1994/95 to 60 per cent in 1995/96 (ARMCANZ/ANZECC, 1996, p. 4).

Among the water quality guarantees of performance set out in their customer charters, the retail water companies undertake to ensure that the water supplied:

- is clear and free from objectionable odour and taste;
- meets health requirements listed in the customer contract;
- is of a quality at least equal to that provided by Melbourne Water (MWC) prior to 1 January 1995 (when it took over from MWC); and
- continues to improve as improvement plans listed in the customer contract are completed.

Targets for microbiological quality of water supply are specified in operating licences and are based on the 1987 NHMRC guidelines for bacterial counts. Compliance with these guidelines requires that 95 per cent of samples tested for faecal coliforms have zero organisms per 100 millilitres and 90 per cent of samples tested for total coliforms have no more than 20 organisms per 100 millilitres.

Performance of CWW in 1996/97 exceeded these guidelines (CWW, 1997). A number of activities undertaken by CWW in 1996/97 may have contributed to the improvements in water quality. These include a doubling of the number of special water quality sample points in its licence area, point-of-entry monitoring, extensive air scouring of selected water mains, and an expanded program of water mains replacement. There was a decrease in the number of customer complaints regarding water quality compared with the previous year.

Monthly reporting and analysis is undertaken by the water companies on several quality aspects, such as:

- water quality flushing programs;
- valve checking programs; and

- trialing of monitoring system to establish quality parameters such as chlorine residual.

SEW, for example, has targeted commercial/industrial properties identified as having activities posing medium to high-risk contamination of the water supply system through retro-fitting of backflow prevention devices. Backflow is the undesired reverse flow of water within the plumbing system which can result in contaminants being drawn into the drinking water system.

YVW has achieved ISO 14000 standard accreditation for its environmental systems and SEW has achieved certification as a quality endorsed company, being the first Australian urban water company to be certified to international standard ISO 9001 for all aspects of its operations.

Service quality

The Office of the Regulator General has produced annual customer service indicators since 1995 for the purpose of comparison between the retail companies. The companies report on several quality of service indicators on a monthly basis. They also submit data which allows their performance figures to be standardised to aid comparison, such as the number of connected properties and meters (Office of the Regulator General, 1995, p. 3.1). This enables the Office to report on the number of water supply interruptions per 1,000 connected properties. The Office also undertakes a formal community consultation process in relation to Victoria's regulated utilities, including urban water services.

Customer contracts contain service commitments summarised in the customer charters mailed to customers in the first year of reform. The Customer Contract sets out the basis rights and obligations of the customer in dealing with one of the three Melbourne metropolitan water companies. These rights to water services are that the company:

- meets your reasonable needs; and
- meets minimum flow rates set out in the Customer Contract.

The process of performance comparison does not necessarily account for all differences between companies. For example, socio-economic factors may affect an inclination for customers to lodge a complaint, while the number of interruptions due to pipe bursts may be influenced by the soil types in a company's area. The companies are given the opportunity to explain significant differences which the Office takes into account when making a judgement.

Table 5.2 shows service quality performance for SEW for the last two financial years. 1996/97 was a particularly hot summer in Melbourne which caused an increase in the amount of emergency repair and maintenance work of water mains. Ground movement in dry conditions contributes to cracking and displacement of aged mains. This accounts for the increase in the number of water interruptions per 100 km of mains which SEW experienced. SEW claim that the figures show a resilience considering the potential of the situation (SEW, 1997). On the positive side, the percentage of water interruptions restored within 5 hours improved from 97.1 per cent to 98.4 per cent, while the number of customer calls answered within 30 seconds rose from 94.4 per cent to 97.4 per cent in the last 12 months.

Table 5.2 South East Water performance measures

Indicator	1995/96	1996/97	1997/98 (target)
% of unplanned water supply interruptions restored within 5 hours	97.1%	98.4%	> 98%
Water quality compliance			
- faecal coliforms	99.8%	99.5%	> 99%
- total coliforms	n.a.	98.5%	> 99%
Main bursts and leaks per 100 km of water main	21.6	23.8	21.0
Emergency calls answered within 30 seconds	94.4%	97.4%	98.0%
Water quality complaints per 1000 properties	3.5	3.4	3.5
Correspondence answered within 10 days (%)	99.1%	97.6%	99.5%
Response to telephone queries on rate hotline answered within 30 seconds (%)	94.2%	87.3%	92.5%

Notes: n.a. = not available

Source: South East Water Limited, 1997, p. 7

The Melbourne weather conditions experienced over the summer period, combined with the basaltic clay which predominates in CWW's licence area, also meant that for CWW the expected reductions in the number of unplanned water supply interruptions did not occur. At the height of the summer there were 100 bursts recorded in one day, 10 times the average daily rate. Despite the higher level of burst pipes, CWW achieved its licence requirement to restore unplanned water interruptions within 5 hours. CWW has earmarked \$8 million of capital expenditure for water main renewals in 1997/98 to enhance water supply service performance. Other initiatives include valve inspection and installation programs to reduce the number of customers affected by an interruption (CWW, 1997, p. 20).

5.3 South Australia — Adelaide

Overview of reform

South Australia (SA) is adopting a 'competitive tendering and contracting out', or outsourcing approach, to the reform of its water industry, combined with specific performance criteria for meeting water quality objectives. The government has outsourced the management, operations and maintenance of Adelaide's water networks through a competitive tender process. The contractor is also responsible for developing and managing the capital works program. This is similar to the franchise approach in France. SA Water retains responsibility for management, operation and maintenance of country water supply and wastewater systems, raw water supply to the water treatment plants, long-term infrastructure, and customer service including billing and revenue collection. The SA Engineering and Water Supply Department was corporatised in July 1995 and renamed the South Australian Water Corporation (SA Water).

SA Water has a long-term contract with United Water to manage, operate and maintain Adelaide's water and wastewater systems. The contract commenced on 1 January 1996, with 1996/97 being the first full financial year of operation. Included in the contract is a requirement for United Water to generate exports of water services. The contract target of net exports in 1996 was \$9.5 million, with reported results of over \$24 million.

United Water's overall performance for its first full year of operation was measured against performance targets covering water quality, responses to correcting problems arising in the water network, extension of mains, provision of new service connections and replacement of damaged meters. United Water achieved 100 per cent compliance with 35 out of 39 targets. Of the four remaining criteria, United Water achieved 99 percent compliance with three and 98 per cent compliance with the remaining target. The non-compliance was considered immaterial to the quality of customer service (SA Water, 1997, p. 12)

South Australia's ministerial portfolios for environment and resource management, and infrastructure have been separated. Thus the roles of trustee of the resource and establishing and enforcing regulations have been separated from that of service delivery.

Regulators

Responsibility for setting standards, regulating pollution and water quality rests with the SA Environment Protection Authority (EPA). SA Water is also subject to the provisions of the Public Environmental Health Act 1987, which is administered by the Minister for Human Services. SA Water's extraction of water from a prescribed water resource is licensed under the Water Resources Act. The Department of Treasury and Finance provides quarterly financial performance monitoring reports on SA Water to the Portfolio Minister and the Treasurer.

Water quality

Earlier chapters noted that water quality and treatment is different from place to place due to different local circumstances, especially the water source. As noted in chapter 4, the source of South Australia's water supply is of poor quality. Studies were conducted in 1996/97 to develop treatment processes which will enable further improvement in the quality of the water supplied to metropolitan customers. Implementation of these improvements will be completed by the end of 1997/98 (SA Water, 1997, p. 11).

Tests for microbiological quality are performed on samples taken throughout the water system, but predominantly at customers' taps. In 1996/97 all metropolitan supplies complied with the 1996 guidelines at the customer tap.

Service quality

The standards of service expected by SA Water are constantly increasing in line with industry improvements and community expectations for water quality, service responsiveness and care for the environment:

... the contractor is required to use best practices to improve service continuously throughout the term, but without detracting from the primary objective of costs savings. There are 53 performance criteria in the contract (Killick, 1996, p6).

The SA model could be subject to similar problems to the French model in terms of contracts rarely changing hands. The Adelaide contract was highly contested but the details of the contract are not publicly available and the contract is of long duration. Moreover, there were allegations of improper fraternisation and exchange of information between the negotiators of SA Water and the successful tenderer, United Water, putting the integrity of the tendering process in doubt (Mike Duffy, *Sunday Mail* (SA), December 8, 1996, p.3).

5.4 Australian Capital Territory

Overview of reform

On 1 July 1988, the former ACT Electricity Authority was merged with ACT Water (a division of the former Commonwealth Department of Territories which administered the ACT) to form the Australian Capital Territory Electricity and Water Authority (ACTEW). The ACTEW supplies Greater Canberra and the ACT with water and electricity, owning and operating the associated infrastructure.⁸ ACTEW expressed qualified satisfaction with the merger to the Industry Commission Inquiry:

There were some efficiency gains from the mergers and the Authority has developed an increasingly efficiency conscious, customer oriented culture...In general ACTEW is satisfied with the results although there remains more scope for movements towards a unified corporate culture (ACTEW, 1992 , IC 2).

On 1 July 1995, ACTEW was corporatised and renamed ACTEW Corporation. ACTEW's corporate plan requires that it measure performance of quality and reliability of services to customers. ACTEW surveys its customers each year. It also measures its performance on the number of interruptions to water supply and the length of time to remedy them; and the quality of water provided to customers (ACTEW, 1997, p. 12).

Water quality

ACTEW has a nationally accredited system to ensure water quality. Accreditation involves prior approval to supply a service according to a set of minimum standards.⁹ This means that ACTEW is not subject to outside quality regulation and is able to undertake its own monitoring which has been removed from the responsibility of the Department of Health.

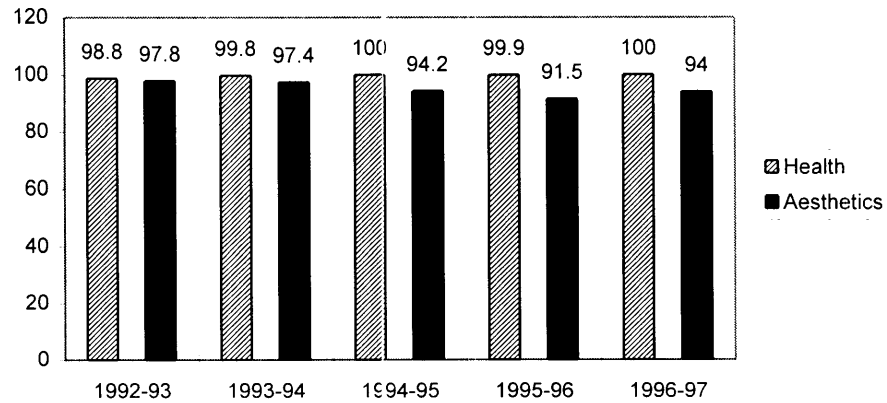
Figure 5.1 shows the average percentage of scheduled samples of health compliance and the three main aesthetic water quality measures: colour, turbidity and pH. ACTEW has consistently met the NHMRC guidelines on health compliance, which state that at least 95 per cent of scheduled samples should have no faecal coliforms. The measures are based on readings at the customer's tap rather than storage reservoirs, giving a more accurate indication

⁸ Also supplies bulk water to the adjoining NSW city of Queanbeyan.

⁹ Accreditation can be withdrawn for failing to comply with the standards.

of what the customer is receiving. Upper limits suggested by NHMRC have been achieved.

Figure 5.1 Water quality indexes and compliance



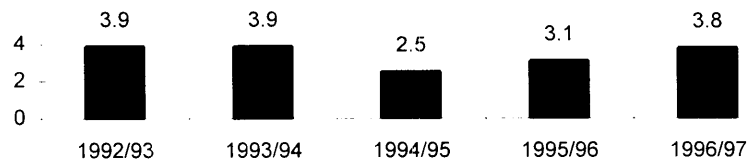
Source: ACTEW 1997, p. 14

Figure 5.1 does not indicate that health or aesthetic qualities of water have been affected by recent reforms to the ACT water industry.

Service quality

The following two tables show ACTEW's performance on service interruptions for the years 1992/93 to 1996/97. Figure 5.2 shows the number of water interruptions per 100 properties (ie loss of supply to customers). ACTEW attributes the increase in interruptions in 1996/97 to dry months from January to April (1997, p. 13). There is no indication that recent reform has affected the number of interruptions.

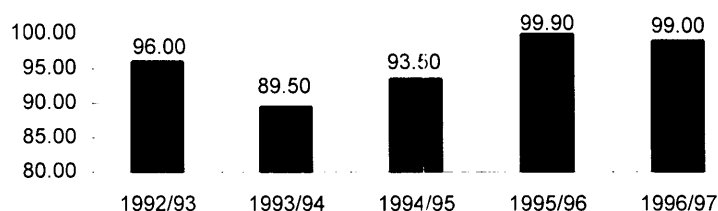
Figure 5.2 Number of water interruptions per 100 properties per year



Source: ACTEW 1997, p. 13

Figure 5.3 shows the percent of ACTEW's interruptions restored within five hours. It indicates an improvement in recent years.

Figure 5.3 Per cent of water interruptions restored within 5 hours



Source: ACTEW 1997, p. 13

ACTEW recently expanded payment options for customers to include telephone credit card payments. This complements a range of direct debit payment facilities.

Public consultation is required before any major initiative is implemented in the ACT. The *Public Interest Disclosure Act* 1994 requires ACTEW to report upon procedures to facilitate the making of public interest disclosures and to deal with such disclosures. ACTEW has informed staff of the provisions of the Act and indicated the appropriate contact points, and developed a corporate procedure on the operation of the Act. Seven public interest procedures were reported during 1996/97, with six investigated and only two substantiated. One report is still under investigation. Six disclosures alleged dishonesty and one alleged wrongful disclosure of information (ACTEW, 1997, p. 16).

5.5 United Kingdom — England and Wales¹⁰

About 50 million people in England and Wales (about 99 per cent of the population) use 16,800 million litres of water a day supplied by 31 water companies. After treatment, drinking water sourced from rivers, reservoirs, lakes and streams, and boreholes and wells is distributed through a network of pipes about 315,000 km long and some 5,000 service reservoirs or water towers.

The UK water industry is organised on a regional basis in England and Wales. Ten water companies, which were publicly owned water authorities until privatisation in 1989, have both water supply and sewerage functions. In 1989 there were also 29 water-only companies, since reduced to 21 through mergers.

Overview of reform

The system before privatisation had been based on the principle of integrated river-basin management. All water functions, commercial and regulatory, were undertaken by the regional water authorities. Even though the water authorities were publicly owned there were conflicting interests within each, and water quality objectives often had to yield to economic constraints (Cowan, 1993). Reform of the UK water industry involved separation of commercial and regulatory functions previously undertaken by the regional water authorities. No provision was made for the regulation of quality in the first privatisation cases. Subsequent concerns with quality performance led to the introduction of quality regulation for all privatised utilities, including the later privatisation of water.

Each water company is subject to the adjusted price-cap regulation, whereby its revenue is limited by $RPI+K$, where K varies according to investment expenditures required by each firm particularly in responding to EC quality directives. There are in effect two elements to the K factor in the formula: an X element relates to usual utility operations, and a Q element relates to mandatory improvements in quality and the environment (ie $RPI-X+Q$). The $RPI-X$ control places a regulatory ceiling on the amount by which enterprises can increase

¹⁰ The water industries of Scotland and Northern Ireland are not included since they are not subject to privatisation and the associated reform processes.

prices over a specified period (usually five years), providing profit incentives for the firms to reduce relative costs.¹¹

Since 1989, the water industry has been faced with a significant tightening of the quality and environmental standards under which it is required to operate. The change in the institutional and regulatory framework of the UK water industry at privatisation highlighted previous under-investment in infrastructure assets and the lack of progress in meeting EC Directives on water quality. An investment program, designed to achieve compliance with these Directives and to meet other quality standards and future investment needs, was established. This program is being paid for by consumers in the form of rapidly increasing real water charges; the price-cap regulation includes a factor 'K' which allows firms to increase prices above inflation to finance their investment programs. The K factors vary across companies and across times. Were it not for such increases in standards, the approach to setting price limits for water companies could be on much the same lines as for other utilities.

Since privatisation there has been a further tightening of standards and new obligations have been imposed. To cover the industry against changes in standards which were unforeseen when K factors were originally set, there is a procedure by which reasonable extra costs can be passed through to consumers via a change in K outside a formal periodic review. But lack of attention paid by those who set the standards to the costs of meeting them has generated debate between the different regulators about the setting and financing of improvements (Cowan, 1993, p. 15). Standards are usually externally imposed by the EC. There are no apparent attempts to apply cost-benefit analysis such as the SWC study.

For the period 1989/90-1994/95 the investment program was around £18 billion, of which £5 billion was to meet environmental and quality standards. Water prices increased by 25 per cent in real terms in the 5-year period to 1994/95. Of this, compliance with quality and environmental standards accounted for two-thirds of the increase, while improved standards of service for items such as water pressure and sewer flooding accounted for a further one-ninth of the increase (Ofwat, 1996).

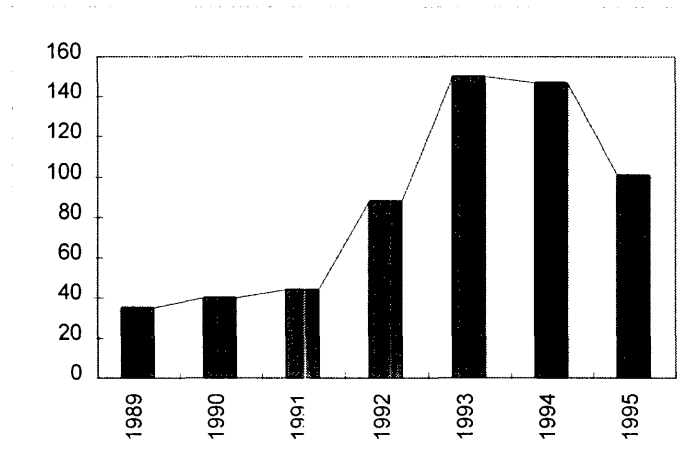
Between privatisation in 1989 and March 1996, £9 billion pounds (1995-96 prices) was spent on asset maintenance, refurbishment and construction for the UK water industry. Nearly 40 per cent of this expenditure (£3.4 billion) went to

¹¹ The factor 'X' represents reductions required in the price charged by utilities in relation to prices generally (measured by the retail price index), and reflects both efficiency improvements and factors relating to the utility's financial position.

improving drinking water quality. Capital expenditure of around £4 billion is planned for the 10 years 1995 to 2005 to further improve drinking water quality.

Figure 5.4 illustrates investments in improvements (in million pounds on the vertical axis) to drinking water quality for one of the 10 privatised water companies, Anglian Water, for the period 1989 to 1995.

Figure 5.4 Investments in improvements to drinking water quality



Source: Anglian Water, 1996.

Common carriage on the waterpipe network was proposed by the Department of Environment in April 1996 to enable competition. A key obstacle to the proposal was whether water quality standards could be safeguarded. Water quality was already an issue in the UK. A report commissioned by the Department of Environment and Ofwat by the Water Research Centre concluded that the difficulties in this area, while presenting a challenge, were not insurmountable (Ofwat, 1996).

An associated obstacle concerned changes in taste and hardness — resulting from changes in the source of supply — that would lead customers to perceive a reduction in water quality. The Director General of Ofwat considered that attempts to ensure taste and hardness did not change as a result of common carriage would likely discourage competition. Hence, changes in taste and hardness would have to be accepted, as they already are when the source of supply is varied within an existing network (Byatt, 1997).

Regulators

The UK privatisation Acts created a partner regulator for each industry, specifically concerned with its decisions. A new regulatory structure was

established for the ten privatised water companies, within which the existing private water-only companies were brought. Ofwat was established to ensure the firms are able to finance their functions and earn reasonable returns on their capital. Subject to this, the interests of customers are protected with respect to prices and undue discrimination. The Director General of Water Services (DGWS), who heads Ofwat, must also promote efficiency and competition and check that licence conditions are satisfied (Cowan, 1993).

Ofwat's role in quality regulation is limited to determining and monitoring levels of service. The Drinking Water Inspectorate (DWI) ensures that drinking-water quality standards, mainly determined by the EC Drinking Water Directive, are met. The National Rivers Authority (NRA) and Drinking Water Inspectorate (DWI) were established at the same time as Ofwat. The NRA took over from the water companies the functions of licensing abstraction and regulating pollution of the water environment. It also has the operational functions of land drainage and flood defence (see box 5.2).

Box 5.2 Major regulators of water companies

- The Office of Water Services (Ofwat), the economic regulator, was established in 1989 to control prices, investment and some aspects of service quality.
- The National Rivers Authority (NRA) was created and given duties of controlling water resources and interpreting and implementing legislation about water pollution.
- European Commission Directives and UK government legislation are sources of standards for both pollution and drinking water quality monitored by the Drinking Water Inspectorate (DWI).

Other regulatory bodies share regulatory responsibilities with the industry regulator. For instance, the relevant Minister holds powers to control entry to the industry or define a legally protected monopoly market; the Office of Fair Trading (OFT) has responsibility for general competition policy; and the Monopoly and Mergers Commission (MMC) has power to alter the licences of the companies and investigate the existence or exploitation of monopoly power.

Water quality

The UK Competition and Service (Utilities) Bill, published in 1991, retrospectively confers on the various utility regulators specific powers to set, monitor and enforce quality standards. The quality of water supplied by the UK

water companies is controlled by the Drinking Water Regulations, which are based on a European Community Directive. They cover the chemical and bacteriological content of the water and also its acceptability — colour, turbidity, odour and taste.

Quality standards are laid down by the Secretaries of State and administered and enforced by the regulators. Water companies submit Strategic Business Plans (SBP) to Ofwat which set out their intentions. Companies and their certifiers need to ensure that their Strategic Business Plans reflect the achievement of new standards on a basis and timescale which the quality regulators accept. This allows the SBPs to provide a basis for subsequent monitoring of performance of water quality objectives. Some companies have agreed to licence amendments which have strengthened the procedure for notification by the Secretaries of State or the companies of new or changed legal requirements. The DGWS does not determine what companies are allowed to spend:

He does not expect the companies to spend in any pre-determined way; their performance will be measured by their achievements on water quality, compliance with discharge standards and customer service rather than by how much they spend (Ofwat, 1994, p. 30).

Working relationships between the quality regulators, companies and Ofwat have been established under the aegis of the Department of Energy (DoE) to make the process of determining quality obligations clearer and reduce uncertainty facing the companies. The DoE ensures that standards for water (and environmental) quality are applied systematically according to EC Directives as translated into national law.

In areas where there is no threat to health, the Secretary of State for the Environment allows companies to supply water which does not meet every requirement of the regulations. Where this is necessary, it is for a limited and agreed period while the company carries out a program of improvement.

For monitoring purposes, each company's network is divided into water supply zones serving not more than 50,000 people. There are nearly 2,500 zones in total. The government has set 55 standards for drinking water. Most of these come from obligatory European Community Directives but some UK standards are more stringent. A few are based on WHO guidelines. The standards relating to health and aesthetics generally include wide safety margins.

Water companies are required by legislation to take water samples and test them to check that quality standards are being met. All measures are tested at representative consumers' taps in each water supply zone, while bacteria is also

tested at treatment work. Each water company retains a public record of all test results.

The Drinking Water Inspectorate monitors testing by the water companies and on health matters is advised by the Government's Chief Medical Officer. Each water company is inspected in relation to sampling procedures and methods, the number of tests taken, recording of the results, water treatment processes, and the operation and maintenance of the treatment and distribution system. Results for each company are published in the Inspectorate's Annual Reports against European and British standards. All compliance data are available publicly from the water companies.

In 1995 the water companies conducted over 3 million treatment tests at treatment works, service reservoirs and in water supply zones. The tests, about 80 per cent of which involved samples from consumers' taps, had a 99.5 per cent compliance rate with the standards (see WSA UK, 1997). None of the contraventions of the standard was found to endanger human health because of the wide margins of safety with which the parameters of any health significance are set. Hence a breach of the parameters of aesthetic significance does not necessarily imply that the water is unfit to drink.

Ofwat has produced scenarios of quality and price combinations in an attempt to involve customers in the process of setting new price limits (Ofwat, 1992). The exercise sets out the percentages that bills would have to rise under different quality strategies, which has helped to illuminate the trade-offs for customers (Ofwat, 1993). Ofwat has also conducted customer preference surveys.

The DGWS has made a case for costing new obligations before they are adopted. He has asked the UK government for their views on the trade-off between quality and cost, and has urged it to consider relaxing some national standards and renegotiating EC directives. The NRA and DWI have some discretion over interpretation and implementation of quality obligations set by the government and the EC.

Service quality

Ofwat is responsible for determining and monitoring levels of service. These include water pressure, the avoidance of hose-pipe bans, and speed of response to leaks and interruptions. The prime responsibility for customers rests with the companies themselves. However, under the Water Industry Act, ten regional Ofwat Customer Service Committees (CSCs), one for each region, were established. CSCs are independent of the water companies; they represent the

interests of customers and investigate customers' complaints. The UK WSA publishes annual service quality outcomes which are reported in chapter 6.

Arrangements to compensate individual consumers for poor service have been introduced for most UK utilities. Under UK 'Guaranteed Standards' schemes, consumers receive a fixed-level rebate if they suffer a loss of some specific service. This mechanism has several advantages. First, it ensures consumer-specific compensation: the individual customer who has suffered the loss in quality will be compensated. Second, the company is provided with more precise management information since it can spot the location of the quality failure. Third, with such a scheme the firm is allowed to trade-off changes in quality against the incremental costs of achieving them. Thus the regulator does not fix a unique level of quality: the firm can choose whether to improve service quality or pay more compensation. As with RPI-X+Q, the regulator does not need to investigate the firm's costs of supplying higher (or lower) levels of quality performance but does need to make a judgement about the relationship between price and quality in setting the compensation level.

The main disadvantages of the approach are twofold. First, the scheme can only work when the detriment is consumer-specific and quality failures can be easily verified. For instance, it would be impractical to compensate individual consumers for failures such as low water pressure. Second, transactions costs to both suppliers and consumers are higher than under alternative mechanisms.

Conclusions

The separation of the NRA from the water authorities (now the water and sewerage companies), and the creation of a separate DWI, has increased the degree of openness of quality regulation. Before separation, water authorities set their own informal water quality objectives. Now the NRA is developing water quality objectives that are legally binding. This greater transparency is likely to mean that the standards that are set are effectively monitored.

The two major problems relating to water quality in the UK are difficulties estimating consumers' preferences for marginal changes in water quality and the interdependence of environmental regulation and water quality regulation where there exists different regulators with different duties and powers. As Cowan (1993) points out:

Even if consumers' preferences could be assessed accurately, it is very unlikely that the optimal standard would be chosen. Suppose the NRA (or DWI) can choose a standard before Ofwat sets prices. If the NRA does not have to consider the costs of achieving a given quality standard then this will be set too high from

the point of view of economic efficiency. Ofwat will then have to set prices to ensure that the costs of reaching high quality are covered. This is known as a problem of common agency, where the firm has different regulators (p. 19).

It is not clear that the trade-offs between cost and quality have been acted on. For example, Ofwat has expressed concern that other regulators and standard setters (including the EC) do not take sufficient account of the costs of achieving quality objectives (Ofwat, 1992). Under the UK *Water Resources Act 1991*, the NRA has certain duties relating to water quality but there is no mention in the legislation of a duty to consider the costs of compliance.

The existence of separate regulators of quality, pollution and prices creates considerable potential for inefficiency if standards are set too high and are policed effectively. There is a clear case for closer co-operation between the various regulators and for an explicit duty to be imposed on NRA to balance costs against benefits, as long as legal obligations are not compromised. The setting of standards by the EC and government should be subject to cost-benefit analysis to judge whether consumers are willing to face increases in charges for increases in quality. To gauge whether current standards are efficient and how much should be paid for improvements requires information on consumer preferences as well as on the costs of improvement.

6 EMPIRICAL RESULTS

This chapter reports results on water quality and service quality for the surveyed Australian urban water businesses and aggregate results for the UK water businesses. The 1994/95 results for the disaggregated businesses of the former Melbourne Water Corporation are reported appropriate to the nature and function of the indicator and available data.

6.1 Health related quality outcomes for surveyed Australian urban water businesses

There are still a wide variety of standards and guidelines used by Australian regulatory authorities for measuring water quality for the various businesses. Tables 6.1 and 6.2 show compliance with the standard or guideline for bacterial quality and aesthetic quality respectively, specified in the water authorities' licence or equivalent for the years 1991/92-1996/97.

For the figures provided, various frequencies of non-compliance or individual samples are allowed for within the different guidelines. Hence, reported percentages of less than 100 per cent of samples are not necessarily in breach of the guidelines used in the business licence. For example, NHMRC Guidelines (1996) for bacteriological compliance require more than 95 per cent of samples free of coliforms and 98 per cent of samples free of faecal coliforms.

There was a generally high level of compliance with bacteriological quality standards over the reported years, with improvements in the latest year — a large majority of the industry's drinking water suppliers achieved 99 per cent compliance with the relevant drinking water standards in 1996/97. According to cost figures reported by WSAA, the stable levels of water quality compliance have been achieved in concert with a combination of requirements for higher standards and significant reductions in water 'trend' operating costs. The key contributors to the cost reductions have been the Melbourne based water businesses in terms of their 'consolidated' outcome.

Sydney Water made the greatest improvement in water quality standards in recent years, increasing its compliance level from 90.0 to 96.85 in 1995-96, and from 96.85 to 99.05 in 1996-97. This probably reflects the new large drinking water treatment plants coming on line for the financial year 1995-96, coinciding with an increase in operating costs.

Consistent with its poor source quality, SA Water had the lowest compliance with bacterial quality standards in 1996/97. However, all metropolitan supplies complied with the revised NHMRC/ARMCANZ guidelines for microbiological quality at customer taps.

6.1 Compliance with bacteriological quality standards

Water Business	Relevant standard	1991-92 %	1992-93 %	1993-94 %	1994-95 %	1995-96 %	1996-97 %
ACTEW Corp.	NHMRC 1996	98.5	98.5	99.5	99.9	98.0	99.9
City West Water	NHMRC 1987	n.r.	n.r.	n.r.	99.0 ^a	100	99.0
South East Water	NHMRC 1987	n.r.	n.r.	n.r.	99.8 ^a	99.8	99.5
Yarra Valley Water	NHMRC 1987	n.r.	n.r.	n.r.	99.7 ^a	99.6	99.8
Melbourne Water Corp.	NHMRC 1997	96.5	96	98.8	99.5 ^a	99.5	99.4
Melbourne Water cons.	NHMRC 1987	96.5	96.0	98.8	n.r.	n.r.	n.r.
SA Water (metropolitan) ^b	NHMRC 1996	98.1	97.2	97.8	99.0	99.0	98.6
Sydney Water Corp.	NHMRC 1980	93.0	89.0	95.0	90.0	96.85	99.05
Hunter Water Corp.	NHMRC 1996	96.2	93.5	96.1	96.9	97.9	98.7

Notes: Industry average is calculated by weighting each GTE's performance by its volume of water supplied.

^a Figures based on six months ending 30 June 1995.

^b Relates to guidelines for faecal coliforms only

n.r. = not relevant

Source: WSAA 1998, p. 45 and SCNPMGTE 1997, p. 65.

Table 6.2 shows compliance with aesthetic quality standards for selected water businesses for the years 1991/92-1996/97. HWC achieved the best compliance result for 1996/97 (99.8 per cent), with MWC a close second (99.5 per cent) and YVW third (99 per cent). For SA water, the turbidity and colour of water supplied to customers in the metropolitan area conformed with the levels of service required under the contract for United Water (SA Water, 1997, p. 13)

Table 6.2 Compliance with aesthetic (turbidity/colour/pH) quality standards

Water Business	Relevant standard	1991-92 %	1992-93 %	1993-94 %	1994-95 %	1995-96 %	1996-97 %
ACTEW Corp.	NHMRC 1996	96.5	97.0	97.1	92.4	91.0	94.7
City West Water	NHMRC 1997	n.r.	n.r.	n.r.	99.0 ^a	94.0	97.65
South East Water	NHMRC 1987	n.r.	n.r.	n.r.	99.8 ^a	99.8	98.5
Yarra Valley Water	NHMRC 1987	n.r.	n.r.	n.r.	96.0 ^a	96.0	99.0
Melbourne Water Corp.	NHMRC 1997	96.5	96.0	98.8	99.5 ^a	99.4	99.5
Melbourne Water cons.	NHMRC 1987	96.5	96.0	98.8	n.r.	n.r.	n.r.
SA Water (metro)	NHMRC 1996	n.a.	n.a.	n.a.	n.a.	n.a.	96.0
Sydney Water Corp.	NHMRC 1980	93.0	89.0	95.0	90.0	98.76	98.74
Hunter Water Corp.	NHMRC 1996	94.8	97.1	98.1	97.7	99.5	99.8

Notes: ^a Figures based on six months ending 30 June 1995

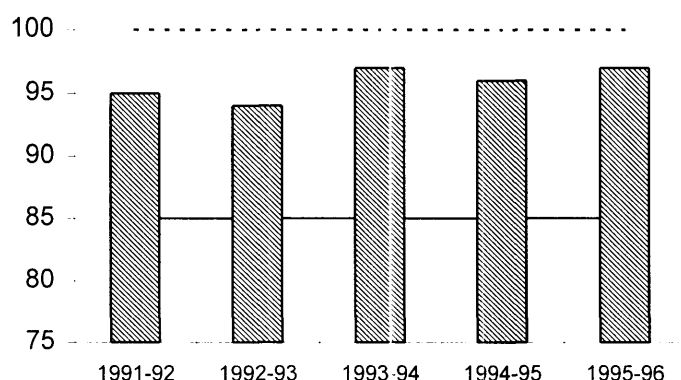
n.r. = not relevant

n.a. = not available

Sources: WSAA 1998, p. 45 and SCNPMGTE 1997, p. 65.

Figure 6.1 shows an overall index of compliance with health and aesthetic quality standards, calculated by weighting each of the 19 water utilities' performance monitored by the SCNPMGTE by its volume of water supplied. It measures the percentage of samples meeting guidelines with respect to microbiological, pH, colour and turbidity measures. Weighted average compliance with water quality standards have been generally maintained at high levels over the reported five years, and was 98 per cent in 1995-96. Compliance in 1995-96 ranged between a low of 85 per cent and 100 per cent (reported by a number of GTEs). There are no apparent implications for compliance of recent reforms to water industries.

Figure 6.1 Compliance with water quality standards (per cent)



Notes: Excludes Brisbane City Council and DNR, State Water Projects.

Source: SCNPMGTE 1997, p. 65.

6.2 Health related outcomes for UK water businesses

The tables below provide an average of the most significant indicators across England and Wales, reproduced by the Water Services Association of the UK from data provided by individual water companies and published by the DWI. Individual results published in the Chief Inspector's report show a similar level of compliance across the UK water companies. There are no results available for the years before privatisation and associated reforms so that direct comparisons before and after are not possible. However, as discussed in chapter 5, quality standards have been significantly tightened since privatisation in 1989, leading to increases in both water costs and water quality.

Table 6.3 shows compliance with specific health related parameters. The main bacteria standard is for coliforms.

Table 6.3 Compliance with specific health related parameters

	<i>Percent of zones complying in.</i>					
	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>
Coliforms	90.9	94.8	96.7	98.9	99.5	99.4
Faecal coliforms	87.6	89.3	90.0	93.6	95.1	95.8

Source: Water Services Association (UK), 1997, p.29

The target and legal requirement for water quality compliance is for 100 per cent of zones to meet all standards. However, results can be affected by

unforeseen events such as exceptionally heavy rain and as such full compliance is not always met. Although the water is still safe to drink because of the wide margins of safety, the DWI has a duty to require water companies to take any necessary action, such as improvements to treatment works and distribution systems.

Table 6.4 shows compliance with aesthetic parameters. There has been a steady improvement from 1990 up to the last two reported years. Zones complying with colour standards increased from 98.4 per cent in 1990 to 99.8 per cent in 1995. Compliance with turbidity, odour and taste standards showed similar improvements. Surveys carried out by the UK Consumers' Association before privatisation showed that more than one in five consumers were dissatisfied with the perceived quality of drinking water; the most common complaints were about poor taste or smell (Winward, 1994, p. 263).

Table 6.4 Compliance with aesthetic parameters

	<i>Percentage of zones complying in:</i>					
	1990	1991	1992	1993	1994	1995
Colour	98.4	98.6	99.1	99.3	99.4	99.8
Turbidity	94.6	94.3	95.2	96.1	96.4	96.4
Odour	96.8	98.0	99.0	99.3	99.3	99.1
Taste	96.8	97.8	98.5	98.9	98.7	99.1

Sources: Water Services Association (UK), 1997 p.29 and Drinking Water Inspectorate 1996.

Table 6.5 shows compliance with concentrations of additives. Compliance with iron concentrations increased from 70.4 per cent in 1990 to 75.2 per cent in 1995. This was despite a decrease in compliance in the 3 years to 1992 from 70.4 per cent to 69.1 per cent. The standard for iron is based on the effect it has on the appearance of water. It is the main cause of complaint about discoloured water. The failures were intermittent and usually caused by corrosion of old iron mains. Although the iron concentrations are not harmful to health, water companies are carrying out major programs to replace and reline affected mains. These are long-term measures, taking up to 15 years to complete (WSA UK, 1997).

Table 6.5 Compliance with concentrations of additives

	<i>Percentage of zones complying in:</i>					
	1990	1991	1992	1993	1994	1995
Hydrogen ion	91.8	92.4	93.3	94.3	96.1	97.1
Nitrate	96.9	96.4	96.4	98.0	98.2	98.9
Nitrite	88.0	87.7	89.7	90.5	90.2	89.8
Aluminium	89.8	91.3	93.7	94.6	97.1	96.3
Iron	70.4	69.0	69.1	74.0	75.9	75.2
Manganese	90.3	89.6	91.6	93.1	94.3	91.7
Lead	76.6	74.4	78.9	79.1	80.2	81.3
PAH	96.0	93.2	91.4	89.9	88.0	87.3
Trihalomethanes ^a	96.7	95.1	94.8	95.5	97.7	99.4
Total pesticides	-	85.4	86.7	88.1	89.1	91.2
Individual pesticides	70.2	69.4	70.2	72.1	76.3	79.2

Notes: ^a Trihalomethanes are by-products of chlorination

Sources: Water Services Association (UK) 1997, p.29 and Drinking Water Inspectorate 1996.

Compliance with lead concentrations increased from 76.6 per cent in 1990 to 81.3 per cent in 1995. The lead failures in 1995 occurred because the water picked up lead from the pipework between the water main and the tap in some houses in the affected zones. Not all water in the zones was affected. Most of the lead pipework belongs to the householder. If consumers replace their lead pipework they can require the water company to replace the lead pipework for which it is responsible. Water companies also have programs to replace their lead pipework and most have improved water treatment in 1995 to reduce the ability of water to take up lead in zones where many properties have lead pipework (WSA UK, 1997).

Polycyclic Aromatic Hydrocarbons (known as PAH) is a group of substances present in coal tar. Compliance with concentrations has been steadily decreasing, from 96.0 per cent in 1990 to 87.3 per cent in 1995. Until the 1970s, tar was used to line iron water mains to prevent rusting. The lining eventually breaks down and can lead to minute traces of PAH in drinking water. Some types of PAH may be harmful if present in large amounts. However, the standard for PAH is very strict and ensures that a health hazard is unlikely. Water companies' programs to replace and reline water mains are expected to rectify the failures.

Compliance with pesticide concentrations has improved over the last 5 years. Total pesticide compliance increased from 85.4 per cent in 1991 to 91.2 per cent in 1995, while compliance for individual pesticides increased from 70.2 per cent in 1990 to 79.2 per cent in 1995. The standard for individual pesticides is very strict at one part in 10 billion. The concentrations of pesticides found were small and unlikely to harm health. Nevertheless, water companies have installed additional treatment at affected works, which also improves the appearance and taste of drinking water.

6.3 Service quality outcomes for surveyed Australian urban water businesses

Service standards are reflected in several ways, such as the number and frequency of service interruptions to the customer, usually reflected in water mains breaks, and the time taken to restore the interruptions. WSAA intends to continue to monitor trends in these service indicators (WSAA 1998, p. 8). A longer time trend will enable better interpretation of how trends in service quality of the industry are related to reforms.

Table 6.7 shows the average number of service interruptions per 100 km of service pipe. It is more a reflection of overall asset condition, environment and management practices. The data show significantly increased failure rates for City West Water and Yarra Valley Water in 1996/97. This coincides with the significantly drier weather conditions and is consistent with the discussion on the implications of climatic changes at 4.2.

Table 6.7 Water main breaks/100 km main 1991/92-1996/97

Water Business	1991-92 No/100km	1992-93 No/100km	1993-94 No/100km	1994-95 No/100km	1995-96 No/100km	1996-97 No/100km
ACTEW Corp.	n.a.	14.0	13.0	14.3	10.7	16.05
City West Water	n.r.	n.r.	n.r.	65.8 ^a	82.94	141.38
South East Water	n.r.	n.r.	n.r.	11.2 ^a	21.57	23.80
Yarra Valley Water	n.r.	n.r.	n.r.	18.9 ^a	26.52	55.9
Melbourne Water Corp.	30.44	49.78	47.46	n.a.	n.a.	n.a.
Melbourne Water Consolidated	30.4	49.8	47.5	n.r.	n.r.	n.r.
SA Water (metro)	19.53	17.61	25.84	27.55	26.79	22.74
Sydney Water Corp.	35.38	37.61	35.21	24.49	19.82	31.27
Hunter Water Corp.	43.04	38.72	46.56	49.31	44.28	39.33
Average of 16 major Aust. metro water businesses	28.16	33.97	34.15	n.r.	25.62	32.98

Notes: ^a Figures based on six months ending 30 June 1995.

n.a. not available

n.r. not relevant

Sources: WSAA 1998, p. 64 and SCNPMGTE 1997, p. 75

Table 6.8 shows the average number of properties which had an interruption to water supply in the years 1992/93 to 1996/97. The figures are presented as a rate per thousand properties per annum. The frequency of interruptions to water supply averaged around 248 per thousand customers across the Australian urban water industry in 1996/97.

The reported outcomes for water mains breaks (table 6.7) and interruptions to service (table 6.8) together indicate that, despite increased failure rates in some places, there has been little apparent impact on the duration of interruptions to individual customers. The relationship between the lives of mains, the nature of their deterioration and the growth profile of the urban service networks suggests that there may be an increase in burst rates in the foreseeable future. WSAA expects this to result in a greater number of mains moving into the period of their life cycle that exhibits an increase in aging faults rather than a corresponding increase in mains rehabilitation or replacement (WSAA, 1998).

The large number of interruptions in Melbourne in 1996/97 can be attributed to the significantly drier weather leading to asset failures. WSAA found

interruption frequency a difficult indicator to measure (WSAA, 1998, p. 53), being dependent on:

- asset reliability;
- location of isolation valves used for repair; and
- distortion by individual large main failure events that can interrupt supply to thousands of properties at the one time.

For SA Water, the total number of burst water mains in 1996/97 was slightly below the 5 year average. This can be attributed to relatively mild climatic conditions through the year which moderated ground movements (SA Water 1997).

Table 6.8 Interruption frequency per '000 properties 1992/93-1996/97

Water Business	1992-93	1993-94	1994-95	1995-96	1996-97
ACTEW Corp.	n.a.	n.a.	n.a.	n.a.	76.02
City West Water	n.r.	n.r.	n.r.	n.r.	580.85
South East Water	n.r.	n.r.	n.r.	300.0	368.41
Yarra Valley Water	n.r.	n.r.	n.r.	371.0	551.04
SA Water (metropolitan)	n.a.	n.a.	n.a.	n.a.	n.a.
Sydney Water Corp.	n.a.	113.0	108.0	73.0	98.0
Hunter Water Corp.	220	233.0	275.0	241.0	264.37
Average of 15 water businesses	230.33	127.94	133.3	182.21	248.23

Notes: n.a. = not available
n.r. = not relevant

Source: WSAA 1998, p. 54

SA Water did not provide results on the frequency of interruptions. However, its annual report states that, due to a higher percentage of bursts requiring mains shut-down for repairs, the loss of service per 1000 customers in 1996/97 was up on previous years. All major bursts were attended to within one hour (SA Water, 1997). United Water reputedly met the high standards specified in its contract for responding to service interruptions, requests for network connections and meter replacement in 1996/97 (SA Water 1997).

HWC undertakes to initiate a response to complaints about a water interruption within 30 minutes of being notified. It endeavours to reinstate the service within 6 hours. If the service cannot be reinstated within 6 hours, at the request of the customer HWC will provide alternative drinking water if it is practical to do so. HWC will provide consumers with a rebate of charges if its services break down

for unreasonable periods of time, for example, water supply interruptions for more than 24 hours in a year (Asher, 1995, p. 9).

Aging faults will present a challenge to water companies to minimise disruption to customers, which for retail businesses can be achieved through a focus on the duration of outages as well as the number. If an interruption occurs, the average duration of the interruption (in hours) is shown in table 6.9. The average duration of an interruption in 1996/97 for the 18 urban water utilities surveyed by WSAA was 2.86 hours.

Table 6.9 Average duration of interruptions (hrs) 1992/93-1996/97

Water Business	1992-93	1993-94	1994-95	1995-96	1996-97
ACTEW Corp.	n.a.	n.a.	n.a.	n.a.	2.1
City West Water	n.a.	n.a.	n.a.	n.a.	3.2
South East Water	n.a.	n.a.	n.a.	2.0	2.0
Yarra Valley Water	n.a.	n.a.	n.a.	2.0	1.85
SA Water (metropolitan)	n.a.	n.a.	n.a.	n.a.	n.a.
Sydney Water Corp.	n.a.	n.a.	4.5	5.84	5.5
Hunter Water Corp.	n.a.	n.a.	4.0	4.1	4.0
Average of 15 water businesses	2.5	2.27	4.1	2.97	2.86

Notes: n.a. = not available

Source: WSAA 1998, p. 54

Over the surveyed period, the NSW utilities performed relatively poorly on the average duration of interruptions, particularly SWC; while SEW and YVW performed particularly well. ACTEW also performed well on both the number and average duration of interruptions. In 1996/97 ACTEW had the lowest interruption frequency per '000 properties (9.6); and the third lowest average duration of an interruption (2.1 hours), after YVW (1.85 hours) and SEW (2.0 hours).

Table 6.10 Average property outage time (minutes) 1992/93-1996/97

Water Business	1992-93	1993-94	1994-95	1995-96	1996-97
ACTEW Corp. ^a	n.r.	n.r.	n.r.	n.r.	9.6
City West Water	n.r.	n.r.	n.r.	n.r.	111.5
South East Water	n.r.	n.r.	n.r.	36.0	46.4
Yarra Valley Water	n.r.	n.r.	n.r.	44.5	61.2
SA Water (metropolitan)	n.a.	n.a.	n.a.	n.a.	n.a.
Sydney Water Corp.	n.r.	n.r.	29.2	25.6	32.2
Hunter Water Corp.	n.r.	n.r.	66.0	59.3	63.4
Average of 15 major Australian. water businesses	41.3	25.6	32.8	32.5	44.3

Notes: n.a. = not available

n.r. = not relevant

Source: WSAA 1998, p. 55.

Table 6.10 is an amalgam of the previous two indicators: interruption frequency per '000 properties and average duration of interruption. The figures are calculated by multiplying the number of properties with an interruption by the average duration of those interruptions and then dividing the result by the total number of properties supplied by the water business.

The results for interruptions reflect the differences in interruption duration targets specified in licences for individual businesses. Despite differences in targets, the duration of interruptions was stable or improved (table 6.11 shows the percentage of restorations of interruptions within 5 hours).

The results for restoration of service interruptions within 5 hours (table 6.11), together with the results for water main bursts per 100 km of mains (table 6.7) indicate that, although there may be evidence of increased failure rates for some authorities, there has been little apparent impact on the duration of interruptions to individual customers. Interestingly, the significant climate induced deterioration in asset performance from dry weather in two of the Melbourne retailers resulted in the reported levels of services restored within 5 hours remaining stable at generally high levels.

**Table 6.11 Restoration of service interruptions within 5 hours
1993/94-1996/97**

Water Business	1992-93 %	1993-94 %	1994-95 %	1995-96 %	1996-97 %
ACTEW Corp.	n.a.	89.5	93.5	99.9	99.5
City West Water	n.r.	n.r.	95.5 ^a	95.5	96.2
South East Water	n.r.	n.r.	94.0 ^a	97.1	98.5
Yarra Valley Water	n.r.	n.r.	96.0 ^a	95.1	98.2
Melbourne Water Corp.	n.a.	91.0	94.0 ^a	n.r.	n.r.
SA Water (metro.)	n.a.	n.a.	n.a.	99.0	97.7
Sydney Water Corp.	n.a.	n.a.	99.43	99.51	99.48
Hunter Water Corp.	n.a.	95.8	97.5	92.5	89.4

Notes: ^a Figures based on six months ending 30 June 1995.
SA Water and SWC figures based on 6 hour response times.
n.a. = not available
n.r. = not relevant

Source: WSAA 1998, p. 55

The results available in Table 6.12 show that, apart from the Melbourne retail companies, response times for customer account queries and complaints were generally on target in 1996/97. Account contacts include any type of communication with the business with regard to a customer's account or bill. Written complaints include complaints on any issue. Restrictions/disconnections for non-payment of accounts were negligible in 1996/97.

NSW metropolitan water suppliers have a number of established mechanisms for public consultation including customer councils, focus meetings and customer surveys. Individual NSW water companies have developed customer contracts/charters discussed at 3.5. The operating licence of SWC sets out the minimum service standards and obligations to service providers.

In July 1995 HWC introduced a Customer Charter as a means of measuring the level of service provided to customers. The Customer Contract contains information on the standards HWC will provide, a list of general questions and answers, and information on how to contact HWC. HWC has also produced a brochure 'Your Guide to Hunter Water's Customer Charter — Our Commitment to Customer Service'. HWC has publicised the brochure through a media campaign, made it available at all HWC offices, and includes it with customer accounts.

Table 6.12 Customer service 1996-97

Water Business	Account contacts meaningly responded to		Written complaints meaningly responded to		Restriction/disconnection of supply for non-payment of bill (rate/'000 properties)	
	within 5 days (%)	within 10 days (%)	within 5 days (%)	within 10 days (%)	Residential (%)	Non-residential (%)
ACTEW Corp.	95.0	100	80.0	100	0	0
City West Water	n.a.	100	n.a.	92.0	0.005	0
South East Water	n.a.	98.0	n.a.	98.0	1.04	0.38
Yarra Valley Water	94.0	98.0	80.0	96.0	0.27	n.a.
SA Water (metro)						
Sydney Water Corp	100	100	100	100	n.a.	n.a.
Hunter Water Corp	n.a.	n.a.	n.a.	n.a.	0.52	0.91

Notes: For SWC, responsiveness is measured on a 21 day basis in line with their performance target. EG in 1996/97, 97% of complaints were resolved within 21 days.

n.a. = not available

Source: WSAA 1998, p. 45.

SWC has produced a booklet containing its customer contract which sets out both the customers' rights and SWC's rights in relation to matters such as: supply of water, consultation and information, notice of interruption to supply and entry onto land, maintenance and repairs, customer assistance, redress and compensation, charges, meters and accounts. Copies are available at all SWC customer centres. In early 1995, SWC sent its customers an abbreviated version of the customer contract, advising them where they could obtain the complete version. SWC has adopted publication of information on quality performance and minimum quality standards to meet its quality objectives.

The Melbourne retail companies produce customer contracts containing information about customers' rights: to supply of water, to consultation and information, to customer assistance, to make inquiries and complaints. The contracts also set out the company's rights in relation to supply and charges, and its liability. Documents are widely dispersed. For example, YVW customers have been made aware of the customer contract through a full page

advertisement in *The Age* and advertisements in the local press highlighting the main points. YVW sent out fridge magnets to customers notifying them of its new telephone number, together with a copy of the customer contract.

The three retail companies also conduct annual customer satisfaction surveys and have agreed on a common methodology for measuring and reporting customer satisfaction. Using the new approach, SEW's survey showed that 82 per cent of customers were satisfied with the level of service they received in 1996/97 (85 per cent of domestic customers and 79 per cent of non-domestic customers). The changed methodology makes direct comparison with data from previous years difficult.

Following customer consultation, SA Water developed a series of service obligations which reflect the range and level of service various customer segments can expect. A set of brochures explains these standards of service. SA Water has also appointed a small business advocate to support the needs of small business.

More results on customer service indicators should be available for meaningful comparison as the WSAA survey becomes more established. The indicators are based on those collected by the UK water industry regulator, Ofwat. While some differences in customer behaviour exist between the countries, such as whether customers use telephone or write letters to make inquiries, the figures should be relatively comparable. WSAA also intends to develop an adequate comparative performance reporting methodology for customer satisfaction.

6.4 Service quality outcomes for UK water businesses

Ofwat is the UK regulator responsible for water service quality. The UK WSA publishes annual results on indicators relating to reliability of water supply and pressure, and on customer service indicators such as response times to billing queries. The results are recorded in the tables below.

Table 6.13 shows that the reliability of supply of water for UK customers has steady improved on several indicators over the last 5 years.

Table 6.13 Reliability of supply indicators

	1990/91	1991/92	1992/93	1993/94	1994/95
% properties subject to unplanned supply interruptions of 12 hours or more	0.42	0.20	0.38	0.35	0.26
% properties at risk of water shortage	24	20	12	12	12
% population subject to hose bans	41	14	9	0	3
Number of drought orders	51	28	16	0	0

Source: Water Services Association (UK), 1997, p.20

The UK water companies must supply water at a pressure which will ensure it reaches the top floor of every building, unless the building is at such a height that water will not flow to it by gravity from the local storage reservoir or water tower.

There are still a few areas where the pressure may not reach this minimum standard. Anglian Water, for instance, has an investment program to reduce the number of properties which fall below the minimum water pressure standard and an agreed timetable with the Secretary of State to achieve this. Table 6.14 shows the percentage of properties at risk of low pressure averaged across the UK water authorities. There has been a steady decline in affected properties over the surveyed period, from 1.85 per cent in 1990/91 to 0.81 per cent in 1994/95.

Tale 6.14 Percentage of properties at risk of low water pressure

	1990/91	1991/92	1992/93	1993/94	1994/95
% properties at risk of low pressure	1.85	1.69	1.26	1.02	0.81

Source: Water Services Association (UK), 1997, p.20

Table 6.15 shows customer service indicators similar to those reported for Australian water utilities in table 6.12. It is not possible to make direct comparisons with Australia because the time periods for the indicators are different and the same year data is not available. There is no early reporting of these indicators in Australia, the first year being 1996/97, for which UK data is not available.

Nevertheless, a comparison of tables 6.12 and 6.15 indicates that Australia performs slightly better than the UK on response times to customer queries. The average response time of the surveyed Australian water businesses for account queries (telephone or written) was 99 per cent within **10 days** in 1996/97 and for written complaints around 99.5 per cent within **10 days**. This compares with an

average UK response to billing queries in 1994/95 of 98.84 per cent within *20 days*, and for written complaints 98.98 per cent within *20 days*.

Table 6.15 Customer service indicators, 1990/91 to 1994/95

	1990/91	1991/92	1992/93	1993/94	1994/95
% billing queries not responded to within 20 days	3.84	3.25	3.99	3.30	1.16
% written requests not responded to within 20 days	8.82	5.86	8.61	12.78	1.02
Disconnection rate (per 10,000 connections) - households	4	11	10	7	5
Disconnection rate (per 10,000 connections) - non-households	9	14	19	16	17

Source: Water Services Association (UK), 1997, p.20

The disconnection rates appear to be slightly higher in the UK than in Australia after allowing for the fact that the number of household/property connections used for the UK figures are 10 times that used for the Australian figures.