Sydney's Water: A Suitable Case for Private Treatment

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BY the end of the century almost all the drinking water consumed in Australia's largest city will be harvested and reticulated to consumers by the public sector. But, on its way to consumers, most of that water will be serviced by way of treatment plants that are privately built, owned and operated.

In 1993 the Sydney Water Board (Sydney Water) contracted with Australian Water Systems and North-West Transfield to build, own and operate two water treatment plants. A third contract has since been signed with a consortium headed by French firm Compagnie Général de Eaux.

Some treatment of water is essential, but the questions of how and how much are matters of continuing dispute. Whether the appropriate treatment can best be delivered by private or public agencies is also an open question. Would a single franchise be an option? If not, what should the bidding process be? What incentive compatibility features could be built into the contracts through tariff structures and risk-sharing arrangements? How would price regulation of the end product influence the absorption of treatment costs?

This analysis of the Sydney experience and the lessons that could be drawn from it may provide insights for other agencies contemplating the private provision of water treatment services through international competitive tender.

Why Treat Sydney's Water?

Sydney's water supply system, designed originally in the 19th century and significantly restructured in the mid-20th century, 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.

At present, Sydney's water is captured, stored, 'treated' and reticulated by Sydney Water, a State-owned corporation, which until corporatised in 1995 operated as the Sydney Water Board, a statutory authority. As recently as 1989, when the Board developed a Drinking Water Quality Strategy for upgrading its systems, there was little treatment beyond screening and 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 1987 National Health

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and Medical Research Council (NHMRC) guidelines on drinking water quality by 1996 and ensure that Sydney was 'positioned to meet community based water quality standards predicted for ten years from now' (Water Board, 1992:4).

The Board established that Sydney consumers were willing to pay to maintain the quality of drinking water. Studies conducted by consultants (Water Board & Dwyer-Leslie Pty Ltd, 1991) identified the following principal benefits from improved quality:

- reduced risks to health;
- reduced damage to pipes, pipe linings, fittings and water using devices;
- lower delivery system, operating and maintenance costs through lower cleaning costs;
- savings in the cost of water treatment by some industries (for example, hospitals); and
- reduced spending on the alternatives (bottled water, filters, etc.) by the consuming public.

The present value (as at 1991) of these benefits (avoided costs) to the Sydney region was estimated to exceed the present value of costs (as at 1991) by \$1,220m. This represented a net benefit of approximately \$40 per person per year. Like most of its other capital projects, the Board proposed originally to build and operate the plants itself.

The proposed upgrading covered by the four treatment plants (and a small, already operational plant built and operated by the Board) stood to affect 95 per cent of the water supplied by the Board. In a submission to a parliamentary inquiry into its operations (Parliament of New South Wales, 1994:100) the Board 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 1987 guidelines respectively.

According to the Board's engineers, difficulties in meeting water quality requirements arose because of such things as:

- 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.

Why Private Sector Construction and Treatment?

The Board decided to switch to a private build, own and operate (BOO) system for water treatment, while raw water harvesting, storage and delivery of treated water would remain with the Board (now Sydney Water). While contracting-out of a wide range of services, including design, construction and maintenance, was becoming increasingly commonplace under the commercialisation of the Board, the private provision of infrastructure and services — with an estimated capital value of A\$520m and integral to the whole supply system — would break new ground. There were no comparable financial or technical pressures to embrace privatisation in the distribution network itself. And the natural monopoly arguments for a single publicly-owned distributor did not carry the same weight when it came to treatment.

In 1991 the Board's governing Act, the Water Board Act 1987, was amended to give the necessary authority for the Board to conduct its operations through BOO schemes. The Water Administration Ministerial Corporation is the ultimate legal owner of the State's raw water resources. The Corporation confers rights to water to agencies such as Sydney Water. The water to be treated under the BOO contracts will not at any stage be owned by the water treatment operator.

Several factors persuaded the Board to adopt the BOO system.

Competing claims on the Board. While the Water Board was recognising the need to upgrade drinking water standards, it was at the same time facing major capital outlays to upgrade and extend *waste* water treatment in the Sydney basin and the escarpment areas draining into it.

The Board was seen as a major cause of contamination below the dam forming the Board's major storage, the Warragamba, because of intermittent sewage contamination of stormwater systems draining into the river systems and into the ocean. The Board responded to these problems with the Clean Waterways Program. A special environmental levy, payable by all households, was introduced to partially fund this program. The levy had a life of only five years and was scheduled to be replaced with a restructured set of water and waste-water charges that have moved closer to full user charges. The total capital budget requirements of the Board in meeting its refurbishment, amplification and environmental commitments (the last item estimated at \$3 billion over the next decade) undoubtedly increased the attractiveness of privatised treatment plants.

Lower costs of construction and treatment. In evidence given to the Parliamentary Joint Select Committee on the Water Board (Parliament of New South Wales, 1994:103) the Board estimated that while the cost of building and operating the plants as a BOO scheme would be \$3,000m over 25 years, the cost would be \$3600m if built and operated by the Board itself. Thus a further \$600m would be added to the benefits identified in the Dwyer-Leslie study referred to above if it had sought to identify the benefits of *private* treatment as opposed to just the net benefits of treatment. These savings were identified in the course of the contract negotiations by comparison with the costing of the system based on the concept design reports prepared for the Board before its decision to opt for the BOO process. Individual sources of the savings have not been published.

Financing. A projection made in 1990 of the Board's financing needs to accommodate both environmental waste water commitments and drinking water requirements for the 1990s suggested there would be unattractive increases in leverage (the ratio of debt to assets) for that authority should all programs be attempted in the traditional manner. However, the extent to which the Board's level of debt was a point of concern and thus a reason for opting for BOO arrangements is a matter of debate. Subsequently (in 1993) the Government Pricing Tribunal commented on what it judged to be the Board's relatively low leverage.

The increasing commercialisation of the Board's functions was being accompanied by increasing calls on dividends, including the taking of \$200m in 'special dividends' since 1991 by the State government as the owner-stakeholder. This 'policy was reducing the capacity of the Board to accumulate reserves. The dividend for 1993-94 was approximately 70 per cent of gross operating profit and about 20 per cent higher than in the previous year.

Loan Council limitations on capacity to borrow. The borrowing requirements of the Board were, when the tender process for the water treatment plants began, subject to the global limits imposed on the borrowings of the Australian States by the Loans Council.

Under this approach, each State was allocated an aggregate limit on its new borrowings. Infrastructure projects with private sector involvement were either entirely included or excluded from the borrowing requirements put before the Loans Council for approval. One of the requirements of a successful tender stipulated in the Board's guideline Commercial Principles document was that the water treatment companies 'will be responsible for financing the project including structuring it to be outside the Loans Council guidelines and to meet all taxation requirements' (Water Board, 1992:13).

Since 1993 this global-limit approach, imposed on total State gross government borrowing, has been replaced by one in which each jurisdiction (State or Territory government or the Commonwealth government) requests a Loan Council allocation based on its deficit or surplus and some 'memo items' that include infrastructure projects with private-sector involvement. While these memo item transactions will

not be public borrowings in the formal sense, they are ones for which the economic impact would be similar. Under the new approach, only the estimated public risk exposure of a project with private sector involvement is included in the Loans Council allocation request.

In the event that corporatisation of the Board did not take place, this would mean that the private treatment option provided the State with a means of increasing the State's borrowing capacity for other infrastructure programs.

Impending corporatisation favoured BOO. Other pressures to avoid a deterioration in the Board's debt-equity structure that would result from the Board building and operating the treatment plants came from the increasing likelihood of corporatisation of the Water Board, a path already taken by the smaller Hunter Water Corporation to Sydney's north. As a corporatised body the Sydney Board would have to make 'tax equivalent' payments to the State government. To the extent that these exceeded payments made to the State, such payments would systematically reduce the interest cover generated by the Board's cash flow and so increase its financial risk. The options for passing on such costs as price increases could be expected to be reduced with corporatisation because of accompanying revenue capping by the Board's price regulator, the Government Pricing Tribunal. A combination of these factors may place a corporatised agency in a high-risk category and therefore raise its cost of obtaining finance. On the other hand, to the extent that corporatisation brings about its own substantial productivity and price rationalisation gains, such cost-raising effects would be mitigated.

The estimated \$600m saving in the net present value of treatment costs under the privatisation option has already been referred to. For a commercialised and possibly corporatised Board, a 'delegated service' approach involving the private sector with access to a full range of international technology was attractive. The fact that 17 consortia were involved in the 'tournament' for the market indicates a level of competition that was always likely to produce outcomes that the Board would find difficult to match given its relative inexperience in filtration systems.

The Choice of Operator

Strategic considerations and the benefits of multiple operators. Once the decision had been made to provide the four treatment systems through private sector involvement, important questions arose about the number of contracts and any restrictions on successful tenderers. The Board determined that there would be only three contracts (the two smallest systems, Woronora and Illawarra, would be let to a single tender). It was decided that the successful tenderer for the largest project would be ineligible to tender for the other two. Under the protocol for the acceptance of bids, only bidders that had not successfully bid for one of the other contracts, and that met the minimum acceptable technical standards, would be considered. The bidder offering the best commercial terms (including risk considerations) would be accepted and have preferred tenderer status conferred.

The initial allocation of bargaining power as determined by such procedures is important in setting the basis for negotiations that may be required during the life of a contract. For instance, if it became necessary to amplify plant capacity during the life of a contract, renegotiation of water tariffs payable to the water treatment companies would be needed to recover expansion costs. Information from other operators would be available to the Board as benchmarks to be used in comparing the performance of the different operators and in negotiating tariff adjustments. As the Commercial Principles document (Water Board, 1992) also stipulates that any upgrading of water quality standards would also require tariff renegotiation, bargaining power would be important in this event.

By opting for separate operators, Sydney Water would also have access to a wider range of implemented water-treatment technologies, so strengthening its hand in future expansions and upgrading.

This approach has costs. For example, the successful tenderers for the second and third contracts may not necessarily have been the lowest-cost bidders meeting minimum technical specifications of the Board. Moreover, it is possible that firms would offer more attractive bids if they could win all three contracts. The added attractiveness of these bids might reflect size economies and any expected benefits in subsequent bargaining. By letting the contract for Prospect (much the largest of the three contracts) first, the Board minimised the cost to the system of this exclusionary protocol.

Detailed design work. Detailed plan and design work by the purchaser, prior to inviting tenders, is recommended in some BOO contracts (Fielding & Klein, 1993). The Water Board's own reports and plans provided it with a fall-back option should the BOO option have to be abandoned for some reason. The design report and pilot-plan studies were, therefore, a cost that would have been incurred with or without private treatment. The process specification detail of these studies, subsequently provided to the tenderers, yielded important time and cost savings to the successful tenderers.

The decision-making environment. Establishing a capability to assess bids and negotiate the final contract terms of Water Treatment Agreements (subsequently referred to as Water Filtration Agreements) required the Board to incur substantial costs setting up a new legal and commercial 'infrastructure'. These costs reflected the Board's perceived need to deal with the risk-sharing implications of the BOO path, a need that would not have arisen had the Board decided to be the builder/owner operator.

From the Board's point of view, embarking on this contracting process required it to break new ground with respect to taxation, insurance, finance and legal issues. The Board enlisted outside commercial and legal expertise to help it review offers. These aspects of the contracting procedure were evidently much more time-consuming and expensive to the Board than satisfactorily resolving the technical requirements. The authors were assisted through interviews with the Board and a

successful tenderer concerning the contracting process., The approach of legal advisers to the Board was to cover contingencies in great detail and to anticipate a wide variety of specific events that could have a bearing on risks borne by the Board. Given the strong powers conceded to the monitoring committee, this 'belt and braces' approach was viewed as unnecessary by some tenderers who felt they were forced into heavy legal expenditures to match the Board's commitment.

The Water Treatment Tariff Structure

The contract arrangements also involved considerable work in defining the treatment services to be provided, the manner of their delivery, and pricing structures allowing for variation in quantity and quality. Although the detail of final contracts is confidential, the essential details of pricing and delivery structure were specified in the original tender documents and amplified in interviews.

The tariff structures agreed to in each case have had two parts. First, an *availability charge* is fixed independently of the volume treated and is designed to cover about 80 per cent of the financing, establishment and fixed costs incurred by the water treatment companies in the timely construction and operation of the plant. It includes penalty clauses in the event of breakdown. Second, a *usage charge* is set at a rate per megalitre that varies with quantity. The agreed tariffs are subject to variation should the treated water fall below the quality level specified in the contract or should the quality of the raw water supplied for treatment fall outside parameters based on the highest and lowest water quality over the preceding 25 years. These steps reflect the increasing costs of treating poor quality water to the required level. According to the Board's submission to the Joint Select Committee (Parliament of New South Wales, 1994:24) the usage charge will 'cover 20 per cent of debt financing, fixed costs plus variable costs related to the quantity and quality of water treated'.

The usage charge comprises two parts. The first part, applicable up to a specified water volume, is designed to cover the remaining 20 per cent of fixed costs not met by the availability charge plus the marginal cost of treating water. Beyond that volume, the tariff will meet marginal treatment costs.

The tariff on the quality of raw water supplied for treatment is based on colour and turbidity. The tariff is structured in three bands. The first band, which attracts the lowest tariff, allows colour and turbidity up to a level to which the Board, from its records (available to the water treatment companies), can expect to operate 80 per cent of the time. The next band, which attracts a higher tariff, is expected only 15 per cent of the time while the third and highest tariff can be expected for the remaining 5 per cent of the contract period. These steps reflect the increasing costs of treating poorer and poorer quality water to the required level. According to the Board, 'in the unlikely event that raw water quality exceeds the previous highest recorded (levels of colour and turbidity) then the Water Board will pay the actual costs of treatment' (Parliament of New South Wales, 1994:24).

These charges against Sydney Water will become part of the costs which its price regulator, the Government Pricing Tribunal, will consider in its rounds of

price determinations. As such they will compose an important part of Sydney Water's financial risk profile. Should the Tribunal decide that full cost pass-through of treatment costs is not warranted, Sydney Water will have to absorb those costs rather than pass them on to its customers.

Risk Sharing

The promulgation of the tariff structure described above in the benchmark tenders was designed to provide what the Board considered to be an adequate protection for the financiers with respect to the financial risks associated with the large fixed costs of the projects while leaving the consortia to bear risks relating to operating costs that were volume related. By pricing treatment at cost at the margin, consumer interests would be protected.

The Water Board structured the water treatment agreements according to the principle that specific risks should reside with the parties best able to assess and manage them. The approach can be illustrated with reference to several specific risk types.

Design and construction: completion and commissioning risks. The water treatment companies will bear completion and commissioning risks. They are responsible for project completion on time and to specifications that meet agreed acceptance tests demonstrating that the plant is ready for continued use to requisite capacity. Thus, the determination of the access fee component of the tariff is based on the fixed costs expected under timely completion of the construction phase. Damages will be paid to Sydney Water for failure to meet the commissioning deadlines. The water treatment company is responsible for constructing all facilities necessary to interface the treatment plant to Sydney Water's existing facilities. No tariffs will be paid until commissioning tests have been passed. Any increases in construction cost will not be passed on to Sydney Water. Quality assurance principles will be implemented by the water treatment company in the design, construction and commissioning phases.

Market risks. The two-part tariff has an availability component. The 'fixed fee' component means that Sydney Water has partly insured the water treatment companies against plant usage that falls short of the designed capacity. The treatment company will otherwise bear the risks of fluctuating revenue generated by the fluctuating treatment demands put on them by Sydney Water by agreeing to meet all demands. The contract specifies that the water treatment company be assisted to design to meet these needs by being given access to details of Sydney Water's demand management strategy, including predictions of demand two, five and ten years into the future. The demand management strategy has five elements: pricing reform, communications, improved system operation, product support, and research.

On the question of the treatment company's possible gains from treating larger quantities of water and so having interests in conflict with the Board's conservation goals, the Board (Parliament of New South Wales, 1994:25) had this to say:

The Water Board provides no guarantees as to the minimum or maximum water quantities to be treated and taken from the plants. These strategies will ensure there is no conflict between the Water Board's demand management policy and the water treatment companies' possible desire to treat more water. . . . Although the Board has agreed to not provide alternative supplies for existing areas to be supplied from the plants, it has reserved the right to decide how *new* areas will be served and to supply recycled waste water within these areas if it desires.

This decision to give exclusive rights to treat water supplied to a designated market involves trade-offs. On the one hand, the government — through the Board — has tied its hands with respect to competition for the contract-winning treatment plants. On the other hand, the contracts themselves should reflect this exclusivity in the terms offered by the treatment companies. The Board, in negotiating the contracts, would have placed an implicit value on the exclusivity arrangements.

Because the contractual arrangements do guarantee a minimum amount of water to be supplied for treatment, there is no guarantee that the usage charge will cover the 20 per cent of fixed costs not covered by the availability charge.

It might appear that, since the Board must pay only marginal cost for water volumes at the upper end of the range, it has weak incentives to restrict final demand built into these treatment arrangements. However, water treatment is only one component of the volume-related costs that Sydney consumers face. The predominant elements of these costs driving conservation strategies are the long-run cost components of building new treatment plants and of storages. Making the treatment tariff reflect marginal costs borne by the treatment company would seem to contribute to efficient pricing of water overall.

If it turns out that the Board's demand projections miss the mark and capacity increases are called for, the contract provides for adjustments to the tariff. This provision shifts risk arising from inadequate projections away from the water treatment company. The fixed component of the tariff (the access charge or availability charge) is designed to cover approximately 80 per cent of the interest and debt amortisation charges of the water treatment company. It is not designed to cover investment costs — part of long-run marginal costs in circumstances where capacity increments are called for.

Performance quality and quantity risks. These risks lie with the water treatment company, provided they do not involve plant amplification, in which case they would be shared through a renegotiated tariff. In the event that quality standards or required volumes 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 Sydney Water 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 will be issued with notification and must respond with an action plan to be agreed upon. The company will carry out ap-

proved quality tests, the results will be subject to audit, and Sydney Water will have the right to conduct its own tests. Disputes over results will be settled by a third party. In the Prospect agreement a monitoring committee consisting of two Sydney Water representatives and two supplier representatives will be formed to monitor the performance of the project and the operation of the agreement. This committee will be empowered to make decisions in good faith and to act as a dispute-resolution committee if required. The decisions of this committee will be contractually binding.

If treatment costs rise as a result of Sydney Water adopting higher targets for the quality of its treated water, Sydney Water will bear some of this risk through a renegotiation of the tariff.

Sydney Water will provide the company with daily predictions of its quantity needs to assist in the efficient operation of the plant as an integral part of the water supply system.

Raw water supply risks. Whereas the risks relating to the output (clean bulk water) reside entirely with the water treatment companies, risks concerning the variable quality of the input (raw) water will be shared by Sydney Water and the company. The quality of the raw water harvested in Sydney Water's catchments is only partly under Sydney Water's control. Storms and floods cause significant variations in the quality. The Water Filtration Agreement reflects this partial control by specifying that, if Sydney Water is not to attract a penalty tariff under the terms of the contract, the raw water must be of a quality that lies within a range established over the past 25 years. Sydney Water therefore has an incentive to manage its catchments so that raw water quality is at least maintained in the established range. As to taking actions to improve quality, according to the government members of the Joint Select Committee (Parliament of New South Wales, 1994:104) 'there is a marginal incentive for the Board to provide improved raw water quality as it gets a discount in tariff for water of a quality better than that specified in the window'.

These cost-sharing arrangements mean that while the water treatment company is compensated for having to treat raw water that falls below a 25-year benchmark quality, it must absorb some of the costs associated with having a capacity to treat water of variable quality.

Environmentalists have criticised these arrangements for lacking incentives to improve raw water quality through improved catchment management. It is true that the contractual arrangements do emphasise keeping raw water quality within an acceptable range, rather than raising average quality. The significance of this concern depends on the practical potential for securing improved quality from greater catchment effort. The structure of this particular contract provision is sensible if the payoff to catchment management effort is low in terms of improved raw water quality. Then increased catchment management effort would not be a cost-effective alternative to the treatment plants now being built. It was a major finding of the Dwyer Leslie study that there was no alternative to water filtration if Sydney's water was to satisfy the 1987 NHMRC guidelines.

Operations and maintenance risks. The risks of operating and maintaining plant, including manning, skills, chemical supplies, power, process control and disposal, will reside with the water treatment companies. This accords with the complete day-to-day autonomy exercised in operations by the company under the Water Filtration Agreement. At the end of the contract period the operators have the expectation that contracts will be renewed. This, and a provision for Sydney Water to buy back at its own evaluation, provide incentives for the operators not to run down the assets toward the end of the contract period.

Upstream risks. Sydney Water will continue to be responsible for operating and maintaining assets 'upstream' of the treatment process. These include the catchment itself, the river systems within it and any canals, pipelines, dams and reservoirs used in the storage and reticulation of the raw water. In announcing its catchment management policy during the bidding process, the Board committed itself to a set of environmental standards and thereby attempted to reduce uncertainty for tenderers. To the extent that these efforts were effective the Board was able to reduce the cost of treatment.

Financing/economic risks. The water treatment company will carry the risks of any changes in interest rates or rates of inflation during the construction period. However, once the plant is commissioned, an indexing formula will become effective through which the risks of inflation and operating-cost variation will be shared in an agreed way by the company and Sydney Water. Few details have been revealed about this important risk sharing aspect.

Technology risks. The use of appropriate technology which is proven and meets required standards and specifications is the responsibility of the water treatment company. However, as indicated above, changes in water quality requirements that induce obsolescence will trigger a renegotiation of the tariff, thereby sharing the risks of unforeseen changes in the standards agreed to in the Water Treatment Agreement.

The gains to Sydney Water from the privatisation of treatment include technology transfer. The Water Filtration Agreement will 'both specify all appropriate contractual terms and be the foundation of a collaborative and co-operative relationship between the Board and the WT Company' (Water Board, 1992:2). It is expected that the water treatment company will keep abreast of technology, perform on-site research and exchange findings with Sydney Water. This expectation is formalised by a component in the negotiated tariff to accommodate R&D by the water treatment company. To this extent Sydney Water will share R&D risks with the company.

Natural disaster. In the event of system emergencies, whether caused by natural disaster or otherwise, according to the Commercial Principles document (Water Board, 1992), Sydney Water will have the right to take whatever action it deems

necessary to safeguard the security of the system and maintain supply, including the right to bypass the treatment plants. Compensation consisting of reimbursement of access fees and treatment costs will be paid in such cases.

Regulated Pricing and the BOO Schemes

The Government Pricing Tribunal of New South Wales operates as a price regulator for Sydney Water by capping Sydney Water's revenues. In considering whether to allow Sydney Water to pass through the costs of the treatment plants to its customers, the Tribunal would need to establish that consumers were willing to pay for the effects on water quality; that the price increases sought reflected the costs incurred; and that those costs were as low as possible.

Within this price setting framework, the Tribunal's approach to the BOO treatment plants has been a cautious one. While noting that the BOO projects were originally proposed well before the Tribunal was itself established, it has made clear that it expects Sydney Water to inform the Tribunal of the nature of the contracts between the parties and the future obligations of Sydney Water; specify the risks involved and the sharing of these risks between the parties; and demonstrate that the proposed scheme is more cost-effective (when adjusted for risk) than other options, including direct provision by Sydney Water. To satisfy its Act requirements, the Tribunal needs to be fully informed of the contractual details of the BOO schemes. It warns that 'it should not be assumed that the Tribunal will automatically pass any cost increases resulting from these projects on to customers unless they can be shown to be justified on economic and environmental grounds' (Government Pricing Tribunal of New South Wales, 1992, vol. 2:114).

These matters are most likely to become a major issue in 1995-96 when the costs of the treatment plants first begin to influence cost data in Sydney Water's pricing submissions. In the Tribunal's most recent hearings, Sydney Water requested that a fraction of the costs be passed through in price determination; but the Tribunal deferred any such decision while it further considers the merit of this.

However, the existence of the schemes is already influencing the Tribunal's determinations and the short-term revenue cap on Sydney Water that it is effectively applying. While welcoming the Board's proposal to reduce real operating costs over the next three years to levels below those prevailing in 1990-91, the Tribunal has signalled that it believes that even greater cost reductions are feasible and desirable and that this is particularly urgent because of the cost pressures arising from the BOO schemes and the likelihood of higher environmental standards (Government Pricing Tribunal of New South Wales, 1994:9).

Environmental Regulation

As discussed above, the treatment plants have been criticised for reducing the incentives to improve catchment management. The critics argue that better catchment management is an alternative to more intensive treatment. The structuring of the tariffs in the water treatment agreements recognises that abnormally *low* raw

water quality will raise treatment costs in reaching a desired standard for treated water. In protecting the water treatment companies from such deviations and shifting the risk of poor catchment management back on to Sydney Water, the tariff structure in the agreements provides an incentive for the Board to invest in catchment care. Similarly, the agreements provide for a discount in the tariff for raw water of exceptionally high quality.

These aspects of the agreements provide a built-in element of self-regulation in Sydney Water's approach to catchment management. The agreements are 'incentive compatible'. Had Sydney Water built and operated the treatment plants itself, there would also have been incentives to find the efficient combinations of treating water at a plant and improving catchment care. Either way there are commercial incentives to find the cost-minimising way of producing water of an agreed quality. Nevertheless, Sydney Water's scope for reducing costs through more effective catchment management are limited by the effects of the behaviour of others whose actions on the fringe of the catchment impinge on the quality of the water harvested. With the abolition of the Catchment Assessment Commission established by the previous government, it is not clear that any effective means now exist to deliver the necessary coordination among local councils, the EPA and other government departments that have catchment related responsibilities.

Conclusions

The BOO option adopted by Sydney Water for its new major water treatment plants will now be receiving its first real test, as the largest of the plants came on line at the end of 1995 and the costs of the Board (now Sydney Water) have started to reflect the costs of delivering improved quality water. While willingness-to-pay studies have underpinned the decision to try to meet more stringent water quality guidelines, the extent to which these quality costs are passed on to consumers will be resolved by the Government Pricing Tribunal. Despite efforts to meet a demand for increased quality by the cheapest approach, Sydney Water may find itself having to reduce costs (and services) elsewhere to achieve acceptable rates of return. The Government Pricing Tribunal has signalled that it will not rubber stamp full pass-on of the costs of these new contractual arrangements. These pressures will be all the more intense to the extent that the implementation of volumetric pricing and phasing out of cross-subsidies would bring politically unacceptable water price increases to some consumers in the absence of substantial cost savings elsewhere.

In developing the water treatment contracts, Sydney Water has accepted significant disciplines. The nature of the contract is such that very low-quality raw water would lead to a higher treatment tariff, with no guarantee that the Tribunal would allow that treatment tariff to be passed on through higher consumer prices. Thus, claims that the BOO plan is disposed toward adverse environmental consequences because of a reduced incentive to manage catchments do not seem to be well founded. The need for a revamped approach to total catchment management would apply regardless of whether treatment was undertaken through BOO contracts or directly by Sydney Water. The BOO contracts that have been negotiated

provide significant incentives for Sydney Water to follow efficient pricing and demand-management practices.

Sydney Water has gone through a costly learning exercise in developing the legal infrastructure to give it access to the BOO option. This infrastructure is now a valuable asset in the implementation of other private provision schemes. Sydney Water may see advantages in selling its experience in this area to smaller local water authorities that are faced with augmentation, but no longer eligible for government subsidies because of their growth, and contemplating BOO options.

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This article is a shortened version of a report prepared for the Private Sector Development Department of the World Bank and delivered at a workshop on private infrastructure financing, Paris, 17-18 November 1994. The authors thank Neil Roger of that department for his advice and encouragement during the project. The authors also wish to acknowledge without implication the help of Pierre Alla (Australian Water Services) and Ray Cork and Graham Trickett (Sydney Water). The constructive suggestions of Agenda referees are also appreciated.