NORTHERN TERRITORY OF AUSTRALIA
DEPARTMENT OF THE CHIEF MINISTER
TERRITORY WATER AUTHORITY STUDY

19 November 1985

CHIEF MINISTER

REPORT ON THE ESTABLISHMENT OF A WATER AUTHORITY
FOR THE NORTHERN TERRITORY

I have pleasure in submitting this Report under the Terms of Reference advised by you on 15 August 1985.

P.F. TEMPLE
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CHAPTER 1 - SUMMARY AND RECOMMENDATIONS

Terms of Reference

The questions examined in this study are those set out in the Terms of Reference approved by the Chief Minister on 15 August 1985, viz:

1. To investigate the costs of providing water and sewerage services to all Northern Territory communities and the extent to which the user-pays principle of cost recovery is currently in place and/or capable of being applied.

2. To examine the functions, structure and staffing of the Water Division of the Department of Transport and Works and the Water Resources Division of the Department of Mines and Energy, and report on the feasibility and desirability or otherwise of establishing some or all parts of these Divisions within a single statutory body operated along commercial lines.

3. To report on how the proposed statutory body should be structured, its functions and responsibilities.

4. To report on appropriate pricing policies and on capital and recurrent funding arrangements for the Authority if and when established and on any initial special funding requirements.

5. To report on staffing requirements and the most appropriate organisational structure for the proposed Authority.

6. As directed, report on special considerations or effects for particular interest groups or communities e.g. Aboriginal communities.

Modus Operandi

The study was carried out by means of:

1. Discussions with responsible Ministers and with officials of the Departments of Transport and Works and Mines and Energy in all main centres and many minor centres, and the Departments of Lands, Community Development and the N.T. Treasury in Darwin. (see Appendix A).

2. Inspection of Water Division and Water Resources Division assets in all the main centres and most minor centres.

3. Discussions with representatives of most local government councils. (see Appendix A).

4. Examination of extensive statistical material.

5. Examination of submissions received. (see Appendix B).

6. Discussions with Heads and senior staff of state water authorities and other water industry organisations in Australia. (see Appendix A).
reference to the publications and documents set out in the bibliography. (see Appendix C).

Terms Used

This study covers the water industry in the Northern Territory. Unless the context indicates otherwise, references to the water industry and the water function refer to the whole gamut of activities relating to water investigation, assessment, development, management, supply and wastewater disposal. The word wastewater is now apparently used as a more up-market term for sewage.

Criteria

The criteria used as guiding principles in this study were:

- any arrangements that are proposed should be administratively efficient;
- they should be cost effective and contribute to reducing the deficit on water and wastewater operations;
- they should be capable of taking the Northern Territory water industry forward over the next decade or so in a way that will assist Territory development.

Summary of Report and Main Recommendations

Costs:

Water and wastewater services in the Northern Territory cost much more than most people think. Even in Government circles, attention has tended to focus only on direct recurrent costs - labour, materials, power and fuel supplies etc. - but if one adds in indirect and capital costs and takes out indirect subsidies, the full costs are seen to be very much higher.

In 1984/85 the average cost of a kilolitre of water was 81.5 cents, however, the excess water charge was only 25 cents.

Town by town the full costs of production varied considerably, e.g. Darwin's was 75 cents while costs in Tennant Creek were $1.11 per kilolitre. In some of the smaller towns costs were even higher; however, care is needed in developing cost estimates for the small towns because of statistical problems.

Much of the high cost of water can be attributed to two factors, not previously quantified:

(a) the very large investment tied up in capital assets needed for delivering water and wastewater services. In current values assets in urban centres are estimated to be worth $405 million. These assets are used up gradually in supplying services and eventually must be replaced. It is thus necessary that depreciation and debt servicing costs be included in the costs of supply. Those costs accounted for about 37% of the cost of production.
(b) the consumption of electricity needed to pump water is more significant than in most States, amounting to over 16 cents/kl. The differences between Northern Territory and many State water supply systems are not always appreciated. In some metropolitan areas of Australia, water is a relatively easy commodity to collect and supply. It falls out of the sky fairly regularly, there are nearby mountain catchments and river systems that can be dammed and it can be supplied under gravity to consumers. In contrast, much of the Territory's water must be pumped from underground aquifers, sometimes many metres below ground level, then pumped considerable distances over mostly flat terrain and finally pumped into high level tanks to provide the required pressure for consumers. Even in Darwin, where only approximately 11% of the water supplied is bore water, the remaining 89% must be pumped from a catchment 73 kilometers outside the city. There is no town in the Territory which does not depend critically on pumping for its water supplies.

The same general conclusions apply to wastewater, however, the Territory's comparative disadvantages here are not so great. The average cost of service per fixture is $145 while the price charged for each additional fixture is $75.

At present, there is a large and partly hidden subsidy being provided by the Government for water and wastewater services in Territory towns amounting to $23 million p.a. In rural communities the subsidy is estimated to be $25 million. These figures include notional interest and depreciation charges on assets tied up in providing services and adds back the subsidy provided through concessional electricity tariffs. They are not the cash costs of providing the services, as disclosed in Budget documents, but the full commercial costs.

A significant problem for the Northern Territory is that it is in a "subsidy trap" caused by its highly subsidised tariffs, which stimulate demand and generate a need to incur large expenditures on the augmentation of the supply system. The resulting depreciation and debt servicing charges on these capital expenditures mean that the subsidies become even larger.

There is a pressing need to move away from the idea that water demand is an independent variable and the role of the supply body is simply to keep up with the growing demand. Instead it should be seen as a commodity like any other, one that is sensitive to price variations, advertising and other means of demand management. If this approach is taken it will be possible to defer some capital augmentation programs and gain better control of the capital costs of supplying water.

The deficit on water operations is likely to continue for a number of years and consequently one of the urgent needs now is to set up administrative/organisational arrangements which bring the deficit out into the open and provide a framework within which action can be taken to reduce its size over time.

Tariffs:

Although the Territory's tariff regimes for water and wastewater are based on the user pays principle and in this respect the Territory is ahead of many of the States which still have land value linked tariff...
systems in which a significant component of the charge is unrelated to use, the problem is that the Territory is behind most States in actual cost recovery. The Northern Territory has the user-pays principle in place, but for a number of reasons it is not operating as effectively as it should. The reasons include:

- demand for water has not been seen as something that can or should be managed.
- tariff setting has been an ad hoc process and largely done independently of commercial considerations.
- the costs of production, which tariffs should seek to recover, have been almost impossible to quantify because of the way the water function is organised.
- there are still some anomalies in the tariff system itself. The Report concludes that the user-pays principle would be more effectively realised if the water allowance and exemptions were abolished. It also recommends that the present basic charge and excess charge be replaced by a fixed service charge and a usage charge based on a rising block tariff. The service charge would be a payment for the right to be connected to the reticulation system. It would carry no consumption entitlement and would cover some fixed costs of the system, e.g. meter reading/billing.

In the interests of promoting regional development it is proposed that the present policy of uniform Territory-wide tariffs be retained.

Frequency of billing is an important component of a rational tariff policy and ought not to be unnecessarily restricted by legislation. Accordingly, it is recommended that either by an amendment to the Water Supply and Sewerage Act or by introduction of a new Water Bill, greater scope for flexibility should be given in respect of the billing cycle. This would allow quarterly or even monthly billing if necessary.

The question of appropriate principles to be employed in tariff setting has been considered. The conclusion is that costs of production are currently so high that it would be unrealistic to aim for full cost recovery at this stage. That view is strengthened by the belief that there is some scope for reducing costs and this ought to be explored before the question of full cost recovery is seriously considered. In the meantime it is recommended that tariff policy for water and wastewater services should be based on the maintenance of a reasonable revenue effort by comparison with the States.

Organisation:

The Report concludes that because of the very substantial deficit on the water function and because under present organisational arrangements it is difficult to identify and control costs, it is essential to:

- bring together into one cohesive organisation all the parts contributing to the water function;
- take action to generate economies of scale by amalgamating and rationalising functions, and to embark on a program of cost reduction generally.
ensure that the future development of the water function takes place in a commercial environment.

More specifically, there is a need to reduce and eventually turn around a very large deficit, to improve tariff policies as an aid to demand management, to satisfy new sources of demand, and to exploit technological change effectively as a means of reducing costs.

These are essentially commercial goals and are best met in a commercial environment. Accordingly the Report recommends that a prescribed statutory corporation be established to supply water and wastewater services in the Northern Territory.

The name proposed for the new body is "Territory Water Authority".

It is recommended the proposed Water Authority should incorporate the present Water Division of the Department of Transport and Works and the Water Resources Division of the Department of Mines and Energy, but that certain of the functions of the latter should be wound down or devolved. Specifically it is recommended:

that the surface water assessment program become a function of the proposed Authority, but that new policies for its administration be developed based on the confirmed or perceived long-term commercial/developmental potential of the catchments being assessed. As part of this redirection of policy, the scope for private sector involvement in the construction, maintenance and data recording by streamgauging stations should be assessed;

that water quality monitoring become a responsibility of the hydrographic field staff;

that expressions of interest be sought from the private sector to take over the Water Resources Division's drilling and bore testing functions;

that, subject to confirmation that the Mines and Energy Department's arrangements for private sector operation of the minerals testing laboratory are found to be satisfactory as a long-term arrangement, expressions of interest should be called from the private sector for the operation of the three water laboratories;

that the Water Supplies Development Act be amended so as to permit loans under it to be granted and administered by the Northern Territory Development Corporation, with the Water Authority providing advice on loan applications as required.

Role for Local Government?

Considerable attention was given to a possible role for Local Government, and it was concluded that, at this stage, that would be undesirable because:

with the very large deficit, the most urgent need is to bring all water related functions together under one roof so as to be able to effectively manage necessary programs of rationalisation and cost reduction. Involvement of the Councils before that process was completed could mean that such measures were not fully realised.
involvement of the Councils will create a new set of problems for the Government.

- there will be the need to subsidise the Councils, however, the Government will want to know that they are managing the function efficiently. This will mean a need for mechanisms to monitor performance.

- if Councils have control of tariffs there will be inevitable disputes about whether tariff levels should be increased or the subsidies increased, and about whether inadequate cost control or inadequate subsidisation is the real reason for the need to raise tariffs.

- some staff resources will have to be provided to the Councils, resulting in fragmentation of the available expertise.

- there will be a tendency for the Councils to want only the "good bits" of the system leaving the Government to run a conglomerate of hopelessly uneconomic units.

- there may be a tendency for Councils to focus on operational matters possibly giving capital maintenance second priority, and resulting in higher costs for the Government in the long-run.

there will be problems for the Councils also:

- if they take responsibility for the small towns there may be claims of ratepayers in the Council areas subsidising consumers in the small towns.

- the fundamentally uneconomic nature of the water operation at present would be a continuing burden threatening Council budgets.

- Councils would find that the technical aspects of water and wastewater services in the larger towns of the Territory are more complex than in many other parts of Australia.

to bring the Councils into the water function in the Territory at this stage would be to opt for yesteryear's solution at a time when the trend elsewhere is clearly in the other direction. States like Victoria have been undertaking a fundamental re-organisation of their water industries over the last few years, one of the main features of which has been a dramatic reduction in Local Government involvement and the creation of larger commercially oriented authorities. Western Australia has just established a single State-wide water authority and South Australia has had the equivalent for decades. These moves are in accordance with present-day views about water being a commercial product like any other and thus best supplied by a commercial organisation. The traditional view that water and wastewater services are somehow rightfully Local Government functions is now an anachronism.
Implications for Other Departments

It is considered that the present directions of the Secretary, Department of Mines and Energy, for resolving issues arising from overlapping responsibilities for water related matters on mining tenements should serve as a model for the relationship between the proposed Authority and the Department.

In order to promote economies and the avoidance of possibly costly design problems it is recommended that the Authority be provided with some capital works design and supervision capacity and that some staff be transferred to the Authority from the Department of Transport and Works. This group would be located in the Operations Division of the Authority and would have the capacity to handle repairs and maintenance and new works projects.

The building licensing and inspectorate function, which was transferred to the Department of Lands in December 1984, is working well and should remain there, however it is recommended that responsibility for the Plumbers and Drainers Licensing Board be transferred to the Authority as the Board is concerned with industry standards which will be one of the important responsibilities of the Authority.

A recommendation for quarterly billing and the possibility of introducing computerised meter reading devices offers the prospect of some rationalisation in the meter reading function between NTEC and the Authority.

It is therefore recommended that NTEC and the proposed Water Authority, when established, consult about the feasibility of setting up a single meter reading group for both organisations.

The Report recommends that the Authority be under the control of a Board comprising five members and that it be organised into four divisions: Planning, Operations, Water Resources, Finance and Administration. Its staff should be employed under the Public Service Act. Detailed organisational and staffing proposals have not been developed at this stage, pending decisions on the main recommendations in this Report.

Legislation:

It is proposed that the new Authority start operations on 1 July 1986; a great deal must be done if that target is to be met. Accordingly, although a draft of a comprehensive Water Bill is in existence, it is not proposed that it be enacted by that date as it requires some revision. Instead it is recommended that existing legislation remain in force with minor amendments to accommodate the establishment of the Authority. A simple Act incorporating the Authority would be required also.

Financial Considerations:

Detailed arrangements concerning the valuation of assets for transfer purposes, the mix of equity/debt to fund the transfer and arrangements for subsiding the deficit should be developed in the period leading up to the establishment of the Authority.

General Observations:

This study revealed a number of aspects of the water function in the Northern Territory that require attention, and many of those are touched on generally in the report, or more specifically in the recommendations,
but there were four general matters regarding the administration of the water function that merit special note:

- there have been numerous previous studies and reports on the arrangements for providing water and wastewater services in the Territory, some internal, some external, some financial, others technical, some covering aspects of the arrangements, some the broad picture. They add up to a formidable array of advice, unfortunately, much of it not heeded.

- the arrangements themselves have been the subject of frequent change, each well reasoned and no doubt properly justified, but, with the benefit of hindsight, the overall impression is of excessive change and indeed of change so frequent that it has hindered progress. When the staff movements that have resulted from the organisational changes are added to the normal comings and goings in any organisation, the degree of change has been bewildering. For example, one Water Division officer indicated that in a period of 19 months there had been no less than 10 movements in occupancy of his senior officer's position. The problems of getting a consistent management style, policy approach etc., necessary to build a cohesive organisation - a basic requirement for efficiency and cost effectiveness - are obvious. The need now is for stability: select an organisational arrangement and stick with it for a few years.

- change has had its effects on staff. While it would not be true to say staff are demoralised, many are not chaffing at the bit either. Some have become just a little cynical, ("you only have to blow a whistle and they'll begin moving desks for the next reorganisation"), some have gone into second gear, some are confused. As often happens in such situations, people are filling the gaps, making sure that work is getting done, and in doing so they are often carrying more than their fair share. The fact is that there are many well qualified, experienced and capable staff in both Divisions. What they need is a sense of organisational purpose and the feeling that, organisationally, they are no longer in transit, but have at last arrived;

- The emphasis tends to be on technical solutions rather than solutions that are a trade-off between commercial and technical considerations. As put by one officer, "they think they are doing a good job if water comes out the tap and people aren't being poisoned". Certainly cost/benefit studies are done, especially for major capital works, and wherever possible the cheapest option is taken, but the total environment is not financially or commercially driven. This seems out of keeping with the essentially commercial nature of the operation.

Acknowledgements

Thanks are due to the Executive Officer Mrs Julie Carswell for the long hours she spent in processing the large volume of statistical data obtained from Departments; to my Secretary Ms Sandy Webster for producing a readable document; and to the many people who assisted an outsider in piecing together a picture of the water industry in the Territory.
CHAPTER 2 - DEMAND

The Territory is estimated to have an annual river flow of 106,000 million cubic metres or 23% of the national total, and some 27,000 million cubic metres of usable groundwater or 39% the total Australian resource (Water N.T. Vol. 1). This chapter deals with some aspects of the demand for and use of the small portion of this resource that is currently used.

Water

In 1984/85 metered and unmetered consumption through the various town reticulation systems amounted to 30,104 ML. To assist in placing this figure into perspective, the following table sets out consumption levels in major water supply authority areas interstate.

<table>
<thead>
<tr>
<th>Supply Authority</th>
<th>'000 ML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney M.W.S. and D.B.</td>
<td>573</td>
</tr>
<tr>
<td>Melbourne M.B.W.</td>
<td>373</td>
</tr>
<tr>
<td>Brisbane Department of W.S. &amp; S.</td>
<td>172</td>
</tr>
<tr>
<td>Perth M.W.A</td>
<td>165</td>
</tr>
<tr>
<td>South Australian E. &amp; W.S. Dept.</td>
<td>164</td>
</tr>
<tr>
<td>Hunter District Water Board</td>
<td>69</td>
</tr>
<tr>
<td>Latrobe Valley W. &amp; S. Board</td>
<td>55</td>
</tr>
<tr>
<td>Ballarat Water Commissioners</td>
<td>11 (1983 cal.year)</td>
</tr>
<tr>
<td>Whole N.T. - Water Division</td>
<td>30 (1984/85)</td>
</tr>
</tbody>
</table>

Source: Annual Reports and N.T. Water Division.
From information supplied by the Water Division, consumption in Territory towns during 1984/85 was:

Table 2.2
Water Consumption by Town 1984/85

<table>
<thead>
<tr>
<th>Town</th>
<th>Consumption '000 ML</th>
<th>No. of Connections</th>
<th>Average Consumption kl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>20.548</td>
<td>18,943</td>
<td>1085</td>
</tr>
<tr>
<td>Batchelor</td>
<td>.286</td>
<td>141</td>
<td>2028</td>
</tr>
<tr>
<td>Adelaide River</td>
<td>.059</td>
<td>995</td>
<td>1255</td>
</tr>
<tr>
<td>Katherine</td>
<td>1.249</td>
<td>68</td>
<td>765</td>
</tr>
<tr>
<td>Pine Creek</td>
<td>.049</td>
<td>24</td>
<td>2042</td>
</tr>
<tr>
<td>Mataranka</td>
<td>.025</td>
<td>13</td>
<td>1923</td>
</tr>
<tr>
<td>Larrimah</td>
<td>.007</td>
<td>10</td>
<td>700</td>
</tr>
<tr>
<td>Daly Waters</td>
<td>1.270</td>
<td>1,005</td>
<td>1264</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>.154</td>
<td>82</td>
<td>1879</td>
</tr>
<tr>
<td>Elliott</td>
<td>.010</td>
<td>14</td>
<td>714</td>
</tr>
<tr>
<td>Newcastle Waters</td>
<td>6.335</td>
<td>5,086</td>
<td>1246</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>.037</td>
<td>18</td>
<td>2056</td>
</tr>
<tr>
<td>Ti Tree</td>
<td>.023</td>
<td>20</td>
<td>1150</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30.104</td>
<td>26,472</td>
<td>1137</td>
</tr>
</tbody>
</table>

Source: Water Division

The substantial differences in average consumption between one town and another are due to a variety of factors, e.g. the mix of users (domestic, government, business, exempt); metering problems; meter reading and recording errors; the normal distortions that arise when working with small numbers etc.

It is interesting to compare the Territory average usage level with levels interstate.
Table 2.3  
Average Water Consumption  
State Comparisons

<table>
<thead>
<tr>
<th>Area</th>
<th>Average Consumption per connection kl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Territory</td>
<td>1137 (1984/85)</td>
</tr>
<tr>
<td>Sydney</td>
<td>552 (1984/85)</td>
</tr>
<tr>
<td>Melbourne</td>
<td>387 (1983/84)</td>
</tr>
<tr>
<td>Queensland</td>
<td>703 (1983/84)</td>
</tr>
<tr>
<td>Adelaide</td>
<td>448 (1983/84)</td>
</tr>
<tr>
<td>Perth</td>
<td>513 (1983/84)</td>
</tr>
</tbody>
</table>

Source: Annual Reports

The differences are striking, they are generally attributed to climatic conditions, however pricing policies are also a factor, as will be seen later.

Over the last four years total consumption in Darwin has been growing at 4.3% p.a., which implies a doubling of demand every 17 years. This is somewhat less than the city's population growth rate; however, in that time there have been two increases in tariffs which would have depressed demand growth. Average consumption per connection in Darwin has in fact fallen from 1285 kl in 1980/81 to 1085 kl in 1984/85, although, as Table 2.4 shows, this trend has not been reflected in each of the main Territory towns.

Table 2.4  
Changes in Water Consumption  
Main Towns

<table>
<thead>
<tr>
<th>Town</th>
<th>Average Consumption - kl</th>
<th>Change % 81-85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>1369</td>
<td>1224</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>1118</td>
<td>1412</td>
</tr>
<tr>
<td>Katherine</td>
<td>980</td>
<td>1111</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>778</td>
<td>1064</td>
</tr>
</tbody>
</table>


It is likely that two factors have contributed to the reduction in average consumption:

- the effects of tariff increases on demand (the elasticity of demand)
- changes in the consumption mix
Elasticity of Demand

The responsiveness or elasticity of demand for water when prices are low is generally regarded as quite high, reflecting the fact that there are water uses which may be readily curtailed. Gallagher (quoted in Gibb) refers to price elasticities mentioned in the literature of -0.27 for total demand and as high as -1.57 for domestic sprinkling demand. Studies by the then Metropolitan Water Authority of Perth based on a household attitudinal survey indicated elasticities of -0.05 for indoor consumption and -0.31 for outdoor consumption, with elasticities generally being higher at higher levels of consumption. The Hunter District Water Board estimates elasticity to be -0.2 based on experience in 1982/83 with a new tariff regime.

We know little about price and income elasticities of demand for water in the Territory; work will need to be done in this area as a matter of priority to assist in establishing a rational framework for pricing policy and for assessing the effects of various pricing regimes on the financial position of the supplier.

Nevertheless, one may conclude, that in circumstances where, as will be seen later, water is supplied at prices which are heavily subsidised, there will be marginal water uses which are quite sensitive to price increases, and thus there is scope to manage demand through pricing policy.

Seasonality

Water consumption is, of course, highly seasonal. In 1984/85 Darwin consumption ranged from a low of 23.7 ML per day in the wet season to a high of 136.6 ML per day in the dry, the amplitude of fluctuation being 5.8 times minimum consumption. Water supply system design is based on peak consumption. Systems may be designed to cater for the peak or some specified percentage of the peak, with water restrictions applying when demand exceeds the specified capacity. The trick is to judge the degree of risk attaching to the specified maximum capacity being exceeded on more than an acceptable number of occasions. Clearly, if it is acceptable to the community to have a system that involves water restrictions being applied on say 3 or 4 days a year, then it is possible to design a cheaper system than one that must always cater for peak demand.

An examination of 1984/85 daily water consumption records for Darwin indicates that consumption exceeded 130 ML on only one day; it exceeded 125 ML on two days and 120 ML on four days. Thus, the system designed as it obviously was to meet the 1984/85 peak consumption of 136.6 ML needed to have a capacity 14% larger than one which would have fully met demand on all but four days of the year.

The implications of this are not that supply capacity can and should be maintained continuously within a narrow band below peak demand, since that would be quite impractical in a situation of rapid demand growth. Capital augmentation occurs infrequently and, when it does, it must allow some surplus capacity for future growth. The significance is in the timing of augmentation. Where restrictions are acceptable, augmentation can be delayed, and this factor, together with pricing policy, means that there is in fact more scope than may have been realised to control the size and timing of capital works programs and thus depreciation and debt servicing costs.
Consumer Profile

Over the last few years there have been changes in the mix of consumers as well as their consumption patterns and these have also contributed to the decline in average consumption.

Table 2.5

Water Consumption - Darwin
by class of consumer
1980/81 and 1984/85

<table>
<thead>
<tr>
<th></th>
<th>1980/81 Consumption Users</th>
<th>1984/85 Consumption Users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1'000 ML % No. k1 p.a.</td>
<td>1'000 ML % No. k1 p.a.</td>
</tr>
<tr>
<td>Domestic</td>
<td>8.0 47 11299 711</td>
<td>12.2 60 16894 723</td>
</tr>
<tr>
<td>Business &amp; Govt</td>
<td>7.5 43 2027 3579</td>
<td>6.6 32 1934 3433</td>
</tr>
<tr>
<td>Exempt</td>
<td>1.8 10 104 16943</td>
<td>1.7 8 115 14763</td>
</tr>
<tr>
<td>Total</td>
<td>17.3 13430 1285</td>
<td>20.5 18943 1085</td>
</tr>
</tbody>
</table>


From Table 2.5 it will be noted that three changes in consumer mix have contributed to the decline in average consumption:

- the most important has been an increase in the number of (relatively low average usage) domestic consumers - from 11299 in 1980/81, to 16894 in 1984/85. Their water consumption accounted for 60% of total consumption in 1984/85, compared with 47% four years earlier.
- the average consumption of business and government users has declined and there has also been a decline in the number of users. The reasons for the latter are not clear; one might be tempted to postulate some rationalisation of metering especially for the Councils. However the fact that absolute consumption has declined suggests that budget/economy measures have also been involved.
- average consumption of exempt users has fallen. Exempt users include churches and schools. They enjoy consumption free of the basic charge and a concession representing 75% and 50% respectively of the excess charge. It is likely that budget measures have depressed average consumption.

An analysis of consumption levels (Table 2.6) reveals that 9020 consumers or 36% took 500 k1 (the water allowance) or less, and 15765 consumers or 63% took less than 750 k1 in 1984/85, (close to the average domestic consumption) although the aggregate volume of consumption that this represented was only 23% of total consumption throughout the Territory. At the other end of the spectrum, 272 or 1% of users each took over 10,000 k1 in the year and their consumption in aggregate amounted to over 32% of total consumption.
Table 2.6
Water Consumption by consumption levels 1984/85

<table>
<thead>
<tr>
<th>% of total consumption</th>
<th>% of total consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-500</td>
<td>8</td>
</tr>
<tr>
<td>501-750</td>
<td>15</td>
</tr>
<tr>
<td>751-1500</td>
<td>25</td>
</tr>
<tr>
<td>1501-3000</td>
<td>9</td>
</tr>
<tr>
<td>3001-10000</td>
<td>11</td>
</tr>
<tr>
<td>10000+</td>
<td>32</td>
</tr>
</tbody>
</table>

Source: Water Division

Who are the large consumers? They are government bodies (Commonwealth, Territory and Local) including schools. A survey of the 59 largest users in 1980/81 conducted by W.D. Scott (1982) showed that 38% of the total consumption was by the Territory or Local Governments, 29% by the Commonwealth, 1% by Government schools and 14% by business.

Under present billing arrangements, rebates are provided to consumers who take less than the 400 kl annually. In 1984/85 there were 3532 consumers, or 14%, in this category.

Unaccounted Consumption

A certain amount of water pumped from supplies is lost or otherwise unaccounted for in distribution. This is known as unaccounted consumption. It is measured as the difference between the volume of water pumped from supplies and the volume consumed as indicated in billing/accounts records. It may be caused through leakage at various points in the distribution system, unauthorised use (e.g. illegal tapping into the distribution system, unauthorised use of fire hydrants etc), authorised unmetered use (e.g. firefighting) or faulty meter operation. The last is thought to be the main reason for unaccounted consumption in the Northern Territory.


What is an "acceptable" level of unaccounted consumption? A figure in the vicinity of 15% seems to be accepted as the norm; however, it must be said that its derivation probably owes more to educated guessing than to a comparison of the marginal cost of effecting further reductions against the savings or increased revenues they generate.
Accepting 15% as the norm and also the estimates made by the Water Division, it appears that unaccounted consumption in the Territory is high and rising, especially in Alice Springs, where there is a problem with fine particles affecting meter operation. Whether the problem of unaccounted consumption can be tackled effectively by altering the present meter exchange policy, perhaps in combination with other (technical) measures, needs to be further examined. For example, the S.A. Department of Engineering and Water Supply believes that water meters experience a progressive decline in accuracy at the rate of 1% p.a. and accordingly has instituted a policy of replacing meters every 8 years.

Wastewater

Wastewater reticulation systems are provided in seven towns.

Table 2.7
Wastewater Services
June 1985

<table>
<thead>
<tr>
<th>Town</th>
<th>No of Connections</th>
<th>No of Fixtures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>18802</td>
<td>34132</td>
</tr>
<tr>
<td>Batchelor</td>
<td>141</td>
<td>231</td>
</tr>
<tr>
<td>Adelaide River</td>
<td>53</td>
<td>88</td>
</tr>
<tr>
<td>Katherine</td>
<td>995</td>
<td>1925</td>
</tr>
<tr>
<td>Pine Creek</td>
<td>62</td>
<td>139</td>
</tr>
<tr>
<td>Mataranka</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Larrimah</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Daly Waters</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>1005</td>
<td>1631</td>
</tr>
<tr>
<td>Elliott</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Newcastle Waters</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>4750</td>
<td>11740</td>
</tr>
<tr>
<td>Ti Tree</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td>Finke</td>
<td>NSA</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>25908</strong></td>
<td><strong>49886</strong></td>
</tr>
</tbody>
</table>

NSA: No Sewer Available

Source: Water Division

The main sources of demand are extensions to urban areas as a result of increasing population. About 80% of connections are domestic.

One area which has not been properly addressed to date in the Territory is the disposal of trade wastes. Although some industrial organisations dispose of trade wastes through the sewers, appropriate policies and pricing regimes for such disposal need to be developed.
Irrigation

In states like Victoria and South Australia, some 70% of water consumed is for irrigation. While the Territory is far from that situation at present there are increasing moves afoot to develop our agricultural and horticultural industries and these are heavy users of water. For example, citrus trees may require 6 ML per hectare p.a. and crops watered by overhead sprinklers up to 12 ML per hectare.

Throughout the Northern Territory, there are presently some 1,300 hectares under horticulture, 900 hectares to fruit and 400 to annual crops. By 1990, the Department of Primary Production conservatively estimates that this will have grown to 9,000 hectares, a compound growth rate of 47%. These areas could be higher if projects like the CSR cashew project at Wildman River go ahead (an extra 5,000 hectares).

In the Katherine region estimates have been made by the Department of Primary Production of present and possible future demand for water for irrigation. Consumption in 1983/84 was calculated to be about 10 ML/day. This may grow to between 26 and 50 ML/day by 1990. These represent annual compound increases of from 17% and 30% p.a. Further strong growth is expected through to at least the year 2000.

Territory horticultural crops have some natural advantages over those grown elsewhere in Australia. They tend to bear outside the main seasons for eastern suppliers and so they fill a gap in the market. They are less subject to droughts, floods and frosts and some, like pawpaws, can be grown all year round. There is increasing interest by southern growers wishing to produce in the Territory to exploit these advantages and the industry is assured of rapid growth.

Because horticulture is labour intensive it needs to be located near population centres, but, with town water supplies possibly derived from the same surface or groundwater sources there is the potential for future problems of allocation. The main immediate tasks, however, are to gear up the water resources and water supply areas of Government to provide assured supplies of water that will support the irrigation requirements of this rapidly expanding industry.

Conclusions

- The volume of water consumption through reticulation systems in the Northern Territory is small by comparison with systems elsewhere amounting to 30,104 ML in 1984/85 - equivalent to 18% of consumption in the city of Perth or 5% of the consumption in Sydney.

- Darwin accounts for about 68% of Territory consumption, Alice Springs 21%, Katherine and Tennant Creek around 4% each.

- Average consumption per supply point in the Territory at present is about 1.5 to 3 times higher than interstate, reflecting partly climatic conditions and partly subsidised pricing.

- Over the last four years total consumption in Darwin has been rising at the rate of 4.3% p.a. however average consumption per connection while rising in Katherine and Tennant Creek has been falling overall due largely to the increase in (relatively low average usage) domestic connections.
Domestic consumption accounts for 60% of total consumption, 36% of consumers take only the water allowance (500 kl p.a.) or less, and this consumption represents 8% of total. On the other hand 1% of consumers take in excess of 10,000 kl p.a. and their consumption accounts for 32% of total.

The largest users are government users - schools and parks feature prominently.

The demand for water is sensitive to price and income levels generally and price changes for the product. The implications of this for demand management require examination as a matter of priority.

Water consumption is highly seasonal, with maximum consumption in 1984/85 being 5.8 times higher than minimum consumption, but peak consumption might only occur on a few days a year. System augmentation timing can be lengthened, particularly when combined with demand management, if there is community acceptance of supply restrictions for a few days a year for perhaps one or two years towards the end of each system augmentation cycle.

Unaccounted consumption, at up to 40%, is too high and revenue could be increased by reducing it.

There are approximately 26,000 wastewater connections throughout the Northern Territory. Growth between 1978/79 and 1984/85 has been at the rate of 9.4% p.a.

At present, only insignificant amounts of water are used for irrigation; however, there will be a big expansion of requirements over the next few years which will have implications for the supply body.
CHAPTER 3 - COSTS OF SUPPLY

This chapter seeks to identify the full costs of water and wastewater services in the Territory in 1984/85 and to further identify those costs by towns individually and rural communities in total.

Data

At the outset, it must be said that the gathering of reliable data for this exercise was a major problem. Although the fullest co-operation was received from the Departments concerned, it was clear that their information systems were not set up to generate data in a form that would be normally required for management reporting were their operations being run as commercial enterprises.

Although a small statistics cell existed in the Water Division up until about two years ago, it was then abolished for reasons that are not now clear. It needs to be re-established as a matter of priority. The introduction of new computer accounting systems seems to have been associated with a move away from functional or cost centre accounting to costing at levels which are not particularly useful from a management viewpoint, in some categories on a Division-wide basis and, in others, on a Departmental-wide basis. Registers of major assets are not being maintained up to date, although registers of minor assets are.

Consequently, to get the data required for this study it was necessary for Departmental staff to undertake a series of special exercises. Even so, a large amount of necessary data was simply not available or only available with considerably more work than time allowed. Those deficiencies were mainly in the area of cost allocation and they were resolved by making numerous assumptions about bases of apportionment (described later), as far as possible, with the guidance of departmental staff.

Because of these problems, the statistical results presented in this chapter must be qualified. Since the greatest gaps were in data relating to cost apportionment, the more disaggregated the results the more care is needed in interpretation. Those results should only be viewed as presenting orders of magnitude. On the other hand, the aggregates are more reliable, although again not entirely devoid of these problems.

The simple lesson that comes through in all this is that we will never know with accuracy the true costs of providing water and wastewater services in the Territory until proper financial management and statistical reporting systems are set up with this purpose in mind.

Methodology

The aim was to identify the full costs of providing water services and wastewater services in towns and regional rural areas.

Since these services are currently provided from within the normal departmental structures of Government, the first task was to identify those divisions or branches of Departments which contribute directly or indirectly to the provision of the services. These were:
Water Division, Department of Transport & Works (DTW)
Public Works Division, (DTW)
Contracts & Plant Branches, (DTW)
Executive, Secretariat and Administration Divisions, (DTW)
Water Resources Division, Department of Mines & Energy (DME)
Policy & Administration Division, (DME)
Northern Territory Division of Computing & Information Technology,
N.T. Treasury
Capital Resources Division, N.T. Treasury
Plumbers & Drainer's Inspections & Licensing, Lands
Department of Law
Office of the Public Service Commissioner
N.T. Housing Commission
Department of Community Development

The second task was to estimate for 1984/85 the cost of the contribution
made by each. The most significant, of course, was the Water Division
itself, and whilst the whole of this Division's costs were readily
attributable to the water function, the problem, as indicated, was to get
the necessary breakdowns. A summary of the bases of apportionment used
follows:

Water Division:

Salaries and related payments: the Division was asked to survey its
staff in each region to assess the proportion of each employee's time
which was attributable to water or wastewater, urban or rural,
divisional management or regional management functions. The potential
weaknesses of this kind of approach need no explanation. Its virtue
was that it was the best method available.

From these returns, costs were recorded to functions where so
identified and overhead costs (divisional and regional management
expenses) were apportioned on the basis of direct costs.

Administrative and operational expenses: currently direct costs are
usually recorded against specific undertakings and where that data was
available it was used. Indirect costs and management overheads were
apportioned on the basis of combined salaries and direct administ­
trative and operational costs.

Other services: no apportionment was necessary as direct costs were
recorded.

Capital items: although capital in nature the items concerned mostly
have low unit values and are related to operating needs. Accordingly,
apportionment was as for administrative and operational expenses.

Property Management and Communication: apportioned on basis of staff
numbers identified to particular functions.

Assets: information about the assets in each area and their value on
both historical and current cost bases were provided by the Water
Division.
Public Works Division, Contracts and Plant Branches: - DTW.  
Aggregate costs attributable to the water function were identified with the aid of responsible staff, and apportioned on the basis of the value of assets attributable to each function.

Executive, Secretariat and Administration Divisions: - DTW.  
Costs were apportioned on the basis of staff numbers, identified to particular functions.

Water Resources and Policy and Administration Divisions: - DME.  
Allocations made using apportionment ratios identified by Division staff.

Northern Territory Division of Computing and Information Technology: - N.T. Treasury.  
Aggregate costs attributable to the water function based on actual charge-out costs provided by NCOM staff. Apportionment was made on the basis of billing data.

Capital Resources Division: - N.T. Treasury.  
Because only one loan is attributable to the water function and because no investment services are provided, costs under this heading are insignificant.

The loan concerned is for the value of assets transferred on 30 June 1978 and is for a nominal amount of $16 million. The term is 118 years with an annual principal repayment of 0.85% ($136,000) and interest on the reducing balance at 5% p.a. Debt servicing on this loan has been attributed to functions on the basis of value of assets.

Plumbers and Drainer's Inspections and Licensing: - Department of Lands.  
Only the licensing function has been brought to account and, as the costs here were so small, no apportionment was made.

Department of Law, Office of the Public Service Commissioner:  
Costs are insignificant and have not been separately identified.

N.T. Housing Commission:  
Commission owned housing is presently rented to public servants at less than its market rental. The aggregate value of this subsidy to the water function was estimated by Treasury officers and was distributed on the basis of staff numbers against each function.

Other Matters:

Depreciation: No depreciation is charged at present because accounts for the water function are maintained on a cash basis, in keeping with normal departmental practice.

To digress briefly, it should be pointed out that the cash accounting system used is not an arrangement that has been acceptable to the Treasurer or the N.T. Treasury. There is correspondence going back some years in which the Treasury has urged that financial statements be produced on a commercial basis for the Water Division’s trading activities. It has also indicated that the Treasurer’s powers under Section 30 of the Financial Administration and Audit Act, might have to be invoked to achieve this result.
For its part, the Water Division has pointed out the difficulties of producing financial statements that would be acceptable to the Auditor-General from an accounting system that was designed for Government cash based accounting, as the INTAS system then was. It also indicated the problems of apportionment that would be necessary (even if a commercial system was in place) due to the organisational arrangements that existed (and still exist). It is to be noted that the first of these problems is being overcome with the introduction of the SI system which has commercial accounting capabilities. The second problem remains.

The value of assets on an historical cost basis was provided by the Water Division and standard depreciation rates derived from the experience of other water authorities were used to calculate depreciation, which was allocated to towns on the basis of asset values. There is further discussion in Chapter 8 on the use of historical cost versus current cost depreciation, but for the purposes of the current exercise, which is the identification of actual costs, the conventional historical cost approach has been taken.

Debt Servicing: At present, the only debt formally attributable to the water function is the $16 million debt to the Commonwealth in respect of transferred assets referred to earlier. Since Self-Government, however, $71.373 million has been spent by the Territory Government on capital works associated with water and wastewater services in urban centres and $71.824 million on water and wastewater assets in rural communities. These expenditures were undertaken through the capital works program and that program is funded by appropriation from the Consolidated Fund. A significant source of the Territory's expenditures on capital works through the Consolidated Fund is General Purpose Capital Payments from the Commonwealth. These are 1/3 grant funds and 2/3 loan funds. To the extent that such loan funds have flowed through to water and wastewater capital works, there is a cost tag on them in the form of interest payments being made by the Territory Government to the Commonwealth, and these should be recognised and brought to account.

Although present budgetary practices in the Territory do not routinely identify expenditures by source of funds, it is reasonable to assume that the grant component of capital funds has been used for non-income earning asset creation and that income earning assets have been funded from the loan component. It might be argued that, in a commercial situation, some portion of capital expenditures could be expected to have been financed internally. While normally so, this could not have been the case with water and wastewater operations in the Northern Territory since Self-Government, because, as will be seen shortly, pricing policy has been such that revenues have been insufficient to cover even the cash costs of operations. There has thus been no implicit cash surplus which could have been directed to capital works. Therefore, the whole of the capital works expenditures in towns and on rural communities since Self-Government is assumed to have been financed from borrowings.

Interest rates used are those paid by the Treasury to the Commonwealth on general purpose loan funds. Apportionment between functions is on the basis of the historic value of assets.

Costs of Supply - the broad picture

Taking first the costs of supplying water, Table 3.1 sets out the overall results of the foregoing exercise:
### Table 3.1
Costs of Water Supply - Northern Territory
1984/85
$'000

<table>
<thead>
<tr>
<th>Salaries &amp; related payments</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries etc - WD</td>
<td>4026</td>
</tr>
<tr>
<td>Salaries etc - WRD</td>
<td>1815</td>
</tr>
<tr>
<td>T &amp; W support</td>
<td>679</td>
</tr>
<tr>
<td>DME support</td>
<td>237</td>
</tr>
<tr>
<td>Superannuation Employers Liability - WD</td>
<td>698</td>
</tr>
<tr>
<td>- WRD</td>
<td>312</td>
</tr>
<tr>
<td>Long Service Leave Provision - WD</td>
<td>80</td>
</tr>
<tr>
<td>- WRD</td>
<td>34</td>
</tr>
<tr>
<td>Recreation Leave Provision - WD</td>
<td>373</td>
</tr>
<tr>
<td>- WRD</td>
<td>169</td>
</tr>
<tr>
<td>NTHC Staff Rental Subsidy - WD</td>
<td>64</td>
</tr>
<tr>
<td>- WRD</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operations &amp; Maintenance (a)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration &amp; Operational - WD</td>
<td>5961</td>
</tr>
<tr>
<td>Administration &amp; Operational - WRD</td>
<td>827</td>
</tr>
<tr>
<td>T &amp; W support</td>
<td>1209</td>
</tr>
<tr>
<td>DME support</td>
<td>129</td>
</tr>
<tr>
<td>Capital items - WD</td>
<td>144</td>
</tr>
<tr>
<td>Capital items - WRD</td>
<td>367</td>
</tr>
<tr>
<td>Other Services</td>
<td>45</td>
</tr>
<tr>
<td>Repairs &amp; Maintenance - WD</td>
<td>1604</td>
</tr>
<tr>
<td>- WRD</td>
<td>62</td>
</tr>
<tr>
<td>Property management - WD</td>
<td>372</td>
</tr>
<tr>
<td>- WRD</td>
<td>62</td>
</tr>
<tr>
<td>Communications - WD</td>
<td>11</td>
</tr>
<tr>
<td>- WRD</td>
<td>13</td>
</tr>
<tr>
<td>Computing charges - WD</td>
<td>72</td>
</tr>
<tr>
<td>- WRD</td>
<td>68</td>
</tr>
</tbody>
</table>

| Capital Consumption - WD                          | 2049  |
| - WRD                                            | 452   |

<table>
<thead>
<tr>
<th>Debt Servicing - WD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>7566</td>
</tr>
</tbody>
</table>

Less costs attributable to rural water services (b) | 29568 |

Total costs attributable to towns.                  | 21908 |

Source: Various N.T. Government Departments

(a) Subsidy implicit in concessional electricity tariffs has not been removed.

(b) This excludes all debt servicing costs and depreciation for capital works which are unable to be identified specifically to this function.

WD - Water Division
WRD - Water Resources Division
It should be noted that Water Resources Division costs shown in the above table are those which have been identified as attributable to water supply operations (e.g. a significant proportion of the bacteriological laboratory salaries and administration costs). The support functions referred to are personnel/salaries/recruitment and other management services etc., performed by the Department concerned on behalf of the water supply services function. In the case of the Department of Transport and Works, the support provided includes, in addition, public works, plant and radio and contract administration staff costs associated with capital works projects and certain water operations activities.

The data in the above table, after deducting costs of rural water services (to Aboriginal communities) together with the consumption statistics provided in Chapter 2, reflect the average cost of town water supplies in the Territory. While, in some towns the cost was significantly more and in others somewhat less, overall, the average cost of producing a kilolitre of water was 72.7 cents in 1984/85.

Adjustment for Electricity Subsidy:

Included in the Operations and Maintenance expenditure of $10.8 million was an amount of $2.6 million for electricity consumption for the operation of pumping stations etc. The cost of electricity in the Territory has long been subsidised and although in the current year the subsidy is probably in the region of 30-40%, in 1984/85 it amounted to about 50%. This added 8.8 cents to costs and takes the full economic cost of water supply in that year to 81.5 cents per kilolitre.

Costs of wastewater services are presented in Table 3.2:
Table 3.2
Cost of Wastewater Services - Northern Territory
1984/85
$'000

<table>
<thead>
<tr>
<th>Description</th>
<th>WD</th>
<th>WRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries &amp; related payments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries etc - WD</td>
<td>2175</td>
<td></td>
</tr>
<tr>
<td>Salaries etc - WRD</td>
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<td></td>
</tr>
<tr>
<td>T &amp; W support</td>
<td>366</td>
<td></td>
</tr>
<tr>
<td>DME support</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Superannuation Employers Liability - WD</td>
<td>378</td>
<td>12</td>
</tr>
<tr>
<td>Long Service Leave Provision - WD</td>
<td>43</td>
<td>2</td>
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<tr>
<td>Recreation Leave Provision - WD</td>
<td>203</td>
<td>7</td>
</tr>
<tr>
<td>NTHC Staff Rental Subsidy - WD</td>
<td>36</td>
<td>1</td>
</tr>
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<td>Operations &amp; Maintenance (a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration &amp; Operational - WD</td>
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<tr>
<td>Administration &amp; Operational - WRD</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Capital items - WD</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Capital items - WRD</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>T &amp; W support</td>
<td>529</td>
<td></td>
</tr>
<tr>
<td>DME support</td>
<td>6</td>
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<tr>
<td>Other Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repairs &amp; Maintenance</td>
<td>776</td>
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</tr>
<tr>
<td>Property Management - WD</td>
<td>241</td>
<td>2</td>
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<tr>
<td>Property Management - WRD</td>
<td></td>
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</tr>
<tr>
<td>Communications - WD</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Computing Charges - WD</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Computing Charges - WRD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Consumption - WD</td>
<td>458</td>
<td></td>
</tr>
<tr>
<td>Capital Consumption - WRD</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Debt Servicing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>8745</td>
<td></td>
</tr>
<tr>
<td>Less costs attributable to rural wastewater services (b)</td>
<td>1848</td>
<td></td>
</tr>
<tr>
<td>Total costs attributable to towns</td>
<td>6897</td>
<td></td>
</tr>
</tbody>
</table>

Source: Various N.T. Government Departments.

(a) Subsidy implicit in concessional electricity tariffs has not been removed.

(b) This excludes all debt servicing costs and depreciation for capital works which are unable to be identified specifically to this function.

The same general explanations apply to the above table as to the previous table.
Using data presented in Table 2.7 as to number of connections, it will be seen that the cost of wastewater services per town connection was $266 p.a. in 1984/85, or $138 per fixture. After adjustment to remove the effects of the electricity subsidy, estimated to have been worth $0.4 million, the cost was $145 per fixture.

Costs of Water Supply - Towns

A disaggregation of the data provided in Table 3.1 into costs for the four major towns receiving water supply services from the Water Division is provided below.

Table 3.3
Costs of Water Supply - Major N.T. Towns

<table>
<thead>
<tr>
<th>Town</th>
<th>Total Costs*</th>
<th>Consumption '000 kL</th>
<th>Average Cost c per kL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>15475</td>
<td>20,548</td>
<td>75.3</td>
</tr>
<tr>
<td>Katherine</td>
<td>1213</td>
<td>1,249</td>
<td>97.1</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>1412</td>
<td>1,270</td>
<td>111.2</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>5116</td>
<td>6,335</td>
<td>80.7</td>
</tr>
<tr>
<td>All N.T. Towns</td>
<td>24545</td>
<td>30,104</td>
<td>81.5</td>
</tr>
</tbody>
</table>

Source: Water Division and various Government Departments.

* The subsidy implicit in the concessional electricity tariffs has been removed.

The table reveals wide variations between towns in the cost of supplying water. These are due to a number of factors, including the statistical problems mentioned earlier. No costs have been shown for the smaller towns individually, as in the absence of adequate statistical information systems and commercial cost centre accounting systems, the available data proved unreliable and could not be used with confidence.

Differences in costs between the four main towns are due to a number of factors; differences in types and scale of assets, differences in local geography and local operating conditions, economies of scale. For example, costs in Tennant Creek reflect the very high real electricity costs per kilolitre of pumping from the large number of bores in its dispersed borefield, and moving water the considerable distance from the borefield into the town. Alice Springs has equally high electricity costs but the reasons are somewhat different. There the bores, although less dispersed and located closer to town, are much deeper. In contrast, electricity costs in Darwin are very much lower, reflecting economies of scale in operating large pumps. Katherine's are the lowest because of the proximity of the supply source. For reasons which were not readily apparent, salaries costs per kilolitre of water consumed were higher in Tennant Creek than in the other towns. Capital related costs were also high. The advantages Katherine gains through its low electricity consumption are offset by higher operating costs and imputed depreciation, and debt servicing on its sophisticated water purification plant.
Costs of Supply - Rural Communities

Data was not available for costs of supply to individual communities. In any event the number of communities is so large and they are so varying in size and circumstances that the exercise would not be particularly useful.

Since the Water Division accumulates some direct operations and maintenance costs on a regional level, it was decided to attempt to build up a picture of full costs on this basis. Salaries were allocated according to the methods outlined earlier, as were the remaining operations and maintenance costs.

The identification of capital assets on rural communities for purposes of depreciation presented a major problem since the records of assets are neither comprehensive nor accurate and the values and dates of installation of assets are mostly unknown. It was therefore necessary to work from the capital works programs for the Departments of Transport and Works and Community Development. These pick-up expenditures since Self-Government.

In the limited time available, it was not possible to identify and compile expenditures before Self-Government. The average life expectancy of equipment in rural areas was assumed to be up to 10 years, based on field experience and thus the lack of confirmed pre-Self-Government asset data is less serious.

The results of this cost analysis are shown in Table 3.4.

Consumption statistics were not available and the only indication of performance was the population served by these outlays.

Table 3.4
Costs of Water and Wastewater Services - Rural Communities
1984/85

<table>
<thead>
<tr>
<th>Area/Region</th>
<th>Water and Wastewater Service costs (a) ($000's)</th>
<th>Population</th>
<th>Cost per Capita Water &amp; Wastewater ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>11,550</td>
<td>7,057</td>
<td>1,637</td>
</tr>
<tr>
<td>Katherine</td>
<td>3,526</td>
<td>4,948</td>
<td>713</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>1,375</td>
<td>3,423</td>
<td>402</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>5,280</td>
<td>8,887</td>
<td>594</td>
</tr>
<tr>
<td>Gove</td>
<td>3,609</td>
<td>6,167</td>
<td>585</td>
</tr>
<tr>
<td>TOTAL</td>
<td>25,340</td>
<td>30,482</td>
<td>831</td>
</tr>
</tbody>
</table>

Source: Water Division and Department of Community Development

(a) Includes depreciation and debt servicing charges on assets.
The reasons for the higher cost of providing water and wastewater services in the Darwin region are unable to be identified with any certainty. Despite extensive investigation, the only explanations provided by the Water Division were:

- Darwin rural communities are more difficult to access during the 'Wet' and high air charter costs are reflected.
- These communities benefit from a higher level of supervision as the expertise is predominately available in Darwin.
- Disparity between the contract rates for Darwin region community contracts and those arranged in other regions (this is currently being rectified).

The facilities provided to rural communities vary depending on technical considerations, the size of the community and its location. For example, groundwater may be provided by diesel bore, electric bore, windmill bore, manual bore or a combination say of windmill/diesel or electric/diesel bores. Within the fundamental requirement of providing a reliable supply, decisions as to the type of installation are based on the minimisation of operating and maintenance costs. However, while this is the principle, it is not always uniformly applied and there is a tendency towards mechanical solutions involving expensive equipment when, in some cases, more simple appropriate technology would be more suitable.

Costs of Supply - Interstate Comparisons

Why are costs of production in the Territory so high? Although what follows centres on water supply costs, the general conclusions can be extended to wastewater.

A comparison was made with interstate supply authorities. Data for the latter was obtained from published sources and relates to the financial year 1983/84. The Territory data used is that for 1984/85 deflated by the non dwelling construction gross fixed capital expenditure price deflator.

Table 3.5

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Operations</th>
<th>Financing</th>
<th>Depreciation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>'000 ML</td>
<td>Cents/kL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N.T. (84/85 deflated)</td>
<td>30.1</td>
<td>45.9</td>
<td>23.8</td>
<td>6.8</td>
<td>76.5</td>
</tr>
<tr>
<td>Hunter District</td>
<td>69.4</td>
<td>36.9</td>
<td>20.9</td>
<td>1.4</td>
<td>59.2</td>
</tr>
<tr>
<td>S.A.</td>
<td>245.7</td>
<td>29.6</td>
<td>20.5</td>
<td>2.5</td>
<td>52.6</td>
</tr>
<tr>
<td>Perth</td>
<td>165.0</td>
<td>21.8</td>
<td>15.3</td>
<td>5.2</td>
<td>42.3</td>
</tr>
<tr>
<td>Sydney</td>
<td>545.0</td>
<td>22.8</td>
<td>12.9</td>
<td>2.9</td>
<td>38.6</td>
</tr>
</tbody>
</table>

Source: Water Division and State supply authorities.
It is apparent that economies of scale play a large part in determining operating costs. The rise in consumption levels between authorities is accompanied by a fall in unit costs. The odd one out in an otherwise regular pattern is South Australia and this illustrates a second factor affecting costs of supply: non-urban operations raise average costs. South Australia has one supply authority for the whole State; it runs a surplus on its metropolitan water supply operations and a deficit on its country operations. The operations and financing costs for the Adelaide metropolitan water supply in 1983/84 totalled about 42 cents per kl.

It should be mentioned that depreciation rates used by the Hunter District Water Board in 1983/84 appeared to be unrealistically low, and the depreciation policies followed in South Australia and Sydney are also somewhat unrealistic. The Sydney Metropolitan Water, Sewerage & Drainage Board indicates in its 1983/84 Annual Report that policies in this area are being developed.

Since operating costs contribute most to total costs, an attempt was made in Table 3.6 to compare these costs in more detail, by separating out salaries from other operating costs. Unfortunately, not all of the published sources included the required data and the comparison has had to be limited to the Hunter District Water Board, and the S.A. Engineering & Water Supply Department.

<table>
<thead>
<tr>
<th></th>
<th>N.T*</th>
<th>Hunter</th>
<th>S.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries &amp; related expenses</td>
<td>17.00</td>
<td>22.2</td>
<td>13.2</td>
</tr>
<tr>
<td>Other operations &amp; maintenance</td>
<td>28.9</td>
<td>14.7</td>
<td>16.4</td>
</tr>
<tr>
<td>Electricity</td>
<td>16.5</td>
<td>4.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Other</td>
<td>12.4</td>
<td>10.1</td>
<td>14.4</td>
</tr>
<tr>
<td>Financing</td>
<td>23.8</td>
<td>20.9</td>
<td>20.5</td>
</tr>
<tr>
<td>Depreciation</td>
<td>6.8</td>
<td>1.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>76.5</td>
<td>59.2</td>
<td>52.6</td>
</tr>
</tbody>
</table>

Source: Water Division - State supply authorities

* Deflated 1984/85 data.

Electricity costs (with the electricity subsidy removed) account for some 12 to 14 cents of the difference in operating costs. Other operating costs do not appear to be out of line. Allowing for a possible anomaly in the salaries figure for the Hunter District Water Board (relating to
capitalisation of salaries costs for capital works), the South Australian salaries figure of 13.2¢ is regarded as the better indicator (it also equates with data for Perth). This would suggest that Northern Territory salaries per kilolitre may be somewhat high at 17¢ per kl. Whilst there is a difference of 4 to 5 cents in depreciation, this is considered to be due to the outdated policies still followed by some Authorities. The then Metropolitan Water Authority of Perth is considered to have followed the most realistic depreciation policies. In 1983/84 it was in the final stages of a catchup depreciation program and, as Table 3.5 shows, depreciation charges were running at 5.2¢ per kl, which is much closer to the N.T. figure. The 3¢ per kl difference in financing charges probably only reflects a larger proportion of higher costs post-1978 borrowings by the Northern Territory.

Electricity shows up as the most important single component of water costs in the Northern Territory. It accounted for 22% of costs of production in 1983/84 compared with 8% in the Hunter District and 4% in South Australia. This reflects the much greater reliance in the Territory on groundwater sources and the need to pump water long distances from supplies to consumers. Although it is doubtful that any significant economies could be achieved in this area, electricity consumption levels should nevertheless be the subject of further study, simply because electricity is such a large cost component. There may be some savings possible in the way installations are designed or operated.

Conclusions

- Significant data problems were encountered in identifying costs by town and the results are therefore provisional only and must be interpreted carefully.
- The full commercial cost of water production in Territory towns and communities in 1984/85 was about $30 million and for wastewater services it was about $9 million (excluding interest and depreciation on assets in Aboriginal communities and before removing the subsidy implicit in the concessional electricity tariffs).
- The above figures include cash costs as reflected in departmental budgets plus non-cash costs not previously identified, such as various salaries related costs (superannuation etc.) and depreciation.
- The full average cost of water across all Territory towns was 81.5¢ per kilolitre, with the electricity subsidy removed, or 72.7 cents per kilolitre with it included.
- The average cost of wastewater services in towns was $145 per fixture with the electricity subsidy removed or $138 per fixture with it included.
- Water supply costs vary considerably from town to town from 75¢/kl in Darwin to $1.11 in Tennant Creek. For the small towns the costs can be very much higher, although the statistics are such that the estimates are less reliable.
- Full costs of water and wastewater services to rural communities average about $800 per capita per annum including depreciation and debt servicing on assets.
Electricity costs accounted for about 22% of water production costs in 1983/84 and are significantly higher in the Northern Territory than for other major State systems. Other operating costs are not out of line with comparable smaller systems, however, salaries costs per kilolitre may be somewhat high.

A study needs to be conducted to establish whether there is any scope for reducing electricity consumption levels.
CHAPTER 4 - REVENUE AND PRICING

In this chapter the demand and cost analyses of the previous two chapters are brought together to explain the revenue, deficit and subsidy implications of present pricing policies.

Subsidies - an overview

To what degree are water and wastewater services in the Territory subsidised? Table 4.1 summarises available cost and revenue data to indicate the overall size of the deficits involved in providing services to towns in 1984/85.

<table>
<thead>
<tr>
<th></th>
<th>Costs</th>
<th>Revenue</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td>24.545</td>
<td>5.705</td>
<td>18.840</td>
</tr>
<tr>
<td><strong>Wastewater</strong></td>
<td>7.227</td>
<td>3.298</td>
<td>3.929</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>31.772</td>
<td>9.003</td>
<td>22.769</td>
</tr>
</tbody>
</table>

Source: Water Division

For water, the unit cost of production was 81.5 cents/kl (including the full cost of electricity). Revenue amounted to 18.9 cents/kl and the deficit therefore was 62.6 cents/kl. In other words, the water subsidy in Territory towns in 1984/85 amounted to 77% of the full cost of production.

This deficit was subsidised through the supplier to the extent of 53.8 cents/kl and through the provision of subsidised electricity to the supplier to the extent of 8.8 cents/kl.

For wastewater services the picture of heavy subsidisation was much the same. The cost of a unit of service (one fixture connected to the wastewater system for one year) was $145 including the full cost of electricity. The cost is reduced to $138 if the electricity subsidy is ignored. Revenue was $66 and the subsidy therefore $79 p.a. per fixture or 55% of the cost of the service.

Subsidies - Towns

Dissecting the foregoing data reveals the following picture on a town by town basis. The caveats mentioned earlier regarding the problem of getting accurate data need to be repeated here. The data for the smaller towns may be misleading due to statistical distortions, data capture and processing errors etc., which, due to the small sizes of the numbers involved, may have a disproportionally large effect.
Table 4.2
Water Supply - N.T. Towns
Costs, Revenues and Deficits
1984/85

<table>
<thead>
<tr>
<th>Town</th>
<th>Costs $m</th>
<th>Revenue $m</th>
<th>Deficit $m</th>
<th>Deficit per kL cents/kL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>15.475</td>
<td>3.979</td>
<td>11.496</td>
<td>55.9</td>
</tr>
<tr>
<td>Katherine</td>
<td>1.213</td>
<td>.230</td>
<td>.983</td>
<td>78.6</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>1.412</td>
<td>.262</td>
<td>1.150</td>
<td>90.6</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>5.116</td>
<td>1.114</td>
<td>4.002</td>
<td>63.2</td>
</tr>
<tr>
<td>All N.T. Towns</td>
<td>24.545</td>
<td>5.705</td>
<td>18.840</td>
<td>62.6</td>
</tr>
</tbody>
</table>

Source: Water Division

Table 4.3
Wastewater Services - N.T. Towns
Costs, Revenues & Deficits
1984/85

<table>
<thead>
<tr>
<th>Town</th>
<th>Costs $m</th>
<th>Revenue $m</th>
<th>Deficit $m</th>
<th>Deficit per fixture $/fixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>5.246</td>
<td>2.326</td>
<td>2.920</td>
<td>85.55</td>
</tr>
<tr>
<td>Katherine</td>
<td>.435</td>
<td>.152</td>
<td>.283</td>
<td>147.01</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>.219</td>
<td>.149</td>
<td>.070</td>
<td>42.92</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>1.144</td>
<td>.637</td>
<td>.507</td>
<td>43.19</td>
</tr>
<tr>
<td>All N.T. Towns</td>
<td>7.227</td>
<td>3.298</td>
<td>3.929</td>
<td>78.75</td>
</tr>
</tbody>
</table>

Source: Water Division

Subsidies - rural communities

The cost of the supply of water and wastewater services in rural communities in 1984/85 was $25.34 million. Revenue from consumers of services was nil. (in the 1985/86 Budget, the Government announced measures to implement some notional recovery in respect of electricity, water and wastewater services). Some subsidisation is also provided through Commonwealth expenditure on the installation of capital equipment in communities, (which results in the Territory Government having to meet operating costs).
Tariffs

The foregoing indicates that very substantial implicit subsidies are now being provided for water and wastewater services in the Territory: almost $23 million p.a. in the towns and over $25 million p.a. in the communities.

It must be stressed that these numbers represent the full economic value of the implicit subsidies. The cash costs of the subsidies as they affect the Territory budget at present are somewhat less - about $16 million p.a. for town services and $9 million for rural services (ie excluding depreciation and salaries related provisions).

Over the years, the setting of tariffs for water and wastewater services has been undertaken somewhat erratically (see Table 4.4). There have been long periods when they remained unchanged, broken by very substantial rises (though from a small base). Tariff reviews have usually been undertaken in the budget context, in earlier years more from the point of view of contributing towards a balanced budget than achieving particular target levels of cost recovery. In recent years the aim has been to achieve a reasonable revenue effort. In a situation where the costs of these services were submerged to the degree they were, this was perhaps a not unreasonable approach.

Since Self-Government, water charges have moved in step with inflation and wastewater charges have moved ahead, suggesting some improvement in the degree of cost recovery.

<table>
<thead>
<tr>
<th>Year</th>
<th>Water Charge for 750 kL</th>
<th>% Change</th>
<th>Wastewater Charge for 2 Fixtures</th>
<th>% Change</th>
<th>CPI All Groups - WTD</th>
<th>AVE 6 State Capitals (1980-81 = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973/74</td>
<td>66</td>
<td>-</td>
<td>35</td>
<td>-</td>
<td>49.1</td>
<td>85.8</td>
</tr>
<tr>
<td>1978/79</td>
<td>75</td>
<td>14</td>
<td>45</td>
<td>29</td>
<td>95.0</td>
<td>103.4</td>
</tr>
<tr>
<td>1979/80</td>
<td>75</td>
<td>-</td>
<td>45</td>
<td>-</td>
<td>114.5</td>
<td>127.3</td>
</tr>
<tr>
<td>1980/81</td>
<td>50</td>
<td>(33)</td>
<td>75</td>
<td>66</td>
<td>127.3</td>
<td>132.2</td>
</tr>
<tr>
<td>1981/82</td>
<td>50</td>
<td>-</td>
<td>75</td>
<td>-</td>
<td>141.1</td>
<td></td>
</tr>
<tr>
<td>1982/83</td>
<td>125</td>
<td>150</td>
<td>100</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983/84</td>
<td>125</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984/85</td>
<td>125</td>
<td>22</td>
<td>150</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

% change 1978/79 to 1984/85 67% 122% 64% (June 74 /June 85)

Source: Water Division and Australian Bureau of Statistics.
Nevertheless, tariffs in the Northern Territory are still much lower than those currently being charged by some interstate water authorities, as table 4.5 shows.

Table 4.5
Comparative Water Prices
1985/86

<table>
<thead>
<tr>
<th>Basis of charge</th>
<th>Charge for 750 kL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.T. allowance @ $75 + 25¢/kL</td>
<td>$152, 20¢/kL</td>
</tr>
<tr>
<td>S.A. ICV x rate + 56¢/kL</td>
<td>$420, 56¢/kL</td>
</tr>
<tr>
<td>W.A. RV x rate + 26¢-135¢/kL</td>
<td>$313, 37¢/kL</td>
</tr>
<tr>
<td>Sydney land value x rate + 36¢/kL</td>
<td>$263, 36¢/kL</td>
</tr>
<tr>
<td>Hunter land value x rate + 56¢/kL</td>
<td>$392, 52¢/kL</td>
</tr>
<tr>
<td>Brisbane land value x rate + no excess</td>
<td>$192, -</td>
</tr>
<tr>
<td>Melbourne NAV x rate + 40¢</td>
<td>$300, 40¢/kL</td>
</tr>
</tbody>
</table>

Source: State Water Authorities

* States figures calculated using an average land value as advised by State authorities.

The picture that emerges seems reasonably clear: services which, because of specific local factors, are very costly to supply, in a part of Australia where water consumption could be expected to be high and where the Government has wanted to promote population growth, have been factors that have given rise to the general expectation that water in the Northern Territory should be heavily subsidised. The heavy subsidies have probably been more than was needed to achieve the aims at the time and instead have served to encourage high demand and lock the Government into a subsidy trap.

The Subsidy Trap

One factor that has been apparent in this study is that the demand for water has tended to be regarded as an independent variable and the duty of the supply authority has been seen merely as keeping supply (quantity and quality) up to the level of demand from time to time. With the concessional pricing regime that has been employed, this has resulted in significant demand growth for water and a consequent need for considerable expenditure on capital resources with attendant high operating costs and implicit subsidy levels. The fact that demand for water can be responsive, sometimes highly responsive, to price levels, has not thus far been used systematically in the planning process.

In reality demand can be manipulated by pricing policy and this in turn has implications for the timing of capital works and levels of depreciation and interest costs that have to be carried. There is, in fact, a "subsidy treadmill" that results from uneconomic or subsidised pricing policies and leads to increased operating costs and still higher subsidies:
subsidised prices
increased demand
increased need for capital works
increased depreciation and interest costs
need for still higher subsidies

This policy approach has equity implications both horizontally and through time. It shifts the real cost of today's water consumption from users onto taxpayers generally (they are not necessarily the same) and shifts a burden through time onto future taxpayers.

On the other hand, a pricing policy based on commercial reality makes current consumers responsible for the resources they use. However, this does not necessarily mean that they end up carrying the full cost of the subsidy. The more elastic is their demand, the lower the additional burden they need to carry, because a given percentage increase in prices will result in a smaller percentage increase in consumer expenditure. Demand contraction will occur (the more so if price levels have been so low as to give rise to wasteful usage patterns) and expenditures will rise by less than the price increase. The demand contraction then enables deferral of the next increment of capital expenditure and thereby results in lower future operating costs than if subsidies were maintained. At the same time some contraction in present operating costs will be possible and necessary.

While the subsidy approach shifts real costs into the future, the commercial approach does not shift the full burden of the subsidy to today's consumers. They bear something less, the remainder of the adjustment being through demand contraction. Thus, the transition from subsidised consumption to full or a higher level of cost recovery is partly through increased revenues and partly through cost reduction, their relative importance depending on the price elasticity of demand.

Demand Management

A fundamental element that has been lacking in the administration of the water function in the Northern Territory has been demand management whether it be through the price mechanism as outlined in the previous section or through other means such as water conservation programs. The basic message is that the Territory need not be in the subsidy trap to the extent it is, if it can stop viewing water demand as an independent variable and start seeing it as a dependent variable, a function of price, income, advertising etc the same as other products and one consequently which, up to a point, is capable of demand management. Pricing policies need to be directed to this end and the remaining sections of this chapter examine some changes that would be of assistance in facilitating demand management.

Features of the Pricing System

Use Related Tariffs: One thing the Territory water industry has going for it is its use related charging system. Most of the states still
operate under tariff systems that relate charges to property values, although some are now attempting to move away from them, with difficulty. Such systems grew out of local government involvement in water and wastewater services at times and places where the scope for demand escalation and the costs of supply were both much lower than in the Territory. Property related charging systems are now regarded as inequitable, since property values are not necessarily a guide to capacity to pay, but, more importantly, they do not establish the necessary link between the level of demand and the level of charges the user pays. The Territory system does, and, for that reason, must be maintained. However, there are some elements of present pricing policies that mitigate against the full benefits of the pay-for-use system being obtained.

The "allowance": Territorians now receive a water allowance of 500 kl 3.3. For $90, i.e. 18¢/kl. This arrangement seems to be a remnant from the days of the "free allowance". Its present purpose is not clear and effectively all it does is define a rising block tariff, (first 500 kl @ 18¢/kl, thereafter 25¢/kl), while maintaining a basic charge element. There are further anomalies in that rebates are allowed where consumption is less than the allowance. ($15 for less than 300 kl and $11.25 for 300 kl and less than 400 kl). Retention of the allowance renders difficult the introduction of quarterly billing, which is considered to be desirable (see later). The allowance may have a perverse affect in that it encourages usage up to the full amount of the allowance (or the relevant rebate level within it) without any increase in cost to the consumer. Provided that appropriate adjustments were made to tariffs for low levels of consumption, the allowance could be abolished, and this is recommended.

Service charge: The present fixed charge element should remain. In theory, this is a charge necessary to cover the fixed costs of providing the service (depreciation and interest, billing, etc). It is a charge for the right to have access to the reticulation systems for one year and such access carries a responsibility to pick up a share of the standing charges of having the system in place. It allows some recovery of costs even though a property may be unoccupied or consumption levels are very low and it adds an element of greater predictability to the supplier's revenues. In practice the fixed charge or service charge could not be set to recover the full fixed costs of the system since with water and wastewater systems these are invariably high. Rather, it could reflect meter reading, checking, testing and billing costs plus some defined proportion of other fixed overheads.

Exempt users: The way in which the provision of exemptions to some users works against better demand management is apparent from the fact that exempt users, notably Government schools, are amongst the largest consumers of water. Exemptions are now something of an anachronism - a necessary part of a system where charges were based on property values but out of place when service based charges are in force. They distort usage patterns by selectively reducing the discipline to conserve water. They should be abolished and, only if hardship can be demonstrated, replaced by grants.
Usage charge: The present excess charge should be replaced by a usage charge applicable to all usage levels, including those now covered by the basic charge. The usage charge is the centrepiece of an effective demand management policy. There are a range of options available for structuring usage charges.

**Uniform Tariff Structure**

(a) constant unit prices.

**Differential Tariff Structure**

(b) by use - declining block tariffs.

(c) by use - rising block tariffs.

(d) by user - domestic vs. commercial etc.

(e) by time - peak/off peak tariffs.

(f) by location - regional tariffs.

These options are briefly considered below against the basic principle that the preferred price regime should be one that most effectively implements the user pays policy and thus facilitates demand management.

(a) It is said that constant unit prices neither reward low consumption nor penalise high consumption, but of course they do by virtue of the costs to consumers reflecting consumption levels. The question is whether to seek a linear relationship or one that offers more pronounced rewards and penalties, in which case the falling or rising block tariff structure would be appropriate. The one big advantage of the constant unit price system is that it is simple to understand. The importance of this should not be under-rated. If the aim is to conserve water, consumers need to be readily able to read meters, to calculate charges for themselves, and generally to get a feel for the way usage affects costs. The simpler the system the better.

(b) Declining block tariff structures which allow lower unit prices for increased consumption are not favoured since they actually reward increased usage. If it could be shown that, within the production ranges involved, there were users whose scale of usage helped to reduce overall unit costs for everyone, then there could be an argument for passing back some of these savings to those users, but this does not seem to be the case in the Northern Territory at present.

(c) Rising block tariff structures charge higher unit prices as consumption increases and therefore allow the supplier to reward the conservative user and penalise the profligate. The choice of shape allows one to do that with various degrees of finesse. Generally, this type of pricing structure is to be recommended, provided that not too many blocks are incorporated.
(d) Usage of water and wastewater services by commercial and industrial consumers has not been subject to separate pricing policies to date. In particular, there are apparently no pricing policies in place regarding the disposal of trade wastes through the sewers. It is also noted that the way the Territory's use related tariffs are applied at present, commercial users contribute less to water revenues than they would under land value related systems. Commercial consumers in central city locations in Sydney, for example, contribute proportionately more than they would in Darwin, even allowing for differences in land values. These are matters that will need to be addressed.

(e) The significance of peak/off peak tariffs is that they recognise the importance of the growth in peak demand for the timing of capital augmentation. Systems are designed for expected peak loads and it is the rate of growth in peak demand rather than average demand which critically determines size and timing of successive system upgrades. Peak demand pricing places higher charges on usage in peak periods and so, by selective pricing, seeks to moderate peak demand. Thus far, it has not been a feature of utility tariff policies in the Territory.

Daily peak demand pricing is technically not feasible as yet; however, seasonal peak demand pricing is. All that is required is quarterly meter reading and billing. The former is in place but not the latter, due principally to legislative requirements which define the billing cycle. As there are advantages in seasonal peak/off peak pricing as an aid to demand management, this option should be examined more fully.

(f) Differential regional pricing is the logical extension of the user pays principle. In effect, it says that if it costs more to supply water and wastewater services in a particular locality then prices ought to reflect that fact. On the other hand a uniform price structure across different regions implies subsidisation by consumers in low cost areas in favour of consumers in high cost areas. The arguments for uniformity are ease of administration through not having a multiplicity of price structures and the need to promote regional development by avoiding, where possible, the worsening of the already significant disabilities of remoteness. At present, water and wastewater prices are uniform across the Northern Territory and that policy should continue.

It is recommended that the present use related charging system be retained, but amended to replace the basic charge and excess charge with a fixed service charge and a usage charge based on a rising block tariff. The allowance and exemptions should be abolished and compensating adjustments made to the scale of usage charges as may be considered appropriate. The present policy of uniform Territory-wide tariffs should be retained.

Concessions: Levels of pensioner and other concessions are a matter of Government policy. Their administration could be through the supply body or through the Department of Community Development; the former is probably more convenient for customers. The cost of concessions given should be reimbursed to the supply body by the Department of Community Development.
The Billing System

Meter reading and billing are carried out by Water Division staff with the aid of a computerised customer accounts system. There are 20 staff directly involved full-time around the Territory and the cost of the function runs to about $635,000 p.a.

At present, each meter is normally read on a quarterly cycle, but customers are billed once a year. The stated reasons for the quarterly cycle are to pick up faulty meters at an early stage, and to advise customers of unusually high levels of consumption (which could be due to leaks etc within a property). The main reason that the quarterly meter readings are not translated into quarterly accounts is that Section 33(6) of the Water Supply and Sewerage Act specifies that the billing period for normal account purposes shall be one year. This seems to be a case of the legislation being overly specific, although some such provision may have been necessary as part of the legislative basis for charging consumers. Nevertheless, it is recommended that either by an amendment to the above Act or by introduction of a new Water Bill (see below), greater scope for flexibility should be given in respect of the billing cycle.

It is also considered that a move to a quarterly billing cycle would be advantageous for the following reasons:

- it will contribute to demand management.
- it will allow customers to better keep track of usage levels.
- customers will find it easier from a household budget viewpoint.
- it offers scope for some rationalisation with NTEC billing (see below).
- it will facilitate introduction of seasonal peak/off-peak pricing.
- it will improve the cash flow of the supply body.

For very high use customers, monthly billing may be appropriate.

More frequent billing cycles should be able to be introduced without significantly affecting billing costs with the concurrent introduction of a computerised meter records device now under review by the Water Division and NTEC. The system is carried by meter readers. It provides route data, past consumption records etc and accepts details of current meter readings. When field staff return to base each afternoon the device is downloaded into a computer and accounts generated overnight. There are thus considerable savings in data entry and improvements in the speed of billing. The system has been in operation overseas for some years and supply authorities in Australia are now adopting various manufacturers versions of it.

Price Levels

Should the Northern Territory Government aim for full cost recovery on its water and wastewater operations?
At a cost of 81.5c/kL, full cost recovery would mean that the annual water bill for the average consumer (say 1000 kL) would rise from $217 to $815, or, leaving in the effect of the electricity subsidy, $727. Costs of wastewater services (2 fixtures) would rise from $150 to $279 p.a. That would mean that the combined water and wastewater bill for the average user would increase from its present 1.9% of Territory Average Weekly Earnings to 4.8%. By comparison, electricity costs for the average consumer in 1984/85 were $582 or 2.8% of AWE.

In the event, of course, most consumers would seek to avoid bills of this magnitude by cutting consumption dramatically and the supply body would then be faced with much smaller than anticipated revenue increases. It would need to make up this shortfall by attempting to effect reductions in operating costs. However, asset related costs could not be reduced (unless parts of the supply system could be closed down and sold off—virtually an impossibility in this industry). The upshot would be that there would still be a substantial deficit on operations albeit at a much lower level of consumption. In spite of what we don't know about elasticity of demand in this field, it can be said with some certainty that the probability of a large down-swing in demand is very great. For example, when the Hunter District Water Board substantially changed its pricing structures in 1982/83, there followed a 35% reduction in demand over the next two years which placed very significant financial strains on the Board.

If there were to be a move towards full cost recovery it would need to be undertaken gradually over a number of years. Premature moves should not be attempted simply because they won't succeed in eliminating the deficit quickly.

A second reason for not attempting full cost recovery in the short-term is that what scope there may be for cost containment first needs to be explored. There is no doubt that present arrangements for supply of water and wastewater services in the Territory need to be substantially re-organised so as to bring all costs under one roof. Once that process of centralisation is completed it will be possible to establish what savings can be wrung out of the present cost structure. Only when a program of cost minimisation has been completed and there is general acceptance that the operation is running in a lean and efficient manner, would it be possible to identify the true cost of running the system and only then would there be a reliable full cost recovery target to aim at.

For the foreseeable future, tariff policies should aim at making a reasonable revenue effort by comparison with the States. Costs that are not covered by the revenues generated by such a policy would then need to be subsidised by the Northern Territory Government and those subsidies should in turn be recognised by the Grants Commission, provided they are related to operating costs only and cannot be shown to result from deliberate policy choices on the part of the Territory.

It is recommended that, for the time being, tariff policy for water and wastewater services should be based on the maintenance of a reasonable revenue effort by comparison with the States.
Conclusions

After allowing for revenues, the notional deficit on water and wastewater operations in towns ran at $23 million in 1984/85.

In rural communities the notional deficit was $25 million. This includes imputed interest and depreciation charges on capital.

Since Self-Government, water charges have kept pace with inflation, while wastewater charges have moved ahead suggesting some improvement in the degree of cost recovery.

Highly subsidised water and wastewater services have placed the Northern Territory in a subsidy trap, where subsidies actually lead to higher costs and thus the need for still higher subsidies.

Instead of adopting an approach of demand management, which recognises that demand for water is a function of price, advertising and conservation programs etc., the Northern Territory has viewed water demand as an independent variable. The job of the supply body has been seen as simply to keep up with the growing demand.

If successful demand management programs are introduced it is possible to defer capital programs and thus interest and depreciation cost increases.

The present tariff system needs to be revamped to replace the basic charge and allowance with a fixed service charge which carries no consumption entitlement. The excess charge should be replaced with rising block usage charges. Exemptions should be removed.

The Water Supply and Sewerage Act should be amended to allow quarterly and other billing cycles.

Because of the very high costs of water and wastewater services and because we don't yet know the scope for cost reduction by rationalisation and economy measures, it is not recommended that the Government adopt a policy of full cost recovery. Instead, it is proposed, that the principle of reasonable revenue effort be adopted and tariffs in the Northern Territory be related to average tariffs elsewhere in Australia.
CHAPTER 5 - PRESENT ARRANGEMENTS

By comparison with other functional areas in the Northern Territory, the water function seems to have undergone a disproportionate number of changes.

A brief summary of the history of how these services have been administered is illuminating. The impression is gained that there has been some doubt as to what to do with them, and consequently there has been more than an average tendency to move the pieces around.

Early 1960's streamgauging and groundwater functions were performed by the Water Resources Branch, Department of Territories; design/construction and operation of water and wastewater services were with the Department of Works; billing/recovery/connections were with the Public Utilities Branch of the Department of Territories.

In 1968 the Water Resources Branch was combined with the Mines Branch to cut down on duplication in the drilling function.

In 1969 the Water Resources Branch was separated from the Mines Branch due to lack of real integration. The Public Utilities Branch continued to have responsibility for water and wastewater services.

In 1972/73 a Water Branch was formed in the new Department of the Northern Territory to take over responsibility for water and wastewater services. Streamgauging and groundwater etc. continued to be the responsibility of the Water Resources Branch.

At Self-Government the water related functions for urban towns only were brought together to form the Water Division in the Department of Transport and Works, i.e. the water and sewerage utility function, and the design and construction of water related capital works. The Division also had responsibility for water investigations and resource management for the whole of the Northern Territory. The idea was to form a statutory authority but this was later shelved. Responsibility for the operation of water and wastewater facilities in rural communities together with responsibility for the design and construction of such rural facilities was established within the Public Works Division.

In 1980/81 the planning and operations responsibilities were combined in a new branch within the Water Division, the Operations Branch.

In 1981/82 the Operations Branch was transferred to the Public Works Division combining urban and rural operations and design and construction responsibility under one Division.

In 1982/83 responsibility for billing and revenue collection was transferred from the Administration Branch to a new Business Undertakings Branch.

In 1984/85 the Operations Branch minus its earlier design and construction capacity was transferred back to the Water Division from Public Works Division.
The Division also took over responsibility for services on Aboriginal communities as agent for the Department of Community Development.

In December of that year water investigations and resource management etc were transferred to the Department of Mines and Energy.

Billing and revenue collection, performed by the Business Undertakings Branch formed two years earlier, were returned to the control of the Administration Branch.

In 1985/86 responsibility for services on Aboriginal communities was transferred back to the Department of Community Development.

No doubt each particular change was necessary, although one's faith in that proposition is strained when a given function is seen to pass backwards and forwards between Divisions in only a matter of years.

Whatever the merits of the changes, it is clear that their cumulative effects have not always been beneficial. Quite apart from the costs involved in each changeover (something rarely calculated) it is difficult to see, at the end of the day, that there have been marked improvements in efficiency or performance. Indeed, in talking to staff, the contrary impression is often gained. Some are confused by the constant changes, some haven't quite caught up with them, using titles and referring to functions that had been changed perhaps two years previously. A degree of cynicism about the repeated changes is sometimes discernible. In general, not an atmosphere that one associates with a dynamic get-ahead organisation. That is not to say that there are not well qualified and dedicated staff in the Water Division. There are, but their energies are being diffused because it appears to some of them that there is frequently more change than progress.

The pattern of change is also reflected in the number of reports that have been written about the water function since Self-Government. The comprehensive Binnie Report of 1980, the three Scott Reports of 1982 and 1984 and the Gibb Report of 1984 made numerous valuable recommendations about a wide range of matters to do with the function, but little seems to have been acted upon. In addition, there have been several internal reports on organisational matters.

Current Structure and Functions

Expressed simplistically, the division of labour between the Water Resources Division and the Water Division is that the former finds water and the latter delivers it. This section summarises the current structures and functions of the two divisions.

WATER RESOURCES DIVISION

This division is concerned with the Territory's resources of water on the ground and under it - surface water and groundwater. One of its primary functions is knowledge, building up a fund of knowledge about where water can be found, in what quantities and of what quality. The other is concerned with the management of that resource. Many regard water as a free resource, and have difficulty seeing that in fact it is a scarce commodity that needs to be managed and controlled. Although a renewable resource, the rate of renewal can vary markedly between different streams.
and aquifers and so rates of withdrawal need to be controlled as do activities that might affect the quality of the resource for others. Their specific functions of the Division are therefore derived from these broad requirements.

The Division presently has a total staff of 255 and comprises five main Branches: Planning, Assessments, Technical Services, Laboratories and Administration. An outline of the current structure is provided in Chart 5.1.

Planning and Management Branch is responsible for long-term resource planning and management, administration of the Control of Waters Act, monitoring of water supplies, assessment of water resources, assessment of Environmental Impact Statements. It runs a Rural Advisory Service and administers loans to landholders for development of water supplies under the Water Supply Development Act. (staff = 20)

Assessments Branch provides the specialist, geological, engineering, and other scientific input into projects for the investigation, proving and development of groundwater resources. Specialists from this Branch advise on locations of bores, yields, design, depth setting etc. They record all relevant data that comes in from all bores drilled so as to assist in building up a composite picture of Territory groundwater resources. The Branch is involved in surface water hydrology, the assessment of data from surface monitoring stations, flood plain mapping, flood warning systems and special projects e.g. Wildman River Cashew Project.

The Branch has a staff of 41, of whom 25 hold science, engineering or other relevant degrees. Some 13 of the staff are responsible for providing advice on, and monitoring surface and groundwater matters in the Alligator Rivers Region.

Technical Services Branch is responsible for providing the resources for the various programs of investigation and research mounted by the Assessments Branch and to a lesser extent other Branches. A depot at Parap, with a staff of 6, primarily supports the activities of this Branch. Its activities fall into three groups:

(a) Drilling - the Branch has three operational drilling rigs (worth about $1.4 million each) in the northern region and one in the southern region. It undertakes drilling according to a program determined annually within the Division. In addition, some drilling is carried out under period contract by two private contractors, mostly on production bores. The Branch also carries out bore testing using three specially equipped pump test units (staff = 31).

(b) Groundwater monitoring and tagging - the performance of all bores is monitored over a number of years to enable the Division to check the status of borefields and undertake early planning for new bores. The Branch also maintains records of the locations of all bores, each of which is tagged and registered. It assists in the locating of bores (staff = 8).

(c) Surfacewater monitoring - the Branch is responsible for stream-gauging in the Northern Territory so that reliable information can be assembled concerning the long-term performance of streams and, in particular, their performance under irregular or infrequently recurring conditions of drought and flood.
It is an exercise which must be conducted over the long-term. Its results are related to meteorological conditions to provide essential background data for decisions about land use, the location and design of private and public assets (particularly bridges and roads), assisting in predicting the economic performance of primary industries in different regions, flood prediction etc. In general, it provides some of the basic data required by those who are taking development decisions.

There are approximately 250 streamgaging stations in operation in the Territory at present, about 160 funded by the Commonwealth under the Water Resources Assessment Program Act and the remainder wholly funded by the Territory. Under arrangements that commenced this financial year, stations funded under the Assessment Program Act will be funded to 100% by the Commonwealth. Previously, they were funded on a 50:50 basis. In addition, there are roughly a further 50 specific project stations constructed and maintained for clients. The cost of these is only partially recovered. Unfortunately, the Territory is fairly new to this field and lacks the data that has been built up in the States over many decades. As well as recording water quantities, samples are taken to determine water quality (staff = 44).

Laboratories are located at East Point, Nightcliff and at the Parap Depot. The East Point laboratory is concerned with water chemistry. It does the testing of borewater samples sent in by drillers or the pump test groups, to determine their chemical composition and whether they meet accepted standards for drinking, stock or irrigation purposes. The Nightcliff laboratory undertakes analyses of samples from the Uranium Province. These are high quality analyses at environmental levels. The Parap laboratory is a microbiological laboratory undertaking bacteriological analyses of water and wastewater, limnology tests for algae, etc which may affect drinking water quality. It monitors the quality of water being drawn off from dams and makes recommendations to the Water Division regarding optimum draw-off levels. Its work is virtually entirely for the Water Division. In addition, staff of the three laboratories may be called upon to assist with specific problems, e.g. scale formation in pipes, algae in dams etc (staff = 28).

The Water Resources Division has its own Administration Branch which provides services in the secretarial, administrative, ministerial and project control areas for the Division (staff = 21).

Area Offices. There is an area office in Katherine which undertakes surface water testing in the region (staff = 13).

The Alice Springs area office carries out functions similar to those of the Darwin office. There are Branches performing technical services, resource management and assessment functions, a laboratory and an administration branch. (staff = 40).

WATER DIVISION

The Water Division presently has a staff of 261. It is responsible for the supply of water and wastewater services throughout the Northern Territory, although its role in relation to aboriginal communities is undergoing review. The Division comprises four Branches: Planning,
Operations, Administration and Business Undertakings. As well, there are area offices in Alice Springs, Tennant Creek and Katherine. An outline of the current structure is provided in Chart 5.2

Planning Branch is responsible for various stages of the planning process and its organisation reflects this. The advanced planning group undertakes long-term planning of water sources, based on safe yields from present sources of supply, demand trends and comparisons of yields and capital and recurrent costs for alternative sources. The system planning group takes over the planning process to prepare systems designs for water and wastewater in urban centres. Based on hydrologic data from the operations group it prepares reticulation models and using cost/benefit studies determines the timing of upgrades for water storages, pump stations etc and wastewater disposal systems, and prepares design briefs for any necessary public works. The development planning group is responsible for public and private development proposals from developers and subdividers. In relation to public works, it prepares design briefs which then go to the Public Works Division for preparation of designs and for the supervision of the projects. The group also works closely with the Department of Lands. The communities planning group is responsible for preparing forward works proposals for aboriginal communities and outstations. The Drafting Section provides drafting support to the Planning Branch generally via drafting production, plan printing and storage of comprehensive plans, drawings, records, contract documents etc regarding water and wastewater services throughout the Northern Territory. It also provides technical advice to consultants other professionals and members of the public (staff = 15).

The Operations Branch operates water and wastewater systems throughout the Territory. The Branch is divided into five sections. Urban operations is responsible for rising mains, reticulation and sewerage systems operation in urban areas. Rural operations covers rural areas. There is a maintenance section, workshops and a technical services section headed by a Chief Engineer whose function is to provide technical assistance to operations staff throughout the Northern Territory. (staff = 100).

Administration Branch carries out the following functions; budget and finance, and accounts; salaries, personnel and recruitment; purchasing, stores and asset control; offices services; and works programming for all centres (staff = 49).

Business Undertakings Branch is responsible for meter reading, billing and revenue, answering customer enquiries, and recoveries action (staff = 29).

Area Offices

The Southern Region Office contains planning, administration and operations branches and has a staff of 27. The Katherine Regional Office has a staff of 21 who are responsible for water and sewerage operations and administrative functions and the Tennant Creek Regional Office has a staff of 17 and similar functions.

OTHERS

Other areas of Government presently involved directly in carrying out water related functions are the Public Works Division of the Department
of Transport and Works and the Department of Lands. From 1 July 1985, the Department of Community Development assumed responsibility for co-ordinating essential service functions on Aboriginal Communities.

The Public Works Division of the Department of Transport and Works currently has carriage of the design and construction functions relating to water and wastewater. The arrangements are that the Water Division's Planning Branch identifies requirements and prepares design briefs for the required works as do other client departments generally throughout the Northern Territory Government. The Public Works Division is then responsible for preparing detailed specifications and plans etc, and supervising construction, after which the asset is handed over to the Water Division. Public Works Division staff throughout the Northern Territory involved in water related works functions in urban centres are estimated by that Division to number 24, and for rural centres to number 14.

In addition, "head office" support is provided to the Water Division by the Secretariat, Plant and Radio Branch, Contracts Branch and Administration Division of the Department of Transport and Works. The number of such support staff is estimated to be 15.

The Department of Lands was given responsibility in December 1984 for ensuring that plumbing and drainage constructed within property boundaries complies with the Northern Territory Plumbing Code and is carried out by qualified persons. The section assesses applications for plumbing and drainage approvals on R1 land and issues permits to carry out approved works. The section also inspects, tests and records construction of the works to ensure compliance with the Code and issues Completion Certificates.

The section comprises a staff of 12 and has a budget of $300,000. It was transferred from the Water Division in December 1984 and now forms part of the Building Branch of the Department of Lands.

The Plumbers and Drainers Licensing Board was also transferred to the Department of Lands in December 1984. The Board's functions under the Plumbers and Drainers Licensing Act are to assess the qualifications of plumbers and drainers and to issue appropriate certificates of competency. The Board is comprised of 5 members representing industry and training interests. In 1984/85, fees of $8,000 were paid to the Board members with approximately $3,000 being received in the way of licence fees.
CHART 5.1
ORGANISATION CHART - WATER RESOURCES DIVISION

Director

Technical Services
- Depot
- Groundwater Monitoring & Tagging
- Drilling
- Boretesting
- Water Quality
- Monitoring Services
  - Instrument Workshop
  - Construction Maintenance
  - Field
  - Record
  - Computations

Assessment
- Geophysics
- Computing
- Water Resource Assessments
- Technical Standards

Planning and Management
- Resource/Forward Planning
- Rural Advisory Service
- Projects

Laboratories
- Environment
- Water Chemistry
- Microbiology

Administration
- Project Control
- Ministerials, Land claims
- Administrative Services
- Typing Services

Area Offices
- Katherine
  - Monitoring Services
- Alice Springs
  - Technical Services
  - Resource Management
    - Computing
    - Hydrographic
    - Groundwater Management
    - Laboratory
  - Assessment
  - Administration

Current Staff = 255
CHART 5.2
ORGANISATION CHART - WATER DIVISION

DIRECTOR

Administration

Business Undertakings
. Billing
. Revenue
. Meter Reading
. Customer Relations
. Recoveries

Administrative Services
. Finance
. Programming
. Office Services
. Personnel Services
. Operations Support
. Project Maintenance
. Resource Planning
. Stores
. Purchasing/Assets

Planning

Advanced Planning
. Systems Planning
. Development Planning
. Communities & Towns
. Drafting Section

Operation

Maintenance
. Workshop
. Rural Operations
. Urban Operations
. Rising Mains
. Reticulation
. Wastewater
. Treatment Plant
. Sewerage

Rural Operations
. Technical Services
. Technical & strategy Investigations
. Technical Library
. Forward Planning

Urban Operations
. Alice Springs
. Planning
. Billing
. Administration
. Water & Sewerage
. Operations

Area Offices

Tennant Creek
. Billing and Administration
. Water & Sewerage
. Operations

Katherine
. Billing & Administ'n.
. Water & Sewerage
. Operations

Current Staff = 261
CHAPTER 6 - A NEW ORGANISATION

So far, this report has focused on the characteristics of the environment in which the water function is performed, the policies that are in force and their implications and the current organisational arrangements for delivering the services. The present chapter aims to draw these threads together and propose a new set of organisational arrangements which will better satisfy present and projected requirements.

The preceding chapters have pointed to rapid demand growth only minimally checked by pricing policies. This has given rise to heavy investment in capital with associated high capital consumption and financing costs. Other significant areas of cost have been salaries and operating costs, with costs of electricity being substantially higher per kilolitre of water delivered than for any of the interstate authorities that were examined.

It was also apparent that there is considerable fragmentation of the organisation providing water related services, which undoubtedly makes the cost of the overall water function greater than it should be. More important, there is no way of knowing with accuracy how, or to what degree economies in the costs of operation are possible, because the costs of the units contributing to the total function are submerged within the larger functions of other organisations. Under such administrative arrangements, no properly articulated scheme for reducing water function costs could be readily devised or executed.

If the present arrangements and policies were allowed to remain, the prognosis would be for continued diffusion of the true costs of the operation with consequent difficulties in cost containment, continued heavy and escalating subsidisation, and a continuing inability to identify and explain (in particular to the Grants Commission) the reasons for the significant differentials in costs of service compared with the States.

The first and most important thing to do, therefore, is to bring together the main parts contributing to the water function.

The second is to implement programs aimed at achieving significant savings in operating costs.

The third is to introduce a commercial approach to future decision making.

In looking at alternative organisational arrangements, the foregoing aims must be paramount, however it was also essential to take account of other issues that can be foreseen as emerging over the next decade in the Northern Territory and their implications for possible organisational arrangements. Some attempt was also made to obtain comparative information and to examine trends in the delivery of such services elsewhere in Australia.
Interstate Trends

At the national level there have been pronounced changes in direction in the water industry over the last few years. In most parts of Australia, water and wastewater services have been traditionally seen as local government functions. Being essential services, their supply was viewed not so much as the provision of a commercial product, but of a community good, like other social goods and services. Consequently, tariff policies have been regarded as just one element of local government revenue policies and taxpayers generally have been called on to meet a substantial portion of costs. With the heavy investment in capital assets that this industry requires, and the tendency for capital expenditures to be pushed up by the higher standards that are now expected by the community, together with the higher cost of capital in recent times, water and wastewater supply costs have had to be looked at from a new viewpoint, the emphasis now swinging towards cost recovery and the user pays principle.

At the present time, there are broadly two models for the supply of water and wastewater services in Australia, the local authority/statutory authority model in which a number of local and regional bodies are responsible for the provision of services, and the statewide supplier model, where one government authority is responsible for supplies throughout the whole State. In general, the Eastern States follow the first model, and South Australia and Western Australia, the second. The changes that are currently occurring are in the direction of the second model.

The longest standing example of the statewide model is South Australia, which has had a Department of Engineering and Water Supply since 1929. Although a department, it is run virtually as a statutory authority.

In Western Australia the Metropolitan Water Authority was set up in 1982 establishing, on a statutory basis, a body which had existed as a government department for many years. The Authority was responsible for water and wastewater services in the Perth metropolitan area, and services outside the metropolitan area were provided by local councils and the Department of Public Works. As from the 1 July 1985, all of these functions have been brought together under a statewide statutory authority known as the Water Authority of Western Australia. Two councils are presently continuing to supply services, but apart from them, all of the water utility functions and the water investigation and resource management functions are now controlled by the one authority. This is seen as a far more efficient approach to the delivery of services to dispersed communities in this large State.

In Victoria, quite drastic changes have been going on for the last four or five years. With the establishment of the Public Bodies Review Committee under legislation passed by the Victorian Parliament in 1980, a fundamental review has been undertaken into the operation and effectiveness of a range of statutory bodies. One of the first references given to the Committee was to review the State Rivers and Water Supply Commission and each constituted water, wastewater, drainage or improvement trust or authority in the State. There were, at the time, 375 legally separate public bodies providing such services, with 344 located outside the metropolitan region.
The Committee has since made a number of wide-ranging recommendations which essentially have had the effect of drastically reducing the number of bodies and transferring responsibility away from local government councils to regional statutory bodies run on commercial lines. At the same time, changes in government policy are resulting in a very much more centralised approach to water management problems in Victoria. In a fundamental reorganisation which is not yet finalised, the water supply authorities may come to be regarded as satellite organisations in a cohesive statewide network controlled centrally.

Although New South Wales has not yet moved in the direction of Victoria, there is the expectation that it will, but rather less radically. Queensland and Tasmania then will remain the only States with decentralised water supply arrangements based on significant local government involvement. Even there, the recent creation of a Brisbane Water Board to sell bulk water to the Brisbane City Council and surrounding shire councils marks perhaps the first moves towards greater centralisation.

While the trends interstate therefore point to a more cohesive, more centralised, more commercial approach to the water function, that does not necessarily provide the direction for the Territory; however it happens that our own local requirements also point the same way.

Trends in the Territory

The main conclusions from earlier chapters point to the urgent need to do something about the water deficit. While not so much a trend as an imperative this will feature prominently in all considerations about water matters for years to come, and must have a profound effect on the way the industry develops.

Other factors of importance are:

- much heavier reliance on groundwater in the Northern Territory.
- emergence of horticulture as a source of increasing demand for water;
- increasing emphasis on integrated long-term planning aimed at cost containment;
- need to take up promptly technological developments and innovations to reduce costs and deal with systems problems e.g. accelerated degradation of concrete sewer pipes due to hydrogen sulphide corrosion.

A Territory Water Authority

There seems little doubt that this bundle of requirements is best met within a commercial environment, simply because they are commercial goals.

The need to reduce and eventually turn around a very large deficit, the need to improve tariff policies as an aid to demand management, the need to run the water organisation as an efficient and properly integrated whole, the need to satisfy new sources of demand, the need to properly plan and forecast market trends and the need to exploit technological change are all commercial targets, and the organisational structure best geared to meeting them is a commercial structure.
Were the products concerned less vital from a community viewpoint, a public company might have been considered to be the appropriate vehicle; however, it seems clear that general responsibility must remain within the public sector and, that being so, the appropriate structure is a statutory corporation. It is therefore recommended that a prescribed statutory corporation be established to provide water and wastewater services in the Northern Territory.

Why not a Government Department?

Simply because the orientation of a department would be less commercial. Departments are not required to operate or report along commercial lines. However they are required to comply with regulations governing purchasing, finances, accounting, personnel management etc. The general philosophy behind such regulations is that they help to promote efficiency and accountability in organisations supplying administrative or community services in a non-commercial environment where the profit motive cannot be applied or is inappropriate. Where the profit motive and commercial goals generally can be brought into play, these kinds of regulations become unnecessary.

In brief, a departmental structure is designed for administrative/community service operations rather than commercial operations and would be unsuited to the water function. That statement is made in the knowledge that South Australia has for many years run its water operation as a Government Department. That simply indicates that a departmental structure is capable of doing the job; however, a statutory authority structure should do it better.

Local Government Involvement

The proposals in this report do not contemplate any significant role for local government in the water function. That conclusion was reached after a careful examination of trends and problems interstate and the particular circumstances existing in the Northern Territory.

There are five reasons for not including local government in the arrangements:

1. If the model adopted for Council involvement were the complete takeover of all assets and all operating responsibilities, then, there would need to be five or six separate Council water and wastewater operations servicing the main towns, with the smaller towns operating their own facilities or having them operated by the nearest council on a regional basis. Some of the problems under such an arrangement would be:

   - the need for the Government to subsidise the water operations of the Councils. This would provide fertile ground for disputes over the efficiency of operations, the size and timing of tariff increases by the Councils in relation to the size of the Government subsidy; claims of subsidies being submerged in Council budgets and finding their way into other activities; the emergence of different tariff structures between one town and another; the need for the Government to closely monitor Council operations to satisfy itself that subsidies on the scale claimed were justified.
the Government would still need to be involved in providing services to rural communities and in maintaining the resource investigation area. Thus, the benefits of possible economies of scale would be lost.

an undesirable fragmentation of professional and other trained staff resources between the Councils and the Government would occur. Given the scarcity of these resources in the Territory, this would be particularly wasteful.

the Government may need to continue to be involved in long-term planning as well as overseeing capital and maintenance policies of the Councils, since the orientation of some of the smaller Councils could be mainly towards operational activities. Capital augmentation and repairs and maintenance might be seen as of secondary importance and in time could become problems.

there would need to be special arrangements between the three Darwin region councils, with the Darwin City Council probably being expected to take on the role of bulk supplier to the other two.

There may be disputes within the areas served by the Councils as to the degree of subsidisation of the small towns by the larger towns (e.g. Pine Creek consumers being subsidised by Katherine rate payers).

2. On the other hand, if the model adopted were that of a central supply authority selling bulk water to the Councils, other problems would arise.

the arrangement would not be the most efficient and in fact would probably represent the worst of both worlds. There would be a need to create a statutory authority as the bulk supplier, and at the same time there would be 5 or 6 Councils each operating in the field. Most of the problems mentioned in paragraph 1 would be apparent. In particular there would be diseconomies through fragmentation.

while the Councils would be relieved of significant system maintenance problems under this arrangement, they would still be responsible for the maintenance of the reticulation systems, which could present problems, particularly in the wastewater system where significant early pipeline replacement or restoration may be necessary.

3. Involvement of the Councils would be inefficient. This is not to say the Councils themselves would be inefficient in carrying out their responsibilities, rather, the arrangement itself would necessarily generate inefficiencies overall. It would involve fragmentation in what is a very small system. It is important not to lose sight of the fact that the Northern Territory towns water services function is really very small by comparison with interstate systems. It is only one-twentieth the size of Sydney for example. For that reason, the Territory cannot afford the
diversity of organisations that the States have. Instead, it should be aiming to capture whatever economies of scale are possible at this level of operations by amalgamating, centralising and simplifying organisational structures instead of dissipating those benefits by unnecessarily dispersed or complex arrangements.

4. To bring local government into the water function in any significant way would be to opt for yesterday's solution to tomorrow's problem. This is not the model that is plainly emerging in Australia as the solution for the 1980's and beyond. That model is a more centralised one with emphasis on the management of the function as a commercial operation rather than a community service.

5. Were the deficit on the Territory's water and wastewater operations not so large the need for a cohesive commercial approach would not be so pressing. For example, if Territory water supplies were more like those of Tasmania - based on reliable surface water sources with significant gravity reticulation to consumers - the water function would be a comparatively simple "supply and bill" operation. But with its heavy reliance on groundwater, the need for expensive pumping over long distances and the special problems of wastewater disposal inland (possibly in the vicinity of aquifers supplying groundwater), the Territory is forced to carry out the water function at a different technical level, one that is more complex and costly. It is the integrated commercial organisation that is best geared to operating effectively in that environment.

Role of the Water Resources Division

Subject to the changes suggested below, it is recommended that the Water Resources Division of the Department of Mines and Energy be incorporated in the new statutory authority. The reasons for this are essentially to do with acknowledging its close relationship with the water utility function, to generate economies of scale, to conserve scarce staff resources and to avoid duplication of activities and resources.

Over 30% of the work of this Division is presently directed to meeting the requirements of the Water Division of the Department of Transport and Works. There is a particularly close relationship in the groundwater hydrology area of Water Resources Division and the water supply function in most towns and communities outside Darwin, since they rely on groundwater. There is a close relationship between these functions and those of the East Point Laboratory and between the water and wastewater service functions and those of the Parap Laboratory. Drilling, bore testing and tagging are activities which in the Territory, perhaps more than elsewhere in Australia, are closely connected with the commercial supply function.

Moreover, many of the professional and other skills in the two divisions are similar. To amalgamate the water utility and water investigation and management functions would provide a logical continuum from investigation, assessment and development to management and supply. This would provide a more varied and interesting employment base for professional staff than the present arrangement and would be of assistance in the recruitment and retention of good quality staff.
There are a number of inefficiencies in the present arrangements: there are two registries, two staffing sections serving the two divisions, there are two sets of management, secretariat and administrative overheads. Moreover, there is some confusion amongst the users of the divisions' services, including other Government departments, concerning their respective areas of responsibility.

While the foregoing argues for the broad functions of the Water Resources Division to be transferred to the Authority, some re-examination of specific functions and activities performed is necessary:

(a) Groundwater Assessment

Three submissions were received representing the views of some 18 staff working in areas related to groundwater hydrology. These variously proposed that hydrogeologists and related professions in the Water Resources Division should —

(i) remain in the Mines and Energy Department and be attached to the N.T. Geological Survey (N.T.G.S.).
(ii) be transferred to the proposed Authority.
(iii) should be redeployed, some to the Authority and the remainder to N.T.G.S.

Hydrogeologists are geologists with specialisations in hydrology. First and foremost, they are the professionals who can identify the likely locations of aquifers using various geological methods; they supervise drilling operations etc.

They work closely with groundwater engineers who compute aquifer behaviour (regeneration rates etc.), develop management parameters for operational aquifers, pumping rates and other specific questions relating to bore management. Indeed, that relationship can be so close that the dividing line between the two professions is in practice somewhat blurred. It is this closeness at the operational level that argues most strongly for the staff to be located together. Although there is also an obvious professional relationship between hydrogeologists and minerals geologists, it is more to do with the similarity of their professional backgrounds and practices rather than an essential complementarity at the operational level. It is a parallel relationship rather than a convergent one.

It is probably true to say that while hydrogeologists are essential to the proper performance of the water function in the Northern Territory, they are not essential (though undoubtedly useful) in the Geological Survey. For the water function they are essential in the investigation, assessment and management of groundwater sources. At present, up to 51% of their time would be connected in some way with operational supply questions. With the Territory's heavy reliance on groundwater supplies the involvement of these professionals in operational questions is rather more important than it would be interstate and helps to explain their placement, until recently, with the water operations function.
In most of the States, however, hydrogeological staff are placed with the Geological Survey and that arrangement seems to work, although, it is noted that those State authorities which have a significant reliance on groundwater (e.g. Western Australia) have found it necessary to recruit or obtain on secondment their own groundwater hydrologists. There have thus been some areas of duplication and overlap between the Authorities and the Geological Surveys in those States.

A further point is that the orientation of the NTGS and the Assessments Section are quite different. The NTGS is concerned with long-term assessment programs aimed at furthering our understanding of the Territory’s resources, whereas hydrologists in the Water Resources Division are concerned with specific assessment or operational projects that have immediate or intermediate practical implications for the supply of water to communities, towns and commercial projects. To do that kind of job effectively, they need to be available on the spot where the action is, rather than be provided in a remote and more academic role as a consultancy resource.

While it is accepted that some savings and economies would be possible by placement of hydrologists with the Geological Survey, there are also economies to be gained by placement in the proposed water Authority. In fact, if this were done, reasonable savings would still be possible in the Geological Survey simply through improved co-ordination and co-operation in work programs, that should in any event be made to occur.

On the balance therefore it is considered to be preferable to leave the hydrogeological function in the proposed water Authority and this is recommended. Because of limited staff resources overall in this area, it is not recommended that staff be allocated partly to the Authority and partly to the Geological Survey.

(b) Surface Water Assessment Program

The long-term information gathering nature of this program, and its emphasis on the expansion of knowledge about water resources, provide the potential for its size and coverage to be dictated by the professionals involved, based on perceptions unconnected with financial constraints or development priorities.

Undoubtedly, the program is important and must be continued. It is a long-term commitment: to obtain reliable information, up to 30 years data is usually required. However what is needed is a different management approach, with more emphasis on the assessment of the perceived long-run commercial/developmental benefits of expenditure in gathering data on the behaviour of catchments. That approach should guide the selection of catchments for study and the extent of detailed assessment of stream flows within catchments. Decisions about streamgauging activity should only be taken after consultation about priorities with the Departments of Primary Production, Mines and Energy, Lands, Community Development and the Conservation Commission and Tourist Commission. If this approach were taken, it is likely that a significant rationalisation of activities could be effected with attendant savings in operating costs.
Under new arrangements which became operative this financial year, the portion of the program supported by Commonwealth funding is to be funded to the extent of 100% rather than 50%, as previously. This may dictate some modification of the above principle, provided that, such funding does, in fact, cover 100% of the costs actually incurred.

It is therefore recommended that the surface water assessment program become a function of the proposed Authority, but that new policies for its administration be developed based on the confirmed or perceived long-term commercial/developmental potential of the catchments being assessed. As a part of this redirection of policy, the scope for private sector involvement in the construction, maintenance of and data recording by streamgauging stations should be assessed.

(c) Water Quality Monitoring

There is a group of five officers whose function is to take water samples for quality assessment. It is argued that these people are needed in addition to the hydrographic field staff (who measure stream flows) in order to assure the quality of the samples tested and the reliability of the tests. There are thus two groups of field staff, one assessing quantity and the other quality.

The arrangement no doubt creates greater certainty about the reliability of the tests conducted; however, it does not appear to be the least cost solution to the problem. Hydrographic field staff, with proper training, should be capable of effectively performing the water quality as well as the stream measuring functions. That arrangement seems to work elsewhere in Australia. Accordingly, it is recommended that water quality monitoring become a responsibility of the hydrographic field staff.

(d) Drilling, Bore Testing etc.

There are some 39 staff and about $5 million in equipment tied up in what is essentially a commercial function. Their activities are in competition with private operators. Given the move by the Department of Mines and Energy out of the drilling function some years ago, together with the limited activities by some other water authorities in this area, there is reason to ask why the drilling/bore testing operation should not be sold wholly or partly to the private sector, or alternatively, set up as a private sector operation.

The arguments against transfer to the private sector have to do with the availability of the service when required and in the localities required. It is said that at times of high demand by the mining industry it is often not possible to obtain drilling rigs when they are required. This has obvious practical implications but also causes inefficiencies in the scheduling of work in other areas of the Water Resources Division. In favour of retaining the drilling function it is also said that it is difficult to get contractors to do work in certain areas; some drilling cannot be defined in advance; there is the need for close supervision of contractors. Also, because the drilling of exploration bores is a less predictable exercise than the drilling of production bores, waiting times are longer and the operation generally lends itself more to in-house drilling.
It is acknowledged that these are valid issues; however, some 41% of the Division's drilling is already done by outside contractors and it should be possible to enter into period contracts for all or most of the remainder of the work with one or more private contractors, the provisions of which include the requirement that rigs are exclusively available for Government needs in accordance with both pre-planned and unplanned work requirements. The practicability of this line of approach should be tested by calling for expressions of interest from the private sector. If it proves unsuccessful, then, at the very least, the drilling, bore testing and depot support operations should be established within the Authority as a self-contained business which charges the rest of the Authority for its services. It would be beneficial if that business were required to bid for some classes of Authority work against private operators.

Accordingly, it is recommended that expressions of interest be sought from the private sector to take over the Water Resources Division's drilling and bore testing functions.

(e) Laboratories

As indicated earlier there are three laboratories, one doing chemical analysis of groundwater samples, one doing environmental level testing of water samples mainly from the uranium province and the third doing the required regular health checks of drinking water and wastewater samples. There is some interchange of work between them, but, by and large, they operate as separate entities.

The Northern Territory Government's laboratory operations were examined in a report by Dr Charles Gurd in 1984, which recommended that the three water related laboratories be combined. While desirable, this move is not urgent at the present time, particularly in view of general budgetary constraints.

What is of more immediate interest for the present study is whether a function that is performed privately in some other parts of Australia, is capable of being performed on that basis in the Territory. There appear at present to be no technical or organisational reasons why such an arrangement could not be made to work. It is noted that the Department of Mines and Energy's minerals testing laboratories are now being operated by a private company, Amdel. That arrangement is comparatively recent and it may be too early yet to evaluate it, since the company is still operating under the guaranteed work-load provisions of the contract, which continue in force for the first 12 months. The preliminary views of the Department on the experience to date are positive and generally it is considered that the arrangement is economical.

For the purposes of the present study it is difficult to overlook that precedent; however before taking a decision to move in that direction, it would be necessary to review the Mines and Energy experience after the guaranteed work-load period had expired to be satisfied that it was capable of providing a reasonable long-run solution for laboratory requirements. If that experience proves to be satisfactory then expressions of interest should be called for the operation of the three water laboratories by the private sector.
Accordingly, it is recommended that, subject to confirmation that the Mines and Energy Department's arrangements for private sector operation of the minerals testing laboratory are found to be satisfactory as a long term arrangement, expressions of interest should be called from the private sector for the operation of the three water laboratories.

(f) Relationships with the Department of Mines & Energy

It was problems in the relationship with the Department of Mines and Energy that resulted in the transfer of the water resources function to that Department in 1984. What guarantee is there that the same problems will not arise again if the function becomes the responsibility of a water Authority?

The problems experienced then were due to conflicts over areas of responsibility under the Mining Act and Control of Waters Act concerning water related issues on mining tenements. The legislation provides no guidelines as to primacy where such conflicts of responsibility arise; this deficiency will eventually need to be picked up in future amendments to one or both Acts.

While the water function has been under the control of the Department of Mines and Energy the matter has been resolved by a sensible administrative arrangement which requires the Director of Water Resources to work through the Director of Mines in dealing with mining companies. The arrangement acknowledges that the Government wishes to promote the "one stop shop" concept in its dealings with mining companies and, for their part, the companies wish to avoid situations where they are receiving different or even conflicting advice from various Government departments.

In an internal memorandum dated 10 May 1985 the Secretary, Department of Mines and Energy, issued administrative directions governing the relationship between the Director of Mines, the Director of Water Resources and mining companies. While relating to a specific mining lease, it was suggested that they should apply to mining leases generally. In essence they provide that:

1. any advice or directions that would be given by the Director of Water Resources to a lessee in a declared Water Control District or Drainage Control Area are to be given instead to the Director of Mines.
2. the Director of Mines is to heed such advice and cause any statutory directions to be implemented.
3. staff of the Water Resources Division are to have access to mining leases to carry out such inspectorial responsibilities as would normally be theirs, but they are not to give directions to the lessee or his employees.
4. any matters of disagreement are to be referred to the Secretary, Department of Mines and Energy.

There appears to be no reason why these should not serve as a model for the arrangements to apply between the Department and the proposed Authority. Some minor legislative changes may be necessary to recognise the arrangements and to protect the legal position of the
Director of Water Resources. The adjudicative provision would need to be replaced by one involving the Secretary of the Department and the head of the Authority, perhaps with a provision for decision by the responsible Minister in the event of disagreement. In this respect, it would be advantageous if the Department and the Authority were responsible to the same Minister.

(g) Water Supply Development Loans

Loans are provided under the Water Supplies Development Act to landholders for the development of water supplies. At end June 1985 there were 8 loans outstanding for a value of $151,217. The function of granting and administering loans is out of keeping with the main thrust of the proposed Authority's functions and would be more appropriately handled by a specialist body such as the Northern Territory Development Corporation.

It is therefore recommended that the Water Supplies Development Act be amended so as to permit loans under it to be granted and administered by the N.T.D.C., with the Water Authority providing advice on loan assessment as required.

Implications for Public Works Division

The broad concept being followed in these recommendations is to bring together all water related functions under the one roof, in order to generate economies of scale and thereby contribute to a reduction in the unit cost of water and wastewater services. It is consistent with this approach that those staff in the Public Works Division of the Department of Transport and Works responsible for the various aspects of capital works in this area should transfer to the proposed Authority.

In discussions with Water Division and other staff, there were criticisms that the organisational distance between those who operate water and wastewater systems, and those who design them and supervise their construction, makes for sometimes serious deficiencies in capital works. In short, the operators don't always get what they believe they need, and their experience in the operating environment does not always get through to Public Works design staff. It is claimed that a close interaction between operations staff and works design staff can give rise to useful economies and the avoidance of costly mistakes.

Those views are quite persuasive and, in the absence of significant argument to the contrary, are accepted. They indicate both that some design and works supervision capacity should be transferred from Public Works Division to the Authority, and that it should be located within the operations division of the Authority. Those changes are therefore recommended.

All of the foregoing comments relate to the capacity to design and supervise public works rather than the ability actually to undertake construction. As is the case now, construction would continue to be carried out by private contractors.
Implications for the Department of Lands

The Department was given responsibility for the licensing (R1 water and drainage plans approval) functions in December 1984, as well as responsibility for servicing the Plumbers and Drainers Licensing Board.

The rationale for the move was to promote the one-stop shop concept for those engaging in dwelling construction. Where necessary, Lands staff consult with Water Division staff about specific applications. The system is working, the concept is worthwhile and the arrangement should therefore continue.

As for the Plumbers and Drainers Licensing Board secretariat, this involves one person in the Department of Lands who spends only a small portion of his time servicing the Board. The Water Division is represented on the Board and in fact chairs it. There are no problems with the arrangement as it presently stands, and no reason from that viewpoint to alter the status quo.

However, given that the Board has a responsibility for applying standards in the water industry in the Territory and given that the proposed Water Authority will be looked to as a leader in setting and applying standards, there seems good reason in logic to have the Board within the ambit of responsibility of the Authority. That change is therefore recommended.

Implications for the Water Division

This Division would, of course, form the core of the new Authority and it ought to do so under broadly similar organisational arrangements to those that now exist. Some changes are considered necessary however:

(a) Operations

There is a view at present that the water and wastewater operations functions do not need to be under the ultimate control of a qualified engineer. In terms of the practice around Australia this seems to be a rather unusual view and one that is difficult to explain. Under the proposed new organisational arrangements, which bring capital works into the Operations Branch, it is considered essential to have a suitably qualified and experienced engineer responsible for these areas.

(b) Meter Reading

In Chapter 4 it was recommended that a quarterly billing cycle be introduced as part of a package of measures aimed at improving demand management. If those recommendations are accepted, then some cost saving measures may be possible in the meter reading area.

With both NTEC and the Water Authority on quarterly billing it may be possible to rationalise the meter reading operations of the two organisations and have a single meter reading group. That arrangement would be aided by a move into computer assisted meter reading. There appears to be no convincing reason why the functions now performed by the two separate groups of meter readers (reading, noting anomalies and fault reporting) could not be adequately performed under such a joint arrangement. The options for the arrangements that might be considered are:
one body provide the service under an agency arrangement to the other.

a jointly funded group be established.
meter reading be undertaken under contract by the private sector.

It is recommended that NTEC and the proposed Water Authority, when established, consult about the feasibility of establishing a single meter reading group for both organisations.

Functions of the Authority

The functions proposed for the Authority are:

(a) the supply of water and wastewater services within designated areas throughout the Northern Territory.

(b) to plan and co-ordinate the supply of water and wastewater services in the Territory.

(c) the purchase and sale of water.

(d) to set or co-operate in the setting of standards for water supply and use or for equipment and installations relating to water and wastewater.

(e) responsibility for the assessment of water resources in the Northern Territory and the provision of advice on water resource management.

(f) carry out the functions of the Controller of Water Resources under the Control of Water Act.

(g) carry out the functions of the Director of Water and Sewerage under the Water Supply and Sewerage Act.

(h) advise the Minister on all matters relating to water and wastewater in the Territory.

(i) advise the NTDC in relation to loan applications under the Water Supplies Development Act.

(j) provide advice and consultancy services to the public, including the rural sector, the Northern Territory Government, and its authorities regarding all water and wastewater matters.

(k) liaise with other water authorities and professional and learned bodies regarding technological, financial and managerial developments in the water industry.

(l) responsible for monitoring safe drinking water and minimisation of the health hazards of wastewater systems.

Structure of the Authority

It is recommended that the Authority be under the control of a Board comprising five members including the Chairman appointed for specified
terms up to 3 years by the responsible Minister. While members should be chosen to reflect a diversity of interests and views it is not recommended that those be specified requirements in the Act, but left to the discretion of the Minister.

Given that the Authority will not be a large organisation, the appointment of a General Manager as well as a Chairman is considered to be unnecessary and instead it is proposed that the Chairman be a full-time Executive Chairman.

It is proposed that the Authority comprise four divisions; Planning, Operations, Resources, Finance and Administration as indicated in Chart 6.1.

The emphasis in the four key positions to head these divisions will be management oriented and designated accordingly.

- The Manager (Planning) at the Executive E4 level ($45521 p.a.) would be responsible for the management of a professional division concerned with all planning stages for water and wastewater systems and for the formulation of policy for planning future developments and reviewing design criteria. The Manager would need to possess, in addition to well developed managerial skills, tertiary qualifications in a relevant engineering field.

- The Manager (Operations), also envisaged at the Executive E4 level has both the responsibility for the efficient operations of water and wastewater systems throughout the Northern Territory, and responsibility for managing the professional and technical staff involved in the design and construction of capital works. Again, the Manager would need to have formal engineering qualifications coupled with highly developed management skills.

- The Manager (Resources) should remain at its existing Executive E4 level with responsibility for water resource management and investigations.

- The Manager (Finance & Administration), at the Executive E5 level ($49956 p.a.) will have overall responsibility for the day-to-day administration of the Authority, for the development of management and financial accounting systems necessary for a commercial entity, and be responsible for high level policy development in such areas as tariffs and acceptable accounting methodologies for the Authority. The Manager will need to have relevant commercial accounting expertise, the capacity for policy development and well developed management skills.

Overall, the proposed organisation will be able to be restaffed within the existing maximum staff allocations of the amalgamating functions and it is expected that some significant reductions will also be achieved.

It was not considered appropriate to carry out more detailed organisation planning at this stage. That task must await a decision on the recommendations in this Report for the establishment of an Authority in the form and with the functions proposed.
Staffing the Authority

Should the staff of the Authority be employed under the Public Service Act or under employment powers given to the Authority?

The conventional wisdom is that if such an Authority is to operate commercially it should have its own employment powers. What is in fact conveyed by such an arrangement is flexibility, the ability to move quickly in the appointment, transfer, promotion or dismissal of staff. If such flexibility can be provided under the Public Service Act then one of the main arguments for having separate employment powers is removed.

The Territory Public Service has been regarded as being more flexible in its employment arrangements than many others; however, it is understood that some major changes are to be introduced which will result in far greater flexibility including particularly the devolution of significant powers to Chief Executive Officers.

In the changes being contemplated the position of authorities like the proposed Water Authority could be improved if special provisions for commercial authorities were incorporated in the Public Service Act, paralleling the special financial provisions for such bodies that exist in the Financial Administration and Audit Act. Nevertheless, it is considered that sufficient flexibility will exist under the arrangements already being contemplated.

Another argument raised in favour of separate employment powers is the ability to set wage and salary levels independently of those in the public service. Wage and salary levels are rarely independent. The real question in this case is whether they are to be related to water industry/supply authority standards, largely interstate determined, or NTPS standards. Recognising that the proposed Authority will employ persons in clerical and administrative positions as well as professional positions and that there is significant employment in all such categories in the NTPS, there could be disadvantages in being out of line with NTPS wage and salary levels. In addition, being in the NTPS would enable ready access to a larger pool of potential employees. This has particular advantages where staff turnover is high.

It is not considered that there would be significantly greater costs if the staff of the Authority were NTPS employees. While staff costs in some categories may be greater than outside the Public Service, the most important means of controlling personnel costs is through staff numbers rather than salary levels.

Employer superannuation contributions payable in respect of NTPS employees would be higher (at about 22%) than for the possible schemes the Authority itself could run, however, the NTFS is moving to introduce a new superannuation scheme for its employees, the employer contribution costs of which should be significantly lower.

Lastly, retention of the present arrangements is likely to find favour with many staff and would be most convenient from a management viewpoint, particularly given the relatively short period in which the Authority is to be established. It should prove to be a cheaper arrangement to administer than one requiring the Authority to deal with numerous different awards and various unions.

For these reasons it is recommended that the staff of the Authority be employed under the Northern Territory Public Service Act.
The water function in the Territory is presently carried out under three pieces of legislation: The Control of Waters Act, the Water Supplies Development Act and the Water Supply and Sewerage Services Act. Two years ago, the Department of Transport and Works commissioned a study by the Professor of Law at Melbourne University, Professor Sandford Clarke, into the drafting of composite legislation to cover all aspects of the water industry in the Northern Territory and a final draft Bill was completed in June 1984. There has been no further progress in this matter since then. In fact, the draft legislation, which is a substantial document, requires careful study before recommendations can be put to Cabinet. This may take some months to carry out and would be unlikely to be achieved by the proposed commencement date for the Authority of the 1 July 1986.

Accordingly, it is recommended that the existing legislation remain in force with minor amendments to accommodate the establishment of the Authority, and that those Acts be repealed when the composite Water Act is brought into force possibly late in 1986.

Enabling legislation for the Water Authority would be required to be in force on or before the 1 July 1986. A detailed Cabinet Submission and drafting instructions will be required, but in broad outline the main provisions suggested for the Act are:

1. The establishment of the Authority including its functions and powers.
2. The composition, terms of appointment etc. of the Board of the Authority.
3. Provisions relating to finance -
   (a) The Authority should be a Prescribed Statutory Corporation to which Divisions 1 and 2 of Part iv of the Financial Administration and Audit Act apply.
   (b) Investment of the Authority's funds should be handled by the Northern Territory Treasury, with interest paid to the Authority's Trust Account as with other such Corporations.
   (c) Audit would be by the Auditor-General.
   (d) It would be required to report annually to the responsible Minister and the report and financial statements tabled in the Legislative Assembly.
   (e) Borrowings would be undertaken on behalf of the Authority through the central borrowing arrangements administered by the Northern Territory Treasury.
   (f) Power would be given to the Authority to recommend to the Minister levels of tariffs and charges for water, wastewater and other services provided by it.
4. Provisions relating to staffing would include any necessary powers compatible with the Public Service Act.
Name of the Authority

It is recommended that the Authority be named the "Territory Water Authority".

The word Territory is preferred to the longer and more formal Northern Territory as it is well accepted and well recognised by Territorians and has more marketing appeal.

The word Water is a catchall for the full range of water related functions proposed for the Authority.

The word Authority conveys the status of the body as a statutory authority and also its regulatory powers under legislation.

The acronym TWA is satisfactory and its similarity to a certain American airline should cause no confusion in the Territory at the present time.

Conclusions

. There is considerable fragmentation of the organisations providing water related services, which has led to diseconomies and to the full costs of such services being hidden.

. The approach adopted by each segment of the water function should be commercially oriented and geared towards reducing the costs of providing such services.

. In the past five years, major changes have occurred in the water industry in other States with the transferring of responsibility away from local government councils and the development of a more cohesive and commercial approach.

. In the Northern Territory, the need to turn around a large deficit, the need to improve tariff policies and the need to meet emerging development demands are best met within an intergrated commercial environment by the establishment of a Territory Water Authority which, as a Statutory Authority, amalgamates the main components of the water function.

. Devolution of responsibility to local government would be detrimental in the areas of cost, resource allocation and efficiency.

. The Territory Water Authority should be created by the amalgamation of the Water Resources Division of the Department of Mines and Energy, the Water Division of the Department of Transport and Works and discrete components from the Public Works Division of Transport and Works.

. The Surface Water Assessment Program should be reassessed and redirected towards long-term commercial or developmental needs.

. Expressions of Interest should be invited from the private sector to take over the drilling and bore testing functions.
The Department of Mines and Energy has recently entered into arrangements for private sector operation of the minerals testing laboratory and, subject to confirmation that these arrangements work satisfactorily as a long-term arrangement, expressions of interest should be called from the private sector for the operation of the three water laboratories.

The administration of loans under the Water Supplies Development Act should transfer to Northern Territory Development Corporation.

The Plumbers and Drainer's Licencing Board should be under the Territory Water Authority and the inspectorate function which transferred to the Department of Lands in December 1984 should remain with that Department.

N.T.E.C. and the Territory Water Authority should consult on the feasibility of establishing a single meter reading group for both organisations.

Staff of the Authority should continue to be employed under the Public Service Act for management and cost effectiveness purposes.

Current Northern Territory water legislation will need to be amended to reflect the approved recommendations and, in the medium-term composite legislation should progress.
Chart 6.1

PROPOSED ORGANISATION STRUCTURE

CHAIRMAN  BOARD

Area Offices

Planning
- Strategic Long-Term
- Water & Wastewater Systems
- Development
- Drafting
- Plumbers & Drainers
- Licencing Board

Operations
- Water Operations
- Wastewater Operations
- Capital Works Design and Supervision
- Workshops
- Customer Services

Resources
- Water Management
- Rural Advice
- Assessment
- Monitoring

Finance & Administration
- Financial and Management Accounting
- Personnel
- Management Services
- Statistics
- Billing
- Computer Systems
- Secretariat
- Staff Development
CHAPTER 7 - ARRANGEMENTS FOR ABORIGINAL COMMUNITIES

The Government has indicated that it wishes to develop arrangements for essential services on Aboriginal communities which place more emphasis on self management and the payment of a reasonable contribution towards the cost of providing services. In the 1985/86 Budget, the Government announced that it would begin to levy a charge for essential services and, as a proxy for measured consumption by individual community members and families, the quantity of fuel used at power stations would be used as an indicator of the consumption of essential services generally. This bulk charge would be deducted from TMPU grants to communities.

In addition, the Budget Speech also indicated that the Government would place much greater responsibility with Aboriginal communities for the identification of needs and for the design, construction and management of essential services.

As a first step, the 1985/86 Budget provides that the Department of Community Development take full responsibility for the flow of funds to Aboriginal communities. Funds for recurrent operations will be provided through a mechanism to be announced for ensuring an equitable distribution between communities according to need. That mechanism will probably parallel the Local Government Grants Committee arrangements now in operation. Councils will be responsible for deciding on priorities in the use of recurrent grants. Communities will also be able to bid for Government funding for capital projects.

The Budget Speech indicated that once funds are granted, communities will be able to use them to provide services and carry out construction projects in their own way. They may use community labour resources, private contractors or Northern Territory Government agencies on a fee for service basis.

The Government has said that it hopes and expects by these new arrangements to ensure that services and facilities are provided in a cost effective manner and to make a significant step forward in the process of self-management.

The arrangements outlined above were announced after the Terms of Reference for this study were given and, in this context, the last Reference has been interpreted as referring to special considerations relating to implementation of the changes.

A submission was received from the N.T. Branch of the Australian Water and Wastewater Association which commented on the changes announced by the Government, expressing concern that they could lead to unco-ordinated and less cost effective services to Aboriginal communities. A precis of the submission is provided in Appendix D. While there is merit in the views expressed, it is noted that these matters have been exhaustively debated amongst the departments involved in recent months, and the Government has now determined its course of action. That being so, there seems little point in canvassing the issues further here and the aim should be to devise the best available means of implementing the Government's wishes.

It should be said initially that the establishment of the proposed Water Authority, per se, will have no significant implications for Aboriginal
communities either under the existing or the planned arrangements. In the longer run, if the existing arrangements were being retained, some changes would be apparent in the type of facilities provided, with perhaps greater emphasis on cost effectiveness and appropriate technology, in accordance with the commercial orientation of the Authority.

Some communities will be better able than others to move quickly into the planned arrangements. These are the communities with established and effectively operating community council structures. One of the first tasks therefore will be the identification by the Department of Community Development of those communities which can move into the new arrangements in the near future. For these, the proposals are:

for operations -

- an operations grant would be made to each qualifying Council by the Department of Community Development upon the advice of a suitably constituted Community Government Grants Committee.
- the Councils would employ appropriate staff to operate water and wastewater facilities in accordance with general guidelines and standards provided by the Department (using the resources of the proposed Authority). If necessary, training programs would also be provided.
- the Councils would obtain technical advice from consultants (amongst whom might be the Water Authority on a fee for service basis).
- surveillance of health standards would be maintained by the Department of Health.

for capital works and repairs and maintenance -

- Councils would make bids in the annual budget process for capital works and R & M funding.
- once approved, projects would be the responsibility of Councils to plan and supervise, making use of consultants as they see fit.
- many projects would be capable of being undertaken by Council employees.
- for larger projects the Department of Community Development would want to ensure that the Councils had obtained access to qualified works design and supervision resources.
- a mechanism would need to be established for acquitting the grants provided by the Department.

The foregoing arrangements would not be suitable for smaller communities and outstations and, it is therefore proposed that the arrangements now employed for providing electricity services be used as the model.

- funds for operations would be provided by the Department of Community Development to the Water Authority to provide specified water and wastewater operational services.
the Authority would be responsible for making all the necessary arrangements to provide the services.

Funds would be provided to the Authority to carry out approved capital works and repairs and maintenance as requested by the Department of Community Development.

Obviously, before any changes are implemented detailed working arrangements will need to be developed by all the affected parties.
CHAPTER 8 - FINANCIAL CONSIDERATIONS

This chapter examines some of the financial considerations involved in establishing a Water Authority.

Profit and Loss Projections

A preliminary attempt has been made to project over a period of years the likely profit and loss position of the Authority on various assumptions regarding pricing policies and cost containment. As an initial reference point, a hypothetical profit and loss statement was drawn up for the total water function as it operated in 1984/85. This is presented in Table 8.1.

It brings together all the relevant expenditure and revenue data from Chapters 3 and 4 with some adjustments. The expenditure data presented is actual cash expenditure as reflected in departmental budget results for the year, plus non-cash costs including salaries on-costs (superannuation etc.), depreciation and debt servicing. These costs are shown in the Expenditure Reconciliation presented in Appendix E. Electricity costs used are the full subsidised costs of electricity consumed, that is, the subsidy has been reinstated, on the grounds that under present arrangements it was available to the Water Division. For more details about these assumptions refer to Chapter 3.

Table 8.1 indicates that the total real cost of the water function in 1984/85 was $63 million. This covers town water and wastewater services, services to Aboriginal communities and the water resources investigation and management function. Revenue from all sources amounted to $11 million and the aggregate deficit was $52 million. It should be stressed that this expenditure figure includes both cash and non-cash costs. It does not represent the amount actually spent by the Government in cash during the year, which was a considerably smaller amount, roundly $32 million. What it does indicate is that if all the water activities that were carried out in 1984/85 were accounted for under normal commercial accounting conventions then the aggregate result would have been a loss of $52 million.

The data in Table 8.1 was then used as the basis for projections regarding the likely operating results of the Authority on various assumptions regarding tariffs and expenditure trends. A major assumption was that because water and wastewater assets in Aboriginal communities are on Aboriginal owned land they will not be transferred to the Authority. Consequently, the Authority will not need to provide for capital consumption or debt servicing on those assets. The latter would remain a cost to the Government (to the extent that loan funds can actually be identified as having been used to finance them), while in the case of depreciation, it could be assumed that the assets were fully written off by the Government in the year of installation.

The second major assumption is that the remaining costs of providing services to Aboriginal communities are fully reimbursed by the Department of Community Development.

Finally, in regard to the water resource function, although it is assumed divestiture of functions to the private sector will occur as recommended in Chapter 6, the savings resulting from these changes have not been brought to account; fees paid for services are assumed to equal the
### Table 8.1
**Profit and Loss Statement**
**1984/85**

#### URBAN

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| **Profit/(Loss)** | (19,419,363) |

#### RURAL

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| **Profit/(Loss)** | (25,007,126) |

#### RESOURCE SERVICE

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| **Profit/(Loss)** | (7,960,414) |

#### CONSOLIDATED

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<td>Sewerage</td>
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| **Consolidated Profit/(Loss)** | (52,386,903) |
current operating costs of those activities. That assumption has been made, not because it is felt there will be no savings, but because, in the absence of more detailed studies, it has not been possible to quantify how the Authority's levels of use for laboratory and other services would be affected by privatisation. Indeed, those changes may prove to be capable of quantification only after the event.

In Table 8.2, therefore, a preliminary profit and loss statement for the Authority is projected within that framework and using the relatively modest assumptions about tariffs and costs indicated in the table. All figures are in 1984/85 prices.

Demand is assumed to grow by 3% p.a. and the projections show the aggregate deficit growing from $27 million to $35 million, as the costs of meeting unrestrained demand increases exceeds cost saving measures.

The projections in Table 8.3 are based on many of the same assumptions as in Table 8.2 but with a number of additional assumptions, the most significant being that tariffs are raised to a reasonable revenue effort level over four years and, in consequence, there is a levelling of demand which permits significant deferral of new capital works. Under these assumptions, the deficit falls from $22 million to $19 million in four years and then grows at about 3% p.a. Both sets of projections are significantly influenced by the interest and capital consumption costs resulting from capital expenditure programs.

While the foregoing projections suffer from the data problems that were encountered throughout this study and were prepared using simple manual methods, they are nevertheless fairly representative of the broad scope for savings in subsidisation that are possible and also indicate that the Authority will require subsidisation for some time.

Of course, such subsidies will merely make explicit what is already happening implicitly. The covert subsidisation now provided is on a much larger scale and one of the main advantages of establishing a Water Authority will be to bring all these hidden subsidies out into the open as a first step towards reducing their size.

Transfer Arrangements

The establishment of a Water Authority along the lines recommended in this Report will involve the transfer of various assets and liabilities associated with existing operations from the Government to the Authority. The specific terms of the transfers will need to be the subject of detailed negotiations in the period leading up to the commencement of operations. This section therefore only attempts to outline some of the issues involved.

There are different methods of valuing an ongoing business operation. Were an income-based valuation method used, the transfer value would presumably be negative. Given the ongoing relationship that will exist between the Authority and the Government, valuation on the basis of an assessment of the value of assets and liabilities to be transferred is the most realistic. The resulting net asset value will point to a preliminary transfer value which may then be adjusted by negotiation.
Consideration for the transfer would need to be financed through a long-term loan to the Authority or treated as equity or some combination of both. The size and terms of any such loan will be of paramount importance because of their influence on the financial results that are achievable by the Authority in the longer term.

Assets on aboriginal land would need to be excluded from these calculations since ownership in most cases does not vest in the Government. In fact, for accounting purposes, these assets would be regarded as having been written off in the year in which expenditure was incurred and would thus not incur depreciation. (Note: in the calculations in Table 8.1 for the year 1984/85, depreciation charge for assets on aboriginal land have been included to reflect the true cost of services. Regardless of ownership of assets, water and sewerage services on aboriginal communities involve capital consumption costs which should be recognised). Interest charges on borrowings used to finance such assets (to the extent they have been so financed) would continue as a cost to the Government.

The employers' superannuation liability in respect of previous service of transferred employees will need to be valued and a financial capacity provided, or else an arrangement for meeting the liability on an emerging cost basis entered into.

Similarly transfer values for sick leave, recreation leave, and furlough liabilities will need to be established.

**Subsidy Arrangements**

As with the transfer arrangements, the subsidy arrangements should be negotiated and settled in principle during the period preceding the establishment of the Authority, although there is also the option of determining the subsidies through the annual budget process. The latter should be avoided, if possible, because it is an arrangement that tends to penalise good performance and reward poor performance.

The problem with subsidies is that, where they are provided as make-up payments, they militate against the profit motive, tending to act as a disincentive to the vigorous pursuit of a profit maximisation goal. The aim therefore should be to provide any necessary subsidies in a way that avoids these disincentive effects.

Important in achieving this will be:

- the avoidance of cross-subsidisation between commercial and non-commercial activities.
- the provision of subsidies in commercial areas not as balancing amounts but according to an agreed formula, reviewed periodically, which is independent of actual yearly results.

Concerning cross-subsidization, the deleterious effects on the commercial incentive of subsidisation in non-commercial areas can be lessened by isolating those areas in an accounting sense and making them subject to separate subsidy arrangements. The rural services function (under the client arrangements proposed) and the resources function (after implementation of the changes recommended) will be non-commercial operations which should be accounted for separately from one another and from the urban utility function.
In relation to the commercial urban utility function the projections in this chapter show that, even on reasonably optimistic assumptions, there will be deficits in this area of the Authority's operations for a number of years hence. The subsidy arrangements proposed here are for triennial negotiations to take place between the Authority and the Treasury, which will determine the size of the subsidy according to an agreed formula that is independent of actual results. The Authority will then not be able to rely on the subsidy to balance the books and should therefore have a greater incentive to pursue tariff and expenditure policies which minimise the loss.

The determination of the subsidy formula will need to be based on clear understandings between the parties in a number of areas:

- just as the Authority should not expect any shortfall in the subsidy in a given year to be made up, any excess subsidy should not be removed or adjusted in the current or the following year. However, consistent excesses would indicate either that the Authority was doing better than expected or that the subsidy formula was too generous. The necessary adjustment would then be by way of an amendment to the formula at the next triennial review.

- the triennial subsidy reviews will depend fundamentally on mutually acceptable profit and loss projections for the Authority and agreement as to the Authority's policies and targets concerning tariffs, expenditures and provisions. Particularly important will be tariff and depreciation policies.

In Chapter 4 the recommendation was made that tariffs be lifted to a reasonable revenue effort level rather than a full cost recovery level, because of the cost implications for consumers and because the subsidy implied at the reasonable revenue effort level should be recognised by the Grants Commission during the remaining period of eligibility for special grants, and, beyond that, in the assessments for determining relatively factors. If there is a clear understanding between the parties at the commencement of each triennium as to the tariff policies that will be followed throughout the period then there should be reduced scope for argument subsequently about the size of the subsidy.

Similarly, there will need to be prior agreement regarding a range of other policies and practices of the Authority that have implications for costs and the size of the subsidy. The most notable of these will be depreciation policies. Apart from questions such as the average depreciation rates to be used for particular classes of assets, there is a choice to be made between historical and current cost depreciation methods. The former is simply a method of allocating the original cost of an asset over its useful life. The latter is oriented more to capturing the real costs of the capital assets consumed each year. It recognises the current replacement value of assets and bases capital consumption on that; as well, it adds in backlog depreciation.

In conditions of inflation, historical cost depreciation, by definition, does not provide sufficient funds to meet the replacement cost of assets. If an organisation is not making a profit or does not have significant sources of cash flow, it would need to borrow in order to finance asset replacement as well as new asset acquisition. Debt servicing then becomes a growing factor in the cost structure.
On the other hand, current cost depreciation generates the cash needed to meet replacement costs and reduces the need for borrowings to those required for new asset acquisitions. It is thus to be preferred from that viewpoint; however, the problem is that it implies higher tariffs or higher subsidies. Though that may be unpalatable it reflects the commercial reality and should be faced: opting for historical cost depreciation in times of inflation is in fact opting for a cost postponement mechanism which results in greater problems in the future.

Given the high debt structure the proposed Authority may inherit, it is highly desirable as part of a rational cost containment program that the growth in debt servicing be constrained. Demand management policies, discussed in Chapter 4 will help to achieve this result and so also will the adoption of a policy of current cost depreciation.

Financial and Management Accounting Systems

The question of the Water Division's accounting systems was comprehensively addressed in a report prepared by W.O. Scott Management Consultants in 1984 and little more can be said here except to note that the systems presently in use are inadequate for a commercial enterprise.

In the period before the Authority starts operation, very considerable work will need to be undertaken in setting up proper commercial accounting and management information systems, and this work will need to continue for some time after the Authority is established. Fortunately, the SI ledger and accounts payable systems being introduced by the Treasury into departments and authorities is a commercially based system, and on a preliminary assessment should provide an adequate basic system for the Authority's purposes. The Department of Engineering and Water Supply in South Australia also operates on the SI system and some assistance could be sought later regarding additional modules.

Conclusions

. On a commercial basis, the total cost of all water function operations in 1984/85 was $63 million and after allowing for $11 million in revenues the aggregate deficit was $52 million.

. projections indicate that while there is room for considerably reducing and then holding down subsidy levels, there will be a continuing need for subsidisation in the foreseeable future.

. creation of the Authority will make this subsidisation more explicit. At present the subsidy is hidden and, while that continues, it will be extremely difficult to take effective measures to reduce it.

. transfer arrangements will need to be negotiated in detail during the period leading up to the opening of the Authority.

. a formula based subsidy arrangement is proposed, to be determined on a triennial basis and with the commercial and non-commercial operations subject to separate arrangements.

. considerable work will be needed over the next 12 months or so in the installation of commercial accounting systems.
## Statement of Predicted Profit and Loss

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### Total Expenditure

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Table 8.2

FOOTNOTES TO TABLE 8.2

Assumptions

Revenue

(1) Current exemptions are removed. Revenue is brought to account in the year in which it is earned.
(2) Tariffs increase at a real rate of 2% p.a.
(3) Elasticity of demand for water is -0.2.
(4) Unaccounted consumption is reduced to 15% of water production, of which 70% was assumed to be revenue generating.
(5) Underlying growth rate = 3% p.a.
(6) The cost of rural water and wastewater services is fully recovered through payments by the Department of Community Development.
(7) Recoveries on services provided to other clients approach 50% of actual costs over the period.

Expenditure

(8) Salaries costs and on-costs are reduced by 10% through rationalisation of staffing and reorganisation proposals by Year 4.
(9) Superannuation costs are reduced from 21.6% to 12% by Year 10.
(10) Non-electricity components of water and sewerage operational costs are reduced by 10% by Year 3 whilst electricity costs increase at a real rate of 2% p.a. (to 10.8¢ per kl by Year 10) in line with Government announcements.
(11) The Water Authority is not responsible for debt servicing costs nor depreciation on Aboriginal Community assets, since these assets are the property of the communities.
(12) Debt servicing costs are based on the projected cost of the current forward works program of the Water Division at future interest rates as estimated by N.T. Treasury.
(13) From Year 2, level of rural demand and services can be reduced by 10% by Year 10.
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Viewed at 14:07:38 on 29/07/2010 Page 85 of 100.
Table 8.3

FOOTNOTES TO TABLE 8.3

Assumptions

Revenue

(1) The following assumptions from Table 8.2 have been used:
   . (1), (3), (4), (5), (6).

(2) Tariffs are based on the averaged South Australia and Western Australian charges (46.5c kl for water; $166 per connection for wastewater) phased in through declining percentage increases by Year 4 and then held constant, and with an accompanying price elasticity of demand of -0.2.

(3) Commercial tariffs are as for domestic tariffs.

(4) Recoveries of services provided to other clients approach 80% of actual costs by Year 10.

Expenditure

(5) The following assumptions from Table 8.2 have been used:
   . (8), (9), (10), (11).

(6) Debt servicing costs reflect reductions to the forward Capital Works Program, viz,
   . Year 1 to Year 4 - by 50%.
   . Year 5 to Year 10 - by 30%.

(7) Assessment and monitoring programs are reduced by 5% to Year 5 and by 10% by Year 10.
CHAPTER 9 - A PLAN OF ACTION

This chapter previews the essential activities needed to be undertaken in order to establish the proposed Water Authority within a reasonable time-frame. The date proposed for commencement of operations is 1 July 1986. The list of activities is by no means exhaustive, but it identifies the pressing tasks to be addressed and the expected time-frames required should the establishment of a Water Authority be approved. The Action Plan is summarised at Chart 9.1 and has been developed on the assumption that a decision to proceed is given by 1 January 1986, and the major recommendations of this report regarding pricing, cost containment and organisation structures are accepted.

The most essential tasks to be undertaken during the six months period include the passing of enabling legislation for the Authority, interim amendments to existing legislation to recognise the Authority, the development of commercially oriented accounting and information systems, the determination of an optimum organisation structure and the appointment of staff, investigation of the divesting of functions to the private sector, negotiations with relevant government organisations regarding funding and transitional arrangements and the preparation of a budget for 1986/87.

These tasks are briefly reviewed below.

(a) Legislation (Tasks 2, 3 and 14)

Time constraints preclude the development of comprehensive legislation governing the Authority and all of its responsibilities, the three existing Acts would therefore need to be reviewed and amended to take account of the new Authority. At the same time, a Water Authority Act establishing the Authority and defining its powers and functions etc. would need to be developed and enacted before 1 July 1986.

In the longer term the existing draft of a new Water Act aimed at modernising and amalgamating all existing water legislation, will need to be reviewed and amended. Although preliminary work has already been undertaken on this new Act, further work should be deferred until 1986/87 to enable more essential tasks to be undertaken during the preparatory and transitional phases.

(b) Accounting and Information Systems (Tasks 5 and 20)

As mentioned in other sections of the report, the current accounting system is not adequately developed as an accounting and information system for a commercial organisation. Additionally, commercial management information/performance indicators are either non-existent or inadequate. It is essential that the current systems be totally reviewed and adapted prior to the formal commencement of a Water Authority or yet another financial year’s data will be unavailable in a meaningful format. A preliminary assessment is that the current S1 ledger systems can be built upon to achieve most objectives as has been done by the South Australian Department of Engineering and Water Supply. This task would involve considerable effort and the development of a completely revised chart of accounts oriented towards recording costs by cost centres.
(c) Organisation Structure and Transfers (Tasks 4, 8, & 10)

Once a detailed organisation structure for a Water Authority has been approved, it will be necessary to undertake negotiations with other organisations (Transport and Works, Mines and Energy, etc) to effect transfers of existing positions to the new organisation.

(d) Further Investigations into Divesting of Functions (Tasks 17, 18 & 19).

As covered elsewhere in the report, further investigation and cost benefit analyses need to be undertaken in the billing, streamgauging, drilling and water laboratory functions to ascertain the viability and effectiveness of divesting such functions from the public sector to the private sector. The proposed timetable allows for the calling of expressions of interest from private industry, the financial analysis of such expressions and the implementation of Government's decisions, in the areas of drilling, streamgauging and meter reading. Such analysis and decision-making should desirably be undertaken prior to the development of the 1986/87 Budget and prior to the commencement of the Water Authority.

The analysis of the future status of the Laboratories is dependent, in part, upon a review of the Amel experience and should therefore not proceed until the Department of Mines and Energy initial guarantee to that company expires and is reviewed on 1 July 1986.

(e) Financial Arrangements

Negotiations will need to be undertaken with the Northern Territory Treasury in the following areas prior to 1 July 1986:

- Treatment for the transfer of assets.
- Treatment for the transfer of debts.
- Accounting and reporting requirements for the Authority.
- Preparation of the 1986/87 Budget.
- Subsidy arrangements.
- Transfer of funds from other departments.

Administrative Arrangements for 1 January 1986 to 30 June 1986

In order to successfully implement the proposed Action Plan preparatory to the formal commencement of a Water Authority, it will be necessary for responsibility for the affected water related functions to be transferred to a Chief Executive Officer and for a Provisional Board to be appointed as soon as possible after 1 January 1986. This would best be achieved by a revision of the existing Administrative Arrangements Orders until the necessary legislation is prepared and in effect to create a Water Authority. Time constraints and the extent of the tasks involved prevent the effective creation of the Authority before 1 July 1986. However, it would be both undesirable and destabilising to allow the status quo to continue beyond the date of Government's approval to proceed in the recommended direction.
APPENDIX A

PERSONS CONTACTED AS PART OF THE TERRITORY WATER AUTHORITY STUDY

Water Division - Department of Transport & Works

Mr Bill Steele, Director.
Mr Dave Hibbert, Chief Engineer, Planning Branch.
Mr Andre Basset, Supervising Draftsman, Planning Branch.
Mr Alan Groves, Engineer, Planning Branch.
Mr Tad Soroczynski, Engineer, Planning Branch.
Mr Upali Ranjasinghe, Engineer, Technical Services.
Mr Bob Boyd, Administrative Officer, Operations.
Mr Henry Mizow, Manager, Business Undertakings.
Mr Graham Jackson, Sr. Engineer, Alice Springs.
Mr Ray D'ambrosio, Executive Officer.
Mr Kevin McRae, previous Executive Officer.
Mr Greg Musgrove, Operations Manager.
Mr Don Tilakaratne, Engineer, Planning Branch.
Mr Rooney Chan, Planning Branch.
Mr Percy Wijenayaka, Engineer, Planning Branch.
Mr Kerry Morant, Operations Division.
Mr Bob Garvin, Katherine.
Mr Keith Jackson, Regional Manager, Tennant Creek.
Mr Don Wegener, Regional Manager, Katherine.
Mr Norm Rankin, Katherine.

Water Resources Division - Department of Mines & Energy

Mr Norm Watson, Director.
Mr Hugh Wilson, Chief Chemist.
Mr Norm Allen, Senior Chemist.
Mr Norm Brookes, Executive Officer.
Mr Peter Garone, Technical Services Manager.
Mr John Lawrie, Principal Technical Officer.
Mr David Field, Water Quality Section.
Mr Mike Nicholas, Computations Section.
Mr Andy McQueen, Asst. Director, Assessments.
Mr Ron Reinhardt, Computer Servs., Assessments.
Mr Peter Jolly, Groundwater Hydrology Assessments.
Mr Geoff Arnold, Regional Manager, Katherine.
Mr Hyatt Querishi, Groundwater Hydrology Assessments.
Mr Ramsis Salama, Groundwater (Alligator Rivers).
Mr Ian Smith, Surface Water (Alligator Rivers).
Mr John Verhoeven, Principal Engineer, Assessments.
Mr John Paul, Asst. Director, Planning & Management Branch.

N.T. Government - Other

Dr Keith Fleming, Public Service Commissioner.
Mr Allan Scott, Secretary, Department of Community Development.
Mr Mike Green, N.T. Treasury.
Mr Terry McLaughlan, Director, Aboriginal Programs, Department of Community Development.
Mr Keith Blinco, Group Manager, Finance & Administration, N.T.E.C.
Mr Richard Marks, Public Works Division.
Mr Bob Martin, Director of Mines, Department of Mines & Energy.
Mr Ian Campbell, A/Secretary, Department of Mines & Energy.
Mr Creed Lovegrove, Secretary, Department of Mines & Energy.
Mr Col Fuller, Secretary, Department of Transport & Works.
Mr Chris Martin, Executive Officer, Public Works Division.
Mr Gary Swanson, Department of Lands.
Mr Trevor Gargon, Director, Planning & Building Division, Department of Lands.
Mr Rudi Roodenrys, Director, Revenue Branch, N.T. Treasury.
Ms Sharon Mulholland, Director, Corporate Administration, Department of Community Development.
Mr John McLaren, Asst. Director, Local Government Division, Department of Community Development.
Ms Robyn Lesley, Regional Manager, Nhulunbuy, Department of Community Development.
Mr Kevin Jordan, Director, Southern Region, Department of Transport & Works.
Mr Andy Brown, Area Manager, Tennant Creek, Department of Transport & Works.
Mr Bill Duffy, Area Manager, Katherine, Department of Transport and Works.
Mr Brian Kuhl, Agricultural Development & Marketing Authority.
Mr John Sturtz, Director Plant Industry, Department of Primary Production.
Mr Terry Piggott, Horticulture Section, Department of Primary Production.

 Territory & Local Government

Hon. Daryl Nanzie, MLA, Minister for Transport & Works.
Mr Fred Finch, MLA, Country Liberal Party.
Mr Gary Storch, Town Clerk, Darwin City Council.
Mr Michael Ting, Mayor, Palmerston.
Mr Peter Tourell, Town Clerk, Katherine.
Mr Bruce McCrae, Town Clerk, Tennant Creek.
Mrs Leslie Oldfield, Mayor, Alice Springs.

Rural Water Commission, Victoria

Mr John McDonald, A/Director, Planning & Marketing.
Mr Robert Jenkins, Manager, Financial Services.
Mr Howard Rose, A/Director, Corporate Planning.

Department of Engineering & Water Supply, Adelaide

Mr Keith Lewis, Director-General & Engineer-in-Chief.
Mr Ray Williams, Deputy Director-General.
Mr Bob Glenn, Director, Management Services.
Mr Neil Killmier, Director, Administration & Finance.
Mr Bob Greatrex, Manager, Management Accounting & Budgeting.
Mr Ken Gamble, Manager Revenue.
Mr Ken Hall, Manager Accounting.
Mr Jim Mahoney, Cost Accounting Branch.
Mr Ted Boddington, Cost Accounting Branch.
Mr Jim Killick, Director, Water Resources Branch.
Department of Water Resources, Victoria

Dr John Paterson, Director-General.
Mr Leigh Hobber, Director, Financial Management.

Melbourne & Metropolitan Board of Works

Mr Ray Marginson, Chairman.
Mr Russel Ingersol, General Manager.
Dr Peter Greig, Corporate Analyst.
Mr David Heeps, Corporate Analyst.
Mr Germanus Pause, Community Relations.
Ms Lorraine Benham, Community Relations.
Mr Doug Merrett, Water Law Review Consultant.
Mr John Roach, Borrowing & Investment Division.
Mr John Mathews, Financial & Management Information Services.
Mr Nigel Casswell, Corporate Development Division.
Mr John Langford, Corporate Development Division.
Mr Alan Thompson, Industrial Waste Division.

Water Authority of Western Australia

Mr Jim Glover, Managing Director.
Mr Bob Hillman, Chairman.
Mr Steve Shelton, Director Operations.
Mr Bill Wilkins, Senior Executive Officer, Legislative Review.
Mr Allen Kilby, Director, Management Services.
Mr Chris Pollett, Manager, Financial Services.
Mr Ken Webster, Director, Water Resources.

Metropolitan Water Sewerage & Drainage Board, Sydney

Dr Peter Crawford, General Manager.
Dr Rhonda McIver, Chairperson.
Mr Colin Keith, Secretary.

Others

Mr Brian Kent, Executive Assistant, Engineering, N.T.E.C.
Mr Merv Elliott, Executive Director, Master Builders Association, N.T.
Mr Den Schaffner, Chairman, Hobart Regional Water Board.
Mr Allen McLachlan, President, Hunter District Water Board.
Mr Bruce Dockrill, First Asst. Secretary, Transport & Technical Services, Canberra.
Mr Bob Morrison, Consulting Engineer, Sinclair Knight & Partners, W.A.
Alderman Norman Rose, Chairman of Works Committee, Brisbane City Council.
APPENDIX B

ORGANISATIONS & INDIVIDUALS WHO PRESENTED SUBMISSIONS TO THE STUDY

The Institution of Engineers Australia (N.T. Division).
Australian Water & Wastewater Association (N.T. Branch)
Mr P.A. Tourell, Katherine, N.T.
Water Resources Division, Department of Mines & Energy, Darwin.
Mines Division, Department of Mines & Energy, Darwin.
Mr John Milne, Department of Mines & Energy.
Plumbers & Drainers Licensing Board (N.T.)
APPENDIX C

BIBLIOGRAPHY

Books, Studies etc.


Annual Reports

Ballarat Water Commissioners, 103rd Annual Report, 1983.


Engineering and Water Supply Department, South Australia. 1983/84 Annual Report.


Other Reports


EXTRACT OF SUMMARY, COMMENTS & CONCLUSIONS FROM AUSTRALIAN WATER AND WASTEWATER ASSOCIATION SUBMISSION

The premise of the new arrangement is that because full responsibility for water and sewerage is to be placed on Community Councils there is no role for a Water Authority, except as and when requested by Councils.

It is considered that the Water Authority should have a formal technical responsibility role, rather than the defacto role proposed, in order to ensure the following:

1. Co-ordinated planning of systems rather than the piecemeal approach which would result from intermittent consideration of needs.
2. Achievement of minimum design standards rather than a range from sub-standard to 'gold-plated'.
3. Cost effective and operationally suitable designs based on inter-community experience.
4. Incorporation of standardised components to facilitate operation and maintenance.
5. Operation of systems on sound principles to maintain safe drinking water and safe sewage disposal.
6. Recording of system operating data for comparative performance measurement and to facilitate system planning.

It is submitted that with Water Authority technical involvement the role of consultants would be facilitated in that they would receive consistent briefings on sound technical bases. Their consultancies would be administered by experienced technical staff and as a result their proposals could be received by Department of Community Development with confidence.

Contract administration and construction supervision can be expected to cost much more using consultants which are generally centered in Darwin or Alice Springs compared to the Water Authority with regional offices. Also the Water Authority is able to cover a number of communities on one trip whereas neighbouring communities would possibly use different consultants. However, the higher cost may be an acceptable sacrifice if it assists the communities in attaining a greater degree of self-sufficiency.

The importance of a technical co-ordinating role in the administration of remote community water and sewerage cannot be stressed too highly. This is illustrated by examples such as progressive modification of sewerage treatment pond designs to control mosquito breeding, development of special corrosion resistant reticulation and plumbing for the highly corrosive bore waters of the coastal strip, compiling a register of technically approved solar pump sets and daily and emergency radio/telephone liaison of technical personnel with community essential service operators.
If the Water Authority withdraws from Aboriginal community water and sewerage it will progressively lose its ability to provide expert and accurate advice on such matters. This would be to the disadvantage of the Government, Aboriginal communities and consultants.

One objective of this paper is to show the range of activities involved in the administration of water and sewerage services to remote Aboriginal communities. It is contended that if self-sufficiency is given virtually overnight and the present level of support withdrawn suddenly, there will be adverse sociological consequences. The ability of communities to manage their own affairs has increased substantially in recent years and this includes progress in the management of water and sewerage services.

However, it is considered that if adverse affects are to be avoided the move from the present level to complete self-sufficiency would take 5 to 10 years within a co-ordinated progressive programme.

It is submitted that the Water Authority should be heavily involved in this transition programme to ensure that operator training is carried out consistent with the objectives of safe and efficient water supply and sewerage disposal systems.

The cost of water and sewerage services to Aboriginal communities is disproportionately high on a population basis compared to main urban centres. Consequently, in the interests of containing and controlling Government costs it is considered imperative that any proposal for changed administration of services have as one of its main thrusts the establishment of an organisation structure appropriate to the function, and managed by technical and financial staff with expertise and experience in the provision of water and sewerage services to remote communities.
**APPENDIX E**

**EXPENDITURE RECONCILIATION**

*Water, Wastewater and Water Resources*

**CASH APPROPRIATIONS 1984/85 (expenditure as provided by relevant depts.)*

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**NON-CASH COSTS**

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**Total non-cash costs** 35,526,079

**Total Costs** 67,483,232

Signed by G.L. DUFFIELD, Government Printer of the Northern Territory.