



Cayman Islands

**SPECIAL REPORT OF  
*THE AUDITOR GENERAL***

**ON**

***CARIBBEAN UTILITIES COMPANY LTD.***  
**Summary Report**

**Cayman Islands Audit Office**

**October 2003**



# CUC Special Report

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## AUDITOR GENERAL'S COMMENTS

Caribbean Utilities Company Limited (CUC) has been providing electricity to Grand Cayman since 1966. Over the past 37 years the company has grown from a tiny cash-strapped utility with 1.36 megawatt (MW) installed capacity to a modern and well-managed utility with 115.1 MW installed capacity serving over 20,000 residential and commercial customers. There is no doubt that CUC has been a key contributor in the transformation of Grand Cayman into a successful international finance centre and major tourism destination. CUC management and employees can justifiably be proud of its contribution to the economic development of the island.

Last year the Honourable Linford Pierson OBE JP MLA, Minister of Planning, Communications, Works and Information Technology, invited the Audit Office to conduct a special audit of CUC's Licence. I am grateful for Minister Pierson's confidence in my Office to carry out this work. The approach we scoped in consultation with Minister Pierson differs quite radically from previous audits carried out on behalf of the Government ([Appendix 1](#)). The current audit takes a much broader view of the operation of CUC's exclusive Licence. We considered the impact of the Licence on all stakeholders and how well CUC is performing in terms of cost and reliability in comparison with other regional utilities. We also reviewed the crucial issue of whether CUC's capital investments are reasonable and necessary.

### ***Our Findings***

- CUC's Licence with Government has served the Cayman Islands well in that it has enabled CUC to raise capital for investment for the generation, transmission and distribution of electricity. The 15% permitted rate of return was probably reasonable when it was introduced in 1979 when global interest rates were much higher. In my opinion, it is now excessive. Other than a major hurricane, it is difficult to see what risks the company faces that would justify a 15% rate of return in today's economic environment. The rate of return has been fixed for far too long a period – 32 years – without recourse to periodic adjustment. CUC's average cost of capital is currently 7%, with recent borrowing as low as 5.09%. Financial benefits from low cost debt financing are retained by shareholders and are not shared with consumers. However, CUC has upside protection against interest rates exceeding 15%. In my opinion, the Licence has outlived its useful life and needs to be renegotiated.



- I would describe the regulatory control over CUC as “light-handed”. Although the Government is represented on CUC’s Board of Directors, there has been no effective participation by Government in the corporate decision making process from a public interest perspective. Specifically there has been no oversight and few restrictions on the scale and nature of CUC’s capital investments. Tariff increases are driven by investment, not efficiency or productivity.
- Company profitability has increased at over 15% per annum compound over the past decade driven by an extensive capital development programme. Growth in shareholder returns have been significantly higher, averaging 19% over the same period. In the main this is due to the benefits of low-cost debt. At a time of falling world equity markets, I note that total shareholder return over the past five years have averaged almost 16%, outperforming the relevant market indices.
- Consumers have benefited from a reliable and high quality service, comparable or better than other regional utilities. From Government’s perspective, fuel duties are an important and easily-collected source of revenue. Currently, fuel duties represent 16% of utility bills and contribute about 4% to Government’s operating budget.
- Although the fully allocated cost of production and distribution has remained remarkably constant over the past 15 years, tariffs have increased by over 30% in the same period (**Figure 2**).
- Rate of return regulation can provide perverse investment incentives for a mature utility such as CUC, as tariffs and profits depend on how much the company invests, not its performance or efficiency. Between 1996 and 2002, the company invested US\$188 million and plans to invest a further US\$195 million up to 2010. Our review uncovered strong and persuasive evidence of excessive capital investment (“gold-plating”). I would like to highlight the following observations:
  - New generating plant has been installed in advance of need or justification. Two 10.3 MW units commissioned in 1987 and 1989 were substantially too large for the system and affected system reliability. A 7.59 MW generator installed in 1992 was not actually required until 1996. More recently, a 12.25 MW unit commissioned in 2001 took generating capacity well over the maximum stipulated in the Licence. CUC responded to this by removing temporarily three older low value generators from the Rate Base return as a short-term fix to reduce excess generating capacity. One



of these units remains operational. We also concluded that generating reserve could be reduced without adversely affecting system reliability.

- The decision to complete the 69kV looped transmission system was not adequately justified. Specifically, the 14 mile submarine cable installed in the North Sound at a cost of US\$8.6 million could have been deferred for five years with only a minor impact on reliability.
- The old North Sound substation was recently replaced with a new GIS substation costing US\$21.8 million. Our consultants note that the “old” substation still had a substantial residual life. Proper analysis of alternative options might have resulted in cost savings of up to US\$15 million.
- Financial savings could have been made by utilising open terminal technology at the Frank Sound substation.
- Our consultants were not shown any documentation to justify investment of almost US\$200 million in transmission and distribution assets from 1996 projected through to 2010. They concluded there is strong evidence of system “over-build”. Substantial reductions to future capital investment could be realised without serious technical risks.

CUC’s management disagree with most of our conclusions and findings. In order to balance this report, I have included their comments at the end of this summary report.

### ***The Future***

Several issues raised indicate non-compliance with the Licence over a protracted period. Specifically, there is solid evidence, supported by our independent consultants, of excessive and/or unjustified investment (“gold-plating”) in both generating plant and transmission and distribution assets. These investments have had a significant impact on the Rate Base and have driven up tariffs more than is reasonable and necessary. I recommend that this be referred to the Government’s Legal Department for review. I have prepared a more detailed report for use by Government officials and CUC, which I hope will assist.

Since CUC and the Government are in negotiation over a future regulatory framework linked to a further extension of the licence, it would be inappropriate for me to make any specific recommendations. However, CUC seems to recognise that the 15% permitted rate of return cannot continue indefinitely. The company has proposed a price-cap rate setting mechanism to replace the existing rate of return formula. Whilst this may look attractive superficially, I urge the Government to look closely at current tariff levels which are providing excessive returns to shareholders. The over capitalisation we identified should be eliminated as a first step. Our consultants



concur that a price cap form of regulation is an option. My preliminary thoughts are that it ought to be linked to efficiency improvements through a CPI - minus formula.

### ***Acknowledgements***

In closing, I wish to acknowledge and thank all those who assisted and co-operated with my Office during the course of our work, including CUC's senior management, the Ministry of Planning, Communications, Works and Information Technology, the National Archive, and Power Planning Associates, our independent consultants. I would like to record a special note of appreciation to my audit team, as this assignment absorbed considerably more of their time than I originally planned.

*N K Esdaile  
Auditor General*

*Grand Cayman  
October 2003*

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## SUMMARY REPORT

### INTRODUCTION

**S.01** This report is submitted to the Honourable Minister of Planning, Communications, Works & Information Technology pursuant to his request to the Auditor General to conduct a special audit of the monopoly licence for Caribbean Utilities Company (CUC). The terms of reference were developed jointly by the Audit Office and the Ministry of Planning and were agreed with CUC prior to commencement. The terms of reference are reproduced in **Appendix 1**. We wish to acknowledge the full cooperation and assistance CUC provided.

**S.02** Power Planning Associates Ltd. (the consultants) was hired by the Ministry to provide independent technical expertise and assistance to the Auditor General's Office.

### THE HISTORY & TERMS OF CUC'S LICENCE AGREEMENT

**S.03** CUC commenced operations in Grand Cayman in 1966 under the terms of a 20-year Government licence. The licence permitted a fair and reasonable return not being less than 8% of the total value of the company. This remained in force until 1979, when the licence was renegotiated and a permitted 15% Rate of Return (RoR) was agreed. The 8% and 15% RoR used different rate bases and therefore are not readily comparable.

**S.04** The Government received expert advice on the RoR to be incorporated in the 1979 Licence from a consultant nominated by the United Nations (UN). The UN consultant recommended 10% RoR, after taking into account returns then being earned in the United States and CUC's need to attract foreign capital. The 10% RoR recommended by the UN consultant should not be compared with the 15% finally agreed because different methodologies were used in the respective calculations. Archival research shows that the Government of the day initially offered CUC a 12.5% return, but the company successfully countered with 15%.

**S.05** A fuel adjustment factor was introduced in 1979 to protect CUC from fluctuations in fuel prices, which had been prevalent during the 1970s. CUC comments that the fuel adjustment factor also protects consumers from large tariff fluctuations, and is a common method for efficient recovery of fuel costs.

**S.06** The 1979 Licence was extended in 1986 for a further term of 25 years until 2011. Under the terms of its 1986 Licence, CUC is permitted to earn an annual return of 15% on its Rate Base. In simple terms, the Rate Base is the total of the company's net physical assets, plus allowable construction work in progress, plus total allowable



working capital. No amount for interest expense on borrowings is allowed in determining the net operating income.<sup>1</sup> If company profits do not reach the permitted level of 15%, CUC is entitled to increase its tariffs according to a predetermined formula. The Licence does not require Government's prior approval or authorization for rate increases. Details of the RoR calculations are provided at **Appendix 2**.

**S.07** The consultants commented that a free run for 25 years with a permitted 15% RoR seems to be rather generous. The RoR was set when interest rates were far higher than they are now. The consultants suggest it might have been more sensible to set the RoR in real terms, i.e. after allowing for inflation. CUC does not agree with this observation.

**S.08** CUC correctly points out that the 15% RoR is permitted, not guaranteed. Since 1986 the company's weighted average RoR is calculated at 12.8%. This illustrates both the effect of regulatory lag and the impact of rapid capital investment on electricity tariffs.

**S.09** Several Licence concessions were incorporated in the annual Rate Base effective in 1991. Two of these are significant because they directly increased the Rate Base, allowable profits and tariffs.

- Permitted reserve generating capacity was increased by approximately 10% (see **Table 4** and recommendation made in paragraph **S.61**)
- Construction work in progress was no longer disallowed from the Rate Base (for further comments see paragraph **S.56**).

These concessions formed part of a larger package of on-going negotiations between CUC and the Government, which commenced in 1990. The negotiations were not concluded until November 1994 when an amended Licence was issued. We note that in early 1991 Executive Council (Cabinet) agreed in principle to the inclusion of CWIP and the increase to reserve generating capacity, but did not provide clear and definite authority for concessions to be incorporated in Rate Base calculations. It is also evident that CUC made clear disclosures to the responsible officials that they had changed the Rate Base (to their benefit) effective 1991. In our opinion, this raises important governance and accountability issues.

**S.10** CUC did not implement a permitted 2% tariff increase in 2001. This has contributed to a slight reduction in the company's actual RoR for 2002 and 2003. Under the current licencing regime we expect consumers in Grand Cayman to face a regular

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<sup>1</sup> Only interest in excess of 15% of monies borrowed is allowable, which does not apply at the present time.



series of electricity price rises over the next few years, reflecting CUC's extensive investment programme, the effect of regulatory lag and slowing growth in demand.

### ***Government Oversight of Rate of Return Submissions***

***S.11*** Government relies on an independent audit and certification of CUC's annual RoR calculations. This is important because the RoR determines the amount of any permitted tariff increase. The audit is carried out by CUC's external auditors. Periodically the Government institutes an independent review to assist in determining whether tariff increases are justified under the terms of the Licence. The most recent review was conducted to support the 2001 return. The auditors concluded that overall no significant items were noted that would suggest the 2001 rate increase of 2% was not justified.

### ***Accounting Observations***

***S.12*** We reviewed CUC's external auditors' management reports covering the reporting periods 1997 to 2003 and noted that the external auditors raised a number of issues concerning excess capitalization of staff expenses and other costs charged to construction work in progress in past years. Canadian GAAP permits capitalization only of costs directly attributable to the acquisition, construction, and development or betterment of the asset, including installing it at the location and in the condition for its intended use. CUC's external auditors have never issued a qualified opinion on the financial statements as a result of incorrect capitalization of costs indicated in the management letter points. Therefore, we assume there have been no material errors for financial statement purposes.

***S.13*** However, in our opinion, the Rate Base includes capitalized expenditures which are not justified or allowable. We consider CUC's capitalization policies to be overly aggressive for Licencing purposes. For example, we observed that capitalized labour costs for the period 1997-2003 amounted to US\$20.4 million. This includes a 45% "recharge uplift" to applicable salary costs for items such as: overtime, pension health benefits, bonuses and contract allowances. In our opinion the 45% uplift recharge appears to be excessive, based on 2001 figures provided to us by CUC, which CUC used to calculate the 45% recharge uplift. A recharge uplift of 22% in our estimation appears more reasonable. Also, during 2001 CUC began capitalizing certain indirect labour charges relating to the following departments: financial services, corporate administration, material management, and computer services. We understand that 20% of labour costs were capitalized. The 20% was an estimate that CUC used. In our opinion, capitalization of costs from these departments appears to be an overly aggressive and excessive capitalization policy. We note that in 2003 CUC are now using timesheets to allocate the costs out from these departments. CUC's 1997 management letter



disclosed that CUC was overstating the capitalized cost of its projects by recharging all vehicle costs against capital work and repair orders. The auditors recommended this practice be discontinued. This issue has not been mentioned in subsequent management letters. However, after further enquiry, we discovered CUC continues to capitalize vehicle costs. In our opinion some of these costs should not be capitalised. By over capitalising expenditures this increases the Rate Base and allowable profits. We quantified the cumulative impact of the potential excess capitalization on the Rate Base, but were unable to confirm our figures as a result of not having access to CUC's external auditor's working papers on terms acceptable to us. We therefore have relied solely on the costing information provided to us by CUC.

### ***Reserve Generating Capacity***

**S.14** CUC has exceeded the permitted reserve generating capacity for the years 1986 – 1994 and 2001. CUC denies exceeding the allowable reserve generating capacity for both 1994 and 2001. In our opinion, CUC's assessment is erroneously based on a misinterpretation of the Licence provisions. CUC told us that they had been applying a different measure, namely the next following annual peak power demand instead of the most recent annual peak power demand as provided for in the Licence. See paragraphs **S.39** to **S.44** for further discussion.

### ***Fuel Adjustment Factor***

**S.15** We audited CUC's compliance with the fuel adjustment factor for the years ended 30 April 2000 and 2001. In our opinion, CUC was, in all material respects, in compliance with the fuel adjustment factor provided for in the 1986 Licence.

## **IS A 15% PERMITTED RATE OF RETURN FAIR AND REASONABLE?**

**S.16** World interest rates were much higher in the 1970s compared to the last decade, with Cayman Islands prime ranging between 11.5% and 15.75% during 1979. We concluded that the 15% RoR negotiated in 1979 was probably not unreasonable in the prevailing economic climate to attain the objectives outlined by the consultant. However, by 1986 interest rates were markedly lower, ranging from 7.5% to 9.5%. The new Licence issued in 1986 offered the Government an opportunity to review both the fixed period RoR and the 15% return permitted. We were not able to locate any documentation to confirm that the 15% return was reviewed, as the archived records are deficient for the period under review.

**S.17** The company's interim return for 2003 reports an actual return of 11.8668% and indicates a shortfall of US\$7.114 million in permitted profit. The Licence allows CUC to



increase tariffs by only 3% of the shortfall (15% minus 11.8668%). Had the Licence been structured to allow the full profit shortfall to be recovered, consumers would be facing a greater increase than the 3%.

**Risk and Reward**

**S.18** CUC maintains that a 15% return remains fair and reasonable in today’s market. Apart from the real risk of a major hurricane, it is difficult to see what significant risks CUC and its investors face. It is appropriate to consider risk and reward from the admittedly differing perspectives of CUC and the audit team. This is outlined in **Tables 1 and 2** below, and is examined in more detail later in this report.

<b>Table 1: Significant Risks</b>			
<b>CUC</b>		<b>Audit &amp; Consultants Comments</b>	
✓	Substantial hurricane risk	✓	Agreed. Uninsured T&D assets could affect survivability of company and could threaten the Island’s economy
✓	Small island economy, not connected to a mainland grid	✓	Agreed, but minimum / maximum reserve generating capacity mandated in Licence
✓	Sovereignty risk / Government default	✗	Minimal. Stable political and economic environment. Strong legal protection in the event of Government terminating the Licence early
✓	Small capitalization relative to US utilities	✗	Minimal. Monopolist niche market
✓	Risk of re-alignment of the CI\$ against the US\$.	✗	Minimal. The Cayman Islands currency has remained stable and fixed to the US dollar for the past 30 years

<b>Table 2: Significant Rewards</b>			
<b>Audit &amp; Consultants</b>		<b>CUC Comments</b>	
✓	Monopolist. No local competition		
✓	CUC has right of first refusal on grant of extension post 2011		
✓	Neither the company nor its shareholders suffer any local corporate or personal taxation		
✓	Profit and shareholder return is based on investment, not performance or efficiency	✗	CUC investment is required to meet demand and maintain reliability
✓	RoR has been fixed for 32 years and not subject to adjustment in line with market rates	✗	The Licence term is consistent with life of assets 25 – 40 years
✓	15% permitted return is generous in the	✗	Returns are fair and reasonable. A



Table 2: Significant Rewards	
Audit & Consultants	CUC Comments
	current economic climate. Shareholder returns are even higher
✓	CUC is able to leverage investment and earn superior returns for shareholders
✓	RoR regulation can lead to over-capitalization of assets (“gold-plating”)
✓	Fuel cost risk is passed on to consumers
	15% return is needed to provide 3 – 4 times interest cover
	Prudent utilities utilize a proper mix of debt and equity
	No evidence to suggest this applies to CUC
	Fuel recovery clauses are commonplace

### Impact of the Licence on Stakeholders

#### The Government

**S.19** The Government derives a significant source of indirect taxation revenue from CUC’s operations. Between 1986 and 2002, CUC paid CI\$121.8 million in duties and fees, comprising of: fuel import tax - CI\$106.8 million, materials import duties - CI\$11.3 million, and CI\$3.7 million royalty fees based on 0.625% of the company’s turnover. Duties and fees paid to government for 2002 amounted to CI\$13.1 million, representing 4% of total government revenues.

**S.20** CUC points out that since 1990 Government duty on fuel has increased by 245%. At the time the fuel factor base was established we are told the duty on fuel was 10 cents/imperial gallon, whereas, now the duty is 50 cents/imperial gallon. Therefore, there is little scope for a downward fuel adjustment on a customer’s bill. It is important to note that fuel taxes do not affect the company’s profitability, as fuel taxes and any increases thereon are passed through to the consumer through the fuel adjustment factor and are therefore not reflected in the tariff increases. For reference purposes, fuel tax is approximately 12% of the average selling price per kWh. A 10 cent /gallon change, upward or downward, in the fuel duty rate would result in a variation of about \$2.4 million in government revenue. It should be noted that the current 3% tariff increase announced by CUC will generate a similar level of additional revenue for CUC in a full year, based on current sales levels. The level of Government taxation is a policy matter that goes beyond the scope of the Auditor General’s mandate and accordingly is not discussed further in this report.

#### The Company

**S.21** The company’s strategic financial objective is to increase shareholder value by producing solid earnings, maintaining a strong balance sheet and sustaining steady



dividend growth. From 1992 – 2002, CUC profits have increased at a compound annual rate of 15.4% from US\$4.588 million to US\$19.275 million. Enhanced profitability has been achieved through an extensive capital investment programme in generation plant and the transmission and distribution system. We note that CUC invested US\$188 million between 1996 and 2002 and plans to invest a further US\$194.9 million up to 2010 (see **Table 3**). By way of comparison, this exceeded the Government’s total capital investment in education, health, public buildings and roads over the same period.

Net Book Value of Fixed Assets US\$ m		Category	Net Invested US\$ million 1996-2002	Forecast US\$ million 2003-2010
1996	2002			
17.3	14.6	Land and Buildings	9.0	8.3
39.0	114.7	Generation, Plant and Other	79.9	64.8
19.5	86.6	Transmission and Distribution	90.2	107.7
-	-	Information Systems & Equipment	5.9	4.1
13.9	7.1	Motor Vehicles	3.0	4.4
-	-	Minor Projects	-	5.6
<b>89.7</b>	<b>223.0</b>	<b>Total</b>	<b>188.0</b>	<b>194.9</b>

NOTE: Forecast provided by CUC and is subject to change

**S.22** Capital investment increases the Rate Base, which in turn increases the company’s permitted profit. This drives up consumer tariffs in accordance with the terms of the Licence. CUC has been able to fund much of its extensive capital investment programme at a fixed rate of 7% on which it has a permitted return of 15% (actual return 12.8%). From examination of archive information, it is clear that the double impact of low-cost financing, combined with the ability to optimize shareholder returns through capital structure, was never envisaged when the Government amended the Licence in 1979 and agreed to a 15% return. In our opinion, this is one of the most significant issues arising from our review.

**S.23** It is worth emphasizing that the benefits of reduced borrowing costs are not shared between the consumer and the company or its shareholders. All financial benefits from reduced long-term interest rates and lower borrowing costs accrue solely to shareholders. This is because interest expenses are excluded from the RoR calculation. However, it is relevant to point out that CUC has upside protection against interest rates exceeding 15%.

**S.24** Future investments will inevitably drive up consumer tariffs under the present RoR regime. We suggest that Government requests CUC to provide forecast financial

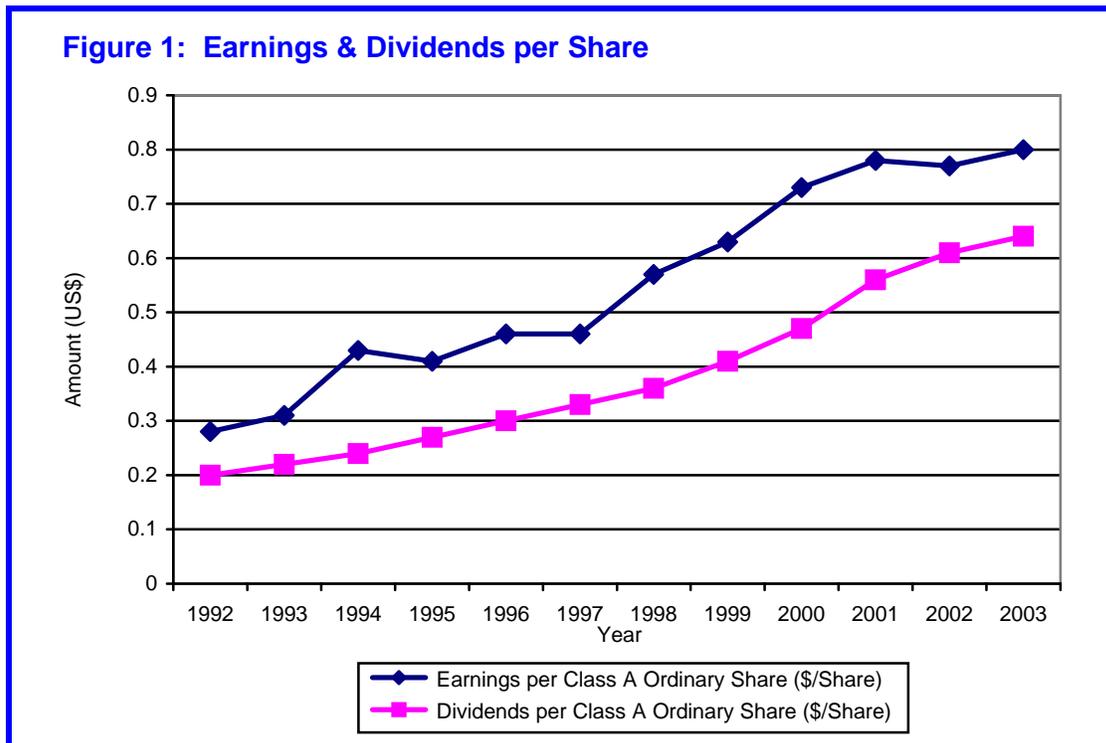


statements covering the period 2003-04 to 2010-11, together with a projection of the anticipated tariff increases during this period. CUC's capital investment programme is examined later in this report.

### Shareholders

**S.25** There is conspicuous difference between company and shareholder returns, which are significantly higher than 15%. This is principally due to the beneficial effect of low-cost debt finance instead of equity finance. The differential between the cost of borrowing and the permitted (15%) or actual return (12.8%) is passed direct to shareholders. In our opinion, this has been a key plank of CUC's strategy to attain its stated financial objectives.

**S.26** Shareholder return comprises dividends plus any capital increase in share value. Between 1992 and 2003 dividends and earnings per share increased by 220% and 185% respectively (**Figure 1**). We calculate that annual shareholder return averaged 19.1% over this period. CUC say although this is arithmetically correct, it is not a fair representation. The company argues that use of an average return may lead to incorrect conclusions. The company claims that, "...for the most part, the growth reflects the initial public offering bump to original equity". CUC's comments are debatable and are not supported.



**S.27** CUC's published figures report an average annual total shareholder return of 15.9% over the five-year period 1997 to 2002. CUC's total returns outperformed both the Toronto Stock Exchange (TSE) 300 Index (6.7% p.a.) and the TSE Gas/Electrical Utilities Index (13.4% p.a.) in the same period. These returns (1997 - 2002) were achieved in spite of falling world equity markets in both 2001 and 2002. For example the TSE 300 Index fell 15.6% over the two-year period 2001 and 2002.

**S.28** A long-term investor from the initial public offering (1992) currently enjoys a dividend yield of 26% and earnings per share of 33% (US\$3.20) on the original investment.<sup>2</sup> In addition, an investor has seen his IPO investment increase fivefold in value over the 11 years. These figures confirm that while the company is restricted to a maximum 15% return, no such restrictions apply to shareholder returns, which are significantly higher. They also illustrate clearly the fundamental flaw of the Licence – a long-term permitted RoR not subject to market adjustment – and how the company has optimized shareholder return.

### **Consumers**

**S.29** Consumers have benefited from a reliable and high quality service. Our research confirmed that the reliability of the CUC system appears comparable or better than other utilities in the region and also compares favourably with utilities in both Canada and the United Kingdom.

**S.30** CUC points out that inflation-adjusted tariffs declined by 8.1% since 1997, and claims that this is an indication of the efficiencies brought about by investment. The company claims that consumers have also benefited from productivity gains, which they say has improved by 24.8% since 1998. We can confirm based on the data CUC has provided us that there has been fuel efficiency savings.

**S.31** However, from our observations we believe that consumers have not benefited from the evident economies of scale, after taking into account CUC's considerable investment during the past 10 years. Our analysis shows that, since 1988, the company's fully allocated cost of production of each kWh of electricity sold has actually reduced by 3%<sup>3</sup>. During the same period, tariffs have increased in 12 of the past 15 years, with a 27.4% cumulative increase up to 2002-03. A further 3% increase was effective in August 2003.

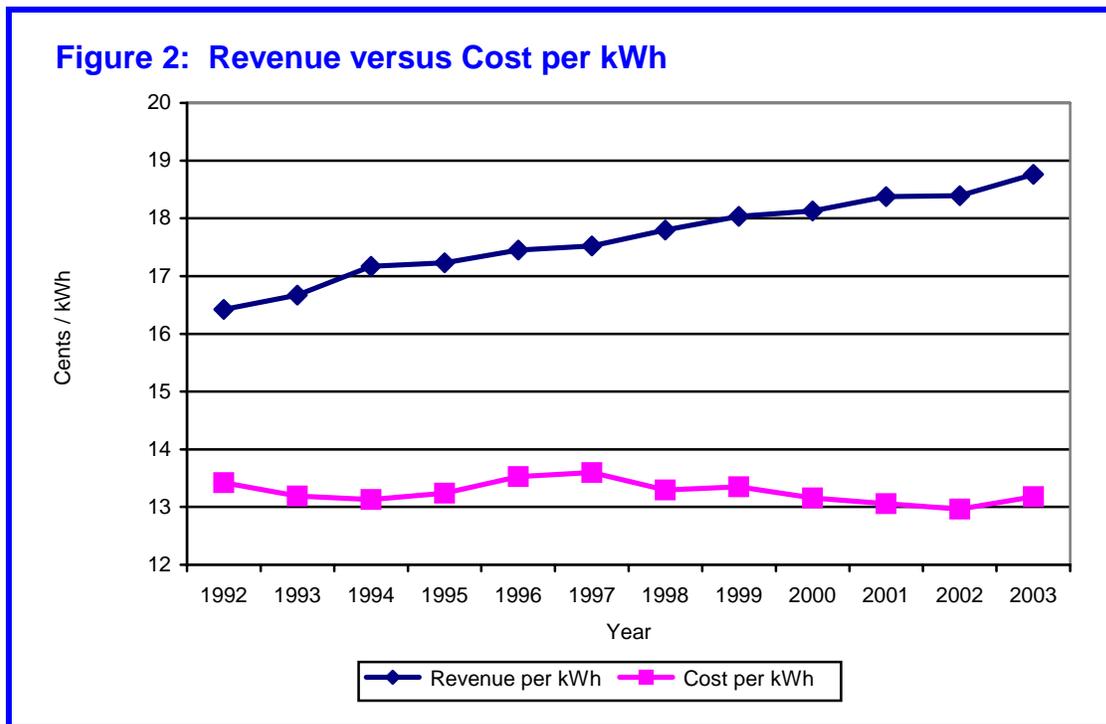
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<sup>2</sup> Adjusted for stock splits in 1995 and 1998.

<sup>3</sup> Cost of production ignores fuel adjustment factor as it is directly passed through to the consumer.



**S.32** Analysis of 15 Caribbean utilities shows that Grand Cayman residential tariffs (based on 800kWh/month) are positioned midway (8th out of 15). Grand Cayman tariffs are between those in Grand Bahama and Bermuda where socio-economic conditions are comparable. Commercial consumer tariffs are similarly positioned. Our consultants also noted that Grand Cayman consumers have the highest specific consumption of the 15 utilities surveyed, with an average of over 21,000 kWh/year per consumer. This may partially explain why consumers complain that electricity bills are high in Grand Cayman. Further comments on energy efficiency are provided later in this report.



**Overall Conclusion: Is a 15% Rate of Return Fair and Reasonable?**

**S.33** In our opinion, the 15 % ROR return is excessive in today’s market. The problem stems from several fundamental flaws in the Licence:

- The permitted RoR is fixed for too long a period (32 years – via the 1979 and 1986 licence). Rate of return regulation in other jurisdictions often features periodic adjustments to the permitted return. Essentially, the licence has locked Government and consumers into a fixed RoR without adjustment to reflect the changing cost of capital in world markets.
- The cost of capital has fallen considerably in recent years. CUC’s weighted average cost of debt is 7% per annum and the company recently raised a further US\$40 million for future investment at 5.09% per annum. It is our view that the



fixed long-term RoR regime, combined with much lower world interest rates and debt financing, has enabled CUC and its shareholders to earn excess profits. Financial benefits from reduced cost of capital are retained exclusively by shareholders and are not shared with consumers.

- Company profitability is driven by the value of capital investment made, not by performance, efficiency, or risk assumed. There are no incentives to the company to reduce tariffs and for consumers to benefit through economies of scale.
- There is potential for excessive and/or unjustified capital investment in order to drive up permitted profits and shareholder returns. This issue is examined later in the report.

**S.34** It is our view that capital investment in the electricity infrastructure has benefited the company and its shareholders far more than the service, reliability and productivity benefits that consumers have enjoyed.

**S.35** In our opinion, based on the maturity level of the electrical system, the licence has outlived its useful life and should be re-negotiated to attempt to rectify these fundamental flaws.

### **ARE ALL CUC'S INVESTMENTS REASONABLE AND NECESSARY?**

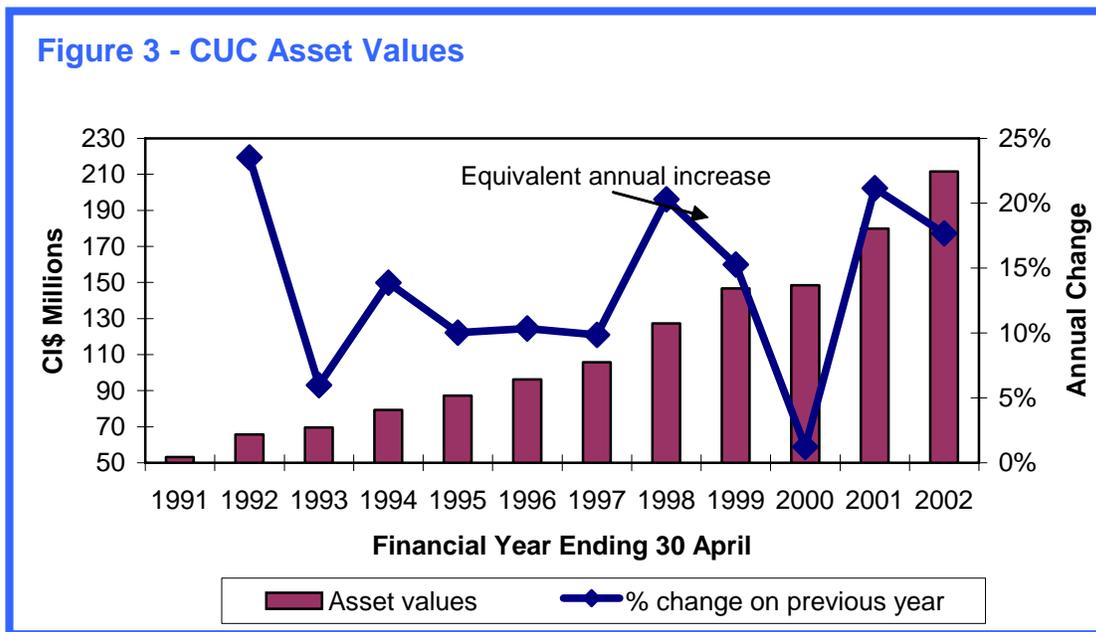
**S.36** Governments regulate monopolies to substitute for the absence of competition and thereby secure the advantages of a single supplier whilst avoiding monopolist pricing. In traditional rate-of-return regulation, there is a possibility of inefficiencies emerging caused by the non-incentivised nature of rate-of-return. In simple terms, the company's profit is tied to the value of its investments, not its efficiency or performance. The more the company is able to invest, the greater its allowable profits. Rate of return regulation has been found to give rise to an over-capitalization (or "gold-plating") by utilities, whereby regulated companies engage in excessive investment in order to increase their allowable profits. This is known as the "Averch-Johnson effect" as has been well documented by academics and others. CUC's position is that the Averch-Johnson effect is merely a tendency that has been the subject of considerable debate. They state that there is no evidence that suggest over-capitalization applies to them.

**S.37** It is normal practice in any company to consider alternatives to proposed capital projects, and to estimate the costs and benefits of each. This is particularly important in the context of an electricity company when the assets have lives of up to 40 years. Throughout the period of this review we have repeatedly requested copies of such analysis, together with details as to the investment criteria adopted by CUC. Such criteria would include net present value and target rate of return / payback period. CUC has



failed to provide any adequate analysis of historic investment decisions. We have therefore concluded that CUC’s capital budgeting process is not based on the type of investment criteria we would expect to find in normal commercial enterprises. In our opinion, there is a significant risk that certain capital investments may not be properly justified or necessary.

**S.38** We also noted that capital investment is increasing much faster than the annual growth of energy sales. **Figure 3** shows the value of, and annual change in, CUC assets (excluding CWIP) from 1991 to 2002. Asset values have increased from CI\$53 million in 1991 to CI\$211 million by 2002 – equivalent to an average annual increase of 13.4%. Over this same period the maximum demand has increased at an average annual rate of 6.1%, and energy sales to customers by 6.6%. The following sections examine CUC’s recent investments in generating plant and transmission and distribution assets.



**Generating Plant**

**Licence Requirements**

**S.39** The Licence provides some countermeasures, or controls, regarding the level of permitted generating capacity. The objective is to guide CUC as to the maximum and minimum generating capacity levels acceptable in order to have adequate security of supply on the one hand, but not to have a “gold-plated” system on the other. The maximum and minimum levels have been amended twice since they were introduced in 1979, as shown in **Table 4**.



<b>Date</b>	<b>Minimum Required</b>	<b>Maximum Permitted</b>
Nov. 1979	15% of peak power demand	20% of peak power demand
Jan. 1986	Capacity of largest generator plus 10% of peak power demand	55% of peak power demand
Nov. 1994	Unchanged	Capacity of largest generator plus 40% of peak power demand

**S.40** The reserve generating capacity has implications in the way CUC conducts its operations. With a unit size larger than 20% of peak power demand, it becomes difficult to run a “spinning reserve” to cover an outage of this unit without a total system shut down. The consultants observed that the 2 x 10.3 MW Stork units installed in 1987 and 1989 were substantially too large for the system. This situation persisted for 10 years and resulted in high loss of load probability and outages. CUC comment that the Stork generating units have performed well.

**S.41** We observe that from 1986 to 1994 the generating reserve capacity exceeded the permitted upper limit<sup>4</sup> (see **Figure 4**). After 1994, the installed capacity again exceeded the permitted maximum in 2001 by 4.6 MW. It appears to us that CUC’s strategy is to have as much installed capacity as possible in order to maximize the Rate Base and allowable profits. The excess capacity was exacerbated by unforeseen reductions in peak demand in 1989 and again 1993 during a period of recession. The failure in CUC’s investment strategy appears to be that they did not take into consideration the excess capacity when considering the timing of new plant acquisitions. A delay of just over one year in commissioning new plants would have matched capacity more closely to the permitted range. The consultants conclude that the 7.59 MW Mirelees generator commissioned in 1992 was not actually required until 1996.

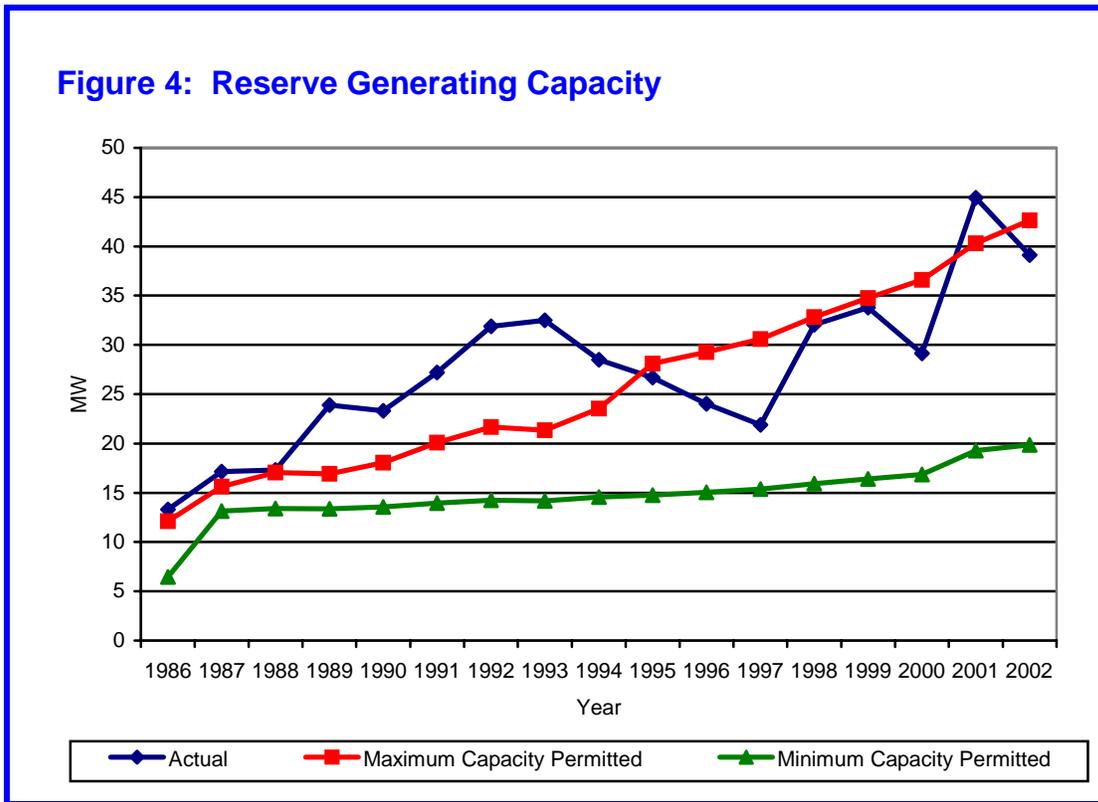
**S.42** The Government of the day was fully aware of the history of excess generating capacity and recognised that this contributed to tariff increases. However, the Licence requirements were ignored and CUC was allowed to increase the tariffs throughout this period without restriction or adjustment. We were unable to find any formal technical or economic justification for this policy, which was allowed to persist for nearly a decade. In our opinion, excess generating capacity should have been grounds for reducing the Rate Base and possibly the tariff increases.

**S.43** CUC reduced the 2001 Rate Base by removing three generating units to compensate for the excess capacity. The units removed were old units nearing the end of

<sup>4</sup> The Government approved a maximum limit of largest generator plus 40% of peak power demand in April 1991, but the licence was not amended until November 1994. However, for the years 1991 – 1994 CUC still exceeded the revised upper limit.



their economic and useful lives and having a low book value. These units were, however, only *temporarily* excluded from the rate base for 2001, and were reinserted the following year. This adjustment appears to have been undertaken as a short term fix to reduce the extent to which the maximum permissible generation margin was infringed. One of the units remains operational with a second actually retired in 2003. We note that in 2001 CUC installed 24.5 MW of new capacity at a cost of almost US \$20 million. This had a \$5.6 million impact on the Rate Base, but did not have a material increase on tariffs as CUC withdrew its tariff increase following the September 2001 terrorist attack.



**S.44** A summary of the main investments in generating equipment actually invested in for the period 1996 to 2002 against planned investments for 2003 to 2010 is outlined in **Table 5**.



<b>Table 5: Generating Equipment Capital Investments</b>		
	<b>1996-2002 Actual</b>	<b>2003-2010 Planned</b>
Capital Investment	\$71.0 million	\$65.0 million
Capacity Installed	57.2 MW	55.1 MW
Capacity Retired	13.4 MW	12.7 MW
Net capacity increase	43.8 MW	42.4 MW
Description of main installations	<ul style="list-style-type: none"> <li>▪ 2 MAK units, \$15.2 m, 18 MW</li> <li>▪ 2 CAT unit, \$7.7m, 8.8 MW</li> <li>▪ 2 MAN units, \$19.3 m, 24.5 MW</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1 MAN unit, 12.25 MW</li> <li>▪ 3 MAN units, 14.29 MW</li> </ul>

**S.45** The independent consultants carried out a loss of load probability (LOLP) analysis to measure system reliability. The consultants advised that most developing countries use an LOLP criterion of between 10 and 50 hours per year. For example, Jamaica uses a figure of 20 hours per year. Their analysis of CUC shows a very high LOLP in 1987 (387 hours/year) due to the low reserve capacity, which was less than the capacity of the largest unit. LOLP analysis projected through to 2006 confirms a LOLP below 4 hours/year since 1997 through 2006<sup>5</sup>, assuming CUC's planned investment programme is followed. In view of the substantial capital investment in generating plant, Grand Cayman consumers have every right to expect a world-class reliable service. CUC questions adopting a LOLP approach similar to Jamaica, which they suggest would reduce reliability to levels found in these and other countries. Our consultants have re-affirmed their views that a LOLP approach is relevant and appropriate for the Cayman Islands in that it provides a quantifiable measure of security. It is, accepted that in the context of small systems, LOLP values are indicative and actual reliability figures can be higher or lower than the calculated value. The consultants comment that the problems experienced in Jamaica and Guyana relate to lack of investment and aging equipment. These problems are not experienced by CUC.

**S.46** In comparative terms, Grand Cayman has a reserve plant margin of 51.4%, which is similar to Belize and Bermuda, but less than Grand Bahama and Bonaire. We expect this margin to rise only slightly when the third MAN 12.25 MW generator is commissioned in summer 2003, because other generating plant is scheduled to be retired at the same time.

**S.47** The consultants have expressed concern as to whether electricity has been generated in such a way as to minimise fuel costs. Their observations are based on an indicative of energy generated over the last five years. In particular we note a high level

<sup>5</sup> The LOLP for 1997 – 2006 is less than 1 hr/year except 2003 (1.7 hr) and 2005 (3.8 hrs)



of utilisation of the costly gas turbine plant in 2001 (when there was a substantial plant margin) and apparent “out of merit” operation of the new MAN units.

### ***Transmission and Distribution (T&D) Investments***

**S.48** There are no limitations on the company’s other investments, particularly transmission and distribution (T&D) assets, which comprise US\$198 million (52%) of the company’s capital investment programme 1996-2010. CUC’s philosophy has been to focus on improving reliability and reducing maintenance. The US\$107 million planned T&D investment for 2003-2010 is dominated by the completion of a looped transmission system and construction of indoor GIS substations at Frank Sound, Mount Pleasant, Bodden Town and North George Town. The key points arising from our consultants’ review of T&D assets and investments are summarized in paragraphs **S.49** to **S.53** below.

### ***Construction of a Looped Transmission System***

**S.49** One of CUC’s major investments is the development of the 69 kV transmission system from a radial system to a ring configuration, including 14 miles of submarine cable across the North Sound. The development of the system is illustrated in the diagrams in **Appendix 3**. CUC acknowledge that the looped system could be deferred, but with the added risk that consumers could experience extended outages when a single circuit is lost. The consultants note that neither of the two loops are closed yet, and therefore there is no current benefit to customers through enhanced reliability. In the longer term, however it is agreed that remaining with a radial system is not advisable. However, further analysis would be required to determine if the construction of loops could have been economically deferred. After extensive discussions with CUC it is clear that the decision to complete the 69kV loops was not adequately justified. In the opinion of the consultants, the submarine cable project, while probably the least cost long term solution, could have been deferred by five years with only a minor impact on reliability. The project cost US\$8.6 million. We are satisfied that this project was implemented in advance of requirement and we concluded that the investment is not reasonable and justified at this point in time.

### ***Transmission System Voltage***

**S.50** The choice of 69kV does not appear unreasonable although a full study involving a comparison with a 34kV system would be needed in order to arrive at a definitive conclusion. Taller poles (80 foot) are required for 69 kV lines. The consultants indicate that the cost of such single circuit lines are typically US\$60,000 to US\$120,000 per



kilometre internationally, compared to CUC's costs of US\$124,000 per kilometre. There is only a small cost premium for using concrete instead of wooden poles. It is, however, noted that some manufacturers do not produce equipment specifically for the 69kV market, and that some plants are capable of higher voltages. This includes the GIS substation equipment.

### ***Construction of Indoor GIS Substations***

**S.51** The indoor gas insulated switchgear (GIS) substations are considerably more expensive than an equivalent outdoor substation but have a much longer life expectancy and require less maintenance. CUC argue that planning difficulties, protection against hurricane damage and climatic conditions mandate a GIS approach. CUC and our consultants do not agree on the cost premium for a GIS substation compared to an outdoor substation. Our consultants quote typical premiums of between 120% and 340% where complex GIS arrangements have been substituted for simple open terminal designs elsewhere, but CUC say the premium is nearer 30% for the North Sound substation.

**S.52** The consultants expressed particular concern at the US\$21.8 million cost of the North Sound GIS substation, which they consider to be very high. Being part of an extensive power station site, the planning permission and land advantages of GIS are less relevant. It was noted that the cost included some elements which we do not consider should have been capitalised; these included site remediation and the transfer of foundations from the old substation. Our consultants noted that the "old" outdoor substation, which was commissioned in 1987 had a substantial residual life and that an analysis of alternative options might have resulted in substantial cost savings of up to US\$15 million.

**S.53** The consultants also expressed concern about the necessity to construct GIS substations in areas other than in high income residential / high density commercial areas. In particular, financial savings could have been made by utilising open terminal technology at the Frank Sound site.

### ***Asset Lives***

**S.54** It has become common practice amongst regulated utilities to examine the estimated useful life of their assets. This has been driven by downward pressure from national regulatory authorities, resulting in utilities finding ways to concentrate capital expenditure in the more strategically important areas. Such considerations do not apply to CUC under the present RoR regulation and essentially there are no restrictions on T&D capital expenditure.



**S.55** There is some evidence to suggest that CUC's plant may be retired before the end of its useful life. We see potential for extending the operational life of certain generating units. However, CUC has strong financial incentives to replace older equipment earlier than justified from an operating and technical perspective. A fully depreciated generator (asset) contributes nothing to the Rate Base and permitted profits. For illustrative purposes, we estimate that a new generator costing US\$10 million will increase tariffs by 2.4%. We cite this example because it is illustrative of the 2001 year.

### ***Construction Work In Progress***

**S.56** Prior to 1994, the Licence explicitly excluded Construction Work in Progress (CWIP) from the Rate Base. In 1990 CUC submitted several proposed changes to the licence including the inclusion of CWIP. Their stated justification was to avoid large tariff increases immediately following the commissioning of new plants. In simple terms, the inclusion of CWIP means that consumers are paying for plant and equipment before it is brought into production. We would expect this proposal to have received close government scrutiny from the perspective of protecting consumers against unnecessary tariff increases in a monopolist environment. From archive information, there is very limited evidence of internal analysis or discussion. However, we note that a government consultant advised CWIP should be allowed in the Rate Base only if it were necessary to enable a financially strapped utility to earn sufficient cash to continue construction programs. That criteria did not apply to CUC in 1990-91. In our opinion, the inclusion of CWIP in Rate Base is questionable.

**S.57** We were very surprised to note that CWIP was included in CUC's 1991 to 1994 Rate of Returns despite the fact that there was no legal basis for this. We note that Licence negotiations were ongoing between CUC and Government representatives from July 1990. Whilst there appears to have been agreement in principle from the Government side on several issues, including CWIP and to increase the maximum generating reserve, there was no unqualified authorisation from the Executive Council (Cabinet) that such changes could be incorporated into an amended Licence. Indeed the amended Licence was not finally agreed until November 1994, and covered only some of the issues the parties had been discussing in 1990 and 1991. We are unable to express an opinion on the legality of these changes to the conditions of the Licence in force, and specifically whether the 1991 to 1994 Rate Base Returns are in compliance with the Licence. The inclusion of CWIP in the Rate Base had a significant impact on tariffs. CUC has consistently been able to extract more profits than would have been permitted without CWIP. Based on our estimates, the cumulative effect of the inclusion of the



CWIP was that it permitted CUC to extract approximately CI\$18million more for the period. Additionally, we estimate that current tariffs would be 2.5% lower.

**S.58** In our opinion the CWIP amendment unnecessarily favoured CUC's shareholders as it increased shareholder returns through increased profits. It may also have created incentives for CUC to protract construction projects longer than necessary in order to keep the costs in CWIP at full cost. The North Sound 69kV GIS substation project is a good example of a project taking longer than it normally should have according to our consultants, having been spread over the period from 1999 to 2003. The North Sound submarine cable is another example as it is not improving service reliability.

**S.59** If CWIP was not included in the Rate Base, it is our opinion that there would have been minimal risk on CUC's capacity to raise capital. As evidenced earlier in this report. CUC has done little or no financial analysis to determine whether or not a project is economically justified on technical grounds and implemented at the lowest cost. In our opinion, if CWIP was excluded from the Rate Base, this would bring more rigour to CUC using a least-cost analysis when evaluating whether or not it should proceed with a construction project.

***Overall Conclusion: Are All CUC's Investments Reasonable and Necessary?***

**S.60** It is the view of both the audit team and the consultants that CUC is maximizing shareholder returns through excessive and/or unjustified investments in both generating plant and T&D capital investments. In our opinion, there is significant and persuasive evidence of over capitalization ("gold-plating"). The audit team firmly believes that significant efficiency gains could be realized and passed on to the consumers through an alternative licencing agreement. CUC's position is that all its capital investments, actual and planned, are necessary to meet customer service expectations and for service reliability.

**S.61** The consultants conclude that the current maximum reserve capacity stipulated under the Licence (largest unit plus 40% of peak power demand) leads to installed capacities which are probably excessive in terms of normal reliability levels for similar utilities. They recommend that the maximum reserve capacity should be set at a lower level. CUC's response is that reserve capacity is presently at the right level and strongly recommends that it remains unaltered. The company says that generation shortages could be repeated and will be more probable and frequent if the reserve margin is reduced.

**S.62** The consultants were not shown any reports or cost-benefit analysis which would provide a justification of almost US\$200 million investment in transmission and distribution over the 15 years 1996 – 2010. Measured in terms of the increase in demand



over the same period, the investment works out at US\$3,300 / kW, which is very high and probably difficult to justify in terms of reliability gain. CUC say that the figure of US\$3,300 / kW is not a fair measure and points out that part of the T&D investments are attributable to replacement of existing assets. They also comment that the life of the equipment being installed is 40 years and will meet load demand beyond 2010.

**S.63** The consultants conclude that there is definitely strong evidence of “over-build” of the T&D system. In other words, there is more investment than can be justified on pure techno-economic grounds. They are of the opinion that CUC’s system is so robust that substantial reductions in future capital expenditure could be realized without serious technical risks. However, it is difficult to see how the government could enforce this through the existing Licence as there are no specific restrictions or controls over transmission and distribution capital investments.

**S.64** In order for corporate and shareholder interests to be equitably balanced with broader national and consumer interests, we recommend that CUC agrees to a voluntarily code of regulation which would require independent review and prior approval of all proposed major capital projects. We see this as a logical progression towards the company’s stated policy of openness and transparency.

**S.65** If it is not possible to reach agreement on the appropriateness of the generation and T&D asset base for purposes of setting tariffs, the consultants suggest two alternatives that could be considered.

- An independent valuation of T&D assets could be undertaken to determine the appropriate value of an optimally designed, sourced and constructed network to interconnect generation and demand with a given security and quality of supply. This could be used as the asset base for tariff setting rather than the actual book value of the CUC network. Such an approach would eliminate over-capitalization inefficiencies, compensate CUC for the appropriate level of T&D investment and penalize any over-capitalization.
- Move from a RoR regulation to a price cap form of regulation, which is becoming increasingly used throughout the world. This would bypass the question over the appropriateness of the asset base. However, the setting of the initial tariff would require a view to be taken on the current asset base and the RoR.

**S.66** The collective effect of these proposed changes would be to position CUC’s asset base at an appropriate level and compensate the company only for reasonable and necessary capital investments. We believe this approach would reduce both the company’s future capital investment and the Rate Base. In turn this would limit or restrict expected future tariff increases.



## OTHER MATTERS

### *Hurricane Risk*

**S.67** A major hurricane would likely cause significant damage to CUC's transmission and distribution systems and could disrupt electricity services for a prolonged period. The company no longer insures transmission and distribution assets because insurance premiums are uneconomical, and maintains only a US\$3.5 million insurance reserve. CUC agrees that a major hurricane would present a significant funding challenge to the company to replace these uninsured assets, which have an estimated replacement cost of US\$68 million. This could have potentially disastrous and long-lasting effects on the Cayman Islands' economy.

**S.68** CUC has recently proposed that it be allowed to recover the costs of extraordinary events, including hurricanes, from customers. In view of the company's increasing profitability and high dividend distribution to shareholders (currently 80% of profits), it seems wholly inequitable that the consumer is being asked to underwrite the company's main business risk. In our opinion, it is the responsibility of CUC to have a realistic insurance reserve in order to properly manage the risk that a serious hurricane would pose to the economy of the Cayman Islands.

### *Energy Conservation*

**S.69** CUC's customers have the highest consumption in the Caribbean region. Part of this may be attributable to local building standards which do not follow best industry practice in respect of energy conservation, insulation and natural ventilation. This matter should be followed up by Government and the private sector.

**S.70** CUC's *Energy Smart* programme provides consumers with useful energy efficiency and conservation information. However, the company has not done enough to promote attainable cost savings for consumers. For example, solar water heaters for domestic use are widely used elsewhere in the Caribbean and in the southern United States. However, few are in operation in the Cayman Islands. A typical solar water heating system costing around US\$2,500 to install in Cayman would pay for itself in about two years. Encouraging the use of solar panels for water heating would allow businesses and residents an opportunity to "compete" with CUC in a limited form. Timers on water heaters also have considerable potential to reduce household bills. The payback period on compact fluorescent lamps (CFBs) may be as little as 8 or 9 months. In our opinion, CUC and the Government need to do more to help consumers convert energy saving ideas into lower fuel bills.



**S.71** The Government itself needs to demonstrate more initiative and commitment to energy conservation. We note that the Ministry of Planning embarked on an energy conservation programme two years ago, following earlier unsuccessful forays by the Portfolio of Finance. With the assistance of CUC, potential savings of \$250,000 per annum were identified. A cost cutting pilot was implemented in late 2001 at the Tower Building, but was discontinued in January 2002. Also, there has been no usage reduction at the Government Administration Building.

### ***Renewable Energy***

**S.72** Although CUC is actively examining the feasibility of renewable energy resources (wind and ocean thermal), we see this as having little or no beneficial impact on consumer tariffs in the medium term.



## **CUC'S POSITION**

**S.73** CUC was provided with an interim draft of this report and invited to comment. In several respects, the company's comments present a contrary opinion to the views of the Auditor General and the independent consultants. In order to present a balanced view of the issues discussed in this report, CUC's principal comments are reproduced in the following paragraphs.

**S.74 CUC's investment in electricity infrastructure is necessary for reliable world-class service.** The draft report appears to take the early position that CUC is over-investing for the exclusive benefit of shareholders at the expense of consumers. The line is used aggressively to the point that material misstatements are made. CUC requires a robust system capable of withstanding hurricane-force winds. CUC's consumers have grown to expect world-class reliability; and this requires CUC invest in new technology, reliable assets with long lives and maintain a sufficient reserve.

**S.75 CUC's reserve generating capacity is necessary to maintain high reliability.** The draft report downplays the importance of reliability of service and portrays a lack of understanding of the operations of an isolated electrical system. The report concludes that CUC has excessive reserve generating capacity for Rate Base reasons, yet finds its reserve margins comparable to other utilities in the Caribbean. It also concedes that countries with lower reserve margins can experience ongoing power outages.

**S.76 CUC's returns are fair and reasonable given the risk factors.** When considering appropriate returns to shareholders, consideration must be given to the risk factors associated with an investment in a small island utility that is not connected to a mainland grid and exposed to substantial hurricane risk. Any comparison with returns of US undertakings is misleading due to their size and cost structure. We agree with your comment on calculating rates of return that..."it is difficult to make fair comparisons with other utilities in other jurisdictions." Furthermore, shareholders are not the only group to have benefited. Fees and duties paid to Government for fuel and materials amounted to US\$135.7 million for the period 1991 to 2002, versus US\$109.3 million in dividend payouts to shareholders.

**S.77 CUC's use of debt in its capital structure is prudent.** Prudent world-class utilities utilize a proper mix of debt and equity. When analysing the debt-to-equity ratio of CUC, it can be concluded that the company maintains a healthy level of equity which has been the key to its financial strength. This is reflected in "A" credit rating that has been assigned by Standard & Poors.



## GLOSSARY OF TERMS

**Annual load duration curve** – a plot of the power demand in each period of the year (either hourly or half-hourly) against time. The power demand values are sorted from highest (corresponding to the annual peak power demand) to the lowest (corresponding to the minimum power demand).

**GIS** – gas insulated switchgear.

**kV** – kilovolt: measure of electrical voltage, equal to one thousand volts.

**kVA** – kilovolt ampere: measure of power including both active and reactive<sup>6</sup> components, equal to one thousand volt amperes (where an ampere is a measure of electrical current).

**kW** – kilowatt: measure of electrical power, equal to 1,000 Watts.

**kWh** – kilowatt-hour: measure of electrical energy, equal to 1,000 Watts for 1 hour.

**Loss of load probability (LOLP)** – A measure of the reliability of an electrical system, measuring the number of hours per year on average there will be insufficient generating plant available to meet the power demand.

**MW** – megawatt: measure of electrical power, equal to 1,000,000 Watts.

**MWh** – megawatt-hour: measure of electrical power equal to 1,000,000 Watts for 1 hour.

**MVA** – megavolt ampere, equals 1,000,000 volt-amperes.

**Peak power demand** – Maximum electrical load to be supplied by the generating plant.

**OFGEM** – Office of Electricity and Gas Markets is the UK energy regulatory body.

**Spinning reserve** – Power generating capacity in excess of the system demand that operating and available to meet any increase in demand without the need to start another generator.<sup>7</sup>

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<sup>6</sup> Electrical power has two components – an active or resistive component, measured in watts (W), kilowatts (kW) or megawatts (MW) and a reactive component measured in volt-amperes (VAr), kilovolt-amperes (kVAr) or megavolt-amperes (MVA). All electrical devices, including transmission and distribution lines, have some reactive power requirement that has to be met.

<sup>7</sup> For reasons of security of supply, CUC's policy is to operate at all times with a minimum spinning reserve of not less than the capacity of the largest unit that is on-line and supplying power to the system, so that, if there is an unexpected outage of a generating unit, the system integrity should be maintained.



## APPENDIX 1: TERMS OF REFERENCE

### 1. *The Guaranteed 15% Rate of Return*

- a) To establish when and why a 15% guaranteed rate of return was agreed; to advise whether this was a typical RoR expected for this industry at the time the agreement was negotiated; and whether it is still relevant in today's current economic environment with markedly lower interest rates, privatisation and competition in many developed economies?

### 2. *Generating Capacity*

- a) To validate whether the generating capacity complies with the requirements of the licensing agreement, and to prepare a historical analysis of actual generating capacity compared to maximum permissible capacity consistent with the terms of the Licence Agreement.
- b) To determine why the formula for reserve generating capacity was incorporated into the licence agreement and whether it is appropriate in the modern operating environment.
- c) To review reserve generating capacity using a Loss of Load Probability approach.

[The terms of the licence indicate that at all times CUC shall to their best efforts ensure that the reserve generating capacity is not less than the rated capacity of the largest generator + 10% of the most recent annual peak power demand. Unless approved by the Government, this reserve generating capacity shall not exceed the rated capacity of the largest generator installed + 40% of the most recent annual peak power demand. Any new generating unit shall not exceed 20% of annual peak power demand.]

### 3. *Investment*

- a) To review CUC's power generation and transmission and distribution capital investment program covering the period 1995 – 2010 (forecast) and to evaluate the technical, economic and business justification of major projects from the viewpoint of the all stakeholders (i.e. shareholders, employees, consumers, and Government), *taking into account the demand growth and customer growth forecasts.*



- b) To establish whether CUC perform ex ante evaluations of major investments and to review the results thereof.
- c) To examine the benefits of the strategic alliance agreements between CUC and MAN B&W Diesel Germany and ABB T&D Power Company Inc. of the USA.

#### **4. Production and Selling Costs**

- a) To compare CUC's actual production cost per Kwh with other similar jurisdictions (i.e. small island economies in the Caribbean and/or elsewhere that use diesel generation). A historical cost trend line could be established and projected if possible. A further breakdown of the production cost per Kwh would be useful (i.e., Generation, T&D, Admin).
- b) To compare CUC's Kwh costs to residential and commercial customers with other similar jurisdictions (i.e. small island economies in the Caribbean and/or elsewhere that use diesel generation). A historical cost trend line should be established.
- c) To benchmark key operating parameters, including system reliability, generating plant efficiency, losses by voltage level, and non technical losses

*[It might be expected that there will be substantial variations in the costs of generation between different utilities, due to difference in fuel costs, local taxation, plant size and age, level of maintenance, etc. If possible, equalise the cost of hydrocarbon fuel tax (i.e. fuel taxes, surcharges, etc) when doing the comparisons.]*

#### **5. Fuel Adjustment Factor**

- a) To validate the fuel adjustment factors applied for 2000 and 2001 to CUC data.

#### **6. Other**

To investigate and enquire into any other matters which, in the opinion of the Auditor General, are relevant to the operations of the Licence Agreement by CUC.



**APPENDIX 2 – LICENCE SCHEDULE C PART A AND B**

SCHEDULE C

PART A

INTERIM RETURN (Under Clause 7 of the Licence)

PARTICULARS IN RESPECT OF FINANCIAL YEAR ENDING \_\_\_\_\_

(All amounts to be expressed in Cayman Islands currency and given to nearest dollar)

1. TOTAL REVENUE COMPRISED OF:
  - a. Revenue from billings for electricity consumed.
  - b. Revenue derived from or connected with any operating expense or asset included in items 2 through 9 below.
  
2. TOTAL OPERATING EXPENSES COMPRISED OF:
  - a. Generation expenses
  - b. General and administration expenses showing Director's remuneration and expenses as a separate item
  - c. Customer service and promotion expenses
  - d. Distribution expenses
  - e. Maintenance
  - f. Interest in excess of Fifteen percent (15%) on moneys borrowed
  - g. Any tax or imposition of any kind imposed by the Cayman Islands Government or any of its statutory authorities.

No expense shall be taken into account for the purpose of determining the Interim Return from any financial year unless such expense has been reasonably and necessarily incurred in producing the operating revenues for the year.

No amount for interest except as allowed in item 2(f) above, or amortisation, or goodwill or franchise costs will be allowed as expenses in determining operating income.



## **APPENDIX 2 (CONTINUED)**

The foregoing shall not be interpreted to exclude charitable donations and similar non-essential expenditures provided that such do not exceed 2% of the total of general and administration, and customer service and promotional expenses as defined in Schedule C Part A. Further, the foregoing shall not be interpreted to exclude guarantee fees payable in connection with debt obligations arising prior to the date of execution of the Further Supplementary Licence. For greater certainty, guarantee fees payable in connection with debt obligations arising on and after the date of execution of the Further Supplementary Licence shall be excluded from the calculation of operating expenses.

3. TOTAL DEPRECIATION CHARGED ON THE HISTORICAL COST OF THE UNDERTAKERS FIXED PHYSICAL ASSETS, AS CALCULATED IN ITEM 5 BELOW, PLUS LOSSES AND LESS GAINS ON DISPOSAL OF FIXED PHYSICAL ASSETS DURING THE YEAR.
4. OPERATING INCOME (being item 1 less the total of items 2 and 3 above)
5. FIXED PHYSICAL ASSETS AND CONSTRUCTION WORK IN PROGRESS

Fixed physical assets valued at historical cost employed by the Undertakers include electrical plant in service capable of supplying at least 80% of maximum initial installed rated capacity less the amount of total accumulated depreciation computed on historical cost at annual rates designed to fully depreciate the related assets on a straight line basis over their estimated useful lives.

- a. Beginning of year
- b. End of year

The Net Physical Assets shall be the average of (a) and (b)

Depreciation must be based on historical costs. Depreciation provisions must be in accordance with generally accepted accounting principles and practices as used by the Undertakers for financial accounting purposes.



## APPENDIX 2 (CONTINUED)

Construction work in progress (CWIP) which is still in progress at the end of the year shall be included as part of the Rate Base in addition to the Net Fixed Physical Assets. The level of CWIP to be included shall be the average of (c) and (d).

- c. Beginning of year
- d. End of Year

The allowable value for Rate Base purposes shall be the Net Fixed Physical Assets which is the average of (a) and (b) plus allowable CWIP which is the average of (c) and (d). No amount for interest on borrowings will be allowed in determining Rate Base.

### 6. ALLOWABLE INVENTORY (i.e. allowable material and stock plus allowable fuel defined in this item).

(1) All material and stock used in the operation of the undertaking excluding fuel.

- (a) Beginning of year
- (b) End of Year

Allowable material and stock inventory shall be the average of (a) and (b). Provided that in the event of such average exceeding an amount equivalent to 12 ½% of the value of the Net Fixed Physical Assets the latter amount only is allowable.

(2) All fuel used in the operation of the undertaking:

- (a) Beginning of Year
- (b) End of Year

Allowable fuel inventory shall be the average of (a) and (b), provided that such average shall not exceed the equivalent of 45 days fuel stock, calculated in accordance with the following formula:

$A \times 1 \frac{1}{2} \times B$  \$: where

A = maximum monthly fuel oil consumption during the year expressed in Imperial Gallons.



## **APPENDIX 2 (CONTINUED)**

B = average price paid per Imperial Gallon for the fuel consumed for the generation of electricity under the Licence during the year.

For the purposes of this section fuel includes lube oil.

### **7. PREPAYMENTS AND DEPOSITS MADE BY THE UNDERTAKER**

- (a) Beginning of year balance
- (b) End of year balance

Allowable prepayments and deposits, i.e. the average of (a) and (b) or 1 ½% of the Net Fixed Physical Assets.

### **8. ALLOWABLE CASH WORKING CAPITAL**

One-eighth of operating expenses as listed in item 2 of this schedule, excluding fuel and lube oil expenses, and interest expense in excess of 15% of moneys borrowed.

### **9. INTERIM RATE OF RETURN**

For the year calculated in accordance with the formula set out in Part B of Schedule C to the Licence

I CERTIFY TO THE BEST OF MY KNOWLEDGE, THESE PARTICULARS TO BE CORRECT

---

President & CEO



**APPENDIX 2 (CONTINUED)**

SCHEDULE C

PART B

RATE OF RETURN FORMULA

(Under Clause 7 of the Licence)

Rate of Return equals –

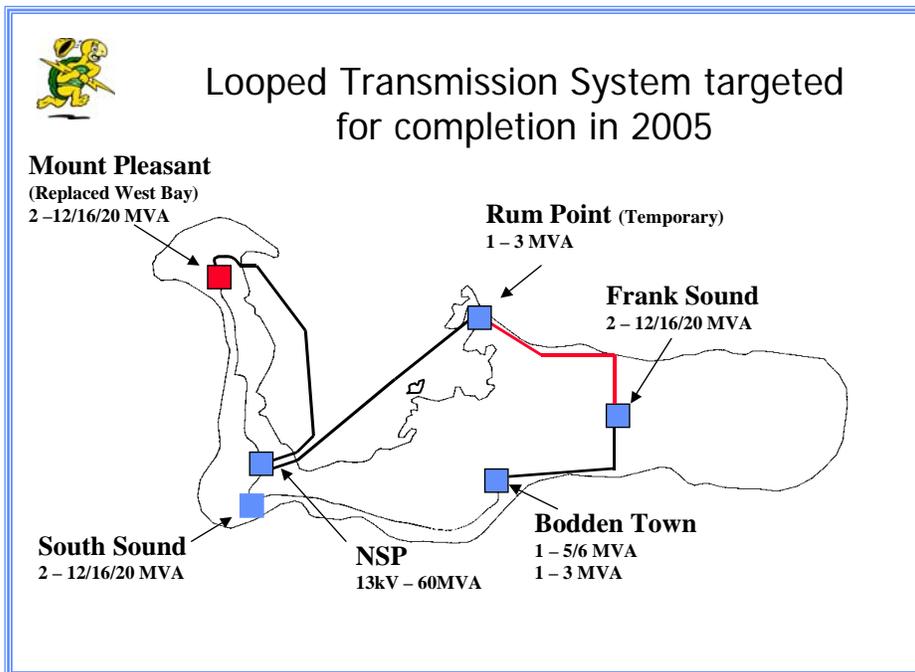
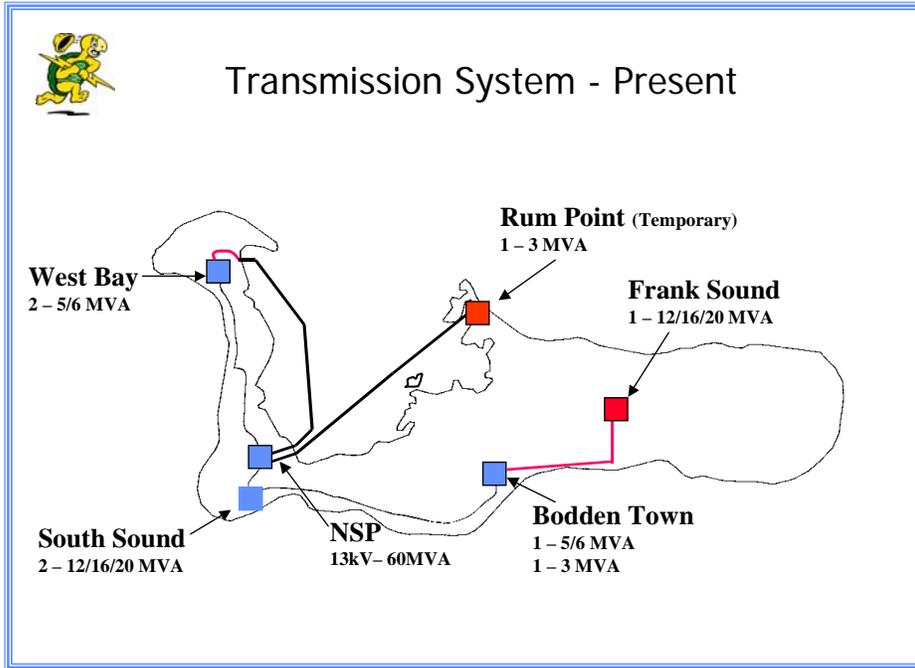
$$\frac{\text{Operating income as per Item 4 of the Interim Return} \times 100\%}{\text{Over Rate Base}}$$

Where

- (a) THE RATE BASE EQUALS THE NET FIXED PHYSICAL ASSETS WHICH IS THE AVERAGE OF ITEMS 5 (a) AND (b) OF THE INTERIM RETURN, PLUS ALLOWABLE CWIP WHICH IS THE AVERAGE OF THE BEGINNING AND END OF YEAR BALANCE OF CONSTRUCTION WORK WHICH IS STILL IN PROGRESS AT YEAR END AS PER ITEM 5 (c) AND (d) OF THE INTERIM RETURN, PLUS TOTAL ALLOWABLE WORKING CAPITAL. NO AMOUNT FOR INTEREST ON BORROWINGS WILL BE ALLOWED IN DETERMINING THE RATE BASE.
  
- (b) TOTAL ALLOWABLE WORKING CAPITAL EQUALS ALLOWABLE INVENTORY PLUS ALLOWABLE PREPAYMENTS AND DEPOSITS MADE BY THE UNDERTAKERS PLUS ALLOWABLE CASH WORKING CAPITAL AS PER ITEMS 6, 7 AND 8 OF THE INTERIM RETURN.



### APPENDIX 3 - 69 kV TRANSMISSION SYSTEM DIAGRAM



Notes: Figures next to substations indicate number of transformer installed and their capacities. For example: South Sound, 2 - 12/16/20 MVA indicates two transformers each with a capacity of 12 MVA under natural draught cooling, increasing to a maximum of 20 MVA under forced draught mechanical cooling.

