IN THE MATTER OF
THE UTILITIES COMMISSION ACT
S.B.C. 1980, c. 60, as amended

and

IN THE MATTER OF
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
APPLICATIONS FOR RATE RELIEF

DECISION

February 28, 1983

Before:

J.D.V. Newlands,
Deputy Chairman, and
Chairman of the Division
M.W. Mulligan,
Deputy Chairman
(Deceased December 15, 1982)
F.E. Walden, F.C.A.
Commissioner

TABLE OF CONTENTS

TABLE OF CONTENTS
(Cont'd)

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I. INTRODUCTION

1. General Comments

Under provisions of the Utilities Commission Act ("the Act") which was proclaimed September 11, 1980 the British Columbia Hydro and Power Authority ("B.C. Hydro") became subject to general regulatory jurisdiction for the first time. Among the significant effects of this is that any change in rates charged by B.C. Hydro for gas or electric service must have prior approval of the B.C. Utilities Commission ("the Commission").

Rates in effect at September 11, 1980 were validated by Section 141 (4) of the Act which deems them to have been filed with the Commission and to be the lawful, enforceable and collectible rates of B.C. Hydro at that date.

By Application dated June 18, 1981 B.C. Hydro applied to amend those Gas and Electric Tariff Rate Schedules, which gave rise to a hearing of the Application and this Decision.

The Hearing started on January 19, 1982 and continued through to December 2, 1982 with a break of some two months in the summer. The Commission sat for some 82 days and the extensive review included some 437 Exhibits and was reported in over 14,000 pages of transcript.

This being the first review of B.C. Hydro's affairs by the Commission, it was necessary for the information of the Commission, the Applicant and the Intervenors that a fairly detailed description of background, organization, planning methods and operations of B.C. Hydro be presented. This was a lengthy procedure not only because of the exceedingly complicated nature of the B.C. Hydro organization but also because of the unfamiliarity of the Applicant with regulatory procedures. It should be recorded, however, that the Commission found all participants to be cooperative and while subsequent hearings, guided by instructions and comments throughout this Decision, will serve to refine and extend the understanding of all concerned, the evidence finally adduced was adequate to our present requirements.

It should be noted by way of introduction that there are important differences in the regulation of a Crown Corporation as compared to a private or investor-owned utility. The essence of regulation of a public utility is to simulate a free market in which the interests of the consumer are protected by competitive forces. To ensure that decisions made by regulators have this effect there are two basic and powerful controls.

First, an investor-owned utility is granted a "return on a rate base" so that operating within the circumstances envisaged on a "test year", the company will have enough net income to cover the interest on its debt and provide a fair return to the shareholders. The rate base is made up mostly of fixed assets together with an allowance for working capital. These fixed assets must, however, qualify as "used and useful" and approval for their construction must first be granted by the regulators, through a "Certificate of Public Convenience and Necessity". If there are unnecessary cost overruns or the assets do not qualify as used and useful, having for instance been abandoned or become obsolete, reductions may be made to the rate base which in effect reduces the shareholders equity.

Secondly, the regulator approves tariffs which have been scrutinized in the light of a test year presentation. Prospective expenses are reviewed and either approved or rejected, and necessary adjustments made in tariffs to result in a reasonable return to the utility.

It is obvious that the control, both on levels of capital expenditure and on the nature and amount of allowable expenses, constitute an effective discipline towards running an efficient operation where the entity is investor-owned. If the company fails in either of these then the equity shareholders bear the cost.

In a Crown Corporation such as B.C. Hydro, where the equity is owned by the public, and on which no specific "return" is determined, this disciplinary effect is diluted or perhaps non-existent. If costs of either capital assets or operations exceed budgets or expectations the deficiency does not fall to the equity shareholders for, in effect, there are none. The overruns are financed by borrowed funds. Interest and principal on these funds must be paid by future consumers. This does not mean to imply that a Crown Corporation cannot operate efficiently; it does mean that there is no independent shareholder control to ensure that it does so.

Part of the Commission's responsibility is to try to assess the efficiency of the B.C. Hydro operation. While Special Direction No. 1 (as discussed hereafter) sets out criteria for operating results, it also indicates that those results must be obtained in a climate of efficiency and economy. In assessing operating results it has been difficult to distinguish between cost reductions achieved by new efficiency measures and those which are the result of the present restraint program imposed on industry generally. Our interest is primarily on the former. B.C. Hydro has a responsibility to operate on a least-cost basis, and somehow an assessment must be made as to how close the Authority is to achieving that objective. This precept must be acknowledged in good times or bad.

It should be recorded that the late Maurice Mulligan, Deputy Chairman of the Commission and a member of the hearing panel made a great contribution to our discussions of the issues both during and after the completion of the hearing. While this Decision reflects the views of the surviving Commissioners whose signatures appear at the end of the text, none of the comments or recommendations following vary significantly from his views. It may be emphasized in particular that it was his strong concern that B.C. Hydro is overstaffed and that continuing vigilance must be exercised by the applicant to keep the Authority with its decentralized system from becoming an unwieldy group of individual centres of influence. The surviving Commissioners share his opinion, frequently expressed, that there is little likelihood of self-imposed restraint being effective; financial and productivity goals must be set and performance measured independent of the department concerned.

It is obvious on first inspection that this document is very lengthy. Perhaps the Commissioners should apologize to readers, and plead in a paraphrase of George Bernard Shaw, that we regret having written such a long report but we had insufficient time to write a short one. In our view it is essential to get on with the process of regulation so that the climate of uncertainty will disappear and the benefits of the process be quickly realized. Much of the report is merely a summary of the evidence which is an essential part of any initial hearing and must be presented here if relentless repetition of background information is not to be a part of future hearings. That it could have been presented more succinctly there is no doubt; that the delay caused thereby would have been justified is doubtful.

2. The Application

The Application requested rate increases to provide average revenue increases in two stages, being as follows:

	Service		
	Electric	Lower Mainland Gas	Greater Victoria Gas
Effective August 1, 1981	11.15%	6.15%	48.82%
Effective April 1, 1982	11.66%	5.40%	25.41%

By Order No. G-63-81 dated August 6, 1981 the Commission ordered, in part, as follows:

> "1. The Commission accepts, effective August 1, 1981 and April 1, 1982, the proposed tariff schedules for Mainland gas service, subject to refund after a public hearing, with any refund bearing interest at the average prime rate of the principal chartered bank of B.C. Hydro, calculated monthly.

2. The Commission accepts, effective August 1, 1981 the proposed tariff schedules for Greater Victoria gas service, subject to refund after a public hearing, with any refund bearing interest at the average prime rate of the principal chartered bank of B.C. Hydro, calculated monthly.

3. The Commission rejects, at this time, the tariff schedules for Greater Victoria gas service proposed to be effective April 1, 1982, but will reconsider this matter upon receipt of additional information regarding the timing and completion of the Vancouver Island Pipeline Project.

4. The Commission rejects the tariff schedules for electric service proposed for August 1, 1981 and April 1, 1982, and directs B.C. Hydro to file revised tariff schedules, taking into account increased revenue derived from electric export sales and water storage rentals in the amount of $56,821,000 in the fiscal year ending March 31, 1982, and electric export sales of $50 million in the fiscal year ending March 31, 1983. The tariff schedules so revised, upon timely filing, will be effective August 1, 1981 and April 1, 1982 respectively, but subject to refund after a public hearing, with any refund bearing interest at the average prime rate of the principal chartered bank of B.C. Hydro, calculated monthly. The Commission will reconsider the electric service tariff schedules to be effective April 1, 1982, upon receipt of additional information from B.C. Hydro respecting the adequacy of the electric service tariff schedules as determined by this Order."

Subsequently, on November 23, 1981 B.C. Hydro filed revised information in further support of the original Application material. This new information accounted for certain electric export sales revenues and water storage revenues for the year ending March 31, 1982 in compliance with Commission Order No. G-63-81. However, the additional revenues were offset in large measure by increased cost of service estimates. These B.C. Hydro numbers indicated that the utility required an average electric rate increase of 17.85% over the rates being billed at that date. This level of increase would still have left a shortfall of $69 million as compared to the target revenue requirement in the year ending March 31, 1983.

The Commission Order No. G-63-81 dated August 6, 1981 had previously set down the Application for public hearing starting January 19, 1982.

The hearing of the Application was structured in two phases; one to determine revenue requirements and the second to examine the rate structure proposed to obtain the authorized revenue.

The first phase, which is the subject of this Decision, was subdivided into four parts as follows:

Part I - General Background and Demand
Part II - Assets in Service
Part III - Revenue Requirements excluding Return
Part IV - Financing and Capital Requirements

It consisted of a detailed review of B.C. Hydro's written evidence as submitted in the Application and interrogatory responses and its oral evidence as presented by numerous panels. Most of the Panels were composed of B.C. Hydro employees, in virtually all of which Mr. J.P. Sheehan, Executive Vice President Administration, appeared as the chief policy witness. In passing, the Commission wishes to commend Mr. Sheehan for his remarkable understanding of the organization and its policies and for his consistent courtesy and cooperation.

Most of the hearing time was spent at the Commission's Hearing Room in Vancouver, although the Commission also held hearings in Victoria and Fort Nelson to discuss issues specific to those areas.

Dominant themes during the initial periods of Phase I were the treatment of export revenues for domestic revenue requirement purposes; the need for interim refundable electric rates to be effective April 1, 1982, and the complaint of the Council of Forest Industries made under Section 67 (4) against Commission Order G-97-81 allowing B.C. Hydro to recover in full the increase in water rentals effective January 1, 1982.

In respect of these matters the Commission, by Order No. G-26-82 dated March 30, 1982, directed B.C. Hydro to establish a "Rate Stabilization Account".

In that regard the Order reads as follows:

> "5. The Commission directs that B.C. Hydro create as of March 31, 1982, an account to be known as the "Rate Stabilization Account" in the amount of $90,000,000., derived from export sales of surplus electric energy.
>
> In the fiscal years subsequent to March 31, 1982, B.C. Hydro is directed to credit to the Rate Stabilization Account annually, an amount based upon the revenue derived from the export sale of surplus electric energy (exclusive of revenues received from Washington Water Power Company and sales of firm energy under approved export contracts), less direct expenses associated with such sales, provided that the said account will not, at any time, exceed in the aggregate $200,000,000. For further clarity, direct expenses will include water rental fees calculated by reference to the electricity generated to make said export sales.
>
> In each of the fiscal years subsequent to March 31, 1982, B.C. Hydro is directed to transfer from the said Rate Stabilization Account the amount of $60,000,000., or such lesser amount as will reduce the Account balance to nil, to be credited to income in the year, unless otherwise directed by the Commission.

B.C. Hydro will file with the Commission a calculation of the amount to be credited to the Rate Stabilization Account in accordance with the directions of this Order."

Order No. G-26-82 further provided as follows:

"1. The Commission will accept for filing effective April 1, 1982 amended Tariff Rate Schedules incorporating an interim increase of 11.5% on the rates in effect April 1, 1981 for the following Rate Schedules:

1101,	1111,	1121	1272
1107,	1117,	1127	1273
1131,	1133		1275
1132,	1134		1276
1140,	1141		1277
1146			1278
1147			
1148			1401
1150			
1151			1701
			1702
1200,	1201	1210, 1211	1703
1220			1704
1222,	1223		1755
1234			1760
1255,	1256,	1265, 1266	1761
1270			1770

2. The Commission will accept for filing effective April 1, 1982 amendments to the rates applicable to "Bulk" customers and "Schedule 1821" customers as follows:

(i) An interim rate of:

Demand Charge: $3.00 per kV.A of billing demand per month

plus

Energy Charge: All kWh per month at 1.38 cents/kWh

shall be substituted for the present rate; and

(ii) The above interim rate shall be increased by 11.5%; and

(iii) The 1981 water rental increase of 0.078 cent per kWh, confirmed by Commission Order G-21-81, shall be increased by 11.5%.

3. The interim increases resulting from clauses 1 and 2 will be subject to refund after the public hearing, with any refund bearing interest at the average prime rate of the principal chartered bank with which B.C. Hydro conducts its business, calculated monthly.

4. Order G-97-81, made under Section 67 (4) of the Utilities Commission Act is hereby confirmed and the complaint of the Council of Forest Industries is hereby dismissed."

Contemporaneous with this increase in rates, the Commission stated in its Reasons that it expected B.C. Hydro to accomplish a 5% decrease from budgeted controllable expenses for 1982/83 while at the same time maintaining its level of service to its customers.

On May 28, 1982, B.C. Hydro filed an Amended Application to update its November 23, 1981 Revision. The Amendment requested an order to approve the tariff schedules as provided in the original June 18, 1981 Application, and further rates to be effective April 1, 1983 to be incorporated with rate design principles to be determined or approved by the Commission.

The average revenue increases provided for in the Amendment were:

	Service		
	Electric	Lower Mainland Gas	Greater Victoria Gas
Effective April 1, 1982	7.7%	-	-
Effective April 1, 1983	15.7%	4.2%	57.7%

By letter of August 5, 1982, B.C. Hydro requested that, as the future of gas supply to Vancouver Island is yet to be determined, the Commission extend for a further year the provision in Order No. G-63-81 that there be no increase in rates for Greater Victoria Gas customers. The Commission took no action at that time on the May 28, 1982 Amended Application for further revenue increases.

As B.C. Hydro and all intervenors actively participating in the hearing generally supported the inclusion of the review of 1983/84 rates in the ongoing public hearing, the Commission decided to hear the evidence. It therefore directed B.C. Hydro to publish a Notice of Public Hearing to this effect in the major newspapers in its service area.

The Amended Application was based on B.C. Hydro's May 15, 1982 Corporate Plan incorporating numerous changes from the previous Application including:

1. Revised inflation and exchange factors.
2. Revised cost estimates including budget reductions recommended by the Commission.
3. A revised Gas System Plan.
4. The Electric and Gas Service rates as approved by the Commission to April 1, 1982.

5. Electric Service
   - provision for rate stabilization
   - inclusion of the May 1982 interim load forecast
   - inclusion of the May 1982 interim system plan (Exhibit 244).

B.C. Hydro had not made a revision to its June 18, 1981 filed Electric tariff schedules, although the 7.7% increase for 1982/83 was slightly larger than would be generated by the rates in those tariffs. B.C. Hydro counsel stated that they were not asking for any additional interim increase at this time but that if Phase I lasted beyond September that they may take another look at it.

After a break in the proceedings the hearings reconvened on September 14, 1982. B.C. Hydro concerns then were that even if the increased rates were granted for the balance of 1982/83 the Authority would not achieve its targeted interest coverage, and also that it might not break even on the year's operations. B.C. Hydro announced its intention to file updated figures relatively close to the end of Phase I but advised that the numbers would not have the same level of detail and accuracy as those in the original Application because the new System and Corporate Plan would not be completed for some months.

During this stage of the proceedings, the Rate Increase Restraint Act was passed by the legislature setting a limit of 6% on rate increases for the period ending September 30, 1983. The Commission nonetheless concluded that the Phase I hearings should proceed to completion and requested that B.C. Hydro make material adjustments to the information as best they could in order to bring the hearing to a timely conclusion. On October 5, 1982 B.C. Hydro filed, as response, its current forecast for the fiscal years 1983 and 1984 (Exhibit 355). This forecast was restated in expanded form by Exhibit 415 on November 17, 1982.

Phase I of the Hearing continued through to final argument and was adjourned on December 2, 1982.

II. BACKGROUND TO B.C. HYDRO

The British Columbia Hydro and Power Authority is the 5th largest corporation in Canada in terms of net assets. It was created as a Crown corporation by Act of the Provincial legislature on March 30, 1962 as the successor, by amalgamation, of the British Columbia Electric Company Limited and the British Columbia Power Commission which had been the two major suppliers of electricity in the Province of British Columbia prior to that time.

British Columbia Electric Company supplied power to the populous southwestern part of the province and had been an investor-owned utility prior to its take-over by the Provincial Government in 1961. The Company also operated gas systems, transit systems, and a terminal railway.

The British Columbia Power Commission was a Provincial Crown Corporation organized in 1945 to improve the availability and supply of electric power in many of the less densely populated areas of the province.

The two electric utilities were amalgamated in order to facilitate integrated planning, generation and distribution of power in response to the growing requirements of the province. As well the existence of a single major utility was considered necessary to the financing and construction of the large hydroelectric generating projects and other developments that would form the future base of the provincial power supply.

The principal components of the development strategy in the years immediately following the 1962 amalgamation were the dams and power plant constructed under the Columbia River Treaty with the United States, and the W.A.C. Bennett dam and Gordon M. Shrum generating station on the Peace River. Major high voltage transmission lines were also required to bring the power from remote power sites to the load centres where population and industry were located. Other significant generation and transmission projects followed as required.

In the years after the amalgamation of the two major corporations, B.C. Hydro also acquired a number of small systems that were supplying or distributing electric power to particular localities within the province.

The gas distribution operations now owned and operated by B.C. Hydro in the Lower Mainland and in Victoria on Vancouver Island date back to well prior to the turn of the century. They were part of the British Columbia Electric Company that became the major component of B.C. Hydro in the 1962 amalgamation. Until 1956 when the Westcoast Transmission Company Limited pipeline was built to bring natural gas from the Peace River area to the populous parts of the province and the United States, these were relatively modest operations. While the Victoria Gas operations have remained small, the growth in demand for natural gas in the Lower Mainland area has led to substantial system expansion.

As a consequence of amalgamation and growth, B.C. Hydro now owns and operates an electric service that supplies approximately 90% of the people of British Columbia, and a gas distribution service which ranks, in terms of customers served, as the third largest gas distribution utility in Canada.

In terms of physical plant, manpower requirements, and financial significance, the Authority's electric utility operation is clearly its dominant business.

In addition to its electric and gas utility activities, B.C. Hydro operates a local and terminal rail freight service in Greater Vancouver and the Fraser Valley which carried some 2,383 thousand tonnes of freight in the year ended March 31, 1982. The Authority also carries on certain industrial land banking operations adjacent to the railway system for purposes of promoting use of the railway facilities. These activities are continuations of businesses carried on by the British Columbia Electric Company Limited prior to the amalgamation in 1962.

Prior to April 1, 1980 B.C. Hydro also carried on public passenger transportation operations which had been a part of the overall operations of the British Columbia Electric Company. On that date the assets and undertakings involved were transferred for nominal consideration to the Urban Transit Authority and the Metro Transit Operating Company in accordance with the legislation that had established those entities.

III. BASIS OF REGULATION

The Commission's regulatory responsibility with respect to revenue requirements and rates is restricted to the electric operations, the Lower Mainland gas operations, and the Greater Victoria gas utility. It does not include the Corporation's railway and ancillary industrial land bank activities.

The utility operations of B.C. Hydro are subject to the provisions of the Utilities Commission Act but with two important exceptions:

1. The Act does not require or empower the Commission to approve security issues by the Authority.

2. The regulation of B.C. Hydro is modified as stated in "Special Direction B.C. Hydro No. 1", dated March 19, 1981.

The Special Direction is addressed to the Commission and reads as follows:

"Special Direction

B.C. Hydro No. 1

Application

1. This special direction applies with respect to the exercise of the Commission's powers and functions in connection with the British Columbia Hydro and Power Authority (the "authority").

Debt Support

2. The authority should generate adequate funds from the efficient operation and conduct of its business to support all of its activities and its debt.

Economic Borrowing

3. The authority should achieve a financial position that allows it to borrow funds on the most economic terms available.

Financial Standards

4. The financial standards to be observed by the authority should include interest coverage ratio and debt/equity ratio.

Minimum Standards

5. The authority should achieve by the 1983-84 fiscal year an interest coverage ratio of 1.3:1 and should maintain that ratio thereafter so as to achieve and ultimately maintain a debt/equity ratio of 80:20."

Special Direction No. 1 bears directly on the manner in which the Commission is to exercise its powers in the regulation of B.C. Hydro's rates.

IT IS THE COMMISSION'S VIEW THAT IN THE EXERCISE OF ITS REGULATORY RESPONSIBILITY UNDER THE UTILITIES COMMISSION ACT AND NOTWITHSTANDING THE REQUIREMENTS OF SPECIAL DIRECTION NO. 1, IT IS OBLIGED TO ENQUIRE INTO ANY ASPECTS OF B.C. HYDRO'S OPERATIONS AND PRACTICES WHERE IT BELIEVES INFORMATION BEARING ON THE EFFICIENCY OF SUCH OPERATIONS MAY BE FOUND AND TO MAKE SUCH DECISIONS, FINDINGS AND RECOMMENDATIONS AS IN ITS JUDGMENT WILL RESULT IN RATES CHARGED BY THE AUTHORITY BEING JUST AND REASONABLE IN ALL OF THE CIRCUMSTANCES.

THE COMMISSION IS FURTHER OF THE VIEW THAT MOST OF THE CONSIDERATIONS NORMALLY APPLIED IN ASCERTAINING A REVENUE REQUIREMENT FOR AN INVESTOR-OWNED UTILITY ARE EQUALLY RELEVANT TO THE REGULATION OF THE AUTHORITY'S RATES. B.C. Hydro incurs operating, maintenance, and administrative costs in relation to each of its regulated services under circumstances comparable to any other utility; it holds assets which are subject to the normal requirements for ascertaining annual depreciation and amortization expenses; and it is subject to government-imposed taxes and fees or grants in lieu of taxes in a manner comparable to private sector companies.

One significant difference from an investor-owned utility is that the major part of B.C. Hydro's assets have been financed through the issuance of long-term debt instruments guaranteed by the Province of British Columbia. In that respect the resources and credit of the Province have been committed to support the Authority's financial requirements and obligations. There can be no doubt that the guarantee has a favourable effect upon the terms under which B.C. Hydro is able to finance its capital programs. Because of it, equity funds have not been required to be maintained in the manner of an investor-owned utility. However, in the absence of an equity component by what measure is the cost of capital to be determined?

B.C. Hydro submitted that the appropriate method for determining the cost of capital component for its annual revenue requirement in accordance with Special Direction No. 1 is one which might reasonably be described as an "interest coverage basis". In essence this means that the cost of capital is equal to "n" times the annual cost of carrying the aggregate debt.

The Commission's view is that an "interest coverage test" is a fair basis by which the cost of capital may be determined for B.C. Hydro in a given year, but that it is not by itself a method of regulation. IN THE REGULATION OF B.C. HYDRO THE COMMISSION HAS AND WILL CONTINUE TO APPLY THE NORMAL REGULATORY TESTS THAT WOULD APPLY TO ANY UTILITY IN THIS PROVINCE. IT HAS AND WILL CONTINUE TO REVIEW B.C. HYDRO FOR PRUDENCY OF INVESTMENT AND EFFICIENCY OF OPERATION. IT WILL ACT TO ENSURE THAT B.C. HYDRO'S OWN CORPORATE OBJECTIVES ARE BEING MET, AND IT WILL DO SO PRIMARILY THROUGH THE PUBLIC HEARING PROCEDURE.

Throughout the Revenue Requirement Phase of this proceeding, the Commission has found itself concerned that the Authority's presentation of its case for rate relief did not display a sufficient level of awareness that its corporate plans, and the cost of operations implicit in them, cannot simply be taken as a "given" for regulatory purposes. The Rate Application information filed in the initial instance by the Authority - including the direct testimony of its witnesses - showed a negligible commitment to demonstrating the reasonableness and validity of its projections of operating and other costs. The inevitable consequence of that approach has been the substantial demands for additional information from Intervenors and Commission staff alike, which B.C. Hydro has found itself obliged to answer. It is equally a result that the Authority effectively missed the natural opportunity available to it to present a comprehensive and integrated explanation and justification for its filed revenue requirements. Instead, the Commission has had to deal with a distinctly fragmented record in assessing the reasonableness of those revenue requirement representations.

In making these observations the Commission is conscious of the fact that B.C. Hydro's direct experience in the rate regulation process in the recent past has tended to be in the role of an Intervenor in applications of other utilities. That role is clearly different from what applies to an applicant. As a result, some of the deficiencies experienced in the Authority's approach to validating its projections of costs must be attributed to the fact that this rate case has been an inaugural one. BUT THE CORPORATION MUST REALIZE THAT A MORE RESPONSIVE BASIC APPROACH TO PRESENTING ITS CASE WILL BE EXPECTED OF IT IN ITS NEXT PROCEEDING. IT MUST RECOGNIZE THAT IT HAS THE ONUS OF DEMONSTRATING TO THE COMMISSION THAT IT REQUIRES THE RELIEF WHICH IT REQUESTS.

The Authority's definition of its revenue requirements is the ultimate focal point in terms of which the Corporation seeks the opportunity, in the words of Special Direction No. 1, to "generate adequate funds from the efficient operation and conduct of its business to support all of its activities and its debt." B.C. Hydro must take the initiative in responding to that requirement by ensuring that an appropriate information base of both data and interpretive explanations forms the fundamental record in a rate application proceeding. It must recognize that public forum scrutiny of the contents and basis of all filed material is to be expected in the future and that where requests for rate relief are predicated on management plans and expectations, the regulatory review process will be as concerned with the propriety of planned actions and related costs as senior management of the Authority must be presumed to be.

IV. CORPORATE OBJECTIVES AND MANAGEMENT ORGANIZATION

The corporate objectives of B.C. Hydro include, as submitted in Exhibit 13 by Mr. J.P. Sheehan, Executive Vice-President, Administration,

"(a) Providing the services required to meet the anticipated needs of customers, commensurate with a reasonable security of supply and good quality of service.

(b) Meeting the requirements for services at the lowest long-term cost to customers consistent with sound utility financial principles, thereby ensuring sufficient return on investment to enable Hydro to borrow competitively and on economical terms to finance additional facilities required to meet anticipated demand.

(c) Operating and maintaining facilities in an efficient manner to ensure safety to employees and the public.

(d) Encouraging conservation by promoting the efficient use of energy."

In relation to these objectives Mr. Sheehan went on to indicate that the Corporation focuses its activities on three basic stategies in relation to realizing these objectives. In his terms these were formulated as follows:

"B.C. Hydro's principal corporate strategies, planned to achieve the objectives are:

(a) To continue the systematic and orderly expansion of the electric system, in accordance with established criteria, based on the most economic and acceptable sequences of plant additions to meet anticipated electrical demand.

(b) To continue the systematic and orderly expansion of gas plant to ensure an adequate supply of natural gas to meet the increasing demand for firm gas in the Lower Mainland.

(c) To maintain B.C. Hydro's Triple A rating of its bond issues by achieving a times interest coverage of 1.3 by 1983/84, thereby enhancing Hydro's ability to borrow competitively and on economic terms in world money markets."

The Authority's view of its public service responsibility assigns a very high level of importance to anticipating future service needs and providing for expansion of its facilities to meet a perception of the form and timing under which those anticipated needs will arise. As one would expect for an operation of the size and significance of B.C. Hydro, this means that planning processes are critical to operations and management. Necessarily the planning processes involve relatively long-term forecasting and projection horizons. It follows that the focus on future service and related plant expansion causes a high degree of importance to be attached to financial standards and related considerations. In view of the expected need to attract significant sums of debt capital in the future, satisfactory ongoing financial performance is necessarily a priority concern.

WHILE THE COMMISSION TAKES NO EXCEPTION TO THE AUTHORITY'S DECLARED PRINCIPAL OBJECTIVES AND STRATEGIES, IT DOES OBSERVE THAT THERE ARE NO CLEARLY STATED OBJECTIVES WHICH FOCUS ON MINIMIZING THE CURRENT COSTS OF PROVIDING SERVICES TO CUSTOMERS. THE AUTHORITY SHOULD FORMULATE A MINIMUM CURRENT COST OBJECTIVE AND EMPHASIZE THROUGHOUT THE CORPORATION A RELATED BASIC STRATEGY OF SYSTEMATICALLY SEARCHING FOR, DEVELOPING AND IMPLEMENTING LEAST-COST PROGRAMS.

The Commission does not intend by this requirement to suggest that the Authority's apparent preoccupation with growth, expansion, and finance is not of importance. B.C. Hydro's ability to serve the future needs of the people and industry of the province is a vital concern of the Commission. However, B.C. Hydro should be equally concerned with minimizing the rate of growth of its revenue requirements as it is with ensuring expansion of its system to provide services to meet provincial requirements.

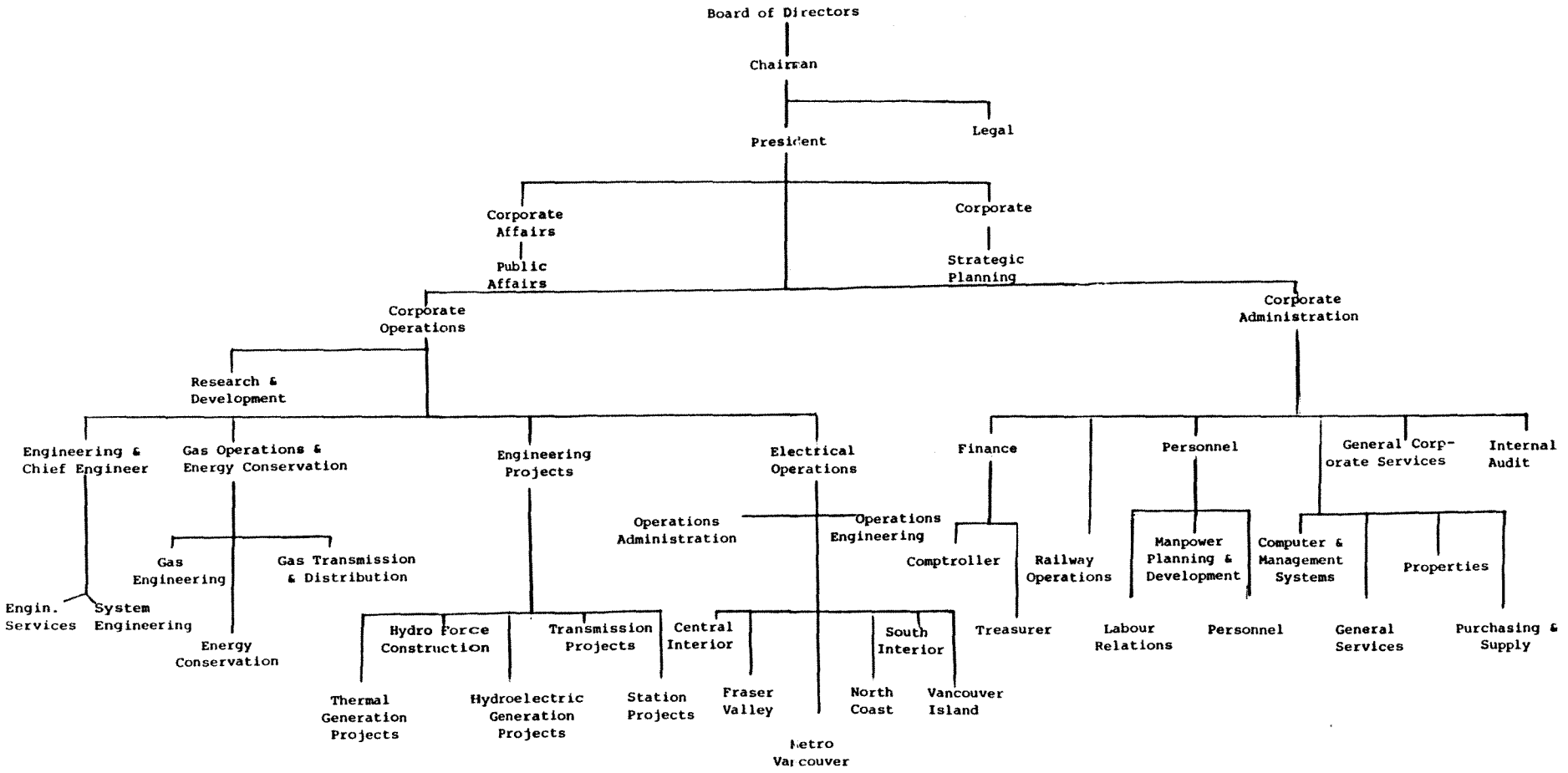
The organization of responsibilities involved in managing the utility in its achievement of the corporate objectives, is shown on the accompanying chart dated April, 1981.

The B.C. Hydro management/operating structure involves three basic categories of functions. These are:

A. Corporate functions - generally those operating and management activities which can be viewed as concerned with planning, coordinating and controlling the total operations of the Corporation;

B. Administrative functions - generally those activities which involve combining of internal service functions relevant to each operating segment.

C. Operations functions - generally the activities which are reasonably clearly directly related to a particular segment of the Corporation's business.



Salary Administration
April 1981

INSERT ORGANIZATIONAL GRAPH HERE

In terms of the underlying types of activities covered by the three functional categories referred to above, the data filed shows the following particulars:

A. Corporate Functions

I. Corporate Affairs

(a) Public affairs functions
(b) Office of the Vice-President for Corporate Affairs.

II. Corporate Administration

(a) Legal aspects of administering the Corporation
(b) Other functions inherent in overall administration of the Corporation.

III. Corporate Service functions - planning and related activities for the Corporation as a whole.

B. Administrative Functions

I. General Corporate Services Activities

(a) Purchasing and supply functions
(b) Property acquisition and management functions
(c) General administrative support services
(d) Computer and management information and other systems functions
(e) Office of the Vice-President for general corporate services

II. Personnel Management Functions

(a) Personnel services
(b) Labour relations activities
(c) Manpower planning and development related activities
(d) Office of the Vice-President for Personnel.

III. Internal audit services to the Corporation as a whole.

IV. Finance related activities

(a) Comptroller's division accounting functions
(b) Treasurer's division finance and funds management functions
(c) Office of the Vice-President of Finance.

V. Rail freight division

VI. Office of the Executive Vice-President for Administration.

C. Operations Functions

I. Electrical Operations - organized into five area operations divisions with associated common administrative and engineering functions.

II. Engineering Division - essentially the electric systems engineering function.

III. Gas Operations - involving division between the Lower Mainland and Greater Victoria gas operations.

IV. Energy Conservation related activities.

V. Research and Development activities.

VI. Office of the Executive Vice-President for Operations.

IT APPEARS TO THE COMMISSION THAT THREE OF THE ORGANIZATIONAL AREAS (C.II, C.IV AND C.V) SHOULD BE REVIEWED BY B.C. HYDRO. IN EACH CASE THE QUESTION IS WHETHER CERTAIN ACTIVITIES PRESENTLY DEFINED AS "OPERATIONS FUNCTIONS" MIGHT NOT BE BETTER STRUCTURED UNDER "CORPORATE FUNCTIONS" SO AS TO MAKE EACH AS INDEPENDENT OF THE DAY TO DAY OPERATING ACTIVITIES AS IS REASONABLY POSSIBLE.

The Commission's reasons for recommending organizational review of these areas are as follows:

(a) The Electrical Engineering functions are substantially concerned with the process of studying, planning for, and implementing activities which provide for the future development and evolution of the electrical system. These activities involve major capital commitments by the Authority and account for substantial annual costs. The Commission recognizes that there obviously must be good internal communication between electrical operations and electrical engineering but it still may be the case that placing the Electrical Engineering Division directly under the Corporate Function, where the overall direction of the Authority should be determined, ensures its direct contribution and control.

(b) The Commission is concerned that there may be some incompatibility of responsibilities as between that of the Energy Conservation Division and those of electric and gas operations. Operations, as such, should seek the maximum utilization of in-place facilities without undue regard for efficiency in energy usage that may be associated therewith. Conservation activities by contrast should inherently conflict with any such tendencies. Additionally, energy conservation concerns should perhaps be viewed as an energy supply source much as are major project engineering activities.

(c) With respect to Research and Development a good part of what is undertaken is not directly related to actually providing service to customers in a particular year, and arbitrary judgments on expenditure levels must be made. Those kinds of decisions are not obviously an integral part of the basic performance that should be expected of Operations management.

IN REGARD TO THESE MATTERS THE COMMISSION REQUESTS THE AUTHORITY TO REVIEW THESE COMPONENTS OF ITS ORGANIZATION AND REPORTING STRUCTURE AND TO INFORM THE COMMISSION OF THE RESULTS OF ITS REVIEW BY DECEMBER 31, 1983.

V. PLANNING, BUDGETING, ACCOUNTING AND COSTING SYSTEMS

B.C. Hydro manages its operations through a comprehensive corporate planning process which functions on an annual cycle basis.

The planning and budgeting system reflects expectations as to the Corporation's future operating, investment and financing activities. The preparation, review, and approval of planning documents takes place annually in accordance with a planning cycle which starts not long after one fiscal year is completed and ends just before the next one begins. The plans cover a ten year period. The first year of the period becomes the operating and capital budget for the next fiscal year. While the planning perceptions for years subsequent to the first are a necessary element of the planning process because of the long-term decision horizons with which the Authority must work, they effectively "die" each year to be "re-born" in revised terms as the next year's planning cycle begins to re-define that long-term outlook having the benefits of an additional year's actual experience in hand.

A set of planning instructions and budgeting guidelines triggers the preparation of the basic planning documents which are as follows:

(a) Economic Outlook documents prepared by the Corporate Economist for both the short and long-term horizons implicit in the planning process. These are initially prepared quite early in the planning cycle to provide a general framework for the overall process. But initial perceptions on critical variables such as inflation and interest rates are monitored as the planning cycle proceeds and final assumptions are only "locked-in" as close as possible to the point at which the detailed financial estimates for the plan documents must proceed to finalization.

(b) Load Forecast documents for the electric, gas and other services for both a short-term two year period and the basic ten year planning horizon. These forecasts express the Authority's perceptions of the levels and timing of customer demands for services and accordingly bear directly on both the capital and operating planning processes.

(c) System Plan documents for each of the electric and gas services (and revenue forecasts for non-utility operations). These plans articulate the given planning period's forecast of fixed asset additions (and retirements) with related capital expenditures over the planning horizon. These perceptions of required capital spending relate both to plant additions and to projects which the load forecasts indicate will be required elements of the system in the future. The expected timing of projects is subject to ongoing revision in response to changing circumstances as each successive year's planning takes place.

(d) Corporate Plan documents in detail for each of the Corporate, Administration and Operation functions and a "consolidated" or overall expression of the plans. These documents set out the forecast and budget details in financial or cost and revenue form along with supporting particulars respecting factors such as staffing levels expected to prevail over the forecasting period. As indicated above, the first year's data from these ten-year Corporate Plans really provide the operating and capital budget approved for the immediately ensuing operating year.

To a significant degree, the Authority applies what is sometimes described as a "bottom-up" as distinct from a "top-down" approach to its planning and budgeting. This is generally consistent with the "responsibility accounting" emphasis of the Authority, which is characterized by placing cost responsibility on some 4,200 cost centres - or about one for every two and a half persons in the Authority's employ.

Review and approval of plans and budgets generally fits into the basic pyramid structure of the operating and executive management responsibilities of the organization, although the Planning and Budget Support Department is systematically involved in the review and vetting of plan submissions at various stages in their development. In addition, the President of B.C. Hydro has a series of "early review" responsibilities in relation to all of the major components of the annual ten year plans. The review structure which ultimately vets and approves the results of the planning process flows through the Corporate Management Committee which is made up of the Authority's senior executives, to the Budget Committee of the Board of Directors, and hence to the Board itself. In addition the System Plans are subject to specific review by the Energy Committee of the Board.

The accounting system provides, at appropriate intervals, the particulars of actual costs and related information which have flowed from the activities of each responsibility accounting centre. On a semi-annual and annual basis, the Planning and Budget Support Department prepares a set of Variance Reports which provide detailed comparisons, analyses, and explanations of the relationships between budget expectations and actual results. Such reports close the circle between planning and acting for any given fiscal year and in principle provide basic information on the accuracy of the forecasting process.

THE COMMISSION IS NOT CONVINCED THAT THE PLANNING AND BUDGETING PROCEDURES ENSURE THAT OPERATIONS ARE OR WILL BE CONDUCTED IN AN EFFICIENT MANNER. THE DANGER IS THAT INTERNALLY GENERATED INDIVIDUAL OBJECTIVES TEND TO EMPHASIZE THE STATUS QUO AND DOMINATE THE CONCLUSION. THE EFFICACY OF THE METHOD THEN DEPENDS ON THE PERSONNEL RESPONSIBLE FOR ENFORCING THE STANDARDS. GREATER EMPHASIS ON IMPOSED STANDARDS SHOULD LEAD TO BETTER CONTROLS AND GREATER EFFICIENCY. FOR THIS REASON AMONG OTHERS, IN ITS INTERIM ORDER OF MARCH 30, 1982 THE AUTHORITY WAS INSTRUCTED TO ACCOMPLISH A 5% REDUCTION IN BUDGETED CONTROLLABLE EXPENSES FOR ITS 1982/83 FISCAL YEAR. Further consideration of this matter is set out in later sections of this Decision.

THE COMMISSION IS IMPRESSED WITH THE INDICATED SOPHISTICATION AND COMPLETENESS OF THE AUTHORITY'S APPROACH TO THE INFORMATION SYSTEMS ASPECTS OF THE MANAGEMENT PROCESS OF PLANNING, BUDGETING AND CONTROLLING OPERATIONS. HOWEVER, WE ARE CONCERNED THAT THE AMOUNT OF DETAIL REQUIRED TO OPERATE THE SYSTEMS MAY BE EXCESSIVE. PRODUCING INFORMATION IS NOT A COSTLESS PROCESS AND SHOULD BE SUBJECT TO THE SAME EFFICIENCY ASSESSMENT CRITERIA AS ANY OTHER ASPECT OF THE MANAGEMENT PROCESS.

The principles and practices employed by B.C. Hydro in accounting for its activities are founded in the same historical cost, transaction basis of accounting that is currently employed and recognized as generally accepted by business and industry in general. The Commission considers this basis to be appropriate to B.C. Hydro's circumstances and to the process of regulating its revenue requirements and rates for service.

Day to day costs of operations and capital expenditure are dealt with in two basic systems: the "Cost System" and the "Specific Fixed Asset System". Each is supported by authorization, documentation, and processing requirements. Costs respecting grants, taxes, and water rentals, depreciation of fixed assets, or interest costs are dealt with separately in a manner appropriate to their particular characteristics.

In general the Cost System deals with expenditures concerning the Corporate, Administration, Operations, and related functions of the Authority's management organization structure and what B.C. Hydro defines as "Recurring Fixed Asset Expenditures". These latter capital outlays generally relate to assets required in the "distribution" end of the electric and gas services and are viewed as appropriately accounted for within the system that deals with costs of the ongoing basic management process. The Specific Fixed Asset System, by contrast, functions to account for capital asset related costs of major projects and activities related to them. This structure appears to be suitable to the Authority's operating and management structure.

The process of accounting for the Authority's annual stream of expenditures (or budgeting for a future stream of such expenditures) to ascertain an annual revenue requirement, involves a need to make two basic types of decisions. The first of these concerns whether or not, or to what degree, an outlay should be viewed as either the cost of an asset or as an expense of the period. This decision is generally described as the "capital/expense" decision for accounting purposes. If the cost is viewed as an asset cost it will be capitalized or otherwise deferred. It will become an expense of future operations at such time as benefits inherent in the acquired asset are deemed to contribute to the service and generate revenue. If the cost is viewed as an expense outlay - i.e. one which does not involve any basis for expecting future benefits to operations - it will be directly charged against the revenue requirement of the period. If each incurred cost involved only one or the other of these characteristics this part of the accounting and budgeting process would be relatively easy. Unfortunately, however, the matter is not that simple.

The second basic expenditure disposition decision relates to assigning or "allocating" both asset and expense outlays among the different utility service segments and to non-utility service activities. Some costs involve no particular allocation problems. However, there are other costs which are not only "common" to both putting assets in place and carrying on operations, but are also "common" to the activities of the different utility services and the non-utility segments alike. These costs must be allocated among the different services and to the non-utility segment if revenue requirements are to be properly ascertained.

B.C. HYDRO

ANALYSIS OF AGGREGATE COSTS
BASED ON 1982 ACTUAL RESULTS
($000)

	Aggregate Expenditures	Fixed Assets Future Service	Operations Current Service	Electric	Mainland Gas	Victoria Gas	Non - Utility
Operating, administrative and recurring fixed asset costs - total	$ 801,868	$ 282,712	$ 519,156	$ 240,464	$256,877	$3,882	$17,933
Specific fixed asset costs	598,745	598,745					
Interest cost net of interest income	549,888	141,884	408,004	377,098	26,177	1,210	3,519
Grants, school taxes and water rentals	182,904	-	182,904	174,597	6,322	317	1,668
Total expenditures	$2,133,405	$1,023,341	$1,110,064	$ 792,159	$289,376	$5,409	$23,120
Depreciation			152,592	140,141	10,205	455	1,791
Total expenses			$1,262,656	$ 932,300	$299,581	$5,864	$24,911

Schedule A

Derivation of Specific Fixed Asset Expenditures

Net fixed asset additions		$1,023,341	-	$ 964,618	$ 55,621	$2,011	$ 1,091
Capitalized interest during construction		141,884					
		$ 881,457					
Capitalized overhead and recurring fixed asset expenditures		282,712					
Specific fixed asset expenditures		$ 598,745					

The accounting systems employed by B.C. Hydro are designed to make these basic distinctions and allocations in the course of processing basic expenditure transactions. Also, the planning and budgeting process makes these basic distinctions in the Authority's Corporate Plans. Accordingly, the Corporation's Rate Application filing sets out the particulars of its representations as to the magnitude of its different revenue requirements on the basis of the principles, policies, and procedures which it considers appropriate to both asset and expense and inter-service allocation of the costs associated with providing services to customers.

As the tabulation on the preceding page (developed for fiscal 1982 in the same format as Exhibit 38) shows, the Authority incurred aggregate expenditures in excess of $2.1 billion. Approximately 48% was deemed to relate to capital assets. Of the amount charged to current operations, 71% was allocated to Electric service, 26% to Mainland Gas operations, less than 1% to Greater Victoria Gas and about 2% to non-utility activities. Of the combined fixed asset and operating expenditures, 82% related to electrical operations, 16% to Mainland Gas, less than 1% to Greater Victoria Gas and about 1% to non-utility.

There are concerns about the cost allocation procedures. In the area of what has been referred to above as the capital/expense decision, these relate primarily to policies as to overhead and interest during construction capitalization. Consideration of the interest capitalization process is dealt with in the Financial section of this Decision while the overhead issues may appropriately be dealt with in the present context.

For all practical purposes it can be said B.C. Hydro follows the "full absorption" approach to dealing with overhead capitalization. This method results in deferring to future periods a larger share of incurred costs for recovery from future generations of customers than would be the case under other treatments of overhead cost.

THE COMMISSION IS OF THE VIEW THAT B.C. HYDRO HAS TAKEN THE APPLICATION OF THE FULL ABSORPTION APPROACH BEYOND THE LIMITS OF REASONABLENESS. SOME TYPES OF COSTS ALLOCATED BETWEEN CAPITAL AND EXPENSE ARE ONLY REMOTELY RELATED TO THE ASSET ACQUISITION OR CONSTRUCTION PROCESS. THE COMMISSION BELIEVES THAT CAPITALIZED OVERHEAD MUST TANGIBLY RELATE TO PUTTING PLANT IN PLACE FOR FUTURE BENEFITS TO CUSTOMERS. OTHERWISE THE COSTS ARE SIMPLY EXPENSES OF THE PERIOD IN WHICH THEY ARE INCURRED.

It must be appreciated that when overhead costs are capitalized they must be financed, as in the case of Hydro, by the issuance of long-term debt. Consequently the potential for extensive overhead capitalization produces financial carrying costs (in addition to depreciation charges) in future periods which would be avoided if greater recovery of overhead were provided for in the current revenue requirement. IT IS ALSO APPARENT THAT A GREATER MEASURE OF MANAGEMENT DISCIPLINE IS IMPOSED ON EXPENDITURE DECISIONS WHEN EXPENDITURES MUST BE FULLY JUSTIFIED FOR RECOVERY IN THE CURRENT PERIOD RATHER THAN BEING SPREAD OVER AN EXTENDED SERIES OF ACCOUNTING PERIODS. EXTENSIVE OVERHEAD CAPITALIZATION ALSO EXACERBATES THE INCREASE IN CUSTOMER RATES WHEN NEW FACILITIES COME INTO SERVICE. Furthermore, the Commission notes that on the basis of the comments in Exhibit 42, it would appear that the Authority's own external auditors consider that there is some cause for concern and that perhaps the Corporation's practices result in too extensive capitalization of overhead costs.

IN PARTICULAR THE COMMISSION'S REVIEW OF THE DETAILS RESPECTING CORPORATE FUNCTION EXPENDITURES SUBMITTED IN THE COURSE OF THE PUBLIC HEARING INDICATES THAT THEIR RELATIONSHIP TO THE FIXED ASSET ACQUISITION AND CONSTRUCTION PROCESS IS EXTREMELY TENUOUS. THESE COSTS REALLY RELATE TO THE ANNUAL MANAGEMENT FUNCTION OF THE AUTHORITY.

THE COMMISSION THEREFORE REQUIRES JUSTIFICATION FOR CURRENT PRACTICES AND ACCORDINGLY HEREBY INSTRUCTS B.C. HYDRO TO EXAMINE ITS OVERHEAD CAPITALIZATION POLICIES AND PRACTICES WITH A VIEW TO SUBMITTING A REPORT THEREON TO THE COMMISSION BY THE END OF THE YEAR. THE REPORT SHOULD SEEK TO EXPLAIN THE CURRENT METHODOLOGY AND THE BASIS FOR IT, EXPLAINING WHY IN B.C. HYDRO'S VIEW, EACH CATEGORY OF COST SHOULD BE CAPITALIZED. THE REPORT SHOULD IDENTIFY PROBLEM AREAS, RECOMMEND SOLUTIONS, AND PROVIDE THE RATE IMPACT OF PROPOSED SOLUTIONS.

B.C. HYDRO

INTER-SERVICE COST ALLOCATIONS
($'000)

	Totals Allocated				Electric Service				Mainland Gas				Greater Victoria Gas			
	1981	1982	1983	1984	1981	1982	1983	1984	1981	1982	1983	1984	1981	1982	1983	1984
A. Category of Overhead Costs																
Corporate Functions	5,691	8,040	8,718	9,933	4,121	6,479	6,417	7,318	1,526	1,524	2,222	2,525	44	37	79	90
Administration Functions	30,932	38,825	42,639	49,406	26,075	32,227	35,530	41,321	4,702	6,458	6,924	7,872	155	140	185	213
Operations Functions	12,601	16,673	16,411	19,550	6,860	10,523	9,828	12,009	5,601	6,022	6,435	7,368	140	128	148	173
Other Costs (net)	8,943	22,374	13,874	16,126	7,009	18,575	11,417	13,323	1,812	3,613	2,329	2,659	122	186	128	144
Totals	58,167	85,912	81,642	95,015	44,065	67,804	63,192	73,971	13,641	17,617	17,910	20,424	461	491	540	620
B. Allocation Percentages																
Corporate Functions					72.4	80.6	73.6	73.7	26.8	19.0	25.5	25.4	0.8	0.4	0.9	0.9
Administration Functions					84.3	83.0	83.3	83.6	15.2	16.6	16.2	15.9	0.5	0.4	0.5	0.5
Operations Functions					54.4	63.1	59.9	61.4	44.4	36.1	39.2	37.7	1.2	0.8	0.9	0.9
Other Costs (net)					78.4	83.0	82.3	82.6	20.3	16.1	16.8	16.5	1.3	0.9	0.9	0.9
Total Allocations					75.8	78.9	77.4	77.9	23.5	20.5	21.9	21.5	0.7	0.6	0.7	0.6
C. Composition of Allocated Costs																
Corporate Functions	9.8	9.4	10.7	10.5	9.4	9.6	10.2	9.9	11.2	8.7	12.4	12.4	9.5	7.5	14.6	14.5
Administration Functions	53.2	45.2	52.2	52.0	59.2	47.5	56.2	55.9	34.5	36.7	38.7	38.5	33.6	28.5	34.3	34.4
Operations Functions	21.7	19.4	20.1	20.5	15.6	15.5	15.6	16.2	41.1	34.2	35.9	36.1	30.4	26.1	27.4	27.9
Other Costs (net)	15.3	26.0	17.0	17.0	15.8	27.4	18.0	18.0	13.2	20.4	13.0	13.0	26.5	37.9	23.7	23.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
D. Percent Change in Costs																
Corporate Functions		41.3	8.4	13.9		37.2	(1.0)	14.0		(0.1)	45.8	13.6		(15.9)	113.5	13.9
Administration Functions		25.5	9.8	15.9		23.6	10.2	16.3		37.3	7.2	13.7		(9.7)	32.1	15.1
Operations Functions		32.3	(1.6)	19.1		53.4	(6.6)	22.2		7.5	6.9	14.5		(8.6)	15.6	16.9
Other Costs (net)		150.2	(38.0)	16.2		165.0	(38.5)	16.7		99.4	(35.5)	14.2		52.5	(31.2)	12.5
Total Costs		47.7	(5.0)	16.4		53.9	(6.8)	17.1		29.1	1.7	14.0		6.5	10.0	14.8

INSERT B.C. HYDRO INTER-SERVICE COST ALLOCATIONS GRAPH

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The Commission has also examined on an overall basis the difficult question of inter-service allocation of cost. The preceding table summarizes the overhead expenses shown in the Application Statements of Revenue Requirements.

Section B of the table suggests - with some anomalies - that the proportion of costs allocated to each service segment either is, or is intended to be, relatively constant on a year-after-year basis. Thus the following averages summarize the allocation percentages over the four periods:

	Average Share of Allocated Costs		
	Electric Service	Mainland Gas	Victoria Gas
Corporate functions	75.1%	24.1%	0.8%
Administration functions	83.5	16.0	0.5
Operations functions	59.6	39.4	1.0
Other costs	81.6	17.4	1.0
In Total	77.5	21.8	0.7

In relation to the percentage distribution of total and allocated overhead costs as shown in Part C of the table the average proportions over the four periods are as follows:

	Totals	Electric Service	Mainland Gas	Victoria Gas
Corporate functions	10.1%	9.8%	11.2%	11.5%
Administration functions	50.7	54.7	37.1	32.7
Operations functions	20.4	15.7	36.8	28.0
Other costs (net)	18.8	19.8	14.9	27.8
Total	100.0	100.0	100.0	100.0

The major deviations of individual results from these averages are mostly observable in the 1982 data and are largely caused by the fact that the "other costs (net)" category increased so substantially in 1982 relative to 1981 and indeed relative to the subsequent period data.

THE COMMISSION CONSIDERED IT APPROPRIATE TO MAKE A SUMMARY REVIEW OF THE AUTHORITY'S INTER-SERVICE COST ALLOCATION RESULTS. THIS WHOLE AREA IS, HOWEVER, ANOTHER IN WHICH THE AUTHORITY'S INITIAL PRESENTATION OF ITS REVENUE REQUIREMENT SUBMISSIONS WAS LESS THAN ADEQUATE TO THE COMMISSION'S REQUIREMENTS. WHILE INFORMATION REQUESTS AND THE PUBLIC HEARING EXAMINATION PROCESS DID MUCH TO IMPROVE ON THIS SITUATION, THE COMMISSION EXPECTS THE AUTHORITY TO VALIDATE ITS ALLOCATION BY WAY OF DETAILED ANALYTICAL ASSESSMENT AS TO THE PROPRIETY AND FAIRNESS OF THE INTER-SERVICE ALLOCATION RESULTS, AND TO DELIVER A COPY OF THE ASSESSMENT TO THE COMMISSION.

VI. FINANCIAL

1. Introduction

This section addresses the significance of the provincial guarantee of B.C. Hydro's debt, the financial practices between B.C. Hydro and the money markets, accounting for the financial structure and how all these activities are expressed, through the interest coverage test, and the 80/20 debt/equity target.

The extent to which B.C. Hydro is capital intensive, particularly for the electric service, is illustrated by the following data extracted from the Authority's 1982 Annual Report.

($ Millions)	Electric Service	Gas Services	Other Operations	Total
Investment in assets identifiable with segment	$6,703	$403	$65	$7,171
Revenues for the year by service	1,123	316	33	1,473
Dollars of assets per dollar of revenues	$5.96	$1.28	$1.97	$4.87
Dollar of assets per dollar of revenues excluding export	$7.52	-	-	-

The Authority's annual operating costs, per dollar of revenue for 1982 are as follows:

(Per $ of Revenue)	Electric Service Domestic	Electric Service Total	Gas Services	Other Operations	Total
Revenue (base)	$1.00	$1.00	$1.00	$1.00	$1.00
Employee compensation related costs	.17	.14	.10	.37	.13
Purchased materials and services	.09	.08	.03	.18	.07
Gas purchase costs	-	-	.69	-	.15
Payments to governments for taxes etc.	.16	.16	.02	.03	.13
Depreciation on capital assets	.16	.12	.04	.06	.10
Interest on debt	.42	.33	.09	.12	.28
Provision for rate stabilization	-	.08	-	-	.06
Net income	-	.09	.03	.24	.08
Summary					
Operating expenses	$ .26	$ .22	$ .82	$ .55	$ .35
Taxation costs	.16	.16	.02	.03	.13
Capital costs	.58	.62	.16	.42	.52
	$1.00	$1.00	$1.00	$1.00	$1.00

Purchased gas costs make the operating structure of the gas services notably different from that of the electric service. For electric service in 1982, fully 62 cents out of each revenue dollar was needed for some aspect of capital related costs, that is depreciation, interest and net income. Of the 62 cents, 8 cents was set aside (from export surplus revenues) as a rate stabilization reserve, as ordered by the Commission.

A further indication of capital intensity is that the flow of funds from operations in 1982 - the sum of depreciation, the provision for rate stabilization, and net income for the year - provided only 36 cents per dollar of net fixed asset expenditures made in that period.

If debt retirement obligations are viewed as a prior claim on the flow of funds from operations, then the net funds flow for the 1982 year contributed only 9 cents per dollar to total capitalized expenditures of the period. Most of these capital expenditures are in the electric service segment.

B.C. Hydro's Rate Application filing and presentation of testimony in the public hearing, emphasized that capital related costs must be adequately recognized and provided for in the determination of its revenue requirements. As well Special Direction No. 1 stresses the financial aspects of the Authority's mandate.

B.C. Hydro's investment in utility and other plant is primarily financed by long-term bonds and debentures, the extent of which can be seen from a consideration of the following data extracted from its fiscal 1982 Annual Report:

B.C. Hydro Corporate Investment and Financing

($ Millions)

Long-term investment

	1982 Reported
Net fixed assets in service	$5,250
Unfinished construction	1,579
Current assets	895
Other assets	66
Sub-total	7,790
Less current liabilities	683
Net long-term investment	$7,107
Long-term financing debt sources	
Bonds and debentures	$6,425
Deferred liabilities	79
Net debt sources of finance	6,504
Non-debt sources	
Rate stabilization account	90
Earnings retained	513
Net non-debt sources of finance	603
Net long-term finance	$7,107

It is apparent from considering these data respecting B.C. Hydro's capital intensity, that the need to provide for servicing of financial obligations is a major consideration in the regulation of the Authority's rates. Under an interest coverage based determination of earnings margins, an increase in average or embedded interest rates will generally require an increase in the flow of funds from operations. It should be noted, however, that while the coverage ratio and resultant earnings margin are factors in considering the overall financial requirements of B.C. Hydro's operations, there is more to take into account than just earnings and interest coverage.

An overall view of the capital finance dimension of B.C. Hydro's operations requires some consideration of at least the following basic factors:

(a) The level of unrecovered investment in and incremental expenditures on fixed assets in service and under construction that have occurred in the past and will occur in the future;
(b) The rates at and bases under which various categories of fixed asset costs are written off through annual charges to current operations usually by way of depreciation;
(c) The rates of interest attaching to existing and new issues of debt securities and the extent to which portions of the resultant interest costs are deferred to recovery in future years through capitalization as part of plant costs;
(d) The extent to which sales of export surplus energy contribute to income of future operating periods through the functioning of the rate stabilization account;
(e) The terms and conditions under which the Authority requires or otherwise receives contributions in aid of construction related to specific expansions of plant;

(f) Funds needed to meet sinking fund and debt maturity requirements on the various categories of long-term debt outstanding from time to time; and

(g) The margin of earnings over and above operating, depreciation, interest, and rate stabilization charges that is realized in any year from revenues for service.

Some of the financial practices followed by B.C. Hydro cause a growing reliance on debt and consequent dependence upon the provincial guarantee. Capitalizing interest during construction results in B.C. Hydro borrowing funds to pay interest because the interest cost is not recovered in rates until the construction is completed and the asset is earning revenue. The options are that either B.C. Hydro borrows to pay its interest during construction, or customer rates must provide at least a part of the funds.

The course followed depends upon public awareness of the choices and the alternative uses to which the provincial guarantee may be put.

2. Provincial Guarantee

The outstanding debt of B.C. Hydro represents, and will likely continue to represent for the foreseeable future, the single largest commitment of the provincial government's overall credit support capacity for the benefit of the province's people, commerce and industry. The existence of the provincial guarantee of B.C. Hydro's outstanding debt can be said to have two primary effects in relation to B.C. Hydro's needs to raise new debt: it facilitates access to sources of funds which is particularly significant in difficult financial markets. It also favourably affects the rate of interest which must be paid to obtain the funds. The provincial guarantee is, therefore, very important in maintaining service to customers at reasonable rates.

3. Financial Practices and Debt Support

Major electric utility facilities last a long time. The initial cost is relatively high in comparison to the annual costs of operation. As long as the major emphasis in providing electric service to British Columbia is on development of hydro resources, this characteristic of high initial and continuing capital related costs to harness power sources and transmit energy to load centres will prevail. While the gas services also have a significant degree of capital intensity, the recent upward trends in the purchase price of gas has tended to make annual operating costs for those services a much larger share of annual revenue needs than was formerly the case.

The critical component of financing is the Corporation's capacity to issue long-term debt. Given the need to finance some level of asset expansion and replacement, the Authority must obtain all of the required funds from rates or other charges to customers or by borrowing.

The following table taken from the 1982 Corporate Plan illustrates the financial funding requirements forecast by B.C. Hydro for the next ten years.

B.C. HYDRO'S FORECAST OF BORROWING REQUIREMENTS
($ MILLIONS OF CANADIAN DOLLARS)

Year Ending 31 March	Fixed Asset Expenditures	Redemption of Debt and Sinking Fund Requirements	Total Funds Required	Funds Provided by Operations	Increase (Decrease) in Temp. Investments	Total Borrowings Required
1982 (Actual)	$1,016	273	1,289	469	514	1,334
1983	1,176	231	1,407	283	(31)	1,093
1984	1,244	279	1,523	431	32	1,124
1985	1,130	420	1,550	541	(27)	982
1986	1,288	212	1,500	585	117	1,032
1987	1,757	321	2,078	794	309	1,593
1988	2,544	288	2,832	977	555	2,410
1989	3,350	382	3,732	885	125	2,972
1990	3,701	324	4,025	926	(252)	2,847
1991	3,388	408	3,796	1,172	(114)	2,510
1992	3,276	636	3,912	1,452	162	2,622
Total for 1983 to 1992	$22,854	3,501	26,355	8,046	876	19,185

NOTES

1. Fixed Asset Expenditures include corporate overhead and interest during construction less contributions in-aid-of construction. Forecast expenditures on Hat Creek are included but it has since been indefinitely postponed, and borrowings would therefore be reduced by about $5.5 billion, the major portion of which would occur in the years 1988 through 1991.

2. The forecast is prepared in terms of dollars in the year of borrowing.

Rate increases necessary to achieve corporate objectives were forecast in the Corporation's 1982 Corporate Plan as follows:.

	Annual % Increase	
Year	Electric	Gas
1983	7.7	-
1984	15.7	4.7
1985	27.3	3.9
1986	7.6	3.3
1987	4.1	3.6
1988	5.5	6.4
1989	3.8	2.3
1990	7.6	2.1
1991	21.7	2.0
1992	15.3	1.8

These revenue increases assume that the interim rates now in effect will be confirmed.

The extent to which customer revenues provide a margin of earnings over and above expenses is of significance to the terms and conditions under which B.C. Hydro is able to raise debt. The interest coverage ratio financial standard reflected in B.C. Hydro's statement of corporate objectives, and endorsed in the Special Direction, rests on a particular relationship between internal generation of funds and maintenance of capacity to raise debt on acceptable terms and conditions.

Some understanding of the cash flow structure underlying the continuing financial requirements is useful. One such analysis is set out below to show in percentage terms on an overall basis where funds related to the capital costs of the Authority come from and where they go. The table arrays data for historical periods from 1978 to 1982 and for the forecast years 1983 and 1984 on the basis of information filed by B.C. Hydro in its amended Application of May 28, 1982 without any adjustments of the Authority's forecasts.

	Percentages					Forecast	
	1978	1979	1980	1981	1982	1983	1984
A. CAPITAL RELATED INFLOWS							
1. From customers, etc.							
(a) From revenues[1]	45.6	47.4	45.9	48.0	47.5	39.0	46.1
(b) From contributions	2.2	1.8	2.2	2.3	2.3	3.1	2.1
Sub-Total	47.8	49.2	48.1	50.3	49.8	42.1	48.2
2. From Borrowing							
(a) Net long-term debt[2]	52.2	50.8	51.9	49.7	50.2	57.9	51.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
B. CAPITAL RELATED OUTFLOWS							
1. To sources of capital							
(a) For interest	30.6	32.3	34.4	36.8	32.4	36.3	39.9
(b) For principal repayments	12.5	9.2	9.2	12.3	16.1	12.1	13.8
Sub-total	43.1	41.5	43.6	49.1	48.5	48.4	53.7
2. To acquire assets							
(a) Fixed assets[3]	56.9	58.5	56.4	50.9	51.5	51.6	46.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes:

1. Sum of depreciation, interest expense, provision for rate stabilization and earnings adjusted to remove cash loss from transit operations and interest related thereto in 1979 to 1980.
2. Net of change in temporary investments and reduced by transit cash loss and transit capital expenditures in 1978 to 1980.
3. Excluding capitalized interest and reduced by transit capital expenditures in 1978 to 1980.

The analysis indicates that about half of the funds required to deal with the capital related factors of B.C. Hydro's operations each year come from customers and the other half comes from borrowings. On the "outflows" side of the analysis there is a notable shift in average proportions going to service existing borrowings, on account of interest and principal and that which goes to capital assets, excluding capitalized interest. In general terms these shifts in outlay proportions appear to be at least partially attributable to the effects of higher interest rates applying to new debt issues and partially to a need to borrow to service existing debt in a period when significant expansion of plant under construction is taking place.

4. Financial Markets for B.C. Hydro Securities

In May 1980, Moody's Investors Service Inc. awarded B.C. Hydro a Aaa credit rating. A short while later Standard and Poors awarded its AAA rating. The maintenance of the triple A rating is important because it results in lower interest rates and easier access to financial markets. Historically provincially-administered trusteed superannuation funds and Canada Pension Plan funds have been a major source of the Authority's borrowings. Evidence was given that in 1980 the B.C. Government decided that such funds would not be loaned on a long-term basis. As these sources of funds are no longer adequate to the Authority's needs, B.C. Hydro must raise debt money in Canadian and international capital markets with the attendant risk of currency fluctuation losses or gains. The evidence was that the Canadian market might annually provide $100 to $200 million on 5 year terms, the U.S. market $600 to $800 million in 30 year terms and the European market $100 to $200 million on 5 to 10 year terms.

THE RISKS ATTENDANT ON FINANCING IN FOREIGN CURRENCIES WERE EMPHASIZED DRAMATICALLY AT THE HEARING. ON EXAMINATION MR. SHEEHAN ESTIMATED THAT EVERY ONE CENT FALL IN THE EXCHANGE VALUE OF THE CANADIAN DOLLAR AGAINST ITS U.S. COUNTERPART ADDED $5 MILLION TO THE ANNUAL COST OF DEBT SERVICE. THE COMMISSION IS OF THE VIEW THAT THE RISK OF EXCHANGE LOSSES COULD BE MINIMIZED BY INVESTING THE SINKING FUNDS FOR FOREIGN BORROWINGS IN THE CURRENCY OF THE LENDER.

In the preparation of its forecasts, B.C. Hydro does not earmark bond issues at a particular point in time. A computer model is set up to calculate a bond issue, in Canadian or U.S. dollars depending on inserted parameters, when temporary investments from previously borrowed funds are down to a four month level of requirements. The actual decision on time, size, term and placement, etc. is made by the Treasurer in consultation with the underwriters and the Ministry of Finance.

5. Financing Structure

In its 1982 Annual Report the Authority elected to change the way it presents information on the Contributions in Aid of Construction and Columbia River Treaty funds. The effect of that change as well as the nature of the overall B.C. Hydro investment and financing structure, in percentage terms, is as follows:

	1981		1982
	Original	Restated	Reported
Net debt sources of finance	84.8%	93.2%	91.5%
Net non-debt sources of finance	15.2	6.8	8.5
	100.0%	100.0%	100.0%

The difference between the 1981 data as originally reported and the restated presentation produced a significant change in the debt/non-debt relationship. From a position where the relationship was about 85/15, or five percentage points away from the 80/20 debt proportion structure stipulated in the Special Direction, the change produced a ratio of about 93/7. The restated basis moves the Authority considerably further away from meeting its financing structure target than the original presentation indicated.

The issues implicit in a change in financial reporting were canvassed in detail in the course of the public hearing. A method of resolving them must be found because they are important in their own right and because the Special Direction makes specific reference to a "debt/equity" ratio standard. B.C. Hydro itself has strongly endorsed and committed itself to achieving a target 80/20 debt/equity ratio. The fundamental question is: What non-debt funds may be looked upon as equity in the financial structure?

B.C. Hydro's submissions on the manner of calculating the debt/equity ratio excluded long-term deferred liabilities from debt and restricted equity to earnings retained and employed in the business. This approach gives a 93/7 ratio at the end of 1981 and a slightly improved ratio at the end of 1982.

At this time the Commission sees no reason for concern about the exclusion of deferred liabilities from the debt component. They are sufficiently different from normal interest bearing debt to warrant exclusion. In relative terms their current magnitude is such that the exclusion does not produce any significant effect on resultant ratio calculations. IT IS THE COMMISSION'S VIEW, HOWEVER, THAT HOLDINGS OF TEMPORARY INVESTMENTS SHOULD BE DEDUCTED IN QUANTIFYING THE DEBT COMPONENT FOR PURPOSES OF DEBT/EQUITY RATIO CALCULATIONS. The progression of the Authority's debt ratio through time should be related to debt that finances asset investment expenditures when actually made. Outlays that are expected to be made in the future from the proceeds of pre-funding issues of debt should not normally be included.

Four further items require consideration in respect of the "equity" component. These are: the rate stabilization account; contributions in aid of construction; contributions arising from the Columbia River Treaty; and earnings employed in the business. The Commission's analysis and conclusions on each of these is set out in the following paragraphs.

(i) The Rate Stabilization Account

If the Commission had not otherwise ordered, the funds in this account would have been "earnings employed in the business" at the end of the 1982 fiscal year. If, as, and when this account is flowed back against revenue requirements of future periods it will contribute to earnings such amounts as may be reported in those periods and will end up as earnings employed in the business. THEREFORE THE COMMISSION CONCLUDES THAT THE RATE STABILIZATION ACCOUNT, TO THE EXTENT IT CONTAINS A BALANCE AT ANY YEAR END, SHOULD BE CLASSIFIED AS EQUITY FOR PURPOSES OF DEBT/EQUITY RATIO CALCULATIONS.

(ii) Contributions in Aid of Construction

From time to time B.C. Hydro receives funds which it designates as "contributions in aid of construction" from customers and from the provincial government for the extension of electric and gas services to new areas.

Prior to 1982 the contributions and the asset costs were shown on the balance sheet as a financing source and as an asset. Both were amortized against operations so that no net effect on operating results occurred. The 1982 change in treatment cancelled the prior accumulated depreciation related to the part of the costs financed by contributions, reinstated the latter amounts to their full unamortized value, and presented the results of this treatment on a net basis in relation to the fixed asset accounts with no balance shown as a source of finance. The overall result in terms of considering the Authority's financing ratios is consistent with its position that only long-term debt and earnings employed in the business should count as financing sources for purposes of debt/equity ratio calculations.

THE COMMISSION DOES NOT AGREE THAT THE TREATMENT ADOPTED IN 1982 IS THE PREFERABLE WAY TO PORTRAY THE FACTS OF THE AUTHORITY'S INVESTMENT, FINANCING, AND OPERATING ACTIVITIES. The assets that are built against contributions in aid of construction are functionally indistinguishable from similar assets where there are no such contributions. The process of presenting the contributions as a deduction from the costs creates a fictional suggestion that assets added under these kinds of conditions are different from asset additions where no customer contributions are sought. THE COMMISSION ACCORDINGLY CONCLUDES THAT CONTRIBUTIONS IN AID OF CONSTRUCTION SHOULD BE PRESENTED AS A SOURCE OF FINANCE. IN ADDITION, BECAUSE THESE FUNDS INVOLVE NO OBLIGATION FOR REPAYMENT EVEN THOUGH THEY MAKE IT POSSIBLE TO AVOID THE PAYMENT OF DEBT INTEREST AND ASSOCIATED COSTS, THEY SHOULD BE TREATED AS COMPARABLE TO EQUITY FUNDS FOR PURPOSES OF DEBT/EQUITY RATIO CALCULATIONS.

In that the Authority's explanation of its presentation change in 1982 did not disclose what the contributions in aid of construction balance would have been without the change, the Commission will employ an approximation for purposes of computing debt/equity ratio conditions at the end of 1982. An assumed amortization of $7 million will be used as an approximation for this purpose hereafter pending revision by the Authority to put its accounts on an appropriate basis for the future.

(iii) Contributions Arising from the Columbia River Treaty

The circumstances surrounding B.C. Hydro's receipt of these funds and related issues of how they should be accounted for in determining and presenting the Authority's financial position, make necessary searching analysis and interpretation.

There exists in the Corporation's accounts an asset balance representing costs incurred or imputed in relation to building the Columbia River Treaty dams and an exactly matching source of finance balance. Up until the end of 1981, the Corporation's Annual Reports presented these facts, adjusted for the results of the accounting procedures described in the following paragraph, on what is sometimes described as a "broad" basis. That is, the asset amount was shown as an asset investment on the left hand side of the Corporation's balance sheet while the contribution was shown as an amount and source of funding on the balancing right hand side of that financial statement. In the Authority's 1982 accounting there was a change in which the contribution amount was deducted as a form of asset cost offset in accounting for investment in fixed assets.

Under the pre-1982 form of accounting for Columbia River Treaty asset cost and contribution balances, the Authority depreciated the asset balance over the agreed period of the downstream benefits and cancelled out any effect on net income by an exactly offsetting amortization of the funding balance each year. This had the effect of gradually reducing by $9 million per year the financing source balance otherwise shown as contributions arising from the Columbia River Treaty.

The change which B.C. Hydro made in its 1982 accounting has some support in general accounting practice. When an investor owned business receives a government investment incentive grant towards the cost of acquiring a fixed asset, it is required under accepted accounting standards to offset the grant against the asset cost to determine the net amount of investment for which the equity and other investors in the enterprise are at risk. But are the Columbia River Treaty funds really analogous to a government grant towards the cost of building an asset? What is the nature of those funds?

The Commission understands that the Treaty defines these funds to be discounted payments for a "sale" of downstream power benefits from the Canadian dams and a similar payment for downstream flood control benefits. This appears to account for almost $340 million of the funds. The balance is made up of interest amounts accumulated in relation to benefit sale proceeds while the dams were being built and similarly imputed to be part of the cost of the dams. These amounts relate only to the Treaty dams as storage dams. The generation capacity at Mica was built by B.C. Hydro for its own account and not as part of the Treaty arrangements.

Although the Columbia River Treaty term extends to 2025, the downstream benefit "sales" referred to are for 30 year periods from the completion of each storage dam and all expire before 2025. There could be a reasonable expectation of further funds for downstream benefits after 1997, 1998 and 2003 respectively since their existence, and value, will continue as long as the dams exist. Such further benefits could, of course, be in the form of power rather than in the form of an advance payment but presumably there is some entitlement to compensation as long as the downstream power and flood control benefits exist.

Realization of these benefits is not in any sense imminent, the nearest opportunity being some 15 years away. It could even be, as a B.C. Hydro witness suggests, that although B.C. Hydro is defined as the "Canadian Entity" for purposes of administering the Treaty, the Province rather than the Authority might be entitled to any future downstream benefit payment proceeds.

There are also anomalies in the treatment of depreciation and amortization. Under the Authority's pre-1982 accounting the costs of the storage dams were depreciated over the 52 year term of the Treaty and contributions were amortized as an offset over the same term even though the major portion of the funds represented payment for downstream benefits for a period of only 30 years and the rest represented accumulated capitalized interest. In its normal accounting B.C. Hydro depreciates this kind of asset over a 100-year estimated life. As well, in relation to the Mica dam where non-Treaty generation is installed and where costs to build the dam exceeded Treaty contributions, the anomalous result was that the "top" part of the dam was written off over 100 years as part of the costs related to generation facilities, while the "bottom" was expensed over 52 years, a condition that would do more credit to Gilbert and Sullivan than to serious accounting theory. Under the new accounting approach the "top" is still being written off over 100 years while the "bottom" is displayed as having no cost at all.

A further aspect of this matter which requires some mention, although it was not adequately dealt with in the public hearing, concerns the question of what benefits and costs relevant to providing electric service to B.C. Hydro's domestic customers are inherent in the Treaty dam arrangements. There can be no question but that the dams as storage dams produced downstream benefits south of the border - otherwise the contributions towards the cost of constructing the dams would never have been made. What is not apparent is whether there are benefits flowing from the existence of the Treaty dams as storage dams which accrue to domestic customers and, if there are such benefits, what their value might be in relation particularly to the annual operating costs which the Authority must incur to perform its obligations as the "Canadian Entity" under the Treaty.

IF THERE IS A NET BURDEN OR BENEFIT TO THE PROVISION OF DOMESTIC ELECTRIC SERVICE ASSOCIATED WITH THE STORAGE DAMS UNDER THE TREATY, THE COMMISSION BELIEVES THE EXISTENCE AND MAGNITUDE MUST BE IDENTIFIED. THE AUTHORITY IS ACCORDINGLY INSTRUCTED TO PREPARE AN ANALYSIS OF THIS MATTER FOR EXAMINATION IN ITS NEXT RATE APPLICATION. BOTH THE NATURE AND MAGNITUDE OF COSTS AND THE NATURE AND MAGNITUDE OF BENEFITS SHOULD BE ESTIMATED AND DOCUMENTED IN THE REPORT FOLLOWING THE REQUIRED ANALYSIS.

THE COMMISSION IS NOT PREPARED TO ACCEPT THE AUTHORITY'S 1982 TREATMENT OF CONTRIBUTIONS ARISING FROM THE COLUMBIA RIVER TREATY AS FAR AS DEBT/EQUITY RATIO CALCULATION CONSIDERATIONS ARE CONCERNED. IN THE VIEW OF THE COMMISSION THE REASONING UNDERLYING THE INCLUSION OF CONTRIBUTIONS IN AID OF CONSTRUCTION AS "EQUITY" APPLIES WITH EQUAL FORCE TO THE COLUMBIA RIVER TREATY FUNDS. ACCORDINGLY B.C. HYDRO IS INSTRUCTED TO REFLECT THOSE CONTRIBUTIONS ON FUTURE BALANCE SHEETS AS THEY WERE IN 1981 AND PREVIOUS YEARS AND TO FOLLOW THE PRE-1982 ACCOUNTING PRACTICE.

(iv) Earnings Employed in the Business

In the past B.C. Hydro has accumulated earnings through charges to customers in excess of costs for its various services. These assist with the financing of its continuing capital and operating requirements. The Authority is requesting, and the Special Direction stipulates, that its revenue requirements continue to be determined in a manner which will provide it with an opportunity to accumulate further earnings to assist in the financing process.

The Commission agrees that earnings employed in the business must count as an "equity" component of finance. However, two somewhat related questions remain. The first is whether the debt/equity ratio should be analyzed by service and segment or only on a total corporation basis. B.C. Hydro's submissions in this regard were all on a total corporate basis. THE AUTHORITY'S POSITION WAS THAT IT DOES NOT ALLOCATE LONG-TERM DEBT, AND BY IMPLICATION RETAINED EARNINGS, AMONG THE VARIOUS SEGMENTS OF ITS OPERATIONS. FOR THE PRESENT THE COMMISSION CONSIDERS THIS APPROACH TO BE ACCEPTABLE FOR REGULATORY PURPOSES BUT ALSO BELIEVES IT AFFECTS OTHER ASPECTS OF THE PROCESS OF DETERMINING REVENUE REQUIREMENTS.

The other concern is the question of the accumulated effect of transit losses on the earnings from other utility and non-utility operations that would otherwise be reflected in the Corporation's financial structure. Had there not been recurring losses in the transit operation prior to divestiture at the end of the 1980 fiscal year, the Authority's balance of earnings retained would clearly be larger and its debts lower than they have turned out to be.

The annual losses on passenger transportation operations for the 10 years from 1971 to 1980 and the loss on disposal shown in Exhibit 59 totals $345.5 million. There were, however, special subsidy payments to the Authority from the provincial government of $32.6 million in each of fiscal 1976 and 1977. Deducting these from the total of $345.5 million leaves a net deficit result of $280.3 million over this period. But while this amount may be taken as an approximation of the effect of the transit operations on earnings employed in the business over this period, it includes depreciation charges and accordingly overstates any consequent borrowing that might have been required to replace funding from earnings not otherwise available. Assuming, on the basis of data available in earlier annual reports, that depreciation at $3 million per year might give a reasonably generous approximation of this effect, the result would be a transit related cash deficit from 1971 to 1980 of approximately $250 million.

HAVING CONSIDERED THE BACKGROUND AND OTHER RELATED MATTERS, THE COMMISSION IS FORCED TO CONCLUDE THAT THERE ARE NO REASONABLE GROUNDS FOR ANY ADJUSTMENT OF THE AUTHORITY'S ACTUAL POSITION ON EARNINGS EMPLOYED TO IMPUTE ACCUMULATED EARNINGS TO REPLACE THE EFFECTS OF PRIOR TRANSIT LOSSES. THE ACTUAL BALANCE OF EARNINGS EMPLOYED IN THE BUSINESS SHOULD THEREFORE BE USED FOR PURPOSES OF DEBT/EQUITY RATIO CALCULATIONS.

However, there is an interest cost which can be related to the transit losses of the past and which is in part a current charge to the Authority's ongoing utility operations. TO PROVIDE SOME OFFSET CURRENTLY AND IN THE FUTURE FOR THIS BURDEN FROM THE PAST, THE COMMISSION CONSIDERS IT REASONABLE AND FAIR IN ALL THE CIRCUMSTANCES TO TAKE THE EARNINGS OF THE CORPORATION'S NON-UTILITY OPERATIONS INTO ACCOUNT IN SETTING THE LEVEL OF THE EARNINGS MARGIN TO BE PROVIDED FOR THE REVENUE REQUIREMENTS OF THE ELECTRIC AND GAS UTILITY SERVICES. If it were reasonable in the past to absorb transit deficits from electric, gas, and other earnings, it is reasonable for the future to credit earnings from similar non-utility operations. The Commission also considers that the effect of this treatment is substantially equivalent to employing a single interest coverage ratio standard to the entire corporate enterprise for the determination of the Authority's earnings margin requirements under the Special Direction. This is the basis that B.C. Hydro considers appropriate to ascertaining its debt/equity ratio. The Commission believes such consistency in approach is desirable.

Taking all the foregoing into account the Commission has concluded that the following table fairly summarizes the Authority's progress towards its debt/equity ratio target over the past three years.

	$Millions		
	1980	1981	1982
Debt sources of finance			
Bonds and debentures	$5,176	$5,324	$6,425
Notes payable		48	
Parity development bonds	25		
	$5,201	$5,372	$6,425
Less temporary investments	316	16	537
Net debt position	$4,885	$5,356	$5,888
Non-debt sources of finance			
Rate stabilization account			90
Contributions arising from Columbia River Treaty	414	405	396
Contributions in aid of construction	146	171	201
Earnings employed	280	393	513
Total non-debt sources	840	969	1200
Total financing	$5,725	$6,325	$7,088
Ratio-debt/non-debt (equity)	85/15	85/15	83/17

Before leaving the matter, the significance of the debt/equity ratio should be addressed again. In an investor-owned utility the equity will attract some rate of return, approved by regulation. It thereby provides an automatic source of "interest coverage", the actual amount being a function of the rate base, the rate of return on rate base and the debt/equity ratio. In the case of B.C. Hydro, there is no formal rate base, though such could presumably be calculated, and residual equity funds are available to the Authority only through retention of net earnings. Given the valid requirements of the financial markets to which B.C. Hydro must look for the majority of its funding, and the significance of B.C. Hydro's borrowings to the credit capacity of the province under the guarantee, it is necessary for financial viability that the Authority continue to accumulate and retain earnings from operations. But because these funds have a cost to customers, there is a need for a mechanism which will ultimately limit the degree of required accumulation to what is needed to ensure financial viability. In B.C. Hydro's case the debt/equity ratio target serves this function.

In terms of B.C. Hydro's definition of its financing structure, it should be noted that achieving the potential debt/equity ratio of 80/20 from earnings accumulations is much further away in time than might be indicated by the foregoing table.

6. The Earnings Margin

The second financial standard established by the Special Direction for B.C. Hydro is specified as an interest coverage ratio ("ICR"). The standard is expressed as a ratio but the purpose is to provide an objective mechanism through which a margin of earnings over and above costs can be ascertained. The defined objective is to achieve a ratio of 1.3 to 1 by the 1984 fiscal year. A 1.3:1 ICR means that for each dollar of interest costs there would be 30¢ of net income.

B.C. Hydro's submission was to the effect that the possibility of the Authority realizing revenues from export sales should be ignored in setting its revenue requirements. Historical data suggests that export revenues have historically had a very significant effect on B.C. Hydro's realized earnings margins and interest coverage ratios. Without them, the average ratios in the past would have been 1.1 to 1 rather than something closer to 1.25 to 1. And as year by year details show, without export revenues in some years, including 1982, the coverage ratio would, for all practical purposes, have been unity.

EXCLUDING SUCH EXPORT REVENUES IN ASCERTAINING AN EARNINGS MARGIN IS, IN THE COMMISSION'S VIEW, INAPPROPRIATE. THESE REVENUES ARE GENERATED BY THE SAME FACILITIES AND RELATE TO THE SAME COSTS THAT GENERATE DOMESTIC REVENUES. THE AUTHORITY'S REVENUE REQUIREMENTS CANNOT BE FAIRLY DETERMINED IF THEY ARE IGNORED.

B.C. Hydro also submitted that the calculation formula for interest coverages endorsed by the Securities and Exchange Commission in the United States should be used. This would mean that the interest coverage test would be based on gross interest, without an allowance for income from sinking fund investments and income from temporary investments.

With respect to the coverage formula the Commission's concerns are: How interest income should be dealt with and how interest charged to construction should be treated. These matters are discussed below.

WITH RESPECT TO INTEREST INCOME, THE COMMISSION CONSIDERS THAT THESE AMOUNTS MUST BE DEDUCTED FROM GROSS INTEREST COSTS AS OTHERWISE DETERMINED IN COMPUTING THE INTEREST BASE FOR COVERAGE PURPOSES. BOTH OF THESE, INCOME FROM SINKING FUND INVESTMENTS AND INCOME FROM TEMPORARY INVESTMENTS, CAN BE SAID TO CANCEL INTEREST COSTS ON DEBT THAT WOULD NOT EVEN BE OUTSTANDING IF THE AUTHORITY ACTUALLY RETIRED DEBT IN ACCORDANCE WITH ITS SINKING FUND SCHEDULES AND DID NOT ENGAGE IN PRE-FUNDING OF ITS CAPITAL EXPENDITURES. THERE IS ACCORDINGLY NO REASONABLE BASIS FOR ASCERTAINING AN ANNUAL INTEREST COST BASE WITHOUT FIRST DEDUCTING THESE INTEREST INCOME AMOUNTS.

The remaining question is the treatment of interest charged to construction and whether or not this item should also be deducted in the evaluation of gross interest pursuant to the interest coverage formula. If interest charged to construction is deducted, B.C. Hydro would be denied a coverage on the annual interest payable to the bond holders.

The submissions of B.C. Hydro's internal and external financial witnesses, as well as the intervenors' witness, Dr. Waters, supported the inclusion of interest during construction in gross interest for the purposes of the coverage formula. The Commission agrees with the witnesses, who held that the potential provider of new debt funds to the Authority may reasonably be concerned about the adequacy of an earnings margin in relation to total interest costs. From the prospective lender's point of view the question of whether the interest is capitalized and deferred to future revenue periods is a secondary consideration. What matters is the margin of earnings over interest obligations.

IN THE COMMISSION'S VIEW, IT IS APPROPRIATE THAT THE MARGIN SHOULD BE CALCULATED ON INTEREST COST BEFORE DEDUCTING CAPITALIZED INTEREST. THIS WILL MEAN THAT AN INTEREST COVERAGE COST WILL BE INCLUDED IN THE ANNUAL REVENUE REQUIREMENT RELATING TO THE FINANCING COST OF PLANT UNDER CONSTRUCTION.

To some degree this treatment will help prevent sharp increases in rates when new plant goes into service.

While the Commission must try to meet the objectives of the Special Direction, it is not convinced that such an objective must be achieved year in and year out. There are simply too many unpredictable variables in any particular year which may prevent a target from being achieved. B.C. Hydro's current difficulties in approximating revenues and expenses in very uncertain economic conditions are evidence of this fact. And the Authority is not alone in experiencing financial difficulties - its customers of all kinds have at least similar and in very many cases much worse, financial problems. It is not reasonable to expect the Authority to be perfectly insulated from all recession effects.

There is accordingly an obvious need to view a coverage objective such as 1.3 to 1 as a target around which achieved coverages could be expected to fluctuate to some degree. BUT THE COMMISSION RECOGNIZES THAT ADEQUATE INTEREST COVERAGE MUST BE ACHIEVED AND MAINTAINED OVER TIME IN ORDER THAT THE REQUIRED SECURITY IS PROVIDED TO THE LENDER.

VII. Employee Compensation and Manpower

During the proceedings the Commission examined the level of B.C. Hydro's employee compensation.

Evidence was led by R.J. Clifford and Associates, personnel consultants retained by the Commission who analyzed and compared employee compensation levels within B.C. Hydro with a sample of industry data.

The consultants' conclusion was that, with the exception of the senior executive level, the Authority provides total compensation at levels well in excess of the market. The analysis also indicated that this condition has persisted over many years. The consultants estimated, for 1981, that B.C. Hydro's total compensation was $47 million higher than market average compensation. In percentage terms, this amount is approximately equal to 14% of total salaries, wages and employee benefit costs for that year. The study concluded that B.C. Hydro has functioned as a leader in setting benefit and wage pattern settlements in British Columbia for many years.

B.C. Hydro challenged the results of the consultants' study. The Company submitted other results considered by B.C. Hydro to be computed on a more appropriate basis. This data indicated that the maximum possible excess 1981 compensation was $30 million. The Authority also submitted that after taking into account productivity benefits the maximum possible excess would be half this amount. While the Authority gave some acknowledgement to the contention that it has had a leadership status in the compensation settlements area in the past, it argued that it has been seeking systematically to bring its relationship back into line with the market over recent years.

The Commission recognizes that strong differences of opinion can exist between experts in making compensation comparisons. However it finds comparisons to be useful, notwithstanding genuine differences of opinion on techniques. Compensation is not a matter of absolute values relative to any given entity but a question of relative levels within a broader economic context.

This is particularly so with a company having a privileged protected position in the market. The use of comparative data must be an integral part of compensation negotiations and the Authority should always be fully informed of its compensation levels relative to the industries that it supplies, and relies upon for its revenues.

The Commission found the information, analyses and recommendations in the consultants' report to be of considerable value. In this area, there was a noted absence of evaluative information in the material originally filed by B.C. Hydro.

IN THE COMMISSION'S VIEW, IT IS UNQUESTIONABLE THAT THE RESULT OF B.C. HYDRO'S COMPENSATION PRACTICES HAS BEEN TO OFFER COMPENSATION ABOVE THE MARKET AVERAGE. THIS SHOULD BE AN ONGOING MATTER OF CONCERN FOR THE AUTHORITY'S SENIOR MANAGEMENT. EFFORTS TO BRING RELATIONSHIPS INTO LINE SHOULD BE PURSUED WITH VIGOUR WITH THE REFERENCE POINT FOR SUCH EFFORTS BEING COMPETITIVE INDUSTRY CONDITIONS RATHER THAN OTHER REGULATED UTILITIES.

THE SUPPLY AND DISTRIBUTION OF ENERGY IS ONE INDUSTRY AMONGST OTHERS; IT REQUIRES SPECIAL SKILLS BUT THEN OTHER INDUSTRIES DO ALSO. THE UTILITY INDUSTRY SHOULD NOT COMMAND PREMIUM COMPENSATION AND THE AUTHORITY HAS A DUTY TO ITS CUSTOMERS TO ENSURE THAT THIS SITUATION DOES NOT CONTINUE.

An anomaly to this situation is the compensation paid at the senior executive level, where the responsibility is significant but remuneration appears to be below comparable industry levels. The interests of the customers require the Authority to attract and keep the necessary individuals at a compensation required to do so.

While it is possible to assess comparable remuneration, it is much more difficult to assess the required manpower level. While in this proceeding the Commission did not undertake a broad study of B.C. Hydro manpower levels, it did review manpower levels in two areas, namely the personnel division and the Victoria Gas operation. The findings in these two areas has lent support to the contention that overmanning may exist in the whole of B.C. Hydro's operations.

THE AMOUNT OF EMPLOYEE COMPENSATION PAID AND MANPOWER LEVELS SUSTAINED IS, IN THE COMMISSION'S VIEW, AN AREA WHICH MUST BE IMMEDIATELY REVIEWED BY B.C. HYDRO. THE AUTHORITY MUST TAKE STEPS TO ENSURE THAT ITS COMPENSATION AND MANPOWER LEVELS ARE COMPARABLE TO, AND DO NOT EXCEED, COMPETITIVE INDUSTRY, WITH PARTICULAR REFERENCE TO THE INDUSTRIES THAT IT SERVES.

The steps taken and the measures introduced by B.C. Hydro will be examined at the next proceeding before this Commission.

VIII. ELECTRIC SYSTEM PLANNING

The major source of costs to be recovered by B.C. Hydro relate to the Corporation's asset position. These costs are depreciation, grants and taxes, interest and coverage margin.

Most of B.C. Hydro's investment in electric system facilities was undertaken at a time when the Authority was not subject to regulation under the B.C. Utilities Commission Act or predecessor statutes. At the time the Act came into effect the rates then in place were deemed to be the lawful and collectible rates of the utility. The Commission's responsibilities with respect to B.C. Hydro therefore commenced with the proclamation of the Act.

The Act provides that the approval process of major B.C. Hydro facilities is to be dealt with under Part 2. Nevertheless, the Commission took the view that due to materiality and effect of system planning decisions on revenue requirement, some examination of current load forecasting methodology and generation planning was appropriate. The comments and findings that follow relate to the principal planning criteria used by B.C. Hydro in the scheduling of new electrical generating plants.

The technical criteria presently used were summarized in Appendix II of the 1982 Electric System Plans and Evaluations (April 1982 to March 1992) which formed part of Exhibit 23 of the proceedings. The criteria are summarized below.

"B.C. HYDRO ELECTRIC SYSTEM TECHNICAL PLANNING CRITERIA

The technical criteria presently used for planning the expansion of the electric system are outlined very briefly. These criteria have been in use for many years, being modified from time to time to suit changing conditions.

THE LOAD FORECAST

A 20-year forecast of the electrical load is provided by the Load Forecast Department of Strategic Planning in September of each year; three forecasts are included, a low, a probable, and a high. System development is based on the probable forecast but it may be tested against the low and the high for contingency planning.

GENERATION PLANNING

Generation plant additions are scheduled to meet forecast loads on the following basis:

Energy

Plant additions and energy purchases are scheduled so that the firm energy capability of the system is equal to or greater than the probable forecast of electric energy demand. The firm energy capability is defined as the sum of the energy available from the following:

(i) hydroelectric plant under critical water conditions.[2]

(ii) Burrard at about 40% annual capacity factor.[3]

(iii) other thermal generation plant (except gas turbines) whose maximum annual capacity factors range from 60 to 80 percent depending on the type, size and maturity.

(iv) firm purchase contracts.

This schedule of plant additions and purchases is then checked to determine if there are economic advantages in advancing the schedule under average water conditions to reduce the use of fossil fuels.

Peak Capacity

Peak capacity of the system is designed to meet or exceed the one hour peak demand and to provide a peak reserve margin. The peak reserve criteria is based on loss of load probability using a maximum risk of one loss of load in ten years (Risk Index of 0.1). For today's predominately hydro system, peaking capacity is not critical.

No allowance is made for possible peak load reduction by curtailment of supply to large industrial customers during peak months, and no allowance is made for the emergency peak reserve that may presently be available to B.C. Hydro through existing interconnections with neighbouring utilities. In future years when peaking capacity becomes more critical, interconnection contracts may be revised to allow peak reserve sharing (eg. between B.C. Hydro and TransAlta Utilities Corporation).

NOTES

1. Average water conditions - average stream flows for the hydro system over the thirty-five year period from 1940 to 1975.

2. Critical water conditions - the lowest streamflow sequence for the hydro system as a whole during the period from 1940 to 1975. Natural inflows to major reservoirs average approximately 15% below normal during the critical period. With the present system and with Burrard operated as in Note 3 below, the critical period would be the 44-month period from September 1942 to April 1946.

3. Burrard energy generation - since firm energy deficits are forecast to occur by 1986/87, it is expected that Burrard would be operated up to a maximum annual output of about 3,400 GW.h on valley gas in order to refill Williston Reservoir each summer, if possible. Over the 44-month critical period, Burrard would contribute an average of 3,170 GW.h annually."

I. THE LOAD FORECAST

The addition of new generating plant is based upon the load forecast and the estimated availability of generation from existing and future plant. While final planning is based on the probable load forecast it may be tested against the low and the high for contingency planning.

The energy demand forecast initially tabled with the Commission was prepared in September 1981. In May 1982 a revised or interim new forecast was issued that showed a probable demand in 1991/92 reduced from 57,090 GWh to 52,089 GWh. This corresponds to an average growth rate of 4.8%, as compared with the earlier 5.7%.

Subsequently, during the proceedings a September 1982 forecast was issued. This showed a further reduction in forecast demands and growth rates. The load growth rates for the three forecasts are as follows.

September 1981	May 1982	September 1982
Low 3.4%		3.0%
Probable 5.7%	4.8%	4.3%
High 8.0%		5.3%

In terms of total energy demand in the year 1991/2, the differences are considerable, as demonstrated by the following table:

1991/2 Energy Demand - GWh
Probable Forecast

September 1981	57,090
May 1982	52,089
September 1982	49,570

In a period of one year the forecast energy demand 10 years in the future changed by 7,500 GWh. This represents a 30% reduction in growth after 1981/2.

The variation between the low, probable and high forecasts is also very significant. However, the range has reduced between the 1981 and 1982 forecasts. Demands for 1991/2 may be compared as follows.

	September 1981 Forecast	September 1982 Forecast
Low	44,910	44,000
Probable	57,090	49,570
High	72,700	55,000
Total Range	27,790	11,000

The probable load forecast is intended as a best estimate and does not appear to include any contingency amount.

The September 1981 forecasts are broken down among residential customers, (29 percent of total sales) bulk or transmission customers (about 35 percent of sales), and general customers (most of the remaining 36 percent of sales). Because of the large volumes of sales to a relatively small number of customers, the forecasts in the bulk category are developed separately from the procedures applied to the residential and general categories.

With the exception of bulk loads forecast separately at the Head Office level, the forecast of total requirements begins with estimates prepared by managers in the 57 power districts (organized currently into 5 divisions) of basic factors expected to determine growth in loads (such as numbers of customers and usage per account) which are readily converted to sales estimates. These detailed forecasts cover a 2 year period and are supported by 5 year projections of trend data which can be used by Head Office to extend the volume projections to the 10 year and longer planning horizons. Head Office projections of bulk sales are developed in consultation with each customer with allowances added for unspecified growth based upon other inquiries as to load availability.

The detailed forecasting involves guidance on economic and other trends from the Corporate Economist and other staff groups within B.C. Hydro with responsibility for current information on local trends and developments in their individual service areas assigned to local managers. At the aggregated level, efforts are made to ensure basic consistency with economic variability such as Gross Provincial Domestic Product when the near-term detailed projections are extended into the future.

Subsequently B.C. Hydro engaged consultants to prepare a total energy forecast using an econometric approach, and also to estimate ranges of price elasticities for the various components of the load.

The May 1982 and September 1982 forecasts referred to changes in the methodology to reflect economic conditions. The September 1982 forecast made reference to the following changes in method:

- greater emphasis in estimating the likely level of future energy prices and the resulting impact of changes in electricity use;

- development of a residential forecasting model to facilitate more in-depth analysis of this category;

- more detailed analysis of general sales, relating the various components of this category to the growth in certain industrial activity, to growth in commercial floor space requirements and the changing electrical requirements in new buildings, and to certain segments of population; and

- assessments of the growth and electrical requirements of the major industrial sectors based on the resource base and world market, including coal mining and petrochemicals in addition to forestry and minerals mining and smelting.

The September 1982 forecast attempts to explain the extent to which the forecast is affected by the results of these supplementary analyses. It may be noted that while all sales are affected by prices and economic conditions, the bulk sales category responds most directly. The 1982 forecast shows a higher growth rate for bulk sales than other categories, primarily due to growth in demand in the forest industry and petrochemical sectors.

(i) Review of the Load Forecasting Record

The Authority has had to make systematic downward revisions to future gross load requirements and rates of growth therein over the past several years. The Commission recognizes that B.C. Hydro is by no means alone among electric utilities in having to adapt its expectations in this manner.

The following table represents B.C. Hydro's forecast load from the 1974 forecast to that of September 1982 and compares the forecast to the actual growth in load up to the year 1981/82.

TABLE OF SUCCESSIVE GROSS LOAD REQUIREMENTS FORECASTS (GW.h)

Year of Forecast	Forecast For Fiscal Years 1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
1974	37,516*							
1975	35,540	39,290*						
1976	33,350	36,930	40,380					
1977	30,670	32,760	34,710	37,500	40,190	42,950	45,690	48,890
1978	30,560	32,040	34,060	36,770	40,110	42,920	45,550	48,340
1979	30,320	32,080	34,820	38,030	41,350	43,290	45,310	47,520
1980		31,450	34,160	37,340	40,510	43,690	46,010	48,250
1981			32,340	36,160	38,690	41,540	43,690	46,160
1982				32,570	34,320	36,310	38,060	40,290
Actual	29,913	31,114	32,359					

*High forecast only made in these years for the identified periods

Total Change

5 years

Forecasts	-7,196	-7,840	-8,040	-4,930	-5,870	-6,640	-7,630	-8,600
Actuals	-7,603	-8,176	-8,021					

Percent of Initial Year

Forecasts	19%	20%	20%	13%	15%	15%	17%	18%
Actuals	20%	21%	20%					

Average Annual Reductions

Forecasts	-1,439	-1,568	-1,608	- 986	-1,174	-1,328	-1,526	-1,720

Assuming in the recent past a five year construction period for a hydro generating facility, the data for each forecast year in the tabulation indicates that a decision to build for requirements at the level forecast for the initial year in each sequence would have resulted five years later in substantial excess generating capability. In approximate terms and with some discounting of the data in the earlier years of the analysis when only high-growth load forecasts were prepared, it would appear that the load forecast revision process over these years has progressively "defined away" initially perceived needs for 4,000 to 8,000 gigawatt hours of load requirements. At the mid-point of this range of forecast revision differences, the results of the comparisons indicate that on average a decision to build against the forecast demand level of the first year of these sequences would have resulted five years later in an excess capability addition about equal to the size of the Revelstoke project currently under construction. OBVIOUSLY THERE IS A HEAVY RESPONSIBILITY ON SYSTEM PLANNERS AND MANAGEMENT TO ENSURE MAXIMUM FLEXIBILITY IN THE TIMING OF CAPACITY ADDITIONS.

The following data extracted from the same Exhibits as the previous table shows average annual increases in projected load requirements implicit in projections prepared in each of the years 1974 to 1982. Also shown are average actual load requirements growth particulars for the 10 years 1972 to 1982. The average data are shown for the first and second five year periods of the projection and for the full ten year planning horizon. Also shown as a rough indicator of the significance of changing growth expectations to the problem of timing generation additions, is an index based on the Revelstoke generation facility currently under construction. These measures take Revelstoke as potentially adding 6,600 gigawatt hours per annum of capability to the system and indicate how many years at the various average load requirement growth rates it would take to utilize that much capability.

TABLE OF AVERAGE ANNUAL GROWTH IN LOAD REQUIREMENT PROJECTIONS (GW.h)

		Average Annual Growth			Index of Years to Require a Revelstoke size facility at 6,600 GW.h		
Forecast Year	Forecast Period	1st 5 Years	2nd 5 Years	10 Years	1st 5yrs. average growth	2nd 5yrs. average growth	10 yrs. average growth
1974	'75-'85	2,848	4,215	3,532	2.3	1.6	1.9
1975	'76-'86	3,180	4,398	3,789	2.1	1.5	1.7
1976	'77-'87	2,840	3,414	3,127	2.3	1.9	2.1
1977	'78-'88	1,972	2,968	2,470	3.3	2.2	2.7
1978	'79-'89	2,232	2,848	2,540	3.0	2.3	2.6
1979	'80-'90	2,594	2,304	2,449	2.5	2.9	2.7
1980	'81-'91	2,912	2,314	2,613	2.3	2.9	2.5
1981	'82-'92	2,764	2,186	2,475	2.4	3.0	2.7
1982	'83-'93	1,910	1,806	1,858	3.5	3.7	3.6
Actual	'72-'82	1,617	1,280	1,449	4.1	5.2	4.6

This analysis indicates that the System Planners have been operating in an environment where there has been a probability of committing to add capacity in advance of need. The process of annual revision of load requirement forecasts has produced fluctuating expectations of average annual load growth rates in the first five years of successive projections, and a consistent downward trend in average annual growth rates for the second five year projection. Of particular note are the quite significant revisions to expected average annual increments to load requirements incorporated in the most recent September 1982 projections. Actual average annual rates of growth in load requirements in the most recent ten years of operating history are significantly below virtually all of the forecast rates of increase. However, it is not until the September 1982 forecasts are considered that the projections begin to reflect a reasonable approximation to recent average actual volume growth.

THIS REVIEW OF B.C. HYDRO'S ABILITY TO PLAN REALISTICALLY AND EFFICIENTLY FOR SUPPLY, RELATED AS IT IS TO LOAD FORECASTING, INDICATES VERY STRONGLY AN EXCESS CAPABILITY RELATIVE TO DOMESTIC SERVICE NEEDS. For example, the Revelstoke project was committed conditionally in 1977 and firmly in 1978. The in-service date for the first two units was December 1983 with two more units by September 1984. It can now be seen that the result would obviously be surplus capability relative to domestic requirements. Recently B.C. Hydro has recognized the surplus probability by proposing later in-service dates. The limits and costs of deferral procedures do not ensure that the end result will be an appropriate balancing of supply capability and demand.

(ii) Commission Findings on the Load Forecast

(a) THE LOAD FORECAST IS THE MOST IMPORTANT AND COST SIGNIFICANT ASPECT OF GENERATION PLANNING; EVERY EFFORT SHOULD BE MADE TO IMPROVE ITS ACCURACY.

With a lead time now of 10-15 years for major projects, or a minimum six year construction period, the timing of the start of construction work and hence major capital expenditure is directly affected by the long-term, 10 year, load predictions. Significant capital expenditures are incurred prior to final project approval and these are also affected by the load forecast. For example, expenditures, excluding interest and corporate overhead, on Peace Site C are $35,000,000 up to March 1982. Approximately $160,000,000 has been spent on all major planned hydro, thermal and transmission developments, that are currently in the planning stage, up to March 1982.

(b) BECAUSE OF THE UNCERTAINTY OF DEMAND THE TIMING OF THE NEED FOR MAJOR GENERATION CAPABILITY BECOMES EXTREMELY DIFFICULT.

(c) AVAILABLE INDICATIONS ARE THAT SURPLUS CAPABILITY OVER AND ABOVE ANTICIPATED REQUIREMENTS DOES AND WILL EXIST FOR THE NEAR-TERM FUTURE. The December 1981 System Plan supply/demand balance against critical water conditions and probable load growth, indicated firm supply surpluses of about 10% until 1985/86. Under average water conditions the balance indicated that Burrard thermal capability would not be required until 1987/88. Since that time the September 1982 load growth projections have revised expected requirements downwards again with implied increases in available surplus over the near-term during which the Revelstoke project is expected to come on stream, even though its scheduled in-service dates have now been delayed. Until the revised system plans and associated load/resource or supply/demand balance has been prepared the magnitudes and time profile of surplus capability margins as perceived by B.C. Hydro remain indeterminate. The Authority has indicated that it expects to be in a fairly generous surplus capability condition over the next several years and that significant deferrals of later projects from the prior system plan are being made.

(d) REALIZATION OF THE AUTHORITY'S SEPTEMBER 1982 LOAD FORECAST IS SIGNIFICANTLY DEPENDANT ON GROWTH IN BULK LOADS. Treating expected supplies to West Kootenay Power and Light as most analogous to Bulk loads for analytical purposes and grouping Other sales with the General category, the load projections at the sales level show the following breakdown at five year intervals from 1981/82 to 1992/93:

(m GW.h)	Residential	General & Other	Bulk & WKP & L	Total
1981/82 actual	8,640	10,315	9,353	28,308
1986/87 projected	10,071	11,903	13,645	35,619
1991/92 projected	11,444	13,982	18,495	43,921
Changes				
1981/82 to 1986/87	1,431	1,588	4,242	7,311
1986/87 to 1991/92	1,373	2,079	4,850	8,302
1981/82 to 1991/92	2,804	3,667	9,142	15,613
Percent of Total Change				
1981/82 to 1986/87 (excluding WKP & L)	19.6	21.7	58.7 (48.1)	100.0
1986/87 to 1991/92 (excluding WKP & L)	16.5	25.0	58.5 (46.6)	100.0
1981/82 to 1991/92 (exlcuding WKP & L)	18.0	23.5	58.5 (47.3)	100.0

As the table shows, considerable growth in major or bulk loads is provided for in these projections. Excluding West Kootenay Power and Light from the bulk category still leaves 46-48% of the expected sales increase in this source of demand. This is a significant shift from historical experience of the prior ten years or so when something closer to 30% of sales load increases were accounted for by the bulk category. It is clear that delay or non-occurrence of anticipated major load increases in the bulk category could significantly increase the potential surplus supply capability of the B.C. Hydro system in some future years. These forecast sales are the major blocks justifying future projects, some of which are not fully committed. The Authority's assumptions respecting the pulp and paper, coal mining, and petrochemical industries appear to be the major factors involved.

TESTIMONY WAS SUBMITTED BY A PANEL OF INDUSTRIAL EXECUTIVES, COMPOSED OF C.C. KNUDSEN, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, MacMILLAN BLOEDEL LIMITED, BRIAN THORPE, GENERAL MANAGER, INDUSTRIAL CHEMICALS DIVISION, CANADIAN OCCIDENTAL PETROLEUM LTD; AND JOHN HARVEY PARLIAMENT, PRESIDENT, NEWMONT MINES LIMITED. THESE COMMENTS CONCERNING THE CURRENT CONDITION AND NEAR TO INTERMEDIATE TERM OUTLOOK FOR MAJOR INDUSTRIES IN THE PROVINCE, SUGGESTED A NEED FOR CAUTION IN ANTICIPATING SIGNIFICANT CAPITAL INVESTMENT IN NEW FACILITIES BY SUCH CUSTOMERS. The currently depressed output, sales and price conditions were indicated to have wreaked some considerable havoc with the financial condition of significant numbers of industry participants. The suggested likelihood was that even when economic conditions improve a period of time will be required to reestablish viable balance sheet positions before significant financing of new investment will be possible. B.C. Hydro's load growth projections do not provide any explicit indication that this potential constraint on expansion of bulk demand was factored into the forecasting process.

The Commission believes that the load forecast documents should include a description of the economic conditions that underly the load projections. They should also include an indication of how the load projections have been made responsive to the economic factors, particularly with respect to the bulk loads. The connection between economic and load forecast projections should therefore be reinforced and made explicit. It would also be helpful if future forecasts reported the extent to which forecast bulk loads are firm. The September 1982 forecast submitted as Exhibit 334, appears to be a reasonable first step in providing this information.

(e) B.C. Hydro confirmed that the forecast methods used up to 1981 do not take into account the interrelated and corresponding effects of changes in economic conditions or changes in end use brought on by electricity price changes.

The need for economic modelling has been less important in the past as changes in economic conditions provided less dramatic changes than have been indicated in the last two years. However most utilities are using and developing source data and modelling techniques to incorporate such factors more suitably. The consultants hired by B.C. Hydro to review its load forecasting methods identified these deficiencies (Exhibit 63) and the September 1982 forecast does much to correct them. THE COMMISSION CONSIDERS THAT B.C. HYDRO MUST MAKE ITS BEST EFFORTS TO INCORPORATE AND IDENTIFY EXPLICITLY THE RESULT OF THE EFFECT OF PRICE ON ELECTRICITY USE IN ITS NEXT PUBLISHED LOAD FORECAST.

(f) The timing and magnitude of energy conservation efforts by customers was not readily identifiable in the load forecast documents. The indication in relation to the September 1981 forecast is that a total effect of some 4,000 gigawatt hours annually by 1982 is the allowance for conservation effects for the residential and general sale categories. THE COMMISSION BELIEVES B.C. HYDRO SHOULD MONITOR CONSERVATION-INDUCED EFFECTS ON LOAD GROWTH AND SHOULD ENSURE THAT THE EXTENT TO WHICH EXPECTED CONSERVATION BENEFITS ARE INCORPORATED IN LOAD FORECASTS IS READILY IDENTIFIABLE IN TERMS OF BOTH TIMING AND AMOUNT.

(g) Discussion of the preparation and approval process for the load forecasts inferred that the forecast is not reviewed in the light of corresponding capital expenditures and hence tariffs, but seemingly a corporate review is made of the system plan.

THE SEPTEMBER 1982 FORECAST DOES ATTEMPT TO LINK ECONOMIC OUTLOOK WITH PRICES AND ENERGY. HOWEVER, THE COMMISSION BELIEVES THAT B.C. HYDRO SHOULD INTRODUCE MEASURES TO IMPROVE THE STRATEGIC PLANNING LINKAGE BETWEEN THE LOAD FORECAST, THE CAPITAL BUDGETS, BORROWING REQUIREMENT AND TARIFFS. THE NEED FOR NEW CONSTRUCTION AND RESULTANT BORROWINGS MUST BE PROVED BY RIGOROUS TESTING AGAINST THE LOAD FORECAST.

(h) SINCE THE MAJOR FACTOR INFLUENCING FUTURE DEMAND IS THE BULK SALES CATEGORY AND AS THIS IS THE MOST DIFFICULT CATEGORY TO FORECAST, A HEAVY RESPONSIBILITY LIES ON BULK CUSTOMERS TO FORECAST THEIR ACTUAL FUTURE REQUIREMENTS ACCURATELY. THIS IS ESPECIALLY THE CASE WHEN THERE IS UNCERTAINTY ABOUT EXPORT SALES REVENUES. IN THEIR OWN SELF-INTEREST, BULK CUSTOMERS SHOULD FORECAST AS ACCURATELY AS POSSIBLE TO MINIMIZE FUTURE RATE INCREASES CAUSED BY NEW, EXPENSIVE, IDLE GENERATION.

THE COMMISSION THEREFORE EXPECTS TO BE INFORMED OF A BETTER LIAISON BETWEEN THE BULK CUSTOMERS AND B.C. HYDRO FOR THE PURPOSE OF PRODUCING THE LOAD FORECAST. IN THE ALTERNATIVE, SOME FORM OF PRECONTRACTING MAY BE REQUIRED TO PROTECT THE LENDERS AS WELL AS THE OTHER CUSTOMERS.

(i) Implicit in the selection of a load forecast is the consequence of underestimating demand. The risk of underestimating is not serious provided that adequate contingency measures are in place at a reasonable cost. UNDER CURRENT ARRANGEMENTS, HOWEVER, THE FORECASTING AND GENERATION PLANNING OPERATIONS ARE KEPT SEPARATE, AND THE PLANNING GROUP CANNOT DIRECTLY COORDINATE A PLANNING PROCESS TO ACCOMMODATE OR MINIMIZE RISKS FROM UNCERTAIN FUTURE DEMAND.

2. Generation Planning

It would appear that the general generation planning criteria used by B.C. Hydro have been in place for some time. In the hearings it was emphasized that B.C. Hydro has a responsibility to provide very reliable service, and it is to be noted that no instances of significant power shortages were set out.

The scheduling of major new plant is based on the probable energy demand forecast and identified new generation sources, which are ranked on the basis of cost. This ranking includes system considerations that relate to plant size (output) and system transmission capabilities.

Scheduling is based on energy requirements and not peak demand. Excess peak capacity on the system results from the fact that maximum runoff is not coincident with maximum peak load, and that Hydro plant installations are selected on the basis of marginal (secondary) energy costs and the availability of the Burrard gas-fired steam plant. For example, the 10-year plan (December 1981) showed a capacity surplus of 2434 MW (38.6% of peak demand) in 1982/83 changing to 2825 MW (28.5% of peak demand) in 1991/92.

In fact, comparison of firm energy capability with the probable energy demand, as shown in the system plan prepared in December 1981, showed that deficits would occur from 1987 to 1989, assuming Burrard at its maximum output, on valley gas. By comparison, in an average water year only partial generation from Burrard would be required in these years.

While it appeared, because of the supply deficiencies, that B.C. Hydro was not following its planning criteria, Mr. McFarlane, Manager of the Engineering Division, advised that this was not the case. He explained that the Authority would not be able to build the new generation capability in time to meet the forecast deficiency that would arise under critical water conditions.

It was noted that, in the past, while long term load (energy) forecasts were significantly higher than actual demand, major over-installation had not occurred because there had been delays or deferrals in project construction. For example, Revelstoke was deferred by one year in the 1977 plan and again in the 1978 plan.

The Commission reviewed the possibility that B.C. Hydro builds surplus generating capacity for the export market. The implication given in the proceeding was that the optimization procedure for the sizing of installations provides for extensive secondary energy. Mr. McFarlane agreed that the over-installation had been economic only because of the availability of an export market. The B.C. Hydro guideline memorandum "Evaluation of Power Benefits for Project Optimization Studies", Exhibit 213, shows that when project design is optimized, considerable weight is given to the export market and potential earnings therefrom, which influences the amount and timing of capacity additions and in the efficiency aspect in design considerations.

A further benefit of such over-installation is to increase system reliability and flexibility. However, any such benefits or requirements have not been quantified. In fact, as shown by the total generation duration curve (Ex. 230), the 1989 system would have a secondary energy capability of 18,000 GWh or 16% of total energy generation, 3% of the time (which would occur in the wettest water year on record).

However, export sales are only made on a short term basis. The magnitude of sales is limited because:

- the Bonneville Power Authority, as a competitor of B.C. Hydro, is primarily supplied by hydro with a similar hydrologic characteristic to the B.C. Hydro system with surpluses that occur at the same time

- sales into the California area are constrained by transmission facilities and in any case BPA has first access to the California market.

It would appear that a basic cause of over-installation and surplus capacity at hydro projects is that optimization is based on replacement thermal costs. In 1981 the nominal thermal replacement cost used in project optimization was 17.5 mills/kWh.

CONSIDERING THE UNCERTAINTY IN SPOT EXPORT SALES AND A PROHIBITION AGAINST COMMITTING TO FIRM EXPORT SALES, THE COMMISSION IS SERIOUSLY CONCERNED WITH THE PROSPECT OF NON-SALEABLE SURPLUSES. IT IS IMPERATIVE THAT THERE BE CONTINUING CONCERN DURING THE PLANNING STAGES WITH THE COSTS THAT WILL BE BORNE BY DOMESTIC CONSUMERS WHENEVER EXCESS CAPACITY IS ADDED WITHOUT A CERTAIN MARKET FOR THE SURPLUS ENERGY. IN THE SHORT-TERM AT LEAST SERIOUS CONSIDERATION SHOULD BE GIVEN TO FIRM EXPORT SALES WITH ADEQUATE CURTAILMENT NOTICE FOR U.S. CUSTOMERS. THIS WOULD ASSIST IN A U.S. DEFERRAL PROGRAM WHILE PROTECTING THE B.C. DOMESTIC CUSTOMER.

B.C. Hydro simulates the total hydro generation capability of its system on a month by month basis using historical runoff (or derived) records for the period 1940-75. The operation of individual reservoirs is governed by rules that result in a maximized total firm generation in the system (hydro plus thermal).

Based on these historical runoff sequences, the critical period is 44 months from 1942 to 1946. The 44-month period is that required to deplete all the major reservoirs in the system completely.

Because of the major Columbia and Peace River reservoirs, the difference in generation between average and critical conditions is not great. For example, after Revelstoke is completed the comparative values are:

Conditions	Hydro Energy GWh p.a.
Average	46,510
Critical	42,530
Difference	3,980 or 9%

By comparison the energy demand is now forecast to grow by 2280 GWh between 1991 and 1992.

IT IS THE COMMISSION'S VIEW THAT B.C. HYDRO HAS NOT JUSTIFIED THE USE OF THIS EXTENDED CRITICAL DRY PERIOD FOR PLANNING PURPOSES. The Commission notes that its use has not been reviewed recently. Statistical methods in hydrology allow long-term runoff sequences to be developed. These are based on statistical parameters from historical records. While such an analysis would be complex, because it would have to be carried out for all the B.C. rivers with hydro generation, it is feasible. Comparison of the critical 1942-46 period with conditions for a much longer term (100 or 1000 years) would more clearly indicate the probability of occurrences for that critical runoff condition.

According to the testimony no alternative periods have been considered for planning purposes.

THE COMMISSION THEREFORE INSTRUCTS B.C. HYDRO TO RE-EXAMINE THE USE OF ITS CRITICAL 44 MONTH PERIOD (1942-46) FOR PLANNING PURPOSES, AND TO EXAMINE THE FEASIBILITY AND RELIABILITY OF STATISTICAL METHODS TO EXTRAPOLATE A LONG-TERM RUNOFF SEQUENCE. THE RESULTS OF THIS REVIEW ARE TO BE FILED WITH THE COMMISSION AS SOON AS POSSIBLE.

There are planning options available for consideration by B.C. Hydro that do not seem to enter systematically into the generation planning. Whether they should or not, or the extent to which they warrant consideration in order to produce the best possible plans, is a matter which B.C. Hydro did not adequately address in presenting its case. The Authority's basic position appears to be that it has adopted the appropriate criteria for its system and that their validity is largely established by the Corporation's operating history. The degree of commitment to this position was in some measure suggested by the initial reluctance that Hydro witnesses displayed in acknowledging that planning in these terms to meet domestic demand must result in secondary or surplus energy capability in the majority of operating years.

Perceptions of others respecting these criteria appear to involve concerns about the degree of large hydro focus in development planning, concerns that the criteria may be overly conservative and concerns that other available supply options are not given adequate weight in the planning process. A need for adequate recognition by B.C. Hydro of supply capability under non-critical water conditions and possible development of appropriate secondary energy marketing arrangements relative to such circumstances was emphasized by some participants. Of particular concern was the need for a more realistic recognition of export surplus sales within the planning criteria.

THE COMMISSION IS NOT IN DISAGREEMENT WITH THE PLANNING APPROACH OF B.C. HYDRO, BUT BELIEVES NONETHELESS THAT THE AUTHORITY SHOULD EXPAND THE RATIONALE OF ITS PLANNING CRITERIA AND THE ASSUMPTIONS AND IMPLICATIONS INHERENT IN THEM. THE AUTHORITY'S APPROACH APPEARS SO HEAVILY FOCUSED ON LARGE PROJECTS AND A "LARGE HYDRO FIRST" FORM OF SELF-SUFFICIENCY EMPHASIS, THAT IT IS DIFFICULT TO OBTAIN ADEQUATE ASSURANCE THAT OTHER SUPPLY OPTIONS RECEIVE ADEQUATE CONSIDERATION. WHETHER THIS IMPRESSION IS WARRANTED OR NOT IS DIFFICULT TO ASSESS, BUT THE AUTHORITY SEEMS TO WORK FROM A PRESUMPTION THAT THE MAJOR HYDRO PROJECTS WILL BE NEEDED "SOONER OR LATER" AND HENCE THAT OTHER OPTIONS MAY BE RELEGATED TO A POSITION OF SECONDARY IMPORTANCE. THE COMMISSION DOES NOT SEE HOW THIS PRESUMPTION IS WARRANTED.

It may be that these major projects provide indicated lower generation costs, do not affect reserve requirements (due to increased system size) and proportionally require less administration cost. However, recent developments have increased lead times for most large hydro projects. Typically in the period 1955-60 a 300 MW hydro project could be commissioned within 4 years of initial approval. Currently lead times for detailed investigations, approval and construction for a 2000 MW project are in the order of 10-15 years. By comparison a smaller project (typically less than 300 MW) would have an overall lead time of 6-7 years. This has obvious implications in generation planning. The predominance of large projects under the least cost generation criteria removes the flexibility required to adjust to significant changes in electricity demand.

The Commission will expect B.C. Hydro to address the prospect of alternative energy sources and contingency plans. The subject will certainly be addressed in a future proceeding before this Commission. The Commission has particular interest in:

- potential purchases from TransAlta via the projected 500 kV intertie which has an 800 MW capacity.

- future purchases from Alcan, particularly with reference to additional capacity that may be built by Alcan.

- future power or benefits that may result from the expiration of the Columbia River Treaty.

- co-generation potential

These potential energy supplies should have a direct bearing on B.C. Hydro's strategy for implementing new generation facilities.

Typically, despite varying degrees of interconnection capacity, Canadian utilities carry out long-term generation planning on the basis of stand alone systems. Any generation purchases are either made on the basis of interruptible or short-term contracts. Interconnection usually is tied to system electrical stability and reliability.

It would appear that, in view of load growth uncertainties, varying regional economic effects, and different regional predominant generation types (hydro, thermal, etc.), more flexibility and cooperation should be considered to allow joint planning to reduce or defer capital costs by reducing individual reserve margins.

The Alberta-B.C. interconnection is a case in point, since B.C. is primarily supplied by hydro and Alberta by coal-fired thermal. It seems logical that project justification should include costs and benefits from joint generation planning.

IX. EXPORT SALES

It is clear that B.C. Hydro will have surplus generating capability in at least the near term. The manner in which this is to be dealt with has yet to be defined in detail, although the Authority has indefinitely deferred the Hat Creek project, delayed scheduling of the Site C facility, and deferred the Revelstoke in-service targets. The possibility of actually shutting down construction on the Revelstoke project for some period to delay on-power dates even further has been ruled out as costly and impractical.

The most controversial question attracting consideration on repeated occasions during the public hearing was undoubtedly the treatment to be accorded export surplus revenues in ascertaining the Authority's revenue requirements. The B.C. Hydro position was that no recognition should be given to the possibility of realizing such revenues. The intervenor position was that some recognition of such revenues is essential. As has been indicated earlier in these Reasons, in its March 25, 1982 Order No. G-26-82 the Commission ordered the establishment of a Rate Stabilization Account from fiscal 1982 export surplus revenues as an interim measure.

The fundamentals of the B.C. Hydro position on export surplus revenues may be summarized as follows on the basis of Mr. Sheehan's pre-filed testimony:

(a) It is B.C. Hydro and provincial government policy to build generating capacity to meet domestic demand only;

(b) System planning against this policy is properly predicated on meeting demand in critical water conditions (presently defined by the 44 month period between September 1942 and April 1946);

(c) It is consistent with that basic policy and planning criterion to set domestic electricity rates at levels sufficient to produce revenues that will cover all costs;

(d) Export surplus revenues are not forecast or considered in setting rates and the Authority's Board of Directors, including Ministers of the Crown, have annually approved setting rates on this basis; and

(e) Both current and future domestic customers benefit from any actual realization of export surplus revenues through their contribution to reduced borrowing requirements and related interest and interest coverage costs.

Further elaboration was obtained during the course of the hearing. The position of B.C. Hydro therefore appears to be as follows:

(a) B.C. Hydro does not believe that either prices or volumes of possible future export sales can be predicted with sufficient accuracy to allow them to be taken into account in establishing domestic rates;

(b) National Energy Board review of B.C. Hydro's operations in connection with export licence applications confirms that the Authority does not build or operate its system for purposes of realizing export revenues;

(c) Establishing domestic rates on a basis which excludes export surplus revenues helps to ensure that electricity prices will tend to approximate long-term replacement costs as mandated by provincial energy policy;

(d) B.C. Hydro considers that Special Direction B.C. Hydro No. 1 is predicated on domestic rates and excludes consideration of export surplus revenues;

(e) Placing reliance on highly uncertain and potentially volatile export surplus revenues in setting revenue requirements would introduce an unacceptably high level of financial risk into the determination of the Authority's year-to-year financial performance which could have adverse consequences on borrowing terms and capacity;

(f) Reliance on such revenues in conjunction with an objective of maintaining the integrity of financial performance in accordance with B.C. Hydro's objectives could result in large rate changes in response to conditions bearing no fundamental relationship to the Authority's service mandate.

(g) Changes in the treatment of export surplus revenues from the prior policy could cause changes in B.C. Hydro's system planning and operating decisions which could affect reliability of supply to the domestic market by forcing the Authority to seek such revenues in order to achieve its financial objectives.

(h) Availability of and access to the export market is subject to numerous unpredictable contingencies that would make planning for export revenues extremely uncertain -- e.g. supply and demand conditions in the Pacific Northwest, access to tie lines to the Southwest.

Examination of the B.C. Hydro position in the course of the hearing resulted in the identification of the following factors:

(a) The fact that B.C. Hydro installs generation capacity to optimize hydraulic production during years of average or above average stream flows even though basic planning is against critical water conditions, results in a system with built-in capability to sell into the export market.

(b) Given the Authority's system design criteria based on domestic demand only and critical water conditions system design criteria, it is ultimately only possible to justify installation of optimum hydraulic production capacity by contemplating sales into the export market. While some of this may relate to dealing with potential diversity in river system stream flows in some years, the likelihood is that exportable surplus capability will result.

(c) B.C. Hydro is quite capable of assessing and forecasting the existence of export sales opportunities for some period into the future and deciding on their cost/benefit attributes because it has in fact accelerated construction completion at added cost on its Seven Mile project with the intention of realizing export sales.

(d) The Authority's submission that current customers benefit from reduced financing costs under the B.C. Hydro policy was indicated to be incorrect at least with respect to interest. This is because any such currently avoidable interest costs would have been capitalized into plant accounts under the Corporation's accounting policies and thus not charged currently to revenue requirements.

(e) It was also submitted that B.C. Hydro's policies involve pooling of borrowings and associated costs and hence that non-electric customers would benefit from the reduction of borrowing allowed by export surplus revenue policy while electric customers only were held responsible for costs. In addition, the Authority's policy of pre-funding capital expenditures makes it very difficult to see when and in what manner benefits of the export surplus revenue policy flow to customers.

(f) It was shown that other major Canadian public sector electric utilities provide for expected export sales in circumstances which are characterized by as much uncertainty and difficulty in forecasting prices, volumes, and timing as the B.C. Hydro system.

(g) Both Canadian and United States studies of export markets which were considered in the course of the hearings indicated market potential can be or has been seen to exist in the United States at different times and based on various assumptions and conditions.

(h) That B.C. Hydro can shape its secondary energy capability to adapt to generally recognizable annual cycles in export market availability was acknowledged. But this potential was subject to constraints due to the impossibility of knowing whether critical water conditions exist until well into actual experience with stream flows. In addition, the Bonneville Power Authority's intermediary position in the link to Southwest markets clearly complicates the access process and conditions on the BPA system can preclude market availability for B.C. Hydro.

(i) B.C. Hydro does use export market prices as one form of opportunity cost indication of the value of electric energy for rate design purposes. However, these analyses are predicated on historical and not forecast prices.

Evidence was also led jointly on behalf of the Council of Forest Industries, The Mining Association of British Columbia and the Electro-Chemical Intervenors which provided a forecast of export surplus revenues of $135 million in fiscal 1983 and $146 million in fiscal 1984. The direct evidence in support of these forecasts took the form of a study prepared by G. Carter and T. Zepp of Zinder Companies Inc. The study also recommended a mechanism through which these forecast revenues could be combined with the Rate Stabilization Account established in Order G-26-82 in a manner that would result in recognizing, for revenue requirement purposes, $184 million in fiscal 1983 and $138 million in fiscal 1984.

The Carter/Zepp study involved an overview analysis of various characteristics of potential markets and customers for B.C. Hydro secondary energy in the Pacific Northwest and Southwest regions of the United States. It also reviewed factors bearing on the relative competitive position of the Authority in selling to those markets. The study then proceeded to extrapolate the pattern of past experience into the future, generating a forecast of export surplus revenues for fiscal 1983 and 1984. The projection process incorporated arithmetical, statistical, and judgmental procedures to produce what were considered to be conservative estimates of monthly prices, volumes, and sales revenues expected to be realized from estimated available secondary energy capability over the period September 1982 to March 1984. Actual export surplus revenues for the period April to August 1982 were added to these projections to produce the full two year export surplus revenue forecast. In general, the forecasts involve sales volumes which most closely approximate levels realized by B.C. Hydro in the best years of its recent experience, and prices which were perhaps at somewhat less than the Authority's best price realizations in recent periods. The forecasts tend to show a continuation of market conditions approximating but not quite duplicating those of the 1982 fiscal year when B.C. Hydro realized its highest ever export surplus revenue results.

THE COMMISSION CONSIDERS THAT THE EXTENSIVE EVIDENCE IN THIS PROCEEDING ON THE MATTER OF THE TREATMENT TO BE ACCORDED EXPORT SURPLUS REVENUES MAY REASONABLY BE REDUCED TO A CHOICE AMONG THREE ALTERNATIVES:

(A) ACCEPT THE B.C. HYDRO RECOMMENDATION THAT EXPORT SURPLUS REVENUES SHOULD BE IGNORED IN SETTING REVENUE REQUIREMENTS:

(B) CONTINUE SOME FORM OF RATE STABILIZATION ACCOUNT PROCEDURE: AND

(C) INCORPORATE SOME AMOUNT OF EXPLICITLY FORECAST EXPORT SURPLUS REVENUES INTO THE DETERMINATION OF THE ANNUAL REVENUE REQUIREMENT.

IN THE COMMISSION'S VIEW, EACH OF THESE ALTERNATIVES HAS SOME MERIT BUT AT THE PRESENT TIME A CONTINUATION OF THE RATE STABILIZATION ACCOUNT PROCEDURE HAS BEEN JUDGED TO BE THE APPROPRIATE COURSE OF ACTION.

While B.C. Hydro's approach is worthy of some attention, in the Commission's view the customer benefits are too indirect and delayed too long to make this an acceptable solution. There needs to be a much closer link between the absorption of the costs of secondary energy and the receipt of the credit for the revenues that secondary energy capability makes possible. Distributing those benefits over the term of an avoided debt issue as should happen under the B.C. Hydro approach, is not, in the Commission's view, a realistic solution.

The Commission is not convinced on the record in this proceeding that a reliable basis for forecasting export surplus revenues exists at this time. We fully appreciate the forecast submission made on behalf of the industrial intervenors and believe that the expectations it portrays have some plausibility. HOWEVER, WE THINK THE AUTHORITY ITSELF MUST PRODUCE A FORECAST OF EXPORT SURPLUS REVENUES. B.C. HYDRO SHOULD ACCORDINGLY COMMENCE PUTTING IN PLACE AN INFORMATION BASE AND FORECASTING METHODOLOGY WHICH WILL ENABLE IT TO STATE THE MOST PROBABLE EXPECTATION OF EXPORT SURPLUS REVENUES FOR TEST YEARS COVERED IN FUTURE PROCEEDINGS. IN THE COMMISSION'S VIEW, THE PROPER MANAGEMENT OF THE RESOURCES ENTRUSTED TO THE AUTHORITY'S RESPONSIBILITY AND NOT THE DICTATES OF THE REGULATORY PROCESS REQUIRE THAT B.C. HYDRO BE ENGAGED IN SUCH A FORECASTING EFFORT.

The determination of the Authority's revenue requirements with respect to the treatment of export surplus revenues will take place in accordance with the Rate Stabilization Account procedure established in Order G-26-82. The manner in which the account is working will be monitored by the Commission and may be varied if circumstances dictate. THE AUTHORITY IS ACCORDINGLY REQUIRED TO REPORT QUARTERLY TO THE COMMISSION ON THE PARTICULARS OF EXPORT SALES (AND RELATED COSTS) AND THE QUARTER-END STATUS OF THE ACCOUNT COMMENCING WITH THE QUARTER ENDING DECEMBER 31, 1982. THE WORKINGS OF THE ACCOUNT WILL REMAIN IN PLACE UNTIL THE COMMISSION IS SATISFIED THAT AN ACCEPTABLE ALTERNATIVE BASIS FOR DEALING WITH EXPORT SURPLUS REVENUES HAS BEEN ESTABLISHED.

X. ELECTRIC SERVICE ASSETS

Hydro generating sources comprise about 85% of the nameplate installed capacity on the B.C. Hydro system. A total of thirty plants were in-service on the integrated system at the end of fiscal 1982 involving a considerable range of nameplate capacities. As indicated by the following summary, over 85% of this capacity was installed in seven of the thirty plants.

Hydro Plants-Thousands of kW	Nameplate Generating Capacity	Percent
Gordon M. Shrum	2,416	32.3
Mica	1,736	23.2
Peace Canyon	700	9.3
Seven Mile	608	8.1
Kootenay Canal	529	7.1
Bridge River (No.'s 1 & 2)	428	5.7
Sub-Total	6,417	85.7
Other - up to 50,000 kW	322	4.3
- over 50,000 kW	749	10.0
	7,488	100.0

Measured in historical dollars -- i.e. expenditures involving an averaging of purchasing power over the many years that these plants were constructed -- the average investment per kilowatt of nameplate capacity is about $310. This compares with a level of $500 and $590 for the most recently completed Seven Mile and Peace Canyon plants and a currently projected level for the Revelstoke facility of perhaps $1,000.

At the end of fiscal 1982, the Authority had about 16,100 circuit kilometres of transmission lines in service. The backbone of the present transmission grid is the network of 500 kV lines connecting major generating sources and substations to distribution substations and load centres throughout the province. Included in the 500 kV system are two lines providing an interconnect with the Northwest Power Pool in the United States through the system of the Bonneville Power Administration. Other major components of the transmission system carry voltages of 230 kV, 138 kV and 69 kV. At present Vancouver Island is served from the mainland by two 130 kV AC and two 300 kV DC underwater transmission circuits. Under construction and scheduled to come partially into service in fiscal 1984 are the 500 kV transmission interconnection and related facilities to provide the additional Cheekye to Dunsmuir line to Vancouver Island. Other prospective additions to the transmission system include 500 kV lines to connect the Revelstoke generating station and development of a 500 kV intertie with the province of Alberta.

A summary of the Authority's asset position and projections related thereto on the basis of data in the May 28, 1982 Amended Application is as follows:

Electric Service

Summary of Fixed Assets (Original Cost)

($000)	Actual 1981	Actual 1982	Projected 1983	Projected 1984
Assets in service	5,687,972	6,092,749	6,452,882	7,346,742
Unfinished construction	1,050,573	1,571,225	2,274,104	2,485,105
Other items	88,928	128,117	199,135	282,444
Columbia River Treaty	479,108	479,108	479,108	479,108
Total at Cost	7,306,581	8,271,199	9,405,229	10,593,399
Percents				
Assets in service	77.8	73.7	68.6	69.4
Unfinished construction	14.4	19.0	24.2	23.4
Other items	1.2	1.5	2.1	2.7
Columbia River Treaty	6.6	5.8	5.1	4.5
	100.0	100.0	100.0	100.0

Prospective changes in B.C. Hydro's fixed asset investment over the period March 31, 1982 to March 31, 1984 as projected in the Application may be summarized as follows:

Electric Service

Changes in Fixed Asset Investment

($000)	1982 to 1983 Assets in Service	1982 to 1983 Other Items	1983 to 1984 Assets in Service	1983 to 1984 Other Items
Specific fixed asset system expenditures	642,954	59,102	568,937	67,925
Recurring fixed asset expenditures	94,465		104,427	
Overheads charged to plant accounts	123,070	11,916	140,052	15,434
Interest during construction capitalized	227,642		304,328	
	1,088,131	71,018	1,117,744	83,359
Less: asset transfers and retirements	25,119	-	12,883	50
	1,063,012	71,018	1,104,861	83,309
Unfinished construction at beginning of year	1,571,225	-	2,274,104	-
Accumulated costs	2,634,237	71,018	3,378,965	83,309
Unfinished construction at end of year	2,274,104	-	2,485,105	-
Additions to in-service plant for year	360,133	71,018	893,860	83,309
Opening in-service	6,092,749	128,117	6,452,882	199,135
Closing in-service	6,452,882	199,135	7,346,742	282,444

Total investment comparing year end 1981 with year end 1984, is projected to increase by approximately 45% with about a third of this investment occurring to the end of fiscal 1982.

1. Assets In-Service

By major types of plant the electric assets in service over the period 1981 to 1984 are forecast to be as follows:

Electric Assets In-Service

	As At March 31			
	Actual		Projected	
($000)	1981	1982	1983	1984
Generation - thermal	167,071	170,026	170,278	170,787
- diesel	77,562	86,370	91,554	97,092
- hydro	2,323,830	2,326,826	2,336,654	2,379,996
Sub-Total	2,568,463	2,583,222	2,598,486	2,647,875
Transmission	1,118,109	1,306,120	1,419,187	1,856,244
Substations	779,155	860,784	952,574	1,181,871
Distribution	929,631	1,025,079	1,137,301	1,262,391
General Plant	166,692	178,399	194,931	225,386
Sub-Total Direct	5,562,050	5,953,604	6,302,479	7,173,767
Joint-Use allocation	125,922	139,145	150,403	172,975
Total In-Service	5,687,972	6,092,749	6,452,882	7,346,742
Percents				
Generation - thermal	2.9	2.8	2.6	2.3
- diesel	1.4	1.4	1.4	1.3
- hydro	40.9	38.2	36.3	32.4
Sub-Total	45.2	42.4	40.3	36.0
Transmission	19.7	21.4	22.0	25.3
Substations	13.7	14.2	14.8	16.1
Distribution	16.3	16.8	17.6	17.2
General Plant	2.9	2.9	3.0	3.0
Sub-Total Direct	97.8	97.7	97.7	97.6
Joint-Use allocation	2.2	2.3	2.3	2.4
Total In-Service	100.0	100.0	100.0	100.0

The multi-service nature of B.C. Hydro's operations results in the joint use of assets by the services. Examples are the head office facility, computer equipment and service vehicles. To determine the investment on fixed assets for each of the operating segments, allocations of joint-use plant are made on the basis of measureable factors such as usage. After a limited examination during the course of the hearings, it appeared to the Commission that the methodology is appropriate, but this is an area that will have to be examined in greater detail at the next proceeding before the Commission.

The Authority's principal investment in thermal generating capacity is found in the Burrard Thermal Plant which comprises about 70% of rated thermal capacity but only approximately 10% of overall system capacity. Its operation is subject to environmental constraints and gas supply arrangements. Due to these constraints the facility's use today is restricted to standby. Its role in system planning is to act as a potential bridging source of power between additions of major hydraulic generation and as a generating source using valley gas under critical water conditions in order to facilitate management of the Williston reservoir. WITH AN INVESTMENT OF THE MAGNITUDE OF BURRARD THERMAL THE COMMISSION BELIEVES A CLEAR AND DETAILED STATEMENT OF THE PRESENT AND EXPECTED FUNCTION OF BURRARD AND OTHER THERMAL GENERATING CAPACITY SHOULD BE PRESENTED BY B.C. HYDRO IN THE NEXT RATE APPLICATION. THE COMMISSION'S PARTICULAR INTEREST IS THE ACTION TO BE PROPOSED BY B.C. HYDRO TO ALLEVIATE THE ENVIRONMENTAL CONSTRAINTS ON THE OPERATION OF THE FACILITY UNDER DIFFERING CONDITIONS OF USE.

2. Assets Under Construction

The Authority's Unfinished Construction accounts as detailed in the May 1982 Amended Application show the following particulars by type of plant for the Electric Service.

Electric Service Unfinished Construction

	As At March 31			
	Actual		Projected	
($000)	1981	1982	1983	1984
Generation - thermal	54,471	71,176	95,806	133,167
- diesel	250	1,449	3,103	342
- hydro	632,592	1,017,202	1,450,397	1,809,256
Sub-Total	687,313	1,089,827	1,549,306	1,942,765
Transmission	241,056	264,203	428,700	309,682
Substations	106,105	170,475	214,533	132,094
Distribution	35	10	-	-
General Plant	15,540	27,362	32,190	32,544
Sub-Total Direct	1,050,049	1,551,877	2,224,729	2,417,085
Joint-Use allocation	524	19,348	49,375	68,020
Total Construction	1,050,573	1,571,225	2,274,104	2,485,105
Percent of in-service assets	18.5	25.8	35.2	33.8

The above data are based on the December 1981 System Plan. Due to the September 1982 revision of the load forecast it would be reasonable to assume that the System Plan currently under development will result in major revisions to this expenditure plan.

Nonetheless, the figures indicate that the Authority is in the midst of a major construction phase. For the period 1982 to 1984, B.C. Hydro would require additional financing to the value of one third of the assets in service over the period. The major construction activity relates to the Revelstoke dam and generating station and construction of the Cheekye-Dunsmuir line to Vancouver Island.

Interestingly the Site C project is classified as an Unfinished Construction item on the basis that it is an identified component of the System Plan. While it may be that this project has ceased to be a Survey and Investigation item, another category of account classification should be found which properly defines the status of such projects. The appropriateness of account category and accounting policy adopted for such projects is to be reviewed by the Authority and reported on in the next rate proceeding. THE INTEREST OF THE COMMISSION LIES WITH THE ADOPTION OF MEANS TO AVOID SUDDEN EXCESSIVE INCREASES IN EXPENSES AND HENCE RATES, ASSOCIATED WITH BRINGING MAJOR UNDERUTILIZED FACILITIES INTO SERVICE.

A FURTHER OBSERVATION OF THE COMMISSION IS THAT B.C. HYDRO APPEARS TO OVERESTIMATE ANNUAL EXPENDITURES ON UNFINISHED CONSTRUCTION FAIRLY CONSISTENTLY. A prospective under-budget result for fiscal 1982 of some $94 million was indicated during cross-examination of B.C. Hydro witnesses with similar under-budget outcomes reported in prior years. With the present magnitude of unfinished construction, more significant variances are possible in the future. AS ERRORS IN FORECASTING CONSTRUCTION EXPENDITURES AFFECT THE DETERMINATION OF REVENUE REQUIREMENTS THE COMMISSION EXPECTS B.C. HYDRO TO MONITOR ITS BUDGETING SO THAT MORE ACCURATE RESULTS ARE OBTAINED.

3. Other Fixed Asset Accounts

The final group of accounts included in the Authority's presentation of its fixed asset position is composed of the following items:

Electric Service Other Fixed Assets

	As at March 31			
	Actual		Projected	
	1981	1982	1983	1984
Surveys and Investigations	40,375	77,319	148,337	231,646
Acquisition adjustments	35,077	35,068	35,068	35,068
Inactive, unclassified and property held for future use	13,476	15,730	15,730	15,730
Columbia River Treaty	479,108	479,108	479,108	479,108
	568,036	607,225	678,243	761,552

The "Inactive, unclassified and property held for future use" category relates to miscellaneous items of plant not in active service. It may also include costs not yet allocated to detailed plant accounts. The Commission believes B.C. Hydro should consider the application of depreciation to part of these costs. This would give recognition to the decline in value that must occur even though the assets are not in active use.

The "Acquisition Adjustments" account relates to the cost of acquisition of the electric systems from third parties. The Commission accepts the present treatment for regulatory purposes, noting that the amounts are subject to amortization accounting.

The "Surveys and Investigations" category was examined in some detail during the proceedings. It includes the deferred costs of studies conducted on a wide variety of subjects relating to the development and operation of the electric system. Some items in the account go back as far as the mid-1960's although on a net of amortization basis these amounts may be presumed to be fully amortized.

The Commission's concern during the course of the hearing as to the proper accounting treatment to be accorded to this account centred on the extent to which the items are capitalized. Substantial sums of money are involved relating to projects that may or may not be developed in the future. B.C. Hydro's approach is to defer the costs initially and then to amortize the pool of costs evenly over an arbitrary 10 year period. In the event of projects obtaining Board authorization to proceed, the full amount of survey and investigation costs incurred to date is transferred to unfinished construction through an adjustment to accumulated amortization.

THE COMMISSION RECOGNIZES THAT THERE IS A DEGREE OF UNCERTAINTY WITH RESPECT TO SURVEY AND INVESTIGATION WORK AND THAT B.C. HYDRO HAS ADOPTED AN ACCOUNTING POLICY WHICH MAKES AN ALLOWANCE FOR THE UNCERTAIN NATURE OF THESE EXPENDITURES. HOWEVER, THE COMMISSION FINDS THAT B.C. HYDRO SHOULD DEVELOP AN ACCOUNTING POLICY THAT DEALS MORE RATIONALLY WITH THIS ACCOUNT. SUCH AN ACCOUNTING POLICY SHOULD INCLUDE:

(A) A GREATER DEGREE OF CURRENT COST ACCOUNTABILITY.

(B) A CUT-OFF LIMIT ON PROJECT SIZE BELOW WHICH NO DEFERRAL OF COSTS WOULD OCCUR.

(C) STRINGENT MEASURES TO ENSURE THAT THOSE ITEMS CAPITALIZED HAVE A TANGIBLE FUTURE VALUE.

(D) AN ANNUAL REVIEW THAT RELATES TO DIMINUTION IN VALUE.

THE COMMISSION THEREFORE INSTRUCTS B.C. HYDRO TO UNDERTAKE A DETAILED REVIEW OF "SURVEYS AND INVESTIGATIONS" AND TO PROPOSE AN ACCOUNTING POLICY PRIOR TO THE NEXT RATE PROCEEDING THAT MEETS THE COMMISSION'S CONCERNS. IN PARTICULAR, THE REPORT SHOULD ADDRESS THE CIRCUMSTANCES IN WHICH TOTAL WRITE-OFF MAY BE APPROPRIATE.

The Commission's concern, which is shared by intervenors, about the planned level of future expenditures centres on the following:

(a) adequate control of expenditures.

(b) whether or not expenditures are essential in the year they are incurred.

(c) whether or not priorities can be assigned to those projects that have a greater likelihood of success.

While it is recognized that B.C. Hydro must work with very long lead times on major projects, there are also notable risks associated with these lead times. Information and analyses prepared too far in advance of a project being found to be essential may have to be duplicated if the project is deferred for some period. Should a project be abandoned, many millions of dollars might have to be written off.

Intervenor examinations of B.C. Hydro witnesses sought assurances that Survey and Investigation activities did not merely serve to keep project management, engineering and support staff employed within the Authority, particularly with the incidence of deferrals and rescheduling of construction. Questions were also raised whether B.C. Hydro monitored and redefined required manpower levels in response to changes in development criteria. The Commission hopes that B.C. Hydro has taken and will continue to take stringent measures to meet the concerns of the Intervenors and the Commission.

THE COMMISSION WISHES TO BE IN A POSITION TO MONITOR ON AN ANNUAL BASIS, THE PRUDENCY AND TIMING OF PROSPECTIVE EXPENDITURES ON SURVEYS AND INVESTIGATIONS. IN THAT REGARD THE AUTHORITY IS REQUIRED TO FILE PROJECTED ANNUAL EXPENDITURES ON SURVEYS AND INVESTIGATIONS GIVING AN EXPLANATION CONCERNING THE PURPOSE OF THE EXPENDITURES. COMMENCING WITH 1983/84 THIS MATERIAL IS TO BE FILED WITH THE COMMISSION PRIOR TO THE COMMENCEMENT OF EACH FISCAL YEAR IN A TIMELY MANNER AFTER THE AUTHORITY'S BUDGET IS APPROVED.

During the proceedings B.C. Hydro announced that the Hat Creek project was to be "deferred indefinitely". The Authority initially indicated it would seek Commission review and approval of the accounting to be applied to the Hat Creek costs in the light of the indefinite deferral decision. In the end, however, B.C. Hydro decided it would simply write off all costs which it determined had no tangible alternative disposition value, presenting the item as an extraordinary loss in 1982/83. IN THE COMMISSION'S VIEW, THIS DECISION RESPECTING THE DISPOSITION OF THESE COSTS IS INAPPROPRIATE IN THE CIRCUMSTANCES. Had these outlays actually represented construction expenditures on a development that was abandoned, the Authority's proposed write-off might be appropriate for at least a significant part of such costs. On the information available, however, the Hat Creek Project more closely qualifies under "Surveys and Investigations" rather than as "Unfinished Construction" and should therefore either be retained in the accounts or written-off over 10 years. WHILE THE COMMISSION WILL NOT INTERFERE WITH THE ACCOUNTING TREATMENT, IT MUST BE POINTED OUT THAT BY WRITING OFF ALL THE HAT CREEK COSTS IN THE CURRENT YEAR, B.C. HYDRO HAS ABANDONED ANY HOPE OF RECOVERING THOSE COSTS THROUGH REVENUE AND HAS ALSO DELAYED ITS PROGRESS TO A DEBT/EQUITY RATIO OF 80:20.

XI. ELECTRIC ASSET ACCOUNTING POLICIES

1. Overhead

B.C. Hydro's accounting procedures result in charges to Unfinished Construction accounts of direct expenditures on items of plant and allocations of a share of overhead costs. In addition interest costs are charged that are deemed to relate to assets not yet in service. On completion of construction the accumulated costs, being direct outlays, capitalized overhead and capitalized interest during construction, are transferred to in-service plant accounts and depreciation accounting commences in the year following the assets going into service.

While the asset costing procedures employed by B.C. Hydro can be said to be consistent with general utility accounting practice, the Commission is concerned that the Authority's practices may result in excessive deferrals of some categories of overhead cost. Exhibit 204 showed that about 35% ($4,523,000 for fiscal 1981/82) of annual Corporate Division overhead costs are capitalized, to be recovered in future rates. Also capitalized are about 30% ($24,526,000 for fiscal 1981/82) of Administration Division costs and about 30% ($10,962,000) for fiscal 1981/82) of General and Administrative functions within the Electrical Operations group. The level of capitalization is due to the Authority's adherence to full absorption costing, which has been the policy for many years.

Overheads are allocated to capital projects based on a weighting formula tied to four ranges of direct project cost. The ranges are; (a) under $1 million, (b) $1 million to $10 million, (c) $10 million to $100 million and (d) over $100 million. The weighting formula has been designed so that projects within the smallest range attract the highest percentage of overhead loading and those within the highest range the least. In fact, those projects within the smallest range attract overhead at a rate four times that charged to the highest range. The theory underlying this procedure is that any project requires a minimum amount of administrative overhead effort, but that the overhead does not increase proportionately with the overall size of the project.

The Commission recognizes that this mechanism is an arbitrary allocation employed by B.C. Hydro to give simplicity to its overhead accounting and as well, to produce reasonable results. HOWEVER THE COMMISSION IS CONCERNED THAT NO EMPIRICAL EVIDENCE WAS INTRODUCED BY B.C. HYDRO TO SUPPORT THE PROJECT COST RANGES OR THE WEIGHTING OF THE OVERHEAD ALLOCATION. THE END RESULT MAY BE THAT B.C. HYDRO CANNOT EFFICIENTLY CONSTRUCT OR REBUILD A SMALL FACILITY.

Earlier reference has been made concerning the need for B.C. Hydro to examine its overhead accounting policy. This examination is to include a review and justification of project cost ranges and the weighting of the overhead allocation as discussed above.

In the Commission's view this review is essential because:

1. Management must be cognizant of the full financial cost of the prospective project.

2. The overhead loading formula has a significant effect on this financial cost.

3. The results of the process do not appear to be tested for reasonableness.

4. Overhead should be properly allocated to capital projects according to the actual overhead cost incurred.

THE COMMISSION REITERATES ITS FEAR THAT THE SIGNIFICANT PORTION OF OVERHEAD EXPENSES CAPITALIZED MAY REMOVE THESE COSTS FROM CRITICAL SCRUTINY.

2. Interest During Construction

The Authority's policy with respect to interest during construction excludes the following categories of items:

1. projects with a total cost of less than $50,000
2. projects completed in three months or less
3. acquisitions of tools, furniture, etc.
4. recurring fixed asset expenditures
5. survey and investigation projects
6. property held for future use
7. projects deferred for more than one year.

B.C. Hydro justifies the first three exclusions on materiality grounds and the fourth on the basis that such projects involve short construction times. Survey and investigation activities do not attract IDC as they relate to information gathering that will not necessarily bring new assets into service. Similarly, property held for future use and projects deferred are not viewed as construction related activities which should attract interest during construction.

B.C. Hydro calculates the rate for IDC capitalization on the basis of average cost of the most recent borrowings deemed to be the source of construction financing. IDC is calculated on a compound basis only for projects expected to cost in excess of $100 million. This cut-off level has been adopted by B.C. Hydro in order to limit the extent of compound interest calculations that are required to be performed.

THE COMMISSION FINDS B.C. HYDRO'S BASIC ACCOUNTING FOR INTEREST DURING CONSTRUCTION TO BE REASONABLE AND ACCEPTABLE FOR REGULATORY PURPOSES WITH ONE EXCEPTION. The use of an arbitrary dollar limit to define projects which attract compound interest means that interest costs will not be properly reflected in the cost of projects falling below the limit. The Commission recognizes there are practical limits of how much detailed accounting is to be required. HOWEVER IN THE COMMISSION'S VIEW IDC COMPOUNDING SHOULD BE APPLIED TO ALL PROJECTS EXPECTED TO BE IN CONSTRUCTION FOR OVER ONE YEAR. The result will be a more accurate assessment of annual interest costs for revenue requirement purposes. B.C. Hydro is to make this change in its asset accounting procedures on a prospective basis commencing with the 1983/1984 fiscal year.

In the examination of Unfinished Construction accounts the magnitude of current capitalized interest received considerable attention. The principal concern was the future impact on revenue requirements when constructed assets go into service. At that time, deferral through capitalization would cease and the interest costs have to be recovered through the rates. This will be particularly evident on projects such as the Cheekye-Dunsmuir link to Vancouver Island where security of supply is a factor in the expansion as much as the need to service increased loads. With capital expenditures of this nature the prospect of increased rates is almost inevitable.

The Commission shares these concerns. Large rate increases will be necessary in the near future due to Cheekye-Dunsmuir and Revelstoke coming into service when increases in sales volumes are unlikely to be adequate to cover the incremental costs. A considerable part of these increases will be due to the impact of the interest capitalization policy.

THE MAGNITUDE OF THE INCREASES LARGELY DEPENDS UPON THE AUTHORITY'S ABILITY TO SELL THE ADDITIONAL POWER TO THE DOMESTIC AND EXPORT MARKETS. IF DOMESTIC DEMAND DOES NOT INCREASE TO A LEVEL ANTICIPATED WHEN REVELSTOKE WAS COMMITTED, AND PROSPECTS FOR EXPORT SALES DO NOT IMPROVE, THE INEVITABLE RESULT WILL BE THAT THE DOMESTIC CUSTOMER WILL PAY.

Interest costs associated with construction of new facilities must ultimately be recovered in the rates. The timing of this recovery presents two questions: With major under-utilized assets coming into service should the Commission permit some further deferral of interest? As an alternative way to smooth out rate increases and give the desired price signals, should the Commission permit a more immediate expensing of interest during the construction period?

The Commission has given much consideration to this Matter. It finds that the interest capitalization policy of the Authority is broadly acceptable at this time. It also finds, however, that an abnormal escalation in rates is not in the public interest. As indicated in the "Financial" section of this Decision the Commission considers that targeted interest coverage margins must be interpreted in terms of reasonably normal operating conditions.

The Commission's views with respect to this subject of IDC are indicated at the conclusion of the following subsection, which raises similar concerns.

3. Depreciation and Amortization Accounting

In support of its revenue requirement, B.C. Hydro filed a schedule of depreciation rates currently in effect. Additional information in this area was largely limited to a general policy statement. The Commission received the impression that the depreciation rates employed largely resulted from B.C. Electric's use of the same rates, 20 years ago. It seems that few depreciation rates have been examined in recent years.

The Authority's actual 1982 operating results show that, on a total corporate basis, depreciation expense accounted for about 16¢ on the dollar of domestic electric revenues collected in rates.

While the possible effect of any inaccuracy in depreciation rates would not likely cause a substantial change in these relationships, it is significant enough to warrant more concern on the part of the Authority. It is difficult to accept the postulate that technological and other changes in the last 20 years have not had some effect on the expected life and other characteristics of fixed assets used by B.C. Hydro.

B.C. Hydro should initiate, over time, a systematic program of depreciation rate studies in accordance with the recognized procedures for assessing service lives. Such a program should be defined for execution over a five year period and should be structured to concentrate first on categories of plant where either retirement experience in recent years, knowledge of changing technology, or changing conditions of asset use suggest that variations in rates could be required. In the Commission's view, the studies should begin with reviews of selected accounts under, for example, the Substation, Distribution, and General categories of plant where actual types of evidence on plant life characteristics can be developed. The reviews should be appropriately concerned about the adequacy of provisions for retirement costs or salvage values. The limited information in the Application on this subject suggests that inflation effects may have significantly changed the relationships between asset costs and retirement salvage value from what might have prevailed in earlier periods.

IT SHOULD BE APPRECIATED THAT THE COMMISSION IS NOT LOOKING FOR A WHOLESALE EXPANSION OF THE PLANT ACCOUNTING FUNCTION WITHIN B.C. HYDRO IN ORDER TO COMMENCE THIS DEPRECIATION RATE REVIEW AND TESTING PROGRAM. TO THE MAXIMUM EXTENT POSSIBLE IT SHOULD BE IMPLEMENTED WITH EXISTING ENGINEERING AND ACCOUNTING RESOURCES. Given an appropriate definition of a program time frame and proper identification of priority study areas, this type of review should be an integral part of the responsibilities that go with the basic plant accounting function for an organization the size of B.C. Hydro.

The Authority used to maintain a separate depreciation pool for each service only, which provided a global assessment of accumulated depreciation. The Commission notes that for fiscal 1982, the Authority has moved to break down the accumulated depreciation position showing the separate accumulated depreciation positions for each major category of plant in each service for purposes of its financial reporting. FUTURE FILINGS WITH THE COMMISSION SHOULD REFLECT THIS DISAGGREGATION OF THE ACCUMULATED DEPRECIATION ACCOUNTS AND TO THE EXTENT NECESSARY THE PROCEDURES USED TO PRODUCE THESE ALLOCATIONS SHOULD BE EXPLAINED IN THE NEXT RATE APPLICATION.

During the Hearing there was some discussion concerning the phasing-in of depreciation in the event of under-utilized assets going into service. B.C. Hydro's normal policy is to commence depreciation accounting of any "common property" of a facility in the year after any part of it goes into service. An exception to this policy was apparently applied to the W.A.C. Bennett dam and G.M. Shrum generating station on the Peace River where phasing-in of depreciation on common property costs occurred.

The Commission considers that phasing-in of depreciation charges should only be considered with major, high cost facilities where there is underutilization of capacity in the early years of operation.

The two projects currently under construction where this question could warrant some consideration are the Revelstoke plant and the Cheekye-Dunsmuir 500 kV transmission line to Vancouver Island.

The observations of the Commission with respect to the possible deferral of interest recovery related to such new facilities apply with equal relevance in the depreciation accounting area.

As has already been emphasized in considering the Authority's overhead capitalization policies, cost deferrals must be financed. It may be, however, that some phasing-in of costs such as interest and depreciation, even when combined with the added costs of financing such a deferral, could in fact enhance the inter-generational equity of the long-run costs of providing services from these facilities.

THE COMMISSION HAS REACHED NO CONCLUSION ON THIS QUESTION AT THE PRESENT TIME AS THE MATTER WAS NOT EXTENSIVELY ADDRESSED IN THIS PROCEEDING. B.C. HYDRO IS INSTRUCTED TO ADDRESS THIS QUESTION IN A THOROUGH AND COMPREHENSIVE MANNER---INCLUDING ASSESSMENT OF FINANCIAL CONSIDERATIONS AS WELL AS POTENTIAL EFFECTS ON THE NEED FOR RATE INCREASES---IN THE NEXT APPLICATION FOR ELECTRIC SERVICE RATES.

XII. ELECTRIC SERVICE REVENUE REQUIREMENTS

This section addresses the annual Electric Service revenue requirements for the test periods ending March 31, 1983 and March 31, 1984.

1. Energy Sales

As discussed in the Load Forecast section of this Decision, B.C. Hydro has been refining its forecasting methodology and increasing its use of econometric models to improve its long term accuracy. Short term projections (other than Bulk category) are based on power district managers' estimates, which are compared in total to population and economic indicator forecasts by Head Office personnel to ensure a relative fit. Bulk sales forecasts are prepared at Head Office in consultation with each of the customers.

According to B.C. Hydro, utilities consider a difference of 1% per annum between actual and forecast sales to be extremely accurate. As Table PE12 in Exhibit 85 shows, B.C. Hydro's near term (i.e. 3 years away) forecasts are within this range. That is, the forecast prepared in September 1980 could be expected to be within plus or minus 3% of the actual 1982/83 load, barring any completely unexpected event (such as the forest industry strike in the summer of 1981/82).

The Table below shows actual sales for fiscal 1981 and 1982 as well as four different forecasts made by B.C. Hydro for the 1983 and 1984 fiscal years. As can be seen, the Bulk category sales are the most volatile, and were expected to rebound quickly after the 1981/82 strike. The September 1981 forecast lowered expectations somewhat (down 3.2% for 1982/83 and 4.6% for 1983/84). However, as noted in Exhibit 18, pg. 234, the differences are mainly due to conservation and "slippage" in industrial expansion. The May 1982 forecast is 10% lower than the September 1980 forecast in total and 23-24% lower in the Bulk category. The explanation given in Exhibit 345 is that this forecast recognizes the impact of the current economic downturn. In cross-examination, B.C. Hydro staff stressed that it was a hurried top-down forecast, primarily to assist with their ongoing review, leading to the September annual forecast. The September 1982 forecast shows further decreases, but not of the same magnitude. Exhibit 334 explains that the reduction from the May 1982 forecast results primarily from lower population and Bulk category growth and more detailed analysis of the Commercial and Institutional sector.

Actual and Estimated Energy Sales 1981 - 1984

Billed Kwh Sales (Mill.)	1981 Actual	1982 Actual	1983 Initial (Sep 80)	1983 Revised (Sep 81)	1983 Amended (May 82)	1983 Forecast (Sep 82)	1984 (Sep 80)	1984 (Sep 81)	1984 Amended (May 82)	1984 Forecast (Sep 82)
Resid.	8042	8640	8688	8843	8991	8940	9107	9208	9396	9208
General	9344	9706	10337	10206	9939	9683	10842	10649	10539	10042
Bulk	9597	9339	13025	12180	9900	9380	14710	13240	11340	10250
Other	581	609	670	639	636	623	703	667	660	646
WKPL	-	14	331	120	61	80	555	500	305	120
	27564	28308	33051	31988	29527	28706	35917	34264	32240	30266

Change as a % of 1981 actual	Change as a % of September 1980 Forecast					
7.4%	1.8%	3.5%	2.9%	1.1%	3.2%	1.1
3.9	[1.3]	[3.9]	[6.3]	[1.8]	[2.8]	[7.4]
[2.7]	[6.5]	[24.0]	[28.0]	[10.0]	[22.9]	[30.3]
4.8	[4.6]	[5.1]	[7.0]	[5.1]	[6.1]	[8.9]
-	[63.8]	[81.6]	[75.8]	[9.9]	[45.0]	[78.4]
2.3%	[3.2]	[10.7]	[13.2]	[4.6]	[10.2]	[15.7]

The Amended Application uses the May 1982 load forecast to project revenues for the two test years. However, B.C. Hydro provided their estimate of the impact of the September 1982 forecast in Exhibit 415, being a reduction in revenues of $21 million in fiscal 1983 and $65 million in fiscal 1984.

2. Overview of Cost Submissions

Due primarily to changing economic circumstances, the Authority restated its revenue requirements estimates from time to time throughout the hearing. The Initial Application of June 18, 1981 and the Revised Application of November 23, 1981 each included statements of revenue requirements for fiscal 1982 and 1983. The Amended Application of May 28, 1982 provided estimates for fiscal 1983 and added a statement of requirements for fiscal 1984.

The effect of this was to maintain the Application on a two test period basis: fiscal 1983 and fiscal 1984. In this section the overall structure and relationships inherent in the various revenue requirement submissions are reviewed. The comparisons and summary analyses begin with data related to 1981 and 1982 when particulars of actual results are available and then proceed to consider 1983 and 1984 submissions. This overview shows quite persistent increases in B.C. Hydro's costs and the existence of quite distinct limits on the Authority's ability to forecast accurately what its future cost levels will be. All of this review is focused on cost levels before provision for coverage margin.

Fiscal 1982 data

Cost data submitted by B.C. Hydro with respect to fiscal 1982 was as follows:

Electric Service Revenue Requirement Submissions ($millions)	1981 Actual	Fiscal Years Ending March 31 1982 Forecasts: Initial Application	Revised Application	1982 Actual
Operating costs				
Corporate divisions	$ 4.1	$ 6.2	$ 5.8	$ 6.5
Administration divisions	26.1	31.6	32.7	32.2
Operations division	157.8	166.6	173.6	183.2
Other costs (net)	7.0	15.5	16.6	18.6
Sub-total	195.0	219.9	228.7	240.5
Capital and taxation costs				
Water rental fees	17.8	38.2	35.6	86.8
Grants and taxes	65.6	87.5	87.2	87.8
Depreciation	125.4	139.6	140.2	140.1
Interest (net)	372.8	384.8	410.5	377.1
Sub-total	581.6	650.1	673.5	691.8
Total costs excluding coverage margin	$776.6	$870.0	$902.2	$932.3

It is readily apparent from considering this data that some substantial increases in costs were expected and/or experienced by B.C. Hydro in its 1982 fiscal year. The magnitudes and percentage change effects of these factors may be summarized as follows:

Electric Service Changes in Revenue Requirements ($mill.)	Prospective: 1981 Actual to 1982 Applications — Initial	Prospective: 1981 Actual to 1982 Applications — Revised	1982 Actual	Retrospective: 1982 Applications to 1982 Actual — Initial	Retrospective: 1982 Applications to 1982 Actual — Revised
Operating costs					
Corporate divisions	$ 2.1	$ 1.7	$ 2.4	$ 0.3	$ 0.7
Administration divisions	5.5	6.6	6.1	0.6	(0.5)
Operations division	8.8	15.8	25.4	16.6	9.6
Other costs (net)	8.5	9.6	11.6	3.1	2.0
Sub-total	24.9	33.7	45.5	20.6	11.8
Capital and taxation costs					
Water rental fees	20.4	17.8	69.0	48.6	51.2
Grants and taxes	21.9	21.6	22.2	0.3	0.6
Depreciation	14.2	14.8	14.7	0.5	(0.1)
Interest (net)	12.0	37.7	4.3	(7.7)	(33.4)
Sub-total	68.5	91.9	110.2	41.7	18.3
Total costs excluding coverage margin	$93.4	$125.6	$155.7	$62.3	$30.1
Percentage Changes	Change as a percentage of 1981 Actual			Change to 1982 Actual as % of Applications	
Operating costs					
Corporate division	51.2%	41.5%	58.5%	4.8%	12.1%
Administration division	21.1	25.3	23.4	1.9	(1.5)
Operations division	5.6	10.1	16.1	10.0	5.5
Other costs (net)	121.4	137.1	165.7	20.0	12.0
Sub-total	12.8	17.3	23.3	9.4	5.4
Capital and taxation costs					
Water rental fees	114.6	100.0	387.6	127.2	143.8
Grants and taxes	33.4	32.9	33.8	0.3	0.7
Depreciation	11.3	11.8	11.7	0.4	(0.1)
Interest (net)	3.2	10.1	1.2	(2.0)	(8.1)
Sub-total	11.8	15.8	18.9	6.4	2.7
Total costs excluding coverage margin	12.0%	16.2%	20.0%	7.2%	3.3%

A problem arises with these comparisons on the basis of the data filed by B.C. Hydro in relation to the 1982 fiscal year because cost and water rental fee accruals related to export surplus revenues were not adjusted out of the basic data. Such an adjustment cannot be made on a precise basis on available information, but a reasonable approximation is possible using data in the Authority's 1982 annual report. When $7 million of operating costs and $30 million of water rental fee accruals are removed from the 1982 actual data as filed, the following is the result:

	Comparisons with 1981 Actual			1982 Actual Compared to Appls.			
	Adjusted	Change		1982 Applica-			
$millions/	1982	from '81	Percent	tion changes		Percent Changes	
percentages	Actual	Actual	Change	Initial	Revised	Initial	Revised
Operating costs							
Corporate divisions	$ 6.5	$ 2.4	58.5%	$ 0.3	$ 0.7	4.8%	12.1%
Administration division	32.2	6.1	23.4	0.6	(0.5)	1.9	(1.5)
Operations division	176.2	18.4	11.6	9.6	2.6	5.8	1.5
Other costs (net)	18.6	11.6	165.7	3.1	2.0	20.0	12.0
Sub-total	233.5	38.5	19.7	13.6	4.8	6.2	2.1
Capital and taxation costs							
Water rental fees	56.8	39.0	219.1	18.6	21.2	48.7	59.6
Grants and taxes	87.8	22.2	33.8	0.3	0.6	0.3	0.7
Depreciation	140.1	14.7	11.7	0.5	(0.1)	0.4	(0.1)
Interest(net)	377.1	4.3	1.2	(7.7)	(33.4)	(2.0)	(8.1)
Sub-total	661.8	80.2	13.8	11.7	(11.7)	1.8	(1.7)
Total costs excluding margin coverage	$895.3	$118.7	15.3%	$25.3	$ (6.9)	2.9%	(0.8)%

A number of factors must be borne in mind when considering the comparisons:

(1) The Authority could not anticipate the significant increase in water rental fees which occurred at the end of December 1981. On the B.C. Hydro basis of presentation this increase accounted for 44% of the total increase in 1982 costs over those of 1981 and it represents 33% after adjustment for export surplus revenue related items.

(2) In preparing its Revised Application of November 23, 1981 the Authority overestimated net interest costs for the fiscal 1982 year. The difference between that estimate and the actual expense was some $33.4 million, 8.1% less than estimated. The cause of the difference is both lower aggregate interest costs due to issuing less debt than anticipated and earning higher interest offset returns on temporary investments.

(3) The Authority both planned for and implemented a number of significant increases in levels of operating costs during fiscal 1982 relative to 1981. On a basis adjusted for changes in costs related to export surplus revenues, the increase of $38.5 million on a year-to-year actual comparison was some 33% of the total increase in costs of $118.7 million. In percentage terms the increases come close to twice the overall inflation rate assumption used in the 1982 projections. Only in the Operations division was the percentage increase at approximately the inflation rate assumption. This implies that the plan of operations and its implementation for 1982 involved a step-up in the inflation adjusted or "real" level of costs involved in the Authority's operations.

The fiscal 1982 data can be analyzed into labour and material components giving the following results:

Electric Service Operating Cost Submissions ($millions)	1981 Actual	Fiscal Years Ending March 31 1982 Forecasts: Initial Application	Revised Application	1982 Actual
Salaries, wages and employment benefits	$128.6	$152.9	$158.3	$153.2
Materials and services	66.4	67.0	70.4	87.3
Total operating costs	$195.0	$219.9	$228.7	$240.5
Percent change from 1981 actual				
Salaries, wages and employment benefits		18.9%	23.1%	19.1%
Materials and services		0.9%	6.0%	31.5%
Total costs		12.8%	17.3%	23.3%
Percent change to 1982 actual from forecasts				
Salaries, wages and employee benefits		0.2%	(3.2)%	
Materials and services		30.3	24.0	
Total operating costs		9.4%	5.2%	

These comparisons indicate that the employee compensation related cost increases of 19.1% in 1982 over 1981 were for the most part, fully planned and anticipated. The materials and services component, however, increased by over 31% in 1982 over 1981. A significant part of this increase was not anticipated in estimating fiscal 1982 revenue requirements in the Rate Application submissions.

Fiscal 1983 & 1984 data

With respect to fiscal 1983 and 1984 the cost data presented by B.C. Hydro was as follows:

Electric Service Revenue Requirement Submissions ($millions)	Adjusted 1982 Actual	Fiscal Years Ending March 31 1983 and 1984 forecasts 1983 Initial	1983 Revised	1983 Amended	1984 Amended
Operating costs					
Corporate division	$ 6.5	$ 6.8	$ 6.5	$ 6.4	$ 7.3
Administration division	32.2	37.2	39.5	35.5	41.3
Operations division	176.2	184.1	197.4	191.1	216.4
Other costs (net)	18.6	15.5	17.1	11.4	13.3
Sub-total	233.5	243.6	260.5	244.4	278.3
Capital and taxation costs					
Water rental fees	56.8	48.4	46.1	144.0	172.9
Grants and taxes	87.8	106.1	111.1	122.8	140.1
Depreciation	140.1	152.8	153.2	153.9	170.5
Interest (net)	377.1	435.9	457.2	422.1	479.7
Subtotal	661.8	743.2	767.6	842.8	963.2
Total costs excluding coverage margin	$895.3	$986.8	$1,028.1	$1,087.2	$1,241.5

The above data may be analyzed to show the year over year planned or projected changes in cost levels for these periods. This can be done by relating the 1983 Amended submission (after institution of restraint plans) to 1982 actuals and comparing the 1983 and 1984 submissions. Changes in cost levels in 1982 relative to 1981 are also shown.

The result is shown on the following table.

Electric Service Changes in Revenue Requirements ($millions)	Changes in Cost Levels: Adjusted 1982 Over 1981 Actual	Amended 1983 Over 1982 Actual	Amended 1984 Over Amended 1983
Operating Costs			
Corporate divisions	$ 2.4	$ (0.1)	$ 0.9
Administration division	6.1	3.3	5.8
Operations division	18.4	14.9	25.3
Other costs (net)	11.6	(7.2)	1.9
Sub-total	38.5	10.9	33.9
Capital and taxation costs			
Water rental fees	39.0	87.2	28.9
Grants and taxes	22.2	35.0	17.3
Depreciation	14.7	13.8	16.6
Interest (net)	4.3	45.0	57.6
Total costs excluding coverage margin	$118.7	$191.9	$154.3
Percentage changes			
Operating costs			
Corporate divisions	58.5%	(1.5)%	14.1%
Administration division	23.4	10.2	16.3
Operations division	11.6	8.5	13.2
Other costs (net)	165.7	(38.7)	16.7
Sub-total	19.7	4.7	13.9
Capital and taxation costs			
Water rental fees	219.1	153.5	20.2
Grants and taxes	33.8	39.9	14.1
Depreciation	11.7	9.9	10.8
Interest (net)	1.2	11.9	13.6
Total costs excluding coverage margin	15.3%	21.4%	14.2%
Percent distribution of changes			
Total operating costs	32.4%	5.7%	22.0%
Grants, taxes, water rentals	51.6	63.7	29.9
Depreciation	12.4	7.2	10.8
Interest (net)	3.6	23.4	37.3
Total Costs	100.0%	100.0%	100.0%

In terms of detailed percentage distribution the changes are as follows:

Electric Service Percentage of Changes in Revenue Requirements	Changes in Cost Levels: Adjusted 1982 Over 1981 Actual	Amended 1983 Over 1982 Actual	Amended 1984 Over Amended 1983
Operating Costs			
Corporate division	2.0%	(0.1)%	0.6%
Administration division	5.1	1.8	3.8
Operations division	15.5	7.8	16.4
Other costs (net)	9.8	(3.8)	1.2
Sub-total	32.4	5.7	22.0
Capital and taxation costs			
Water rental fees	32.9	45.4	18.7
Grants and taxes	18.7	18.3	11.2
Depreciation	12.4	7.2	10.8
Interest (net)	3.6	23.4	37.3
Subtotal	67.6	94.3	78.0
Total costs excluding coverage margin	100.0%	100.0%	100.0%

Fiscal 1981 - 1984 Operating Costs by Cost Factor

Putting the operating cost data together by cost factor for the fiscal years 1981-1984, provides the following comparisons:

Electric Service Operating Cost Submissions ($millions)	Fiscal Years Ending March 31 Actual 1981	Adjusted 1982	Amended 1983	Amended 1984
Cost				
Salaries, wages, employee benefits	$128.6	$153.2	$ 166.5	$ 187.7
Materials and services	66.4	80.3	77.9	90.6
Total operating costs	$195.0	$233.5	$ 244.4	$ 278.3
Percentage Changes				
Salaries, wages, employee benefits		19.1%	8.7%	12.7%
Materials and services		20.9	(3.0)	16.3
Total operating costs		19.7%	4.7%	13.9%

Summary Observations on B.C. Hydro's Submissions for Fiscal 1981-1984

Taken at face value, it is clear that capital and tax related cost factors are the major items causing the Authority's aggregate costs to increase over the period to 1984. The single largest cause of increases in 1982 and 1983 is the combination of grants, taxes and water rental fees which account for 51.6% of the 1982 aggregate increase and 63.7% of the 1983 Amended submission increase relative to 1982 actual. While water rental fee rate changes are the dominating item of these cost increases, the grants and taxes items also accelerate significantly. In the Authority's submission for 1984, the dominance of grants, taxes and water rentals decreases to just under 30% of the total change for the year. Forecast increases in net interest costs at 37.3% become the largest single item in the change for that period.

With respect to Operating Costs, the levels of which are in varying degrees controllable by B.C. Hydro, the Amended 1983 submission would appear to reflect the program of expenditure restraint initiated by the Commission's interim Order G-26-82. Thus instead of the 11.6% projected increase set out in the Revised 1983 Application dated November 23, 1981 the Amended submission shows a 4.7% increase in this category of costs. However, the projection for fiscal 1984 as included in the Amended Application shows a potential 13.9% increase over the scheduled restraint levels of 1983 suggesting that at least some of the Authority's cost containment efforts are not viewed by it as sustainable into future years. In the Commission's view, B.C. Hydro must devote a continuing effort towards keeping rates of cost increase to a minimum.

The intervenors' panel of industrial executives referred to earlier, discussed at length the necessity of reducing costs in order to lighten the burden on consumers and emphasized the prospective effect on industrial customers and the provincial economy if this is not done. The Commission has reiterated this theme of efficiency throughout the Decision. The Electric Service Revenue Requirements Submissions schedule presents in its most simplified form the problems encountered in overall cost reductions. Between 1983 and 1984 total costs in the Electric division are expected to increase by $154.3 million. Of this amount, $120.4 million is represented by capital and taxation costs over which the applicant has little or no control. If total costs of the Electric division in 1984 were to stay at their 1983 levels, costs of labour and materials would have to be reduced by $86.5 million or 31%. This is patently impossible, but does emphasize again the responsibility falling on B.C. Hydro to reduce and pare at every opportunity.

3. Inflation Assumptions

Integral to B.C. Hydro's cost submissions are its assumptions on inflation.

The Corporation's Cost System budgeting procedures are structured in a manner that requires the operating divisions to prepare their submissions in constant dollar terms. That is, the detailed estimates of costs for short and long range planning purposes do not incorporate any provision for inflation. Inflation allowances are added to the Divisional submissions by the Planning and Budget Support Department when the details are pulled together into an integrated plan. Estimates by the Corporate Economist are employed for this purpose.

While information extracted from B.C. Hydro contains indications of the extent of inflation indexing of real costs for the Revised Application data, no such information was provided in relation to the Amended Application. Only aggregate, inflation-included cost amounts were submitted with no particulars of what inflation adjustments were made in what areas and for what components of costs. A summary indication of assumptions is provided in the April 1982 to March 1992 Corporate Plan submitted as Exhibit 255. That document shows that the following basic assumptions were used:

		Fiscal 1983	Fiscal 1984
Cost System	- labour	13.0%	11.5%
	- fuels	24.0	17.5
	- other	11.5	11.0
Fixed Assets	- thermal	12.0	11.0
	- other	11.5	10.5

Precisely how those rates are distributed across the cost information filed as revenue requirements cannot be ascertained from the filed material.

IN THE COMMISSION'S VIEW THERE IS A LIKELIHOOD THAT B.C. HYDRO'S ASSUMPTIONS AS TO PROBABLE INFLATION IN THE AMENDED APPLICATION TEST YEARS WILL PROVE TOO HIGH. THEREFORE THERE IS A HIGH PROBABILITY THAT THE COSTS OF B.C. HYDRO FOR REVENUE REQUIREMENT PURPOSES ARE OVERSTATED TO SOME EXTENT.

This matter is taken into account in the setting of the revenue requirement.

4. Capital Related and Taxation Costs

By far the largest share of B.C. Hydro's annual revenue requirements (excluding interest coverage margin) consist of capital related and taxation outlays. The relative shares of total costs as submitted for the periods under review (with 1982 adjusted for cost accruals related to export surplus revenues) are shown by the following:

Electric Service Requirement ($millions)	Actual 1981	Actual 1982	Amended Application 1983	Amended Application 1984
Operating Costs				
Corporate divisions	$ 4.1	$ 6.5	$ 6.4	7.3
Administration divisions	26.1	32.2	35.5	41.3
Operations divisions	157.8	176.2	191.1	216.4
Other (net)	7.0	18.6	11.4	13.3
Sub-total	195.0	233.5	244.4	278.3
% change		19.7%	4.7%	13.9%
Capital and Taxation Costs				
Water rental fees	17.8	56.8	144.0	172.9
Grants and taxes	65.6	87.8	122.8	140.1
Depreciation	125.4	140.1	153.9	170.5
Interest (net)	372.8	377.1	422.1	479.7
Sub-total	581.6	661.8	842.8	963.2
% change		13.8%	27.3%	14.3%
Total excluding coverage margin	$776.6	$895.3	$1,087.2	1,241.5
% change		15.3%	21.4%	14.2%

Percentage Distribution of Costs

Percent of total	Actual 1981	Actual 1982	Amended Application 1983	Amended Application 1984
Operating costs				
Corporate divisions	0.5%	0.7%	0.6%	0.6%
Administration divisions	3.4	3.6	3.3	3.3
Operations divisions	20.3	19.7	17.6	17.4
Other (net)	0.9	2.1	1.0	1.1
Sub-total	25.1	26.1	22.5	22.4
Capital and Taxation Costs				
Water rental fees	2.3	6.3	13.2	13.9
Grants and taxes	8.4	9.8	11.3	11.3
Depreciation	16.2	15.6	14.2	13.8
Other (net)	48.0	42.2	38.8	38.6
Sub-total	74.9	73.9	77.5	77.6
Total excluding coverage margin	100.0%	100.0%	100.0%	100.0%

About three quarters of the Authority's annual Electrical Service expenses take the form of capital related and taxation costs. Of these amounts only the water rental fees are variable with generation of hydroelectric power. The taxes and grants in lieu of taxes are a function of the Authority's property holdings throughout the province and represent local tax levies similar to those imposed on any property owner (with certain major properties being exempt). Depreciation costs are determined by applying service life related rates to the cost of assets in service at the beginning of the year. The net interest costs are a function of the amount of outstanding debt.

Once the property investments and related financing are put in place to service load requirements the capital related and taxation costs are beyond B.C. Hydro's control. The Authority cannot cut back on its tax obligations, cease to recover depreciation on its assets, or fail to meet its interest and other debt service requirements on borrowings.

One of B.C. Hydro's principal declared corporate objectives is focused directly on these largely fixed costs. That objective is asserted to be:

> "Meeting the requirements for services at the lowest long-term cost to customers consistent with sound utility financial principles, thereby ensuring sufficient return on investment to enable Hydro to borrow competitively and on economical terms to finance additional facilities required to meet anticipated demand."

While this "lowest long-term cost" objective is obviously heavily qualified by the expressed concern about ongoing financing viability, it still remains the key to what the Authority should be doing in this area of costs. Decisions on the timing of commitments to build plant and issues of debt to finance such building are the principal variables which will determine the levels of long-term fixed costs.

THE AUTHORITY PROVIDED NO MEANINGFUL EVIDENCE ON THE EXTENT TO WHICH IT CONSIDERS ITS DECISIONS AND COMMITMENTS TO FUTURE SUPPLY CAPABILITY IN FACT APPROXIMATE THE OBJECTIVE OF LOWEST LONG-TERM COST. WHILE THIS MAY BE DIFFICULT TO DO IN ANY DETAILED MANNER BECAUSE IT REQUIRES ANALYSIS OF HYPOTHETICAL REJECTED ALTERNATIVE COURSES OF ACTION, THE AUTHORITY MUST HAVE SOME METHOD OF MONITORING ITS ACHIEVEMENTS IN THIS REGARD. UNLESS THAT IS DONE, THE DECLARED OBJECTIVE IS LITTLE MORE THAN A STATEMENT OF THE OBVIOUS.

The one area of B.C. Hydro policy which the Commission believes needs some examination of this sort, is its practice of pre-funding capital expenditures. The Authority's policy is to seek to have from four to six months capital expenditure requirements pre-funded by prior issues of long-term debt. This may well be an appropriate way to seek realization of lowest long-term costs of financing but it may also mean fixing high rate long-term interest cost for the future dependent upon the relative timings of borrowings and peaks in interest rate cycles. The possibility of using short-term borrowings to bridge requirements for long-term funds so as to have a span of time within which to seek lower fixed term interest rates does not appear to have been seriously examined by B.C. Hydro. While the Commission recognizes that simply adding a short-term borrowing facility to B.C. Hydro's financing plans will not necessarily ensure that long-term interest rate commitments will take place at lower levels, the possibility exists that some higher interest costs could be avoided by judicious use of short-term funds. THE AUTHORITY SHOULD DEMONSTRATE THAT SHORT TERM BRIDGING WOULD NOT LOWER LONG-TERM COSTS AS A MEANS OF PROVING THAT ITS PRACTICES DO INDEED ACHIEVE "LOWEST LONG-TERM COST TO CUSTOMERS".

(i) Water rentals, grants and taxes

One of the most persistent and troublesome deficiencies in the Application has been its tendency to submit schedules of estimated costs with no calculation or explanatory details in support. Various Intervenors commented in argument on the Authority's inclination to work from a presumption that cost submissions must be acceptable simply because B.C. Hydro prepared them. A more responsible approach would have been to provide supporting information to prove the basis of the submitted revenue need. Failure to do so created the need for numerous volumes of material filed in response to interrogatories and other requirements of participants in the proceeding. WHILE B.C. HYDRO RESPONDED WELL TO DISPARATE INFORMATION REQUESTS, IN THE COMMISSION'S VIEW A GOOD DEAL OF THE MATERIAL WOULD NEVER HAVE BEEN NEEDED OR REQUESTED IF THE AUTHORITY HAD RECOGNIZED A NEED FOR ADEQUATE EXPLANATION IN THE FIRST INSTANCE.

Most of the supplementary information obtained through information requests related to the Revised Application of November 23, 1981 with very little provided as detailed support for the further update in the May 28, 1982 Amended Application. The basic details of the calculations of such significant and important costs as water rental fees should have been filed and were not. Similarly, some basic explanation and identification of the factors deemed to cause grants and taxes to increase by more than 10% in the Amended Application for 1983 relative to the Revised Application and then increase by a further 14% in 1984 should have been provided. B.C. HYDRO MERELY FILED THE NUMBERS AS PURPORTED EVIDENCE OF NEED WITHOUT COMMENT OR PARTICULARS OF CONTINUITY FROM ONE ESTIMATE TO THE NEXT. THE COMMISSION IS NOT SATISFIED WITH THAT PATTERN AND WILL EXPECT A DIFFERENT APPROACH IN THE FUTURE.

Forecast information for fiscal 1983 and 1984 predicted a reduction in aggregate costs for grants, taxes and water rentals of 9.3% for 1983 and 11.3% for 1984 as compared to the forecasts for the original application. In the absence of details the Commission presumes that revised assumptions as to expected tax increases and net water rental fees were used. While the new data related to aggregate costs rather than expenses only, very few of these particular items are chargeable to capital accounts. Inadequate explanations make the interpretation of these changes uncertain. However, most must relate to the Electric Service simply because about 95% of these costs arise in that area of operations.

(ii) Depreciation

Considering the procedures under which B.C. Hydro applies its depreciation accounting policy there should be little likelihood of estimation errors for this particular element of annual costs. Past comparisons of forecast/actual amounts confirm that errors tend to be relatively insignificant. The one factor which could result in potential discrepancies is estimation errors with respect to timing of plant going into service in the first year of a two test period submission. This is not a problem in the present submission as no major plant is scheduled for service.

(iii) Interest

Interest costs are the largest single item in the revenue requirement, representing approximately 30% of the total expenses. Supporting details should be filed at the outset of a rate application to ensure not only an understanding by the participants of the cost relationship but also an easy reconciliation of changes as interest rates or load forecasts are varied.

The Corporation's record in forecasting interest costs is not particularly impressive. This is due to the large number of variables involved in the estimation process. Unknown items range from timing of issues of new debt to interest rates that will apply on both new borrowings and temporary investment holdings through foreign exchange rates and timing of actual expenditures on plant, and so on. These difficulties are all the more reason for ensuring that the details of estimates are clearly set out and explained.

The manner in which these estimation problems can produce shifting measures of expected costs is indicated by the following comparisons of total net interest (after interest income but before interest capitalized) as submitted in various documents by B.C. Hydro.

Interest Cost Estimates ($ millions)	For Fiscal 1982	For Fiscal 1983	For Fiscal 1984
Initial Application	$570.8	$707.3	
Revised Application	586.6	737.3	
Actual Results	549.9		
Amended Application		690.5	$834.1
Exhibit 355		703.0	841.7
Differences			
Revised to actual	$- 36.7		
Amended to Exhibit 355		$+ 12.5	$+ 7.6
% differences	- 6.3%	+ 1.8%	+ 0.9%

In connection with the changes in estimates for fiscal 1983 and 1984 the Authority did indicate in aggregate terms that the changes in the expense portion of interest costs (i.e. after interest capitalized amounts are deducted from gross interest) were caused by incorrect foreign exchange assumptions, and some effects of additional borrowings and rates thereon. All of these effects in conjunction with reduced interest capitalization estimates will probably result in higher interest cost and expense estimates than those shown in the Amended Application. What is not apparent from these summarized explanations is the effect of potential downward revision of interest rates for forecasted new borrowings included in the financing plan.

5. Review of Functional Areas

(i) Corporate Divisions

The management and administrative functions included in the "Corporate Divisions" grouping are the following:

(1) The Corporate Affairs Division. Its responsibilities include editorial services in relation to B.C. Hydro publications and media communications, advertising and audio visual material used by or about the Corporation; community relations and information dissemination programs concerning B.C. Hydro proposals and activities; and the maintainance of technical and other libraries within the Corporation.

(2) The Corporate Administration Division. This comprises the offices of the Chairman and President of the Corporation as well as the Legal Division. In addition to supporting legal staff there is a Claims Department to handle claims by and against B.C. Hydro, and the Office of the Corporate Secretary with responsibility for serving the Authority's board of Directors and maintaining basic corporate records.

(3) The Corporate Group. This was formed in 1979 to bring together several functions that had already existed within the Corporation and to add several other functions related to long-range planning and regulatory matters.

A Summary of actual and forecast Corporate Division Operating costs for the years 1981-1984 is as follows:

Corporate Division Operating Costs
Fiscal Years Ending March 31

($ thousands)	1981 Actual	1982 Initial	1982 Revised	1982 Actual	1983 Initial	1983 Revised	1983 Amended	1984 Amended
Total costs[1]								
Corporate Affairs	3,983	5,577	5,659	4,870	6,106	6,354	6,295	7,334
Corporate Admin.	2,496	3,672	2,845	3,364	3,983	3,152	3,604	4,065
Corporate Group	2,344	3,627	3,719	4,883	4,041	4,247	5,539	6,139
Total	8,823	12,876	12,223	13,117	14,130	13,753	15,438	17,538
Fixed assets[1]								
Corporate Affairs	1,348	2,236	2,274	2,068	2,450	2,553	2,489	2,896
Corporate Admin.	682	985	770	666	1,079	854	957	1,079
Corporate Group	1,007	1,442	1,479	2,187	1,624	1,708	3,068	3,399
Total	3,037	4,663	4,523	4,921	5,153	5,115	6,514	7,374
Expenses[2]								
Corporate Affairs	1,871	2,666	2,702	2,422	2,919	3,033	2,718	3,177
Corporate Admin.	1,309	1,919	1,491	2,012	2,088	1,652	1,839	2,080
Corporate Group	941	1,593	1,633	2,045	1,762	1,853	1,860	2,061
Total	4,121	6,178	5,826	6,479	6,769	6,538	6,417	7,318

(1) For all segments of operations.
(2) For Electric Service segment only (revenue requirement submissions)

As noted in previous sections of this Decision, B.C. Hydro managers budget their total costs within the cost system before allocations to fixed asset or individual service expense categories. It is therefore necessary to review the submissions at a total cost level.

Taken at face value the Corporate Division cost data shows little evidence of expenditure restraint. With respect to Electric Service expenses it appears that cost containment efforts are intended and contemplated as there is an indicated 1% reduction in 1983 relative to 1982. But at the level of total costs this is not the case. Instead of a reduction in total costs there is a projected 17.7% increase.

The reduction in the level of expenses is therefore due only to an increase in the level of capitalization. This is not restraint, it is a cost deferral into a future period, to be recovered in the form of eventual depreciation and amortization charges.

Corporate Affairs

B.C. Hydro projected the following revenue requirements to cover the costs of the Corporate Affairs department:

Corporate Affairs ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	1,386	1,721	1,899	2,121
Materials and services	2,597	3,149	4,396	5,213
Total	3,983	4,870	6,295	7,334
% change		22.3%	29.3%	16.5%
Electric Service Expenses				
Salaries and wages	606	668	706	789
Materials and services	1,265	1,754	2,012	2,388
Total	1,871	2,422	2,718	3,177
% change		29.4%	12.2%	16.9%
Employees (all services)				
Positions	54	59	57	57
Actual	48	53	N/A	N/A

It appears that the Authority plans to continue expansion in the area of making its activities known to the public. A significant part of this real growth in outlays - ie. increases in outlays over and above the rate of inflation - is for expanded television and print advertising. Some part of the increased expenditures appears to be related to improving B.C. Hydro's image in the community apart altogether from necessary information responses to externally originated demands.

The Commission is satisfied that B.C. Hydro requires a public affairs department because of the part it plays in the provincial economy and society. It is not satisfied that customers should be expected to fund efforts at building a positive image for the Authority. Adequate forums will be provided to B.C. Hydro over the years in which it can seek to demonstrate its role in the life of the province. The function of its public affairs should be the provision of essential information, and with the exception of conservation publicity, most of this output should be at customer request.

THE COMMISSION FINDS THAT THE CORPORATION SHOULD REFORMULATE ITS PUBLIC AFFAIRS STRATEGY INTO THE TERMS DISCUSSED ABOVE. FUTURE COST SUBMISSIONS SHOULD BE ON THIS BASIS. THE COMMISSION SEES LITTLE NEED FOR THE AUTHORITY TO EXPAND THE ROLE OF CORPORATE AFFAIRS. THE AUTHORITY IS A SERVICE INDUSTRY; ITS PRIMARY RESPONSIBILITY IS THE ACTUAL NEEDS OF ITS CUSTOMERS.

Corporate Administration

The underlying details of the Authority's Corporate Administration cost submissions may be summarized as follows:

Corporate Administration ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	2,029	N/A	2,732	3,049
Materials and services	467	N/A	872	1,016
Total	2,496	3,364	3,604	4,065
% change		34.8%	7.1%	12.8%
Electric Service Expenses				
Salaries and wages	902	1,518	1,338	1,495
Materials and services	407	494	501	585
Total	1,309	2,012	1,839	2,080
% change		53.7%	(8.6%)	13.1%
Employees (all services)				
Positions	54	57	55	55
Actual	54	54	N/A	N/A

The major source of costs in this division relates to the Legal Division and the Chairman's and President's Offices. Salary and wage costs tend to dominate expenditure levels because of the function's need for professional and support staff.

A major increase in the level of costs and expenses occurred between 1981 and 1982 which appears to be attributable to such factors as increased costs associated with financing, expansion of involvement in formal public hearing procedures, and general salary cost increases including some retroactive compensation adjustments. It appears to the Commission that the projected level of expenditures is reasonable relative to the outlook.

Corporate Group

A number of functions which support the overall short and long range planning and management processes within B.C. Hydro are organized as subdivisions of the Corporate Group. These include components of the Strategic Planning function as well as the Planning and Budget Support, Rates and Costs, Management Practices, and Hearings and Government Liaison Departments. Sub-units of the Strategic Planning function are Financial Evaluation, the Corporate Economist, Load Forecasting, and Economic and Technical Analysis sections. A Vice-President heads the overall division and a Director is in charge of the Strategic Planning activities.

A summary of revenue requirement submissions for these activities on a combined basis is as follows :

Corporate Group ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	1,876	N/A	3,696	4,126
Materials and services	468	N/A	1,843	2,013
Total	2,344	4,883	5,539	6,139
% change		108.3%	13.4%	10.8%
Electric Service Expenses				
Salaries and wages	749	1,237	1,354	1,511
Materials and services	192	808	506	550
Total	941	2,045	1,860	2,061
% change		117.3%	(9.0%)	10.8%
Employees (all services)				
Positions	60	80	95	95
Actual	55	76	N/A	N/A

A major expansion occurred in both the resources devoted to these activities and the costs of those resources between 1981 and 1982. It is apparent that the Authority plans to continue the expansion into the 1983 year at least, and quite possibly beyond. Information which underlies those planned increases in cost levels indicates the major contributing factors in cost increases to be the establishment of an Economic and Technical Analysis unit within the Strategic Planning group, and expansion in the Hearings and Government Liaison Department.

THE COMMISSION IS CONCERNED ABOUT THE NEED FOR THESE INCREASES IN LEVELS OF RESOURCES AND COSTS, AT A TIME WHEN RESTRAINT AND COST CONTAINMENT IS NECESSARY. IT IS UNCLEAR WHY AN ECONOMIC AND TECHNICAL ANALYSIS UNIT IS WARRANTED IN THE STRATEGIC PLANNING FUNCTION WHEN AN INCREASE IN THE CORPORATE ECONOMIST'S STAFF IS ALREADY BUDGETED AND ALL MANNER OF TECHNICAL COMPETENCE IS AVAILABLE WITHIN THE CORPORATION.

THE EXPANSION OF THE HEARINGS AND GOVERNMENT LIAISON DEPARTMENT STAFF COMPLEMENT FROM 9 IN 1981 TO 27 IN 1983 AND THEREAFTER, INVOLVES THE RISK OF INSTITUTIONALIZING COSTS AT A LEVEL RELATED TO THE SOMEWHAT ABNORMAL EXPERIENCE OF 1982 AND 1983 WHEN TWO MAJOR INITIAL PUBLIC HEARINGS TOOK PLACE AT ABOUT THE SAME TIME.

THE COMMISSION FINDS THAT B.C. HYDRO SHOULD REVIEW THE STAFFING LEVEL OF ITS HEARING AND GOVERNMENT LIAISON DEPARTMENT TO ENSURE THAT THE MINIMUM NECESSARY STAFF COMPLEMENT EXISTS IN THIS COORDINATING FUNCTION TO GET THE JOB DONE. NEEDED SUPPORT SHOULD BE DRAWN AT APPROPRIATE INTERVALS FROM THE CORPORATION'S OTHER RESOURCES OF KNOWLEDGE AND EXPERTISE.

THE COMMISSION IS CONCERNED ABOUT THE EXTENT TO WHICH COSTS OF THIS CORPORATE GROUP OF FUNCTIONS ARE CAPITALIZED INTO PLANT RELATED ACCOUNTS. THESE ARE ONGOING ACTIVITIES INVOLVING RELATIVELY FIXED COSTS WHICH MIGHT BETTER BE EXPENSED AS THEY ARE INCURRED. THIS MATTER HAS BEEN ADDRESSED PREVIOUSLY IN THIS DECISION.

Summary for Corporate Division

($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Corporate Affairs	3,983	4,870	6,295	7,334
Corporate Administration	2,496	3,364	3,604	4,065
Corporate Group	2,344	4,883	5,539	6,139
Total	8,823	13,117	15,438	17,538
% change		48.7%	17.7%	13.6%
Electric Service Expenses				
Corporate Affairs	1,871	2,422	2,718	3,177
Corporate Administration	1,309	2,012	1,839	2,080
Corporate Group	941	2,045	1,860	2,061
Total	4,121	6,479	6,417	7,318
% change		57.2%	(1.0%)	14.0%
Electric Service Expenses to total costs	46.7%	49.4%	41.6%	41.7%
Employees (all services)				
Positions	168	196	207	207
Actual	157	183	N/A	N/A
Costs per Employee				
Total Costs (all services)	$56.2	$69.8	$74.6	$84.3
% change		24.2%		13.0%
Electric Service expense	$26.2	$34.5	$31.0	$35.2
% change		31.7%		13.5%

(ii) Administration Divisions

The functions grouped under the Administration Divisions report to the Executive Vice-President, Administration. The functions are as follows:

(1) General Corporate Services - This group is organized under a Vice-President and is responsible for managing four component activities: Purchasing and Supply, Properties Management, General Service to the Corporation and a Computer and Management Systems function.

(2) Personnel- This group is organized under a Vice-President and charged with providing Personnel, Labour Relations, and Manpower Planning and Development services to the Corporation.

(3) Internal Audit - Responsibilities include the undertaking of special studies for management and audits of the Authority's overall activities.

(4) Finance - This is organized under a Vice-President and is composed of the Comptroller's division and the Treasurer's division.

The rail freight segment is also managed under the Administration category of the organization but it is not subject to review for revenue requirement purposes.

Costs of the Administration category as submitted by B.C. Hydro may be summarized as follows:

Administration Divisions

	Fiscal Years Ending March 31							
	1981	1982			1983			1984
($thousands)	Actual	Initial	Revised	Actual	Initial	Revised	Amended	Amended
Total costs[1]								
General Corp. Services	28,718	32,872	34,124	37,515	41,185	43,724	39,766	44,579
Personnel	7,322	8,976	9,191	9,259	10,021	10,524	9,941	11,621
Internal Audit	842	910	941	771	1,014	1,082	868	967
Finance	15,574	19,399	19,900	18,072	20,843	21,934	20,166	24,727
Executive VP	417	(in GCS)	508	501	(in GCS)	567	592	660
Total	52,873	62,157	64,664	66,118	73,063	77,831	71,333	82,554
Fixed Assets[1]								
General Corp. Services	14,854	16,625	17,332	19,369	20,010	21,370	19,578	22,266
Personnel	2,048	2,273	2,325	2,204	2,512	2,631	2,429	2,683
Internal Audit	308	328	339	420	366	390	287	319
Finance	2,982	4,199	4,327	3,942	4,455	4,729	4,052	5,131
Executive VP	22	(in GCS)	49	62	(in GCS)	55	74	83
Total	20,214	23,425	24,372	25,997	27,343	29,175	26,420	30,482
Expenses[2]								
General Corp. Services	10,727	13,188	13,620	14,369	17,125	18,064	15,891	17,669
Personnel	4,424	5,642	5,782	5,844	6,320	6,646	6,211	7,397
Internal Audit	415	453	468	312	504	538	452	504
Finance	10,250	12,261	12,552	11,378	13,224	13,862	12,589	15,320
Executive VP	259	(in GCS)	314	324	(in GCS)	351	387	431
Total	26,075	31,544	32,736	32,227	37,173	39,461	35,530	41,321

1 For all segments of operations

2 For Electric Service segment only (revenue requirement submissions)

Details of the major Electric Service administration expenses are as follows:

Electric Service Administration Expenses

	Fiscal Years Ending March 31							
	1981	1982			1983			1984
($thousands)	Actual	Initial	Revised	Actual	Initial	Revised	Amended	Amended
General Corp. Services								
Purchasing	1,671	2,232	2,291	1,548	2,412	2,545	1,554	1,781
Properties	801	1,118	1,149	1,143	1,238	1,308	1,172	1,361
General Service	6,707	8,018	8,264	9,207	9,023	9,519	10,776	12,188
Computer/ Systems	1,390	1,558	1,648	2,309	4,164	4,393	2,103	2,005
Vice-President	158	262	268	162	288	299	286	334
Total	10,727	13,188	13,620	14,369	17,125	18,064	15,891	17,669
Personnel								
Pers. Service	1,419	1,864	1,906	2,324	2,073	2,171	2,532	2,718
Labour Rel.	518	351	357	375	391	407	437	529
Manpower Trng.	2,224	3,026	3,111	2,650	3,309	3,498	2,894	3,302
Vice-President	263	401	408	495	547	570	348	848
Total	4,424	5,642	5,782	5,844	6,320	6,646	6,211	7,397
Finance								
Comptroller	6,649	8,018	8,234	7,754	8,540	9,013	9,603	11,905
Treasurer	2,925	3,537	3,597	3,194	3,913	4,043	2,464	2,836
Vice-President	676	706	721	430	771	806	522	579
Total	10,250	12,261	12,552	11,378	13,224	13,862	12,589	15,320

Taking the figures at face value the following observations can be made:

(a) A significant 25% increase in overall costs took place in 1982 relative to 1981. Not all of the increase was anticipated in the planning process.

(b) Most of the expenditure restraint efforts contemplated by B.C. Hydro for fiscal 1983 are concentrated in the capitalized costs area.

(c) Costs and expenses overall are scheduled to increase in 1984 relative to 1983 at about 16% with an average rate of increase for the two years after 1982 of about 12% per year.

(d) The functions showing the most persistent tendencies towards increasing expenses are the General Services area and the Comptroller's department.

(e) IN GENERAL, THE PROJECTED RATE OF COST INCREASE IN 1984 OVER THE BUDGET OF 1983 INDICATES THAT B.C. HYDRO DOES NOT EXPECT TO BE ABLE TO SUSTAIN ITS PROGRAM OF COST CONTAINMENT. MOST CATEGORIES OF COSTS ACCELERATE AT RATES IN EXCESS OF B.C. HYDRO'S INFLATION RATE ASSUMPTIONS.

The individual subdivisions of Administration costs are reviewed in turn hereafter.

General Corporate Services Divisions

The four internal service functions which are organized under the Vice-President, General Corporate Services are:

(a) Purchasing and Supply Division

(b) Properties Division

(c) General Services Division

(d) Computer and Management Systems Division

At March 31, 1982 approximately 15% of B.C. Hydro's employees were involved in these activities. The organization of support functions are therefore a significant part of the Corporation's operations.

(a) Purchasing and Supply

This Division has the responsibility of carrying out centralized contract tendering and other purchasing required to obtain most of the goods and services needed in the conduct of the Authority's operations. It sets standards to control purchasing procedures which take place outside the central system and develops standards for materials required by B.C. Hydro. The Division is responsible for managing the Central Stores inventories which the Authority carries to maintain availability of materials, supplies and equipment to respond to operating needs. Its activity levels and human and material resource requirements are accordingly dictated largely by levels of activity in other parts of the B.C. Hydro operating structure.

The Manager of the Purchasing and Supply Division explained in testimony that about one-third of B.C. Hydro inventories are under the control of the Central Stores Department. The balance is distributed in some 60-70 stores throughout the province. These are for the most part under the control of the Electrical Operations Group. Operation of the Central Stores is controlled by computerized systems. A number of extensions of such systems are presently under study.

Revenue Requirement submissions are as follows:

Purchasing and Supply ($ thousands)	Actual Costs 1981	Actual Costs 1982	Amended Application 1983	Amended Application 1984
Total Costs (all services)				
Salaries and wages	4,980	N/A	5,067	5,846
Materials and services	2,744	N/A	4,147	4,781
Total	7,724	10,079	9,214	10,627
% change		30.5%	(8.6%)	15.3%
Electric Service Expenses				
Salaries and wages	832	914	990	1,133
Materials and services	839	634	564	648
Total	1,671	1,548	1,554	1,781
% change		(7.4%)	0.4%	14.6%
Employees (all services)				
Positions	191	190	186	191
Actual	180	173	N/A	N/A

During the proceedings adequate evidence was not presented for the Commission to make a definitive judgement in this cost area. The Commission's concern centres on the degree to which Central, Regional and District Stores operations are integrated on a least cost basis to minimize inventory investment and risks of excessive duplication of stocks. There was also the question of harmony between local and central purchasing and the timely flow of material to work sites.

THE COMMISSION WILL EXPECT THE QUESTION OF EFFICIENCY IN INVENTORY OPERATIONS TO BE CAREFULLY ADDRESSED IN THE NEXT RATE CASE, BUT IN THE INTERIM BELIEVES THERE ARE OPPORTUNITIES FOR INTERNAL IMPROVEMENT AND A CONCOMITANT REDUCTION IN MANPOWER.

(b) Properties

This division's responsibilities include the acquisition of land and land rights for the conduct of B.C. Hydro operations. It also manages the acquired properties up to the time when they become dedicated to operational use. It handles disposals of surplus land and arranges for construction of buildings other than specialized plant of the electric, gas, and other operations. It is organized under a Division manager and functions with necessary legal and other staff in sections concerned with Acquisitions and Appraisals, Reservoir Land Management, Location Services, Building Programs, and Land Management and Development.

Revenue requirement submissions are as follows:

Properties ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	5,002	N/A	6,136	7,175
Materials and services	925	N/A	2,161	2,511
Total	5,927	7,711	8,297	9,686
% change		30.1%	7.6%	16.7%
Electric Service Expenses				
Salaries and wages	523	610	684	800
Materials and services	278	533	488	561
Total	801	1,143	1,172	1,361
% change		42.7%	2.5%	16.1%
Employees (all services)				
Positions	171	183	183	191
Actual	158	178	N/A	N/A

In original budget submissions the Division had indicated a planned expansion in its staff complement from 152 employees in 1980 to 226 positions by 1984. In the Amended Application the proposed staffing level is 183 positions in 1983 and 191 positions in 1984. This represents a 25% increase over levels considered adequate in 1980. The majority of costs are capitalized into plant accounts rather than being charged to current revenue requirements.

From the evidence it is apparent that B.C. Hydro has an increasing awareness of the public concern with respect to its extensive involvement in land related activities throughout the province.

AMONG THE COMMISSION'S CONCERNS IN THIS AREA, NOT SATISFACTORILY RESOLVED, IS THE FORECAST INCREASE IN THE MANPOWER LEVEL. THE COMMISSION IS NOT SATISFIED THAT THE INCREASES IN MANPOWER ARE ESSENTIAL PARTICULARLY AS SEVERAL PROJECTS HAVE RECENTLY BEEN DEFERRED.

It appears as well that the Division is staffed to handle maximum demands itself rather than draw on outside assistance to deal with peak period requirements, the inference being that overstaffing may exist.

THE COMMISSION EXPECTS SOME FUTURE ASSURANCE FROM B.C. HYDRO THAT THE CURRENT COST LEVELS ARE ESSENTIAL FOR THE PROPER WORKING OF THE PROPERTIES DIVISION.

(c) General Services

The General Services Division has responsibility to provide support services to B.C. Hydro's operations in five primary areas:

Service Vehicles - which involves overall administration of the vehicle fleet ranging from ascertaining special requirements, deciding on timing of replacements and maintaining vehicle use statistics, maintaining Lower Mainland vehicles and looking after credit card administration.

Office Services - such support activities as printing and reproduction of engineering drawings, maintenance of a stenographic pool and communication systems, stationery and mail services, provision of office machines, management of office space, etc.

Building Services - operation and maintenance of buildings in the Lower Mainland area.

Security Services - provision of guards and security devices and conducting or contributing to investigations of crimes against Authority property and advising generally on security matters.

Food Services - Lower Mainland staff cafeterias and coffee services as well as the Head Office tobacco and sundries counter operations.

The revenue requirement submissions of the Authority are as follows:

General Services ($ thousands)	Actual Costs 1981	Actual Costs 1982	Amended Application 1983	Amended Application 1984
Total Costs (all services)				
Salaries and wages	N/A	N/A	9,696	11,050
Materials and services	N/A	N/A	7,631	8,682
Total	10,931	14,297	17,327	19,732
% change		30.8%	21.2%	13.9%
Electric Service Expenses				
Salaries and wages	3,260	4,635	6,223	7,093
Materials and services	3,447	4,572	4,553	5,095
Total	6,707	9,207	10,776	12,188
% change		37.3%	17.0%	13.1%
Employees (all services)				
Positions	495	497	507	507
Actual - Regular	465	483	N/A	N/A
- Temporary	117	188	N/A	N/A
Total	582	671		

The General Services department is responsible for a number of activities which do not show up directly in the Authority's divisional cost analyses. The major one is the management of the Corporation's service vehicle fleet of about 3,500 units which is operated on the basis of charging-out the costs to user departments. The same charge-out arrangement applies to some printing and stenographic services provided by the department. In addition, General Services operates cafeterias within B.C. Hydro which generate revenues to offset costs.

THE EVIDENCE INDICATES THAT THERE HAS BEEN A PERSISTENT INCREASE IN COST AND EXPENSE LEVELS AT RATES WHICH ARE WELL IN EXCESS OF EXPERIENCED AND EXPECTED INFLATION. THE REASON APPEARS TO BE HIGHER DEMAND FROM WITHIN B.C. HYDRO FOR BUILDING SPACE AND OFFICE SUPPORT SERVICES. THESE IN TURN WOULD APPEAR TO BE DRIVEN UPWARDS BY B.C. HYDRO'S OVERALL PLANS FOR STAFF EXPANSION AND RELATED OFFICE SPACE REQUIREMENTS.

This Division reports actual staff levels considerably in excess of budgeted full time positions. Therefore, it would seem that its expansion of activities and costs has been less than properly anticipated or planned. There are strong indications that the increase in General Services staffing and costs levels is due to overhead or administrative factors rather than the requirements of the operating divisions.

THE AUTHORITY MUST RIGIDLY BUDGET AND MONITOR THIS COST AREA TO PREVENT BURGEONING EXPENSE. IT MUST ENSURE THAT THERE IS NO UNNECESSARY DUPLICATION OF COST. THE COMMISSION WILL REVIEW THIS AREA AND B.C. HYDRO'S EFFORTS AT COST CONTAINMENT AT THE NEXT PROCEEDING.

(d) Computer and Management Systems

This Division has overall responsibility for the development, operation, maintenance and expansion of computerized information and analysis systems within B.C. Hydro. Its organization is structured to be responsive to the information needs of user departments and its operations are accounted for on the basis of charging out its costs to the user divisions.

The two main units in the Computer and Management Systems Division are an Information Systems group dealing with general information systems such as Billing and Customer records, etc., and a Technical Systems group dealing with engineering and operating information system requirements. The Division also has a Planning Department with responsibility for working with user Divisions throughout the Authority in making long range plans with respect to computer support for various activities and acquisition of hardware and software as needed. A Divisional Administration group has responsibility for developing standards and instructions, providing project management services related to computer system development projects and operation of the computer cross charge accounting systems.

Revenue requirement submissions are as follows:

Computer and Management Systems ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	10,369	N/A	14,381	16,042
Materials and services net of user charges	(6,507)		(9,816)	(11,932)
Net Costs	3,862	5,154	4,565	4,110
% change		33.5%	(11.4%)	(10.0%)
Electric Service Expenses				
Salaries and wages	4,944	9,457	6,630	7,835
Materials and services net of user charges	(3,554)	(7,148)	(4,527)	(5,830)
Net Costs	1,390	2,309	2,103	2,005
% change		66.1%	(8.9%)	(4.7%)
Employees (all services)				
Positions	393	414	414	414
Actual	372	412	N/A	N/A

This Division was not reviewed in detail during the proceedings. The Commission therefore cannot state conclusions on the level of manpower and costs.

However, the Division has been subject to scrutiny by B.C. Hydro and several years ago a major review of the development history, operations and future plans of the Division was undertaken by external consultants. The report on the review made recommendations for improving the effectiveness with which computers are and could be used in the Authority's operations. Indications are that B.C. Hydro has begun to implement various of the consultant's recommendations in order to produce an appropriately organized computer and information processing service function responsive to developing user needs. The extent to which the new structure is proving effective in the control and improvement of the information system function was satisfactorily addressed by the Authority in the proceedings.

Summary for General Corporate Services

($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Purchasing and Supply	7,724	10,079	9,214	10,627
Properties	5,927	7,711	8,297	9,686
General Services	10,931	14,297	17,327	19,732
Computer/Management Systems	3,862	5,154	4,565	4,110
Vice-President	274	274	363	424
Total	28,718	37,515	39,766	44,579
% change		30.6%	6.0%	12.1%
Electric Service Expenses				
Purchasing and Supply	1,671	1,548	1,554	1,781
Properties	801	1,143	1,172	1,361
General Services	6,707	9,207	10,776	12,188
Computer/Management Systems	1,390	2,309	2,103	2,005
Vice-President	158	162	286	334
Total	10,727	14,369	15,891	17,669
% change		34.0%	10.6%	11.2%
Electric Service Expenses To Total Costs	37.4%	38.3%	40.0%	39.6%
Employees				
Positions	1,253	1,287	1,301	1,306
Actual	1,294	1,436	N/A	N/A
Costs per Employee	On Actual		On Position	
Total Costs (all services)	$22.2	$26.1	$30.6	$34.1
% change		17.6%		11.4%
Electric Service Expenses	$ 8.3	$10.0	$12.2	$13.5
% change		20.5%		10.7%

Personnel Divisions

The three primary management functions organized under the Vice-President for Personnel are Personnel Services, Labour Relations, and Manpower Planning and Development. Generally the Division has responsibility for such things as coordination and direction of labour negotiations and administration of collective agreements; formulation and administration of personnel policies related to salary administration, employee benefits, employment standards and health services and safety; and policy and administration involvement in training and development.

(a) Personnel Services

The Personnel Services Group is organized into Head Office Personnel; Health Services; Benefit Plans; Supervisory, Professional and Confidential (SPC) employees Job Evaluation Unit; Office and Technical Employees Union (OTEU) employees Job Evaluation Unit; Salary Administration; and an Office of the Division Manager.

The Group's basic responsibilities are to develop and administer personnel policies within B.C. Hydro so as to make effective use of B.C. Hydro's human resources. It is involved in maintaining basic employee records, the process of recruiting and selecting employees and performing job evaluations and organizational analyses as well as other personnel related functions.

Revenue requirement submissions are as follows:

Personnel Services ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	2,245	N/A	3,071	3,388
Materials and services	788	N/A	2,018	2,089
Total	3,033	4,656	5,089	5,477
% change		53.5%	9.3%	7.6%
Electric Service Expenses				
Salaries and wages	842	1,228	1,391	1,534
Materials and services	577	1,096	1,141	1,184
Total	1,419	2,324	2,532	2,718
% change		63.8%	9.0%	7.3%
Employees (all services)				
Positions	72	92	93	91
Actual	82	100	N/A	N/A

FROM THE ABOVE DATA AND EVIDENCE PRESENTED AT THE HEARING IT APPEARS PROBABLE THAT THE OVERALL LEVELS OF STAFF IN THE PERSONNEL DIVISION AND THE COSTS ASSOCIATED WITH THE FUNCTION ARE EXCESSIVE RELATIVE TO EXTERNAL INDUSTRY STANDARDS. FOR EXAMPLE, THE DIVISION'S OVERALL STAFF LEVELS WERE ACTUALLY PLANNED TO INCREASE EVEN THOUGH THE DIVESTITURE OF PASSENGER TRANSIT OPERATIONS REDUCED THE NUMBER OF EMPLOYEES IN THE TOTAL B.C. HYDRO ORGANIZATION.

THERE DOES NOT SEEM TO BE A CLEAR DIRECTION TO THE DIVISION SPELLING OUT ITS OBJECTIVES AND HOW IT IS INTENDED TO GO ABOUT ACHIEVING THOSE OBJECTIVES. THERE IS A LACK OF THE FOCUS NECESSARY TO GIVE THE DIVISION A CLEAR SENSE OF DIRECTION AND ESTABLISH A LEVEL OF DESIRED PERFORMANCE. SIMILARLY THERE IS A LACK OF WELL DEFINED STRATEGIC PLANS WITH DEFINED OBJECTIVES, DETAILED IMPLEMENTATION PROGRAMS, AND ARRANGEMENTS TO MEASURE WORKLOADS AND PERFORMANCE AGAINST TIMING AND ACHIEVEMENT TARGETS.

THE COMMISSION IS OF THE VIEW THAT THERE IS MUCH SCOPE FOR IMPROVEMENT IN THE MANAGEMENT AND PERFORMANCE OF THE PERSONNEL DIVISION. WHILE IT IS PERHAPS A TRITE OBSERVATION IN SOME RESPECTS, IT IS NONETHELESS TRUE THAT THE AUTHORITY'S PEOPLE RESOURCES ARE AS ESSENTIAL TO ITS EFFECTIVE PERFORMANCE AS THE DAMS AND TRANSMISSION LINES, ETC. WHICH COMPRISE ITS PHYSICAL PLANT. BOTH HAVE TO BE MANAGED FOR EFFICIENT PERFORMANCE. THE PERSONNEL DIVISION SHOULD BE THE LEADING EDGE OF RIGOROUS MEASUREMENT IN THE HUMAN RESOURCES AREA AND SHOULD INSPIRE COMPARABLE EFFORTS IN OTHER PARTS OF THE ORGANIZATION.

(b) Labour Relations

The Labour Relations group within the Personnel Division is responsible for the detailed process of collective agreement administration with the various bargaining groups. The group is organized into a Wage Section to deal with International Brotherhood of Electrical Workers Union locals in the Electric and Gas Divisions; a Salary Section dealing with agreements respecting OTEU employees, the B.C. Nurses Union, and B.C. Hydro's Management Relations Research Section with responsibility for collective bargaining and research activities.

The Labour Relations group develops labour relations policy recommendations, provides leadership in negotiating collective agreements, assists management in administering such contracts, and provides support in resolving grievances and other disputes.

Revenue requirement submissions are as follows:

Labour Relations ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	521	N/A	681	845
Materials and services	639	N/A	200	221
Total	1,160	756	881	1,066
% change		(34.8%)	16.5%	21.0%
Electric Service Expenses				
Salaries and wages	202	297	338	419
Materials and services	316	78	99	110
Total	518	375	437	529
% change		(27.6%)	16.5%	21.1%
Employees (all services)				
Positions	20	22	21	23
Actual	20	19	N/A	N/A

The view of the external consultants was that the labour relations strategy emphasizes "crisis management" rather than developing plans and programs intended to prevent crises and improve labour/management relationships. Grievance and disciplinary actions within B.C. Hydro tend to be at levels at or below usual industry experience standards. As attendance and turnover data for B.C. Hydro were better than the average for a comparative sample of companies, a conclusion might be drawn that there is good relative performance on B.C. Hydro's part. However, the high wage and compensation settlements are probably primarily responsible for relatively good experience in the areas of grievances, absenteeism and turnover ratios.

ALTHOUGH A DEGREE OF "CRISIS" RELATED MANAGEMENT ACTIVITY IS INEVITABLE IN LABOUR RELATIONS IT APPEARS TO THE COMMISSION THAT A POSITIVE EFFORT TOWARDS DEVELOPING CLEAR STRATEGIES AND PLANS TO MANAGE LABOUR RELATIONS AND CREATE A MORE POSITIVE LABOUR/MANAGEMENT RELATIONS ATMOSPHERE WOULD BE USEFUL.

(c) Manpower Planning and Development

The Manpower Planning and Development Division explained their organizational structure, operational role and responsibilities in filed material in the following terms:

"Organization

The manpower planning and development division is comprised of three departments. The safety engineering department is subdivided into four sections: safety engineering, fire prevention, live line training and industrial hygiene. The manpower planning department includes manpower planning and personnel research, psychological services, the staff counsellor, and industrial relations trainee administration. The manpower development department is comprised of three sections: management and supervisory training, technical training and apprenticeship administration.

Role & Responsibilities

The primary purpose of the division is to provide consultative and other support services to corporate and divisional line management in safety, fire prevention, industrial hygiene, psychological testing, employee counselling, personnel research, manpower planning, and the training and development of management, supervisory and other employees.

Responsibilities in these fields include the formulation and development of corporate policy, providing analyses for monitoring the administration of policies and the cost and effectiveness of services, designing appropriate programs and assisting as required in the implementation and delivery of these programs and co-ordination of corporate-wide programs through field personnel departments. In addition, the manpower development department operates a trade school under licence to the provincial department of labour, for the training of lineman apprentices, and administers the operation of the joint labour management apprenticeship program for all divisions."

The staff complement of the group is distributed 18% in the Manpower Planning area, 34% in Manpower Development, 45% in Safety Engineering and 3% to departmental administration. Thus safety related activities involving both employees and the general public are a major concern of this group even though the Divisional title in the organizational structure is not strongly indicative of this area of responsibility.

The Revenue requirement submissions are as follows:

Manpower Planning & Development ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	1,723	N/A	2,134	2,447
Materials and services	954	N/A	1,348	1,530
Total	2,677	3,185	3,482	3,977
% change	19.0%	9.3%	14.2%	
Electric Service Expenses				
Salaries and wages	1,386	1,608	1,762	2,018
Materials and services	838	1,042	1,132	1,284
Total	2,224	2,650	2,894	3,302
% change	19.2%	9.2%	14.1%	
Employees (all services)				
Positions	70	71	68	70
Actual	61	63	N/A	N/A

R.J. Clifford and Associates review of this function within the Personnel Division focussed primarily on the planning and development aspects. It was assumed that execution of personnel development strategies would be indicative of how the function contributed to prospects for future successful operations within B.C. Hydro, since human resources are a critical input to that prospective result. The consultants concluded that while some components of an adequate performance base were in place a great deal more could and should be done by B.C. Hydro. The available information on succession planning, for example, was seen as generally vague and incomplete and largely inadequate to the needs of an organization of the significance of B.C. Hydro. The impression is that B.C. Hydro has just started developing an adequate and integrated planning strategy and program.

In the manpower development area the consultants observations were both favourable and unfavourable. A more thorough assessment of skills and abilities needed in various positions was seen to be required as a basic input to the overall development process. Development effort links to the performance appraisal process appeared to be reasonably good and course structuring was seen as realistic. However, lack of compulsory course attendance requirements and insufficient line management follow-up of training were also noted in the review. Concern was also expressed that senior management support of development programs might not be as strong as it should be for ensuring effective execution.

Summary for Personnel Divisions

($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Personnel Services	3,033	4,656	5,089	5,477
Labour Relations	1,160	756	881	1,066
Manpower Planning & Develop.	2,677	3,185	3,482	3,977
Vice-President	452	662	489	1,101
Total	7,322	9,259	9,941	11,621
% change		26.5%	7.4%	16.9%
Electric Service Expenses				
Personnel Services	1,419	2,324	2,532	2,718
Labour Relations	518	375	437	529
Manpower Planning & Develop.	2,224	2,650	2,894	3,302
Vice-President	263	495	348	848
Total	4,424	5,844	6,211	7,397
% change		32.1%	6.3%	19.1%
Electric Service Expenses to Total Costs	60.4%	63.1%	62.5%	63.7%
Employees				
Positions	166	189	187	188
Actual	166	188	N/A	N/A
Cost per Employee	On Actual		On Position	
Total Costs (all services)	44.1	49.0	53.2	61.8
% change		11.1%		16.2%
Electric Service Expenses	26.7	31.1	33.2	39.3
% change		16.5%		18.4%

Finance and Internal Audit

While the Finance and Internal Audit Divisions within B.C. Hydro are organized as independent functions, they are here considered together under one heading. The Authority's Finance Division is composed of two functions under a Vice-President, Finance: the Comptroller's division, having basic responsibility for accounting, costing, and financial controls applicable to the Corporation's operations; and the Treasurer's division which deals with financing and funds management. The Internal Audit Division has responsibility for examining compliance with policy, procedure, and other requirements across the overall B.C. Hydro operating structure.

(a) Comptroller's Division

The Comptroller's Division has responsibility for developing and maintaining the Authority's accounting systems, financial reporting principles and practices, and internal control and management accounting reporting systems to record and safeguard the Corporation's assets and revenues. It is organized into Corporate, Plant, and Cost Accounting sections as well as groups responsible for Accounts Payable, Railway Accounting, Customer Accounts and Taxation and Accounting Research matters. The Division is a major user of the Authority's computerized information processing systems.

The revenue requirement submissions are as follows:

Comptroller's Division ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	6,367	N/A	8,176	10,183
Materials and services	3,957	N/A	7,559	9,448
Total	10,324	12,299	15,735	19,631
% change		19.1%	27.9%	24.8%
Electric Service Expenses				
Salaries and wages	3,500	4,146	4,640	5,779
Materials and services	3,149	3,608	4,963	6,126
Total	6,649	7,754	9,603	11,905
% change		16.6%	23.8%	24.0%
Employees (all services)				
Positions	279	284	306	314
Actual	272	279	N/A	N/A

Some part of the planned expansion in Divisional costs and staffing appears to have been intended to accommodate anticipated demands relating to regulatory review. To some degree the plans also involved recognition that there were a variety of deficiencies in the Authority's past record keeping practices in areas such as plant and depreciation accounting in comparison to what is normally needed and expected for regulatory purposes. WHILE THE COMMISSION RECOGNIZES THAT SOME NEED TO ADAPT THE AUTHORITY'S ACCOUNTING PROCEDURES TO REGULATORY REQUIREMENTS IS PROBABLY NECESSARY, IT BELIEVES CARE SHOULD BE TAKEN TO ENSURE THAT AN OVER-RESPONSE DOES NOT OCCUR. GENERALLY THE RATE REVIEW PROCESS SHOULD BE CAPABLE OF FUNCTIONING WITH THE SAME BASIC INFORMATION THAT MANAGEMENT USES, PROVIDED IT IS APPROPRIATELY CODED AND RECORDED.

(b) Treasurer's Division

Revenue requirement submissions are as follows:

Treasurer's Division ($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	1,806	N/A	1,387	1,720
Materials and services	2,463	N/A	1,904	2,112
Total	4,269	4,932	3,291	3,832
% change		15.5%	(33.3%)	16.4%
Electric Service Expenses				
Salaries and wages	968	1,043	819	1,016
Materials and services	1,957	2,151	1,645	1,820
Total	2,925	3,194	2,464	2,836
% change		9.2%	(22.9%)	15.1%
Employees (all services)				
Positions	72	77	55	59
Actual	75	77	N/A	N/A

The Treasurer's Division has primary responsibility for raising the funds required to finance the Authority's plant additions; for managing cash and banking functions; for administering and servicing existing and future debt; and for arranging insurance protection for the Corporation's assets. The latter requirement is the major single item of cost associated with the Treasury function. Most of the other costs relate to cash services functions such as the Customer Payment Centre operations.

(c) Internal Audit

Revenue requirement submissions are as follows:

Internal Audit ($ thousands)	Actual Costs 1981	Actual Costs 1982	Amended Application 1983	Amended Application 1984
Total Costs (all services)				
Salaries and wages	756	N/A	753	840
Materials and services	86	N/A	115	127
Total	842	771	868	967
% change		(8.4%)	12.6%	11.4%
Electric Service Expenses				
Salaries and wages	388	287	392	438
Materials and services	27	25	60	66
Total	415	312	452	504
% change		(24.8)%	44.9%	11.5%
Employees (all services)				
Positions	22	23	19	19
Actual	20	26	N/A	N/A

Although it falls under the Administration group for organizational structure purposes, the Internal Audit reporting responsibilities are to the Audit Committee of the Board of Directors. B.C. Hydro's policy on the Internal Audit function stipulates that no limits should exist on matters which may be subjected to audit review. The policy emphasizes the review of the controls being built into the design of computer systems and the early review of major contract commitments.

WHILE THE OBJECTIVES OF THE INTERNAL AUDIT GROUP APPEAR TO BE APPROPRIATE, THE COMMISSION WAS NOT ABLE TO JUDGE FROM THE EVIDENCE THE EXTENT TO WHICH IT TESTS THE EFFICIENCY AND EFFECTIVENESS OF THE MANAGEMENT OF FUNDS AND RESOURCES.

Summary for Finance, Internal Audit,
Executive Vice-President

($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Comptroller's	10,324	12,299	15,735	19,631
Treasurer's	4,269	4,932	3,291	3,832
Vice-President	981	841	1,140	1,264
Sub-Total	15,574	18,072	20,166	24,727
Internal Audit	842	771	868	967
Executive Vice-President	417	501	592	660
Total	16,833	19,344	21,626	26,354
% change	14.9%		11.8%	21.9%
Electric Service Expenses				
Comptroller's	6,649	7,754	9,603	11,905
Treasurer's	2,925	3,194	2,464	2,836
Vice-President	676	430	522	579
Sub-Total	10,250	11,378	12,589	15,320
Internal Audit	415	312	452	504
Executive Vice-President	259	324	387	431
Total	10,924	12,014	13,428	16,255
% change	10.0%		11.8%	21.1%
Electric Service Expenses to Total Costs	64.9%	62.1%	62.1%	61.7%
Employees				
Positions	393	404	403	415
Actual	384	399	N/A	N/A
Costs per divisional employee				
	On Actual		On Position	
Total costs (all services)	$43.8	$48.5	$53.7	$63.5
% change	10.7%		18.2%	
Electric Service Expenses	$28.4	$30.1	$33.3	$39.2
% change	6.0%		17.7%	

(iii) OPERATIONS DIVISIONS

The Operations Divisions within B.C. Hydro have the responsibility to provide and maintain reliable electrical and gas services to customers. These divisions incur and manage the largest share of operating and capital asset costs involved in providing customer services. The overall Operations Division group is organized under an Executive Vice-President, Operations and consists of Electrical Operations, Electrical Engineering, Gas Operations, the Energy Conservation Division, and the Research and Development Division.

The Electrical Operations Group is the largest organizational unit within B.C. Hydro. This Group is divided into five geographic divisions (Lower Mainland, Central Interior, North Coast, South Interior, and Vancouver Island Divisions) and is supported by an Operations Engineering Division and an Operations Administration Division. All are directed by a Vice-President for Electrical Operations. Included in the activities managed by the Electrical Operations divisions are recurring fixed asset expenditures primarily related to maintaining and expanding the distribution end of the electrical supply process.

The Electrical Engineering Group is also included in the Operations category for cost purposes. The majority of the costs are capitalized each year either as plant or Survey and Investigation costs as the primary focus of the activity is on generation, transmission and substation construction activities, and research on future plant additions and other system developments. The Group is organized into six divisions plus a Construction Department, Personnel Department and an Engineering Group Comptroller. The Divisions are System Engineering, Engineering Services and four "project" divisions - Hydroelectric Generation, Thermal Generation, Transmission and Station Project groups.

The Research and Development activities and the department charged with promoting Energy Conservation are also organized as separate sub-units within the overall Operations Division.

The following table summarizes the various cost submissions for the 1981 to 1984 period made in connection with the Electrical Operations Groups (as defined to exclude Gas Operations Group, which is reviewed under the Lower Mainland Gas Section of this Decision).

Electrical Operations Costs Submissions

($000)	1981 Actual	Fiscal Years Ending March 31 1982 Initial	1982 Revised	1982 Actual	1983 Initial	1983 Revised	1983 Amended	1984 Amended
Total Costs[1]								
Electrical Operations	261,693	270,210	279,554	285,091	297,027	316,145	271,350	307,065
Engineering	68,350	82,045	84,053	87,611	93,261	98,466	96,268	109,054
Energy Conservation	2,371	2,894	2,967	2,843	3,090	3,262	3,175	3,803
Research & Development	4,035	4,992 incl.	5,132	5,284	5,987 incl.	6,329	6,271	8,050
Executive VP	350	above	394	539	above	444	578	671
Total	336,799	360,141	372,100	381,368	399,365	424,646	377,642	428,643
Fixed Assets[1]								
Electrical Operations	106,281	106,587	109,297	107,703	116,503	122,643	85,065	97,084
Engineering	65,801	79,284	81,222	82,446	90,254	95,282	92,672	104,842
Energy Conservation	-	-	-	-	-	-	-	-
Research & Development	974	1,235 incl.	1,272	1,522	1,481 incl.	1,566	1,813	2,339
Executive VP	167	above	186	332	above	222	359	420
Total	173,223	187,106	191,977	192,003	208,238	219,713	179,909	204,685
Expense[2]								
Electrical Operations	150,914	158,892	165,374	172,660	175,171	187,819	181,279	204,352
Engineering	2,545	2,756	2,825	5,159	3,001	3,178	3,596	4,212
Gas Operations	34	55	57	50	60	63	54	59
Energy Conservation	1,287	1,564	1,604	1,559	1,666	1,760	1,750	2,096
Research & Development	2,861	3,505 incl.	3,602	3,579	4,206 incl.	4,444	4,241	5,429
Executive VP	133	above	153	151	above	177	160	183
Total	157,774	166,772	173,615	183,158	184,104	197,441	191,080	216,331

1 For all segments of operations

2 For Electric Service Segment only (revenue requirement submission)

A related summary of changes in cost levels over this period is as follows:

($thousands)	Absolute Changes: Actual 1982 over Actual 1981	Absolute Changes: Amended 1983 over Actual 1982	Absolute Changes: Amended 1984 over Amended 1983	Percentage Changes: Actual 1982 over Actual 1981	Percentage Changes: Amended 1983 over Actual 1982	Percentage Changes: Amended 1984 over Amended 1983
Total Costs[1]						
Electrical Operations	23,398	(13,741)	35,715	8.9%	(4.8%)	13.1%
Engineering	19,261	8,657	12,786	28.1	9.8	13.2
Energy Conservation	472	332	628	19.9	11.6	19.7
Research & Development	1,249	987	1,779	30.9	18.6	28.3
Executive VP	189	39	93	54.0	7.2	16.0
Total	44,569	(3,726)	51,001	13.2	(1.0)	13.5
Fixed Assets[1]						
Electrical Operations	1,422	(22,638)	12,019	1.3%	(21.0%)	14.1%
Engineering	16,645	10,226	12,170	25.3	12.4	13.1
Energy Conservation	-	-	-	-	-	-
Research & Development	548	291	526	56.2	19.1	29.0
Executive VP	165	27	61	98.8	8.1	16.9
Total	18,780	(12,094)	24,776	10.8	(6.2)	13.7
Expense[2]						
Electrical Operations	21,746	8,619	23,073	14.4%	4.9%	12.7%
Engineering	2,614	(1,563)	616	102.7	(30.2)	17.1
Gas Operations	16	4	5	47.0	8.0	9.2
Energy Conservation	272	191	346	21.1	12.2	19.7
Research & Development	718	662	1,188	25.0	18.4	28.0
Executive VP	18	9	23	13.5	5.9	14.3
Total	25,384	7,922	25,251	16.0	4.3	13.2

1 For all segments of operations (but excluding Gas Operations Divisions)

2 For Electric Service Segment only (revenue requirement submission)

Electrical Operations

The Electrical Operations Group operates and maintains all generation, transmission, transformation and distribution plant on the Electric System. It designs and constructs all distribution facilities up to and including 60,000 volts. It conducts all commercial activities associated with the delivery and sale of electricity throughout the Authority's service area. It acts as the regional representative of the Corporation to customers and the public throughout the province. For purposes of this Group the total provincial service area is divided into five regional Divisions each under the charge of a Division Manager. 57 power districts exist as subsidiary organizational units within the five major Divisions. Serving the regional Divisions with centralized support are an Operations Engineering Group and an Operations Administration Division.

The Operations Engineering Division has technical responsibility to control the operation of the integrated electric system to see that hydro, thermal, and purchased energy are used to achieve maximum economy consistent with adequate security. It coordinates planned outages for maintenance purposes as well as other activities of the Regions and develops standards and procedures for inspection and testing of the system to ensure that adequate maintenance is carried out. It operates the communication systems, controls and tests the protective relay system, and maintains liaison with the Engineering Division on system design matters, and with Purchasing and Supply on equipment acquisition matters.

The Operations Administration Division provides business services support to the Region and District offices on matters such as Tariff interpretations, customer accounting and collections, major sales contract negotiations, and standardization of commercial methods and procedures. It has liaison links with the Finance, Rates, and Purchasing Departments on matters of common interest and to the central Personnel Group on matters such as Safety and Training as they relate to Operations and it coordinates these activities among the Operations Divisions. Coordination and administration of budget and load forecast submissions, computer service requirements of the Divisions, and development of uniform management performance standards are other functions regularly performed by the centralized Operations administrative group. It carries out Distribution System Planning and establishes distribution technical standards.

Each of the five Regional Divisions has direct responsibility to operate and maintain all electrical plant within its region - ranging from dams and reservoirs through transmission and distribution lines to communications and control systems. Each Division plans, designs and constructs the distribution plant at 60 kV and below which is required to meet customer needs and maintains liaison with government departments in connection with extensions and modifications to the distribution system. Most Regional Divisions also operate central meter shops to repair, test, and supply electric meters to the Regions. At the commercial end of Divisional responsibilities are activities such as meter reading and account collection, responding to requests for service and information respecting rates and other matters, and providing technical advisory services in response to customer enquiries.

Revenue requirement submissions are as follows:

Electrical Operations ($ thousands)	Actual Costs 1981	Actual Costs 1982	Amended Application 1983	Amended Application 1984
Total Costs (all services)				
Salaries and wages	121,704	N/A	150,519	165,969
Materials and services	139,989	N/A	120,831	141,096
Total	261,693	285,091	271,350	307,065
% change		8.9%	(4.8%)	13.2%
Electric Service Expenses				
Salaries and wages	81,576	93,061	100,566	111,883
Materials and services				
Fuel for generation	10,766	12,487	15,377	17,096
Power Purchases/Wheeling	17,705	18,404	13,990	13,406
Other	40,867	48,708	51,346	61,967
Sub-Total	69,338	79,599	80,713	92,469
Total	150,914	172,660	181,279	204,352
% change		14.4%	5.0%	12.7%
Employees				
Operating Divisions				
Lower Mainland	1,470	1,333	1,410	1,402
Central Interior	596	586	582	595
North Coast	213	224	231	240
South Interior	642	693	700	736
Vancouver Island	701	709	730	740
Sub-total	3,622	3,545	3,653	3,713
Operations Engineering	345	340	346	360
Operations Administration	159	150	204	208
Vice-President	6	4	5	5
Total	4,132	4,039	4,208	4,286
Positions	4,134	4,178	N/A	N/A

Of the information filed by B.C. Hydro in response to Commission and Intervenor requests for evidence respecting managerial emphasis on efficiency, productivity and cost control, that provided by the Operations groups was most useful. Material filed by the Electrical Operations group, which consisted mostly of copies of internal management documents concerning control of operations and costs, indicated that top management instructions for stringent budgeting were taken seriously. The material, which was not developed specifically for the rate hearing, demonstrated an awareness of an ongoing need to measure and monitor performance and to set standards against which actual achievements can be measured. Efforts to ascertain efficiency measures and trends by considering input/output relationships for various activities, and to derive and track unit cost relationships were also evident. There appeared to be conscious efforts to establish and control employee levels that bore a relationship to basic service demands.

The major limitation in the material filed by the Electrical Operations Division is that it is only a recapitulation of historical efforts at cost and operating control. This may be simply a problem of the timing lags in the overall process of developing information and plans within the B.C. Hydro organization.

WHILE THE BASIC DATA ON REVENUE REQUIREMENT SUBMISSIONS RESPECTING ELECTRICAL OPERATIONS COSTS SUMMARIZED ABOVE PROVIDE AN INDICATION THAT THE DIVISION HAS TAKEN RESTRAINT OBJECTIVES SERIOUSLY IN PLANNING FOR FISCAL 1983, IT IS TO BE NOTED THAT EFFICIENCY AND COST CONTROL ARE RELATIVE CONCEPTS. TO BE TOTALLY CONVINCING, OPERATING RESULTS MUST STAND THE TEST OF COMPARISON WITH OTHER SIMILAR ENTITIES AND INDUSTRY AT LARGE. WE GAINED THE IMPRESSION THAT APPROPRIATE PRODUCTIVITY AND EFFICIENCY COMPARISIONS ARE HARD TO COME BY.

Electrical Engineering

The various groups within the Electrical Engineering Division are primarily concerned with present and future additions of capital plant in the electric system. In the normal course something in excess of 95% of the costs incurred in those functions are capitalized and eventually become charges to future revenue requirements through depreciation charges. Thus in terms of immediate revenue requirement the consequences of Engineering Division functions are relatively insignificant.

The Revenue Requirement submissions are as follows:

Electrical Engineering ($ thousands)	Actual Costs 1981	Actual Costs 1982	Amended Application 1983	Amended Application 1984
Total Costs (all services)				
Salaries and wages	46,711	N/A	63,509	74,612
Materials and services	21,639	N/A	32,759	34,442
Total	68,350	87,611	96,268	109,054
% change		28.2%	9.9%	13.3%
Electric Service Expenses				
Salaries and wages	2,061	2,685	2,440	2,863
Materials and services	484	2,474	1,156	1,349
Total	2,545	5,159	3,596	4,212
% change		102.7%	(30.3%)	17.1%
Employees				
Engineering Service	120	154	165	170
System Engineering	159	162	165	168
Station Projects	242	262	247	234
Thermal Generation Projects	26	46	62	62
Transmission Projects	227	221	224	225
Hydro Generation Projects	365	410	403	408
Vice-President	38	40	36	37
Hydro Force Construction	127	126	125	125
Sub-Total	1,304	1,421	1,427	1,429
Hydro Force Temporary	536	583		
Total	1,840	2,004		
Positions	1,301	1,435		

The major category of Engineering Division costs is salaries and wages mostly of professional staff of one sort or another.

Considerable expansion in staffing levels appears to be in prospect. The information assembled prior to the institution of serious restraint efforts for the 1983 fiscal year did not disclose much dedication to restraint. The filed revisions did not, however, have the benefit of revised 1982 load growth projections and their probable consequences for re-defining the time profile of system development plans. Nor did they reflect the decision to defer the Hat Creek project indefinitely. There would accordingly appear to be significant room for cost containment revisions to the Engineering Division plans in accordance with the data filed in the Amended Application.

THE COMMISSION EXPECTS THAT AN APPROPRIATE REVIEW WILL BE MADE IN THIS AREA EVEN THOUGH IT CAN ONLY HAVE SIGNIFICANCE TO THE LONGER-TERM REVENUE REQUIREMENTS OF THE AUTHORITY. B.C. HYDRO'S DECLARED COMMITMENT TO LOWEST LONG-TERM COSTS IMPLIES THAT ITS BASIC OPERATING PHILOSOPHY REQUIRES RIGOROUS CONTAINMENT OF ENGINEERING CAPITAL COSTS.

THE COMMISSION FOUND THE MATERIAL SUBMITTED TO SUPPORT THE PRUDENCY AND EFFICIENCY OF COST LEVELS ASSOCIATED WITH ENGINEERING ACTIVITIES TO BE INADEQUATE. MORE USEFUL INFORMATION WILL BE EXPECTED IN THE NEXT B.C. HYDRO APPLICATION.

Energy Conservation

The Energy Conservation Division is organized into two departments. The technical aspects come under the Energy Use Engineering Department which develops proposals on such things as energy management, prudent energy usage and efficiency applications and considerations bearing on energy alternatives available to customers. The information promotion activities are managed by an Energy Communications Department which is organized into three sections. The Industrial Liaison group focuses on industry energy use and promotion of efficiency and conservation at trade shows, etc. and also administers an Insulation Finance Plan. The Community Liaison section focuses on local governmental units, provides information to the public generally, and to libraries and schools. A Planning Section works on conservation policy for B.C. Hydro and on developing new programs and methods of energy conservation.

The Revenue requirement submissions are as follows:

Energy Conservation ($ thousands)	Total Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	1,574	N/A	2,164	2,654
Materials and services	797	N/A	1,011	1,149
Total	2,371	2,843	3,175	3,803
% change		19.9%	11.7%	19.8%
Electric Service Expenses				
Salaries and wages	896	1,042	1,201	1,473
Materials and services	391	517	549	623
Total	1,287	1,559	1,750	2,096
% change		21.1%	12.3%	19.8%
Employees				
Positions	58	55	63	65
Actual	51	56	N/A	N/A

THE DIVISION IS ORGANIZED UNDER THE GAS SECTION OF B.C. HYDRO OPERATIONS. AS INDICATED PREVIOUSLY, THE COMMISSION CONSIDERS THAT PERHAPS CONSERVATION ACTIVITIES SHOULD BE AN ADJUNCT OF STRATEGIC PLANNING AND THEREFORE BE ORGANIZED UNDER THE CORPORATE DIVISION AND HAS INSTRUCTED THE AUTHORITY TO EXAMINE SUCH AN ORGANIZATIONAL CHANGE.

THE PRIMARY EMPHASIS OF THE DIVISION APPEARS TO BE ON THE COMMUNICATION OF INFORMATION AT CUSTOMER REQUEST. THIS IS AN ESSENTIAL ROLE. HOWEVER, IT WOULD SEEM TO THE COMMISSION THAT THE ENERGY CONSERVATION DIVISION MUST TAKE A MORE ACTIVE ROLE IN THE DETERMINATION OF STRATEGIES THAT WILL ENABLE THE AUTHORITY TO DEFER THE DEPLOYMENT OF NEW EXPENSIVE PLANT FOR AS LONG AS POSSIBLE.

THE COMMISSION QUESTIONS THE IMPORTANCE THAT THE DIVISION HAS WITHIN THE AUTHORITY AS COMPARED TO ENGINEERING.

AT THE SAME TIME, HOWEVER, THERE MUST BE A RELATIONSHIP BETWEEN THE CONSERVATION BUDGET AND BENEFITS TO CUSTOMERS. THE COMMISSION FEELS THAT A COMPLEMENT OF 63 IN CONSERVATION MAY BE EXCESSIVE. B.C. HYDRO MUST GUARD AGAINST DUPLICATING MINISTRY EFFORTS AND ENCROACHING UPON RESPONSIBILITIES OF THE PRIVATE SECTOR.

Research and Development

The Research and Development function within B.C. Hydro was established in 1974 and moved into its new Centre in 1980. It currently employs over 100 people organized into three main departments, Chemical, Materials and Electrical Research. Its primary purpose is to solve technical problems and to generate technology to improve service reliability and the economics of equipment and material. It coordinates its activity with the Canadian Electrical Association and other research centres.

As a Division, it reports to the Executive Vice President, Operations, but a Policy Committee made up of members from all B.C. Hydro service areas, provides guidelines, reviews budgets, and makes recommendations for major programs to the Corporate Management Committee.

Revenue requirement submissions are as follows:

Research and Development ($ thousands)	Total Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Salaries and wages	3,114	N/A	4,743	5,878
Materials and services	921	N/A	1,528	2,172
Total	4,035	5,284	6,271	8,050
% change		31.0%	18.7%	28.4%
Electric Service Expenses				
Salaries and wages	2,008	2,521	3,076	3,812
Materials and services	853	1,058	1,165	1,617
Total	2,861	3,579	4,241	5,429
% change		25.1%	18.5%	28.0%
Employees				
Positions	98	117	121	136
Actual	96	117	N/A	N/A

The Five Year Plan reviewed by the Policy Committee forecasts expenditures to be about .7% of revenue over the period 1981-85, reaching 1.0% by 1990. Establishing priorities is necessary as more requests for work are received from the B.C. Hydro line departments than can be carried out.

THE COMMISSION RECOGNIZES R & D TO BE AN ESSENTIAL FUNCTION BUT IS OF THE VIEW THAT THE EMPHASIS MUST BE ON OPERATIONAL RATHER THAN PURE RESEARCH. THE TANGIBLE LINK BETWEEN RESEARCH AND BENEFIT TO CUSTOMERS SHOULD BE QUANTIFIED THROUGH COST-BENEFIT ANALYSES. THIS AREA OF EXPENDITURE MUST BE RIGIDLY CONTROLLED.

Summary for Electrical Operations

($ thousands)	Actual Costs 1981	1982	Amended Application 1983	1984
Total Costs (all services)				
Electrical Operations	261,693	285,091	271,350	307,065
Electrical Engineering	68,350	87,611	96,268	109,054
Energy Conservation	2,371	2,843	3,175	3,803
Research & Development	4,035	5,284	6,271	8,050
Executive VP	350	539	578	671
Total	336,799	381,368	377,642	428,643
% change		13.2%	(1.0%)	13.5%
Electric Service Expenses				
Electrical Operations	150,914	172,660	181,279	204,352
Electrical Engineering	2,545	5,159	3,596	4,212
Gas Operations	34	50	54	59
Energy Conservation	1,287	1,559	1,750	2,096
Research & Development	2,861	3,579	4,241	5,429
Executive VP	133	151	160	183
Total	157,774	183,158	191,080	216,331
% change		16.1%	4.3%	13.2%
Electric Service Expenses to Total Costs	46.8%	48.0%	50.6%	50.5%
Employees				
Positions (regular)	5,594	5,789	5,822	5,919
Actual (including temporary)	6,122	6,218	N/A	N/A
Cost per Employee				
Total Costs (all services)	$55.0	$61.3	$64.9	$72.4
% change		11.5%		11.6%
Electric Service Expenses	$25.8	$29.5	$32.8	$36.5
% change		14.3%		11.3%

XIII. OTHER MATTERS

1. Zone II Rates

B.C. Hydro inherited an elaborate system of rate zones from B.C. Electric and the B.C. Power Commission, which were based on accounting for differences among communities with respect to customer density and generation and distribution costs. The number of different rates have been reduced under a general policy of covering costs to the extent practicable as modified by their interpretation of a B.C. Government instruction to introduce a postage stamp rate for residential customers. As explained in Exhibit II5, B.C. Hydro currently has two rate zones: Zone I, consisting of areas connected to the main transmission grid, and Zone II, consisting of areas not so connected, but served power from other sources, usually diesel engines.

Part of the rate hearing was held in Fort Nelson, B.C. to consider a complaint by the Village of Fort Nelson of undue discrimination in regard to Zone II Electric Service rates.

The evidence in Fort Nelson dealt primarily with the relationship between Zone I and Zone II rates and the cost of diesel generation.

The Commission believes that due to the nature of the complaint the subject is more properly dealt with in Phase II.

2. Rural Electrification Assistance

A basic component of B.C. Hydro's Electric Service extension policy is the Rural Electrification Assistance (REA) program which was until recently funded (at a level of about $3 million annually) by a special grant from the provincial government, part of which went towards operating losses of REA districts with the balance available for capital purposes. Government contributions to the program were discontinued after fiscal 1981 so that it is now structured as an internal policy in the operations of the Authority itself. Provincial policy, however, is that B.C. Hydro should continue and not reduce this program.

At the time this subject was addressed during the Fort Nelson phase of the public hearing it was acknowledged that the extension policy had not changed since 1976.

In December 1981, B.C. Hydro had initiated an internal review of its REA policy at the request of the Authority's Board of Directors. With the benefit of the public hearing consideration of the subject, this review eventually resulted in a reformulated policy which was responsive to inflation experience. After revision to remove certain provisions involving discrimination among areas on geographical grounds the Commission found this new policy acceptable in current circumstances. THE COMMISSION EXPECTS THAT B.C. HYDRO WILL KEEP THIS POLICY CURRENT IN CHANGING CIRCUMSTANCES.

C. LOWER MAINLAND AND VICTORIA GAS SYSTEMS

XIV. INTRODUCTION

B.C. Hydro is the largest distributor of natural gas in British Columbia. By the number of customers it is also the third largest gas distribution utility in Canada. Its Lower Mainland system consists of over 7,000 kilometers of pipe carrying natural gas purchased from Westcoast Transmission Company Limited at Huntington to regional regulator stations and then through trunk and distribution systems to the customer. The much smaller Victoria Gas system, which distributes a butane air or propane air fuel in the City of Victoria and the municipalities of Esquimalt, Oak Bay and Saanich, consists of about 208 kilometers of pipe and serves less than 4,400 customers.

The Authority's gas systems differ from the electric service in obvious ways. In particular, the gas services are not as capital intensive as the electric operations and the purchased gas costs which comprise the most significant operating outlay has no simple counterpart in a hydro-electric system.

With appropriate allowances for differences in the nature of the services it should be noted that the planning, budgeting, controlling and accounting for the gas operations takes place within the same management structure and systems that have been considered in the previous sections of this Decision. Accordingly and with appropriate adaptations, the Commission's observations, concerns and findings as expressed in the Corporate and Electric Service review, may be considered to have equal relevance to the Gas Services. To avoid adding unnecessary length to this document they are not repeated.

XV. MAINLAND GAS SERVICE

The Hearings addressed the concerns of the Commission and intervenors in the areas of organization, revenue requirements, sales forecasts and system planning. While a more extensive examination of its operations and management practices might have been desirable, the proceedings enabled the Commission to obtain a general understanding with particular reference to areas of significant public interest.

By Application dated June 18, 1981, B.C. Hydro applied to amend the Gas tariff rate schedules. It proposed rate increases to provide average revenue increases in two stages, being 6.15% effective August 1, 1981 and 5.4% effective April 1, 1982. By Order No. G-63-81 dated August 6, 1981 the Commission approved the increases on an interim basis.

Subsequently on May 28, 1982, B.C. Hydro requested a further rate increase of 4.2% to be effective April 1, 1983.

1. System Matters

A review of the system plans and the evidence of B.C. Hydro satisfied the Commission that the Lower Mainland's system design criteria has, over the years, provided a sound and adequate gas system.

The most significant operating characteristic of the Lower Mainland Gas System is it's low load factor of approximately 65% which is mainly due to the absence of major industrial loads on the system. An annual load factor of less than 65% triggers the take-or-pay provision of the Westcoast contract. Penalty payments made under this provision can be recovered in the five year period following the year of incurrence of the penalty, but in order to be fully recovered, gas must be taken in a year where the load factor is at least 65%, in the same amounts as previously paid for. Unrecovered penalties become part of operating costs at the expiry of five years.

As shown on Exhibit 18 the Lower Mainland Gas annual load factor was 61.8% in the 1980/81 fiscal year and 63.8% to January of the 1981/82 fiscal year. This triggered take-or-pay penalties of $5.4 million and $3.1 million in those respective fiscal years. B.C. Hydro projected a load factor of approximately 65% for the 1982/83 and 1983/84 fiscal years.

Without additional interruptible load or peak shaving facilities the Commission does not have confidence in B.C. Hydro's ability to meet the 65% requirement in these years.

In addition to the prospect of annual take-or-pay penalties and non-recovery of past penalties, there is the prospect of amendment to the Provincial natural gas pricing formula. This could result in a shift toward greater demand charges and lower commodity costs, with a significant effect to the consumer.

In response to these problems B.C. Hydro has sought to acquire a greater peak shaving capacity in order to increase the annual load factor and reduce the cost of demand charges from Westcoast. B.C. Hydro's proposed solution was the building of a second Liquified Natural Gas facility (LNG) to be located at Sasamat near the Burrard Thermal Plant. The facility was estimated to cost $82.5 million in inflated dollars and was projected to be in service by late 1984. A study entitled "Economic Feasibility of Expanding LNG Facilities" was tendered as Exhibit 161.

During the proceedings, the Commission addressed the prospect of the LNG facility, considering cost, timing, and benefit to customers. A promising alternative was raised of acquiring underground storage in Washington State. B.C. Hydro would store gas in the facility in summer and call for the gas when needed on cold winter days. On removal from storage the gas would be delivered to Northwest Pipe in exchange for like volumes of gas delivered to B.C. Hydro by Westcoast. Gas drawn out of storage would be offset against B.C. Hydro's peak day load, thereby reducing the peak day load for billing purposes.

On this subject Commission Counsel questioned Mr. W.G. Beirlmeier, Manager of Gas Supply:

Q: "GL41, the export licence expires, as you put it, in 1989. Now, is there any reason why you shouldn't be getting a piece of that surplus gas, which could be used for storage purposes.

A: "I'm sorry, I don't get your question.

Q: Well, it's just a variation on the use of storage, but in part utilizing the surplus gas on a diminished but continuing export basis, in which you, in effect, would be the exporter of that gas, to the extent that it was---that you stored it in the summertime and made it available to the utilities in the south in the winter, and had a continuing flow from Westcoast."

A: "We have not looked into that option."

Q: "Well, I am going to suggest to you that you said in response to the Chairman's question that you would examine anthing that Westcoast put to you. I'm going to suggest to you that, for 62.4 million (current) dollars, it would be prudent for the Authority to initiate some of these discussions. Now, I leave that suggestion with you."

It is the Commission's view that the management of the gas division must consider and act on the best possible alternative. Storage in Washington, provided reasonable contractual terms are obtained, would appear to be more suitable than the alternative preferred by management.

The Commission examined the cost at which B.C. Hydro installs service lines. It appeared that, when overhead is included, it costs twice as much to install a service line using B.C. Hydro crews than it does using contract crews. Apparently labour contracts are a constraint. Due to the fragmentary record, the Commission cannot draw definitive conclusions but there is cause for concern. B.C. Hydro must examine its cost of installation and, where necessary, seek remedies to reduce costs.

Also examined was the potential for using polyethylene pipe in service lines, which would reduce the cost of installation by at least 15%. Mr. MacPherson, Manager of the Gas Engineering Division, indicated that a study was under way which would be completed in a few months. The use of polyethylene pipe is now widespread throughout North America and it is the Commission's view that B.C. Hydro has been slow to adopt a proven cost saving technology.

2. Asset Investment

A summary of the asset position and projection given in the May 28, 1982 Amended Application is as follows:

Mainland Gas Service

Summary of Fixed Assets at Original Cost

($000)	Actual		Projected	
	1981	1982	1983	1984
Assets in Service				
Storage Facilities	6,627	6,636	6,636	15,014
Transmission	47,725	62,969	63,336	63,703
Distribution	258,184	290,370	321,268	359,666
General Plant	15,660	17,655	21,373	27,749
Joint-Use Allocation	16,409	17,939	21,485	25,678
Subtotal	344,605	395,569	434,098	491,810
Unfinished Construction				
Storage Facilities	345	1,650	9,113	18,780
Transmission	5,047	105	1,322	13,691
General Plant	526	360	2,385	1,553
Joint-Use Allocation	3	4,366	11,237	15,480
Subtotal	5,921	6,481	24,057	49,504
Surveys and Investigations	10,072	14,170	21,919	24,966
Other	4,522	4,521	4,521	4,521
Total	365,120	420,741	484,595	570,801

Planned changes in this plant investment position as set out in the Amended Application over the period to 1984 are set out in the following table.

Mainland Gas Service

Changes in Fixed Asset Investment

($000)	1982 to 1983		1983 to 1984	
	Assets in Service	S & I* and Other	Assets in Service	S & I and Other
Specific fixed asset expenditures	20,318	6,300	32,601	2,772
Recurring fixed asset expenditures	21,997		29,979	
Overhead charged to plant accounts	14,036	1,449	17,122	555
Interest during construction capitalized	2,076		4,732	
	58,427	7,749	84,434	3,327
Less: Asset transfers and retirements	2,322		1,275	280
	56,105		83,159	3,047
Unfinished construction at beginning of year	6,481		24,057	
Accumulated costs	62,586		107,216	
Unfinished construction at end of year	24,057		49,504	
Additions to in-service plant for year	38,529		57,712	3,047
Opening in-service	395,569	18,691	434,098	26,440
Closing in-service	434,098	26,440	491,810	29,487

*S & I = Surveys and Investigations

The balance of Surveys and Investigation costs as at March 31, 1981, as set out above, amount to $10.1 million represented as follows:

Vancouver Island Gas Pipeline	$ 8.1
Underground Gas Storage	1.9
Other	0.1
	$10.1

Additional capital expenditures on these projects in the period to March 31, 1983 are forecast in Exhibit 34A to be $10.6 million for the Vancouver Island Gas Pipeline and $3.7 million for other categories. These capital costs are being amortized over a ten year period commencing in the year following the year of incurrence under B.C. Hydro's accounting policy.

AS WITH THE ELECTRIC SERVICE, THE COMMISSION WISHES TO BE IN A POSITION TO MONITOR PROJECTED SURVEYS AND INVESTIGATIONS COSTS IN THE GAS SYSTEM. ACCORDINGLY, B.C. HYDRO IS DIRECTED TO FILE PROJECTED SURVEYS AND INVESTIGATIONS COSTS WITH THE COMMISSION PRIOR TO THE COMMENCEMENT OF EACH FISCAL YEAR IN A TIMELY MANNER AFTER THE AUTHORITY'S BUDGET IS APPROVED. THIS IS TO COMMENCE WITH THE 1983/84 FISCAL YEAR.

As noted previously, various of the Authority's asset accounting and budgeting practices require review. The gas systems operations must be included in those examinations.

3. Demand and Marketing

As B.C. Hydro now supplies natural gas to most communities in the Lower Mainland, major future growth will come from new residential construction and continued conversion from oil under government sponsored assistance programs.

The Commission has some concern that as a result of conservation efforts and a depressed economy, demand and hence revenues may be lower than that forecast by B.C. Hydro. However, possible reductions are not clear enough to warrant changing the forecast.

Considerable cross examination of the gas demand submissions was conducted by Commission Counsel in an effort to determine the basis of B.C. Hydro's calculations and to resolve the problem of what appeared to be different demand estimates appearing in various parts of the Application and in B.C. Hydro's submission to the Gas Surplus Hearing. In order to expedite future hearings the Commission requests that every effort be made to reconcile varying forecasts.

4. Review of Operating Costs

The following table summarizes B.C. Hydro's cost submissions for the Lower Mainland Gas Service for the two most recent year's actual results and the fiscal 1983 and 1984 years covered by the Amended Application. Also shown are the percentage changes in these cost submissions in the two years covered by the Application.

While recognizing that these expense levels are to a considerable degree the result of B.C. Hydro's cost allocation procedures---about which we have expressed concern previously---it remains the case that for many of these functions, serious efforts at cost containment are not indicated by the data. It should be emphasized that any trends are influenced by the high level of gas purchase costs.

SIGNIFICANT YEAR BY YEAR INCREASES IN CONTROLLABLE COSTS INDICATES A TENDENCY WHICH IS AS UNACCEPTABLE IN THE GAS DIVISION AS IT IS WITH THE ELECTRIC SYSTEM. THE AUTHORITY MUST SUSTAIN ITS EFFORTS TO IMPROVE ITS OPERATING EFFICIENCY.

Lower Mainland Gas Service

Summary of Cost Submissions Excluding Coverage Margin

($ Millions)

	Actuals		Amended Application		% Change	
	1981	1982	1983	1984	1983	1984
OPERATING COSTS						
Corporate Divisions						
Corporate Affairs	.7	.4	1.0	1.2	37.5	20.0
Corporate Admin.	.5	.6	.7	.8	16.7	14.3
Corporate Group	.3	.6	.5	.6	(16.7)	20.0
Subtotal	1.5	1.6	2.2	2.6	37.5	18.2
Administration Divisions						
General Corporate Services	1.9	2.9	3.3	3.5	13.8	6.1
Personnel	.6	.8	.8	1.0	-	25.0
Internal Audit	.1	-	.1	.1	-	-
Finance	1.8	2.0	2.2	2.7	10.0	22.7
Other	.3	.7	.4	.5	(42.9)	25.0
Subtotal	4.7	6.4	6.8	7.8	6.3	14.7
Operations Divisions						
Electrical Operations	4.3	4.5	4.8	5.4	6.7	12.5
Gas Operations	12.8	14.8	17.5	20.3	18.2	16.0
Energy Conservation	1.1	1.3	1.4	1.7	7.7	21.4
Research and Development	.2	.2	.2	.2	-	-
Subtotal	18.4	20.8	23.9	27.6	14.9	15.5
Other Operating Costs						
Purchases - Natural Gas	113.1	217.4	264.5	276.6	21.7	4.6
Other (net)	5.3	10.7	9.0	9.8	(15.9)	8.9
Subtotal	118.4	228.1	273.5	286.4	19.9	4.8
Total Operating	143.0	256.9	306.4	324.4	19.3	5.9
CAPITAL & TAXATION COSTS						
Grants & Taxes	4.9	6.3	9.0	11.3	42.9	25.6
Depreciation	8.7	10.2	11.6	13.5	13.7	16.4
Interest - Net of IDC	22.7	26.2	32.9	38.5	25.6	17.0
Subtotal	36.3	42.7	53.5	63.3	25.3	18.3
Total costs excluding margin	$179.3	299.6	359.9	387.7	20.1	7.7

In reviewing Gas Division operations the Commission sought to get an overall understanding of how B.C. Hydro's operation compares to that of an investor-owned gas utility. The Commission therefore put a comparison together using material from the B.C. Hydro Rate Application and the published statistics of Inland Natural Gas Co. Ltd.

The data are as follows:

MAINLAND GAS SYSTEM

SALES MIX COMPARISON (1981 Year Ends)

	Residential*		General *		Industrial*	
	A/C's	Sales	A/C's	Sales	A/C's	Sales
B.C. Hydro	89%	37%	11%	37%	less than 1%	26%
Inland Natural Gas (consolidated utility operations)	88	16	12	14	less than 1%	70

* classifications as defined by the utilities.

GROSS FIXED ASSET COMPARISON

	Gross Fixed Assets $M	Investment per Customer	Gross Investment per Billing Unit sold
B.C. Hydro Year ended March 1981	$365	$1200	43¢
Inland Natural Gas Year ended June 1981 (consolidated utility operations)	$153	$1527	25¢

OPERATING AND MAINTENANCE EXPENSES COMPARISON

	Customers at Year End	Sales BU (thousands)	O & M Cost per Customer	O & M Cost per Billing Units sold
B.C. Hydro Year ended March '81	304,296	853,580	$ 98.18	3.5¢
Inland Natural Gas Year ended June '81	100,196	609,920	$111.98	1.8¢

Note: 1) Billing Unit = 1/10 GJ; 1 MCF = 10.86 Billing Units
2) Operating and maintenance expenses are net of "other" revenue.

NUMBER OF EMPLOYEES PER 1,000 CUSTOMERS

	1972	1977	1981
B.C. Hydro (including Victoria)	3.8	4.5	4.4
Inland Natural Gas (consolidated utility operations)	4.4	3.8	3.5

Due to the varying operating factors such as physical characteristics and customer mixes the Commission has not drawn any definitive conclusions.

Of interest to the Commission, however, is the manpower comparison. It is to be noted that Inland had 3.5 employees per 1,000 customers in 1981 while B.C. Hydro had 4.4. One would expect the relationship to be the reverse considering the physical characteristics of the Inland system. If B.C. Hydro's ratio was the same as Inland's, the manpower level would fall by 20%. While total manpower statistics filed by B.C. Hydro only went to the 1980/81 fiscal year, the material showed that the manpower level of 1,196 in 1979/80 changed to 1,396 in the 1980/81 fiscal year, an increase of 19.5%.

IN THE COMMISSION'S VIEW, B.C. HYDRO MUST REVIEW ITS MANPOWER LEVELS AND INTRODUCE EMPLOYMENT TESTS SIMILAR TO THOSE USED BY PRIVATE INDUSTRY, TO ATTAIN THE ABSOLUTE MINIMUM ESSENTIAL TO THE OPERATION OF THE GAS UTILITY. THE COMMISSION WILL REVIEW THE MEASURES INTRODUCED AND THE STEPS TAKEN AT THE NEXT PROCEEDING.

XVI. VICTORIA GAS SERVICE

By Application dated June 18, 1981, B.C. Hydro applied to amend the Gas tariff rate schedules. It proposed rate increases to provide average revenue increases in two stages, being 48.82% effective August 1, 1981 and 25.41% effective April 1, 1982. By Order No. G-63-81 dated August 6, 1981 the Commission approved the increase of 48.82% on an interim basis effective August 1, 1981 but denied the request for further relief.

Subsequently on May 28, 1982, B.C. Hydro requested a further rate increase of 57.7% to be effective April 1, 1983. This request was withdrawn by letter of August 5, 1982.

The hearing examination of B.C. Hydro submissions on the costs and revenue requirements of the Victoria Gas System left so much doubt as to whether the cost allocation results are a believable representation of actual costs that detailed summarization of those submissions in this Decision seems unwarranted. We will instead briefly comment on the major concerns raised in the course of the proceeding.

1. The Closed Tariff and System Capacity

Concern about the future of natural gas on Vancouver Island has led to some confusion about provision of service from the present system. Following a brief period of expansion in 1969, Greater Victoria Gas instituted a policy of restricting service extensions pending clarification of the potential for natural gas service to Vancouver Island and the extent of rehabilitation which was required to the system. It remained closed until 1981 when approval was given to an application to permit existing customers to buy incremental volumes of gas, subject to available capacity.

During the time the tariff was closed customer count was reduced from over 7,000 in 1971 to about 4,250 in 1982.

Without the opportunity of taking advantage of butane air for space heating, while gas was much cheaper than oil or electricity, modifications were not made, and the principal use is still for water heating and cooking. Average annual use in the Victoria system is 269 billing units which compares with 922 in Nanaimo and 1,172 on the Lower Mainland.

In 1981 the tariff was opened to the extent of allowing existing customers to buy incremental volumes providing capacity was available. The test year estimates did not reflect any increases in recognition of about 60 applications for increased volumes.

B.C. Hydro advised the Commission that even after the tariff was modified to allow additional sales to existing customers, no initiative was taken by B.C. Hydro to advise its customers of this change.

A number of intervenors appeared at the hearings in Victoria to inform the Commission of the difficulties they had encountered because of B.C. Hydro's tariff policy.

The evidence indicates that with the existing storage of 240,000 billing units, peak daily demand capacity of 26,000 could be increased to 31,000 with no additional cost and to 34,500 with a cost of about $90,000.

B.C. HYDRO IS THEREFORE INSTRUCTED TO APPLY TO OPEN ITS TARIFF AND EXPAND SERVICE TO THE EXTENT THAT THE DISTRIBUTION SYSTEM IS FULLY UTILIZED TO THE MAXIMUM OF THE BUTANE/PROPANE AIR PLANT CAPACITY OF 34,500 BILLING UNITS PER DAY. THE COMMISSION ALSO REQUIRES B.C. HYDRO TO FILE, BEFORE SEPTEMBER 30, 1983, THE RESULTS OF STUDIES DIRECTED AT EVALUATING ALL OPPORTUNITIES TO INCREASE DEMAND AND CAPACITY.

2. Capital Expenditures

Evidence at the hearing was that in the period 1973 to 1981 B.C. Hydro spent $11 million on the system. During that time the number of customers on the system declined to 4,571 from 7,000. The initial phase of the program, from 1973 to 1977 was completed at a cost of $6.5 million. B.C. Hydro explained that this expenditure was necessary to eliminate hazardous conditions in the downtown core of Victoria. The second phase of the "Rehabilitation Program" appears to relate in large part to B.C. Hydro's anticipation of natural gas coming to the Island. The evidence indicates the system now in place is suitable for that service.

3. General Observations on Revenue Requirements

With respect to fuel supply, B.C. Hydro explained that the butane used in the butane air mix, which is distributed in Greater Victoria, is obtained by rail car from refineries on the Mainland and occasionally from Alberta. Evidence was given as to the uncertainty of rail delivery due to strike and weather conditions.

B.C. Hydro monitors the least cost alternatives by calling for tenders for both propane and butane supply and it was explained that butane has been the least cost alternative to date. However, at the time of the hearing it was also indicated that the spot price of propane was below that of butane. THE COMMISSION CONSIDERS THAT THE HIGH COSTS OF THE VICTORIA SYSTEM MAKES IT IMPERATIVE TO CONTINUE TO SEEK OUT THE LEAST EXPENSIVE FUEL.

The Commission notes that interest on debt is a significant part of the cost and is allocated to Victoria on the basis of its proportionate share of depreciated assets.

Considerable time was spent in the examination of manpower. It was evident from the testimony and the several exhibits requested by the Commission and filed by B.C. Hydro that the levels of manpower, salaries and benefits were extremely high. B.C. Hydro explained that several permanent staff were involved directly in the plant rehabilitation program and that staff levels would be reduced following completion of that work. However, the staff levels are still inordinately high when compared to similar utilities.

A comparison of the Victoria operation with that of the Vancouver Island Gas Company (Vigas) in Nanaimo shows some interesting differences. The average of 922 billing units per customer in Nanaimo compares with 270 in Victoria, a ratio of 3.4 to 1. The capital investment per customer in Victoria is 50% more than Nanaimo. Although they sell about the same amount of gas, cash operating expenses in Victoria are about five times those of Vigas. While the applicant argued that this was due to the low consumption per customer and to the impact of the rehabilitation program, per customer costs in Victoria are almost double those in Nanaimo.

In addition to direct costs, the Victoria system is charged about $700,000 or roughly $160 per customer per year for head office costs. Commission Counsel questioned the propriety of these charges by examining each of the allocated expense items with the Manager, Victoria Gas Department. The Manager was unable to account for any services rendered from head office which would justify the level of allocated expense charged.

4. Management of the Victoria Service

In response to a question about corporate strategy for Victoria Gas, Mr. Sheehan stated:

> "No, I think our strategy is and has been for some time to keep it in a holding position until we get definite indication of what is going to happen to the supply of natural gas to the Island. In fact, that has been the position for longer than we now like to look back on, and the strategy each year or each time we looked at it seemed to be just to maintain it with the minimum possible disruption to the customers, or build-up of future potential losses, until we got that decision, always thinking that that major decision was just a short time away.
>
> So it was a short-term strategy before making a long-term decision."

The Commission has examined the results of this policy:

1. In the period since the identification of the major leak hazard, B.C. Hydro has spent considerable sums rebuilding and modernizing the system while at the same time eliminating new customers and discouraging existing customers. As costs increased dramatically the revenue base declined.

2. Losses have been consistently incurred in the recent years for which information was made available.

3. In the same recent period sales volume has consistently declined.

4. Capital investment has increased over the past 5 years at least.

5. Total expenses have similarly increased over the past 5 years.

Evidence was submitted by B.C. Hydro indicating that for an average heating customer using 125 gigajoules per year the cost in Victoria would be $8.21 per gigajoule. This compares to $4.13 per gigajoule on the Mainland, a ratio of 2 to 1. The present rate schedule in Victoria with a two step rate compared to the Mainland with a single rate, would result in a greater differential for small use customers.

On the basis of the information provided at the Hearing and in view of the postage stamp rate in the electric and mainland gas services, the cost of service in Victoria and the Lower Mainland should be combined with the exception of the cost of product. The validity of maintaining consistency in these circumstances will be examined in Phase II.

THE COMMISSION BELIEVES THAT THE VICTORIA OPERATIONS ARE SUFFERING FROM LACK OF POSITIVE PLANNING AND CONTROLS AND THAT OPERATING COSTS ARE EXCESSIVE. B.C. HYDRO SHOULD PUT THE VICTORIA GAS SYSTEM ONTO A BREAK-EVEN BASIS AS SOON AS POSSIBLE OR SHOULD SEEK OTHER MEANS OF MAINTAINING THE SYSTEM.

XVII. GAS DIVISION STATUS WITHIN B.C. HYDRO

It became obvious as the hearing progressed that B.C. Hydro is organized and operated as an electric utility, with gas operations playing a subordinate role. This is not unexpected as the operation of a gas utility does not require elaborate systems management and long-term planning that is typical of an electric system. However, because the gas system plays a subordinate role, with the management emphasis being with the electric division, the Commission is concerned whether the Authority's management has given the proper consideration to the management of the gas utilities. For example, there is no senior executive of the gas division on the Corporate Management Committee nor does there seem to be any effort to develop and sustain a gas marketing strategy.

The technologies of the two services are vastly different and the design, construction and operating characteristics of each have little in common. With that in mind there cannot be flexibility in shifting employees of the engineering disciplines or on the operations and maintenance level from one system to the other. Neither can there be a common materials inventory or inter-change of construction equipment or even, except to a very limited degree, utilization of research and development to an equal extent by both services. The Commission therefore questions the degree to which mutual operational benefits are derived by the electric and gas systems.

It seems clear that the Gas Division bears an inordinately high proportion of overhead and possibly interest, and in comparison with other gas utilities, may be operating at excessive cost. It has been suggested that the Gas Division should be operated, not just as a separate division, but as a separate entity, free from association with B.C. Hydro entirely.

THE COMMISSION BELIEVES THE CONCEPT OF SEPARATING B.C. HYDRO ELECTRIC AND GAS DIVISIONS INTO INDEPENDENT COMPETING OPERATIONS MERITS CAREFUL ANALYSIS. ACCORDINGLY, IT IS RECOMMENDED THAT THE AUTHORITY INVESTIGATE THE PROSPECTIVE RESULTS OF SEPARATION OF THE ELECTRIC AND GAS UTILITY OPERATIONS INTO INDEPENDENT CORPORATIONS AND HOW IT WOULD BE ACCOMPLISHED; TO INVESTIGATE THE ALTERNATIVE COURSE OF GREATER AUTONOMY FOR THE GAS OPERATIONS AND HOW THAT WOULD BE ACCOMPLISHED AND ALSO TO RE-EXAMINE THE BENEFITS OF MAINTAINING THE STATUS QUO. THE RESULTS OF THIS STUDY SHOULD BE DIRECTED TO THE GOVERNMENT OF BRITISH COLUMBIA.

D. REVENUE REQUIREMENTS

XVIII. ELECTRIC SERVICE

Fiscal 1983 and 1984 Revenue Requirement

In essence, the revenue requirements of a utility are the amount of money provided by rates or tariffs sufficient to cover all costs and leave a reasonable return to the equity owners. In an investor-owned utility the regulating body makes a decision as to an appropriate return to the shareholders in the light of all the circumstances and sets rates accordingly.

In the present case, a decision as to the rate of return has been replaced by Special Direction B.C. Hydro No. 1 which directs that net revenues of the Applicant must ultimately achieve an interest coverage of 1.30 to 1, or if B.C. Hydro were an investor-owned utility a return to equity shareholders equal to 30% of the interest on the corporation's debt. This decision must also fall within the provisions of the Rate Increase Restraint Act which restricts any increases prior to September 30, 1983 to 6% of rates in effect on September 20, 1982.

In its initial application for rate relief, B.C. Hydro requested increases of 11.15% effective August 1, 1981 and 11.66% effective April 1, 1982. On November 23, 1981, B.C. Hydro filed revised information in further support of the original Application, indicating that the utility required an average electric rate increase of 17.85% over the rates being billed at that date. On March 30, 1982, by Order No. G-26-82, the Commission granted an interim refundable increase of 11.5% effective April 1, 1982. The same Order provided for a 5% decrease in controllable expenditures in the anticipation that the combination together with a portion of export sales revenues might enable the Applicant to reach its targeted interest coverage.

On May 28, 1982 a request was made by B.C. Hydro for additional increases in electric revenues of 7.7% effective April 1, 1982 and 15.7% effective April 1, 1983. This request was made necessary primarily by falling revenues.

THE COMMISSION IN CONSIDERING THE EVIDENCE HAS CONCLUDED THAT THE APPLICANT SHOULD, AS A MATTER OF OPERATING POLICY, ACHIEVE ITS FINANCIAL GOALS AS SET OUT IN THE SPECIAL DIRECTION NO. 1 FIRST BY INCREASING ITS OPERATING EFFICIENCY, THEN BY INCREASING ITS SALES VOLUME, AND ONLY IN THE LAST RESORT BY INCREASING ITS RATES. WE HAVE COMMENTED AT SOME LENGTH THROUGHOUT THIS DECISION ON PRODUCTIVITY AND EFFICIENCY AND HAVE EMPHASIZED THE IMPORTANCE OF THE EXPORT MARKET IN ENHANCING SALES VOLUME.

We must now consider the extent to which additional rate relief is appropriate. By B.C. Hydro's calculations, the requested increases would provide an interest coverage ratio of 1.22:1 for the electric service for fiscal 1983 and 1.30:1 for fiscal 1984.

WHILE DEFINITIVE FINANCIAL RESULTS FOR FISCAL 1983 ARE, OF COURSE, NOT YET OBTAINABLE, IT APPEARS THAT THE FINAL NET INCOME, EXCLUDING THE SPECIAL WRITE-OFF OF THE HAT CREEK PROJECT COSTS, WILL RESULT IN AN ELECTRIC SERVICE INTEREST COVERAGE OF SOMETHING CLOSER TO 1.11:1 THAN TO THE INDICATED TARGET OF 1.22:1 FOR 1983. THE BASIS FOR THIS ESTIMATE, AS DEVELOPED FROM DATA SUBMITTED BY B.C. HYDRO, IS SET OUT IN APPENDIX "A". IN PRESENT ECONOMIC CIRCUMSTANCES, AND GIVING FULL CONSIDERATION TO THE CONFLICT BETWEEN B.C. HYDRO'S FINANCIAL NEEDS AND THE HARDSHIPS BEING ENDURED BY ITS CUSTOMERS, AS EVIDENCED IN THE HEARING BY LETTER, TESTIMONY AND PLEA, THE COMMISSION FINDS THIS PROSPECTIVE COVERAGE RESULT TO BE REASONABLE. THE INTERIM INCREASE GRANTED BY ORDER NO. G-26-82 IS THEREFORE HEREBY CONFIRMED.

The prospects for fiscal 1984 are another matter. This is the year selected for achieving the 1.30:1 coverage target set out in B.C. Hydro's corporate objectives and Special Direction No. 1. The extent to which this objective may be approximated in fiscal 1984 will depend largely on domestic sales volume, chiefly industrial load, and on exports of surplus power. On the basis of present revenue forecasts and prospective costs, together with a transfer of $60 million from the Rate Stabilization Account and anticipating no more than the present improvement in efficiency and productivity required by Commission Order No. G-26-82, indications are that the interest coverage target of 1.30:1 could only be met by rate increases of about 25%, as set forth in Appendix "B". This percentage could obviously be reduced by greater efficiency.

It is the Commission's view that the major factor inhibiting the Authority's progression to an interest coverage of 1.30:1, is the shortfall in the growth of its sales volumes. When the Special Direction was issued in March 1981, the Corporate Plan of that year predicted sales significantly above those actually realized in subsequent years or currently forecast to be made in fiscal 1983/84. Had energy sales actually occurred as they were forecast in the Corporate Plan of March 1981, B.C. Hydro would likely have achieved a coverage above its fiscal 1983 target of 1.22:1, based on rates currently in place. A rate increase of about 11% would then have been necessary on April 1, 1983 for the electric service to achieve the 1.30:1 coverage in fiscal 1984.

THE RATE INCREASE RESTRAINT REGULATION SETS A LIMIT OF 6% ON ANY INCREASES. THE APPLICANT IS THEREFORE GRANTED AN INCREASE EFFECTIVE APRIL 1, 1983 OF 6% TO ITS PRESENT RATES FOR ELECTRIC SERVICE.

WITH LARGE RATE INCREASES IN PROSPECT IN THE NEAR FUTURE THE COMMISSION REITERATES ITS CONCERN THAT B.C. HYDRO'S MANAGEMENT MUST DO ITS UTMOST TO MAINTAIN THE FINANCIAL VIABILITY OF THE AUTHORITY BY MAXIMIZING SALES IN BOTH THE DOMESTIC AND EXPORT MARKETS, AND BY EXPLORING AND EXPLOITING OPPORTUNITIES FOR COST REDUCTION IN ALL AREAS OF THE AUTHORITY'S OPERATIONS TO KEEP FUTURE RATE INCREASES WITHIN REASONABLE LIMITS. IT IS TO BE NOTED FROM FIGURES SET OUT IN APPENDIX "A" AND "B" THAT DIVISIONAL OPERATING COSTS IN 1983/84 INCREASE BY 14% OVER 1982/83. IT IS THE RESPONSIBILITY OF THE MANAGEMENT OF B.C. HYDRO TO MAKE THE HARD DECISIONS NECESSARY TO RECONCILE ITS HIGH LEVEL OF FIXED COSTS WITH PRESENTLY EXPERIENCED INSUFFICIENT DEMAND. QUALITY OF SERVICE, SECURITY OF EMPLOYMENT, LEVELS OF RESEARCH, PROGRESS OF EXPANSION, AND TIMING OF OBJECTIVES TOGETHER WITH INCREASING RATES ARE ALL PART OF THE DIFFICULT EQUATION.

XIX. LOWER MAINLAND GAS/VICTORIA GAS SERVICE

Fiscal 1982, 1983 & 1984 Revenue Requirement

B.C. Hydro's Lower Mainland Gas Service requested and the Commission approved interim increases of 6.15% effective August 1, 1981 and 5.4% effective April 1, 1982. On May 28, 1982 B.C. Hydro requested a further rate increase of 4.2% to be effective April 1, 1983.

With regard to Victoria, B.C. Hydro had applied to amend the Victoria Gas Service rates by 48.82% effective August 1, 1981 and 25.41% effective April 1, 1982. By Order No. G-63-81 the Commission approved the increase of 48.82% on an interim basis effective August 1, 1981 but denied the request for further relief.

Subsequently, B.C. Hydro requested a further rate increase of 57.7% to be effective April 1, 1983. However, the request was withdrawn by letter of August 5, 1982.

The requested increases are intended to bring the Gas Service, including Victoria Gas, to an interest coverage of 1.30:1 in fiscal 1983/84.

IN CONSIDERING THE EVIDENCE THE COMMISSION HAS CONCLUDED THAT OPPORTUNITIES EXIST FOR IMPROVED EFFICIENCY. ACCORDINGLY, THE COMMISSION HAS MADE ADJUSTMENTS TO FORECAST NUMBERS AS SHOWN ON APPENDICES "C" AND "D". IT IS THE COMMISSION'S OPINION THAT THOSE ADJUSTMENTS TO COSTS ARE CONSERVATIVE AND IT IS EXPECTED, FOR FISCAL 1983/84, THAT THE OPERATION WILL BE RUN WELL WITHIN THE LIMITS SET OUT AND THEREBY ALLOW THE GAS SERVICE THE OPPORTUNITY TO REACH OR EXCEED THE COVERAGE OF 1.30:1.

THE INTERIM INCREASES GRANTED BY COMMISSION ORDER NO. G-63-81 ARE HEREBY CONFIRMED AND AN INCREASE OF 3.2% IS AWARDED TO THE LOWER MAINLAND GAS SERVICE RATES EFFECTIVE APRIL 1, 1983. VICTORIA GAS SERVICE RATES WILL BE UNCHANGED.

DATED at the City of Vancouver, in the Province of British Columbia, this 28th day of February, 1983.

J.D.V. NEWLANDS,
Deputy Chairman and
Chairman of the Division

F.E. WALDEN, F.C.A.
Commissioner

APPENDIX "A"

Domestic Electric Service

Estimated Revenue Requirements

1982/83 - $ Millions

	Amended Application	Notes	Adjustments	Adjusted Amounts
Cost of Service				
Divisional operating costs	$ 244.4	1	$(4.4)	$ 240
Grants, Taxes, fees	266.8	2	(32.8)	234
Depreciation	153.9	3	0.1	154
Interest (net)	422.1	4	29.9	452
Coverage margin	171.8	5	(97.8)	74
Total	$1,259.0		$(105.0)	$1,154
Revenues				
Estimated revenues at current rates	1,115.2	6	(21.2)	1,094
Rate Stabilization Account	60.0		-	60
Total	1,175.2		(21.2)	1,154
Difference	$ 83.8		$ 83.8	-
Target/Indicated Coverage	1.22:1			1.11:1

APPENDIX "B"

Domestic Electric Service

Estimated Revenue Requirements

1983/84 - $ Millions

	Amended Application	Notes	Adjustments	Adjusted Amounts
Cost of Service				
Divisional operating costs	$ 278.3	1	$(13.3)	$ 265
Grants, taxes, fees	313.0	2	(28.0)	285
Depreciation	170.5	3	(0.5)	170
Interest (net)	479.7	4	30.3	510
Coverage margin	268.9	5	(29.9)	239
Total	$1,510.4		$(41.4)	$1,469
Revenues				
Estimated revenues at current rates	1,191.0	6	(65.0)	1,126
Rate Stabilization Account	30.0	7	30.0	60
Total	$1,221.0		$(35.0)	$1,186
Indicated shortfall	$ 289.4		$(6.4)	$ 283
Rate increase required to achieve indicated 1.30:1 coverage	24.3%			25.1%

APPENDIX "C"

Mainland Gas Service

Estimated Revenue Requirements

1982/83 - $ Millions

	Amended Application	Notes	Adjustments	Adjusted Amounts
Cost of Service				
Divisional operating costs	$ 42.0	1	$(1.0)	$ 41
Gas purchases	264.4	2	(10.4)	254
Grants, taxes	9.0	2	(1.0)	8
Depreciation	11.6	3	0.4	12
Interest (net)	32.9	4	1.1	34
Coverage margin	13.1	5	(2.1)	11
Greater Victoria losses	-	8	4.0	4
Total	$ 373.0		$(9.0)	$ 364
Revenues				
Estimated revenues at current rates	373.0	6	(9.0)	364
Difference	$ -		$ -	-
Target/Indicated Coverage	1.30:1			1.30:1

APPENDIX "D"

Mainland Gas Service

Estimated Revenue Requirements

1983/84 - $ Millions

	Amended Application	Notes	Adjustments	Adjusted Amounts
Cost of Service				
Divisional operating costs	$ 47.9	1	$(2.9)	$ 45
Gas purchases	276.7	2	(11.7)	265
Grants, taxes	11.2	2	(1.2)	10
Depreciation	13.5	3	.5	14
Interest (net)	38.4	4	1.6	40
Coverage margin	18.8	5	(5.8)	13
Greater Victoria Losses	-	8	5.0	5
Total	$ 406.5		$(14.5)	$ 392
Revenues				
Estimated revenues at current rates	390.0	6	(10.0)	380
Indicated shortfall	$ 16.5		$(4.5)	$ 12
Rate increase required to achieve indicated 1.30:1 coverage	4.2%			3.2%

APPENDIX "E"

Greater Victoria Gas Service

Estimated Revenue Requirements

1982/83 - $ Millions

	Amended Application
Cost of Service	$
Divisional operating costs	2.4
Fuel purchases	2.4
Grants, taxes	.4
Depreciation	.5
Interest (net)	1.5
Coverage margin	(4.2)
Total	3.0
Revenues	
Estimated revenues at current rates	3.0
Difference	-
Indicated Coverage	(1.25)

APPENDIX "F"

Greater Victoria Gas Service

Estimated Revenue Requirements

1983/84 - $ Millions

	Amended Application
Cost of Service	$
Divisional operating costs	2.1
Fuel purchases	3.0
Grants, taxes	.5
Depreciation	.5
Interest (net)	1.7
Coverage margin	(2.9)
Total	4.9
Revenues	
Estimated revenues	3.1
Indicated shortfall	$ 1.8
Rate increase required to achieve indicated (-.45:1) coverage	57.7%

APPENDIX "G"

Notes to Revenue Requirements Schedules

1. General reduction to reflect expected contributions to cost restraint, probable over-estimate of inflation effects and indicated employment reductions.

2. Adjustment to incorporate forecast of Exhibits 355 and 415 including net treatment of export surplus related costs.

3. Rounding adjustment only.

4. Increase to reflect revisions in Exhibit 415 for foreign exchange effects, lower interest income, and higher borrowing rates, provision for additional financing costs due to revenue shortfalls, and deducting an allocation of non-utility income.

5. Adjustment to reflect the Commission calculation of earnings margin.

6. Adjustment to reflect Exhibit 415 revenue forecast.

7. Increase in drawdown from Rate Stabilization Account.

8. Adjustment to cover Greater Victoria Gas Service losses.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
COMPARISON OF AMENDED APPLICATION AND CURRENT FORECAST
FOR YEAR ENDING 31 MARCH 1983

($000)

		Amended Application	Current Forecast
1.	Gross salaries, wages and benefits	398,756(a)	395,000
2.	Materials and supplies	462,168(a)	452,000
3.	Grants, school taxes, and water rentals	279,103(a)	252,000
	Total	1,140,027	1,099,000
	Less: portion capitalized	284,384	280,000
4.	Net charge to operations	855,643	819,000
5.	Gross interest (net of interest income)	690,496	703,000
	Less: Interest capitalized	230,231	210,000
6.	Net interest	460,265(b)	493,000
7.	Depreciation and write-offs	167,836	166,000(h)
8.	Total operating cost, being revenue required before interest coverage (4+6+7)	1,483,744	1,478,000
9.	Interest coverage	188,819(c)	185,000(i)
10.	Revenue requirement (8+9)	1,672,563(d)	1,663,000
11.	Revenue anticipated without further rate changes	1,588,668(e)(f)	1,559,000
12.	Additional revenue required	83,895(g)	104,000

Notes:

(a) Shown in Amended Application schedule (1) 2.1 in net amounts only.

(b) Refer to Amended Application schedule (1) 2.1 and schedule (1) 5.3.3.1.

(c) Refer to Amended Application schedule (1) 2.1 (net income).

(d) Refer to Amended Application schedule (1) 2.1 (total revenues).

(e) Refer to Amended Application schedule (1) 2.1.

(f) Includes $60,000 from rate stabilization account.

(g) Refer to Amended Application schedule (1) 2.1.

(h) No provision is made for write-off of Hat Creek Project costs.

(i) Assumes 1.22 interest coverage.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
COMPARISON OF AMENDED APPLICATION AND CURRENT FORECAST
FOR THE YEAR ENDING 31 MARCH 1984

($000)

	Amended Application	Current Forecast
1. Gross salaries, wages and benefits	450,303[a]	440,817
2. Materials and supplies	506,742[a]	494,875
3. Grants, school taxes and water rentals	327,900[a]	290,136
Total	1,284,945	1,225,828
Less: portion capitalized	324,893	315,972
4. Net charge to operations	960,052	909,856
5. Gross interest	834,112	841,651
Less: Interest capitalized	309,473	293,373
6. Net interest	524,639[b]	548,278
7. Depreciation and write-offs	186,615	186,301[h]
8. Total operating cost, being revenue required before interest coverage (4+6+7)	1,671,306	1,644,435
9. Interest coverage	293,607[c]	298,879[i]
10. Revenue requirement (8+9)	1,964,913[d]	1,943,314
11. Revenue anticipated without further rate changes	1,657,464[e][f]	1,612,632
12. Additional revenue required	307,449[g]	330,682

Notes:

(a) Shown in Amended Application schedule (1) 2.1 in net amounts only.

(b) Refer to Amended Application schedule (1) 2.1 and schedule (1) 5.3.3.1.

(c) Refer to Amended Application schedule (1) 2.1 (net income).

(d) Refer to Amended Application schedule (1) 2.1 (total revenues).

(e) Refer to Amended Application schedule (1) 2.1 (without further rate changes).

(f) Includes $30,000 from rate stabilization account.

(g) Refer to Amended Application schedule (1) 2.1.

(h) No provision is made for write-off of Hat Creek project costs.

(i) Assumes 1.3 interest coverage.

EXHIBIT 415 APPENDIX "I"

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
FORECAST STATEMENT OF INCOME FOR THE
YEAR ENDING 31 MARCH 1983

($ millions)

	Amended Application[1]	Current Forecast[2]	Difference (Impact on Net Income)
Revenues			
Electric - Export Surplus	-	47	47
Transfer to Rate Stabilization Account	-	(38)	(38)[6]
Electric - Other	1115	1094	(21)[4]
Gas	376	367	(9)[5]
Non-Utility	38	29	(9)
Transfer from Rate Stabilization Account	60	60	-
Additional Revenue Requirements [3]	84[7]	104[8]	20
	1673	1663	(10)
Expenses[11]			
Salaries, Wages and Employee Benefits	217	216	1
Materials and Services	361	351[12]	10[5]
Grants, School Taxes and Water Rentals	278	252	26[9]
Depreciation	168	166	2
Interest	460	493	(33)[10]
	1484	1478	6
Net Income	189	185	(4)

Notes:

1. Exhibit 269, Volume 1 Amended Application Schedule (1) 2.1 Amended; Exhibit 355.

2. Exhibit 355 restated in expanded form.

3. Amount required, given other estimates, to achieve 1.22 interest coverage.

4. Reduced sales to bulk customers.

5. Lower gas revenues offset by lower gas purchases.

6. | | |
|---|---|
| Sales to USA, 1 April 1982 to 3 October 1982 | $ 47 |
| Less: related expenses | 9 |
| | $ 38 |

7. Assumes electric service average rate increase of 7.7%, effective 1 April 1982.

8. | | |
|---|---|
| Electric service average rate increase of 6% effective 15 October 1982 | $ 32 |
| Additional revenue to achieve 1.22 interest coverage | 72 |
| | $104 |

9. | | |
|---|---|
| School taxes (adjusted assessments and reduced mill rates) | $ 13 |
| Water rentals (recalculated) | 13 |
| | $ 26 |

10. | | |
|---|---|
| Reduced value of Canadian dollar expressed in U.S. funds (84¢ vs 79¢) | $ 20 |
| Loss of income derived from current rates | 8 |
| Increase in interest rates (15.5% vs 16.0%) | 5 |
| | $ 33 |

11. No provision for write-off of Hat Creek Project costs.

12. Includes gas purchases of $257.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
FORECAST STATEMENT OF INCOME FOR THE
YEAR ENDING 31 MARCH 1984

($ millions)

	Amended Application[1]	Current Forecast[2]	Difference (Impact on Net Income)
Revenues			
Electric	1191	1126	(65)[4]
Gas	393	383	(10)[5]
Non-Utility	43	43	-
Transfer from Rate Stabilization Account	30	60	30[6]
Additional Revenue Requirements [3]	308[7]	331[8]	23
	1965	1943	(22)
Expenses[11]			
Salaries, Wages and Employee Benefits	244	239	5
Materials and Services	389	381[12]	8[5]
Grants, School Taxes and Water Rentals	327	290	37[9]
Depreciation	186	186	-
Interest	525	548	(23)[10]
	1671	1644	27
Net Income	294	299	5

Notes:

1. Exhibit 269, Volume 1, Amended Application Schedule (1) 2.1 Amended; Exhibit 355.

2. Exhibit 355 restated in expanded form.

3. Amount required, given other estimates, to achieve 1.3 interest coverage.

4. Lower sales to bulk customers.

5. Lower revenues offset by reduced gas purchases.

6. Reflects additional transfer to Rate Stabilization Account in 1982/83 arising from sales in that year.

7. Electric Service

Effective in 1983/84 of average rate increase of 7.7% effective 1 April 1982	$ 90
Average rate increase of 15.7% effective 1 April 1983	199
Gas Service - 4.7% increase effective 1 April 1983	19
	$308

8.

Electric Service - additional revenue from average rate increase of 6% effective 15 October 1982	$ 67
Gas Service - additional revenue from Mainland Gas Service average rate increase of 4.2% effective 1 April 1983	$ 16
Additional revenue (after application of above increases) to achieve 1.3 interest coverage	248
	$331

9.

Grants and School Taxes	$ 21
Water Rentals - recalculated on reduced electric revenues	16
	$ 37

10. Composite of factors including Canada/USA exchange rate (85¢ vs 80¢) and interest rate assumptions of (14% vs 15.1%).

11. Do not reflect results of October 1982 restraint review.

12. Includes gas purchases of $268.