P. U. 29 (2003)

IN THE MATTER OF the *Electrical Power Control Act*, SN 1994 c. E-5.1 (the *"EPCA"*) and the *Public Utilities Act*, RSN 1990 c. P-47 (the *"Act"*) and their subordinate regulations*;* and

IN THE MATTER OF an Application by Newfoundland and Labrador Hydro (Hydro) for approval of:

(1) its 2004 Capital Budget pursuant to s.41 (1) of the *Act*;
(2) its 2004 capital purchases and construction projects in excess of $50,000 pursuant to s.41 (3)(a) of the *Act;* and
(3) its estimated contributions in aid of construction for 2004 pursuant to s. 41 (5) of the *Act*.

BEFORE: **G. Fred Saunders**
Presiding Chair

Gerard Martin, Q.C.
Commissioner

Donald R. Powell, C.A.
Commissioner

TABLE OF CONTENTS

DECISION AND ORDER

BACKGROUND

On March 28, 2003 the Board of Commissioners of Public Utilities (the "Board") received an application from Hydro requesting an order of the Board pursuant to Section 41 of the *Act* approving:

(1) its 2004 Capital Budget in the amount of $34,465,000;

(2) its 2004 capital purchases and construction projects in excess of $50,000; and

(3) its proposed estimates of contributions in aid of construction of approximately $240,000.

The Board decided that the application would be the subject of a public hearing and caused notice of the public hearing to be published in several newspapers circulating throughout the Province commencing on April 23, 2003.

Notices of Intervention were received from:

Newfoundland Power Inc.,
Corner Brook Pulp and Paper Company Ltd., Abitibi Consolidated Company of Canada, Stephenville and Grand Falls Divisions, and North Atlantic Refining Limited (the "Industrial Customers").

Following two postponements the public hearing took place in the hearings room of the Board on July 7 to July 11, 2003 with written argument filed on July 23 and final oral argument on July 28.
Hydro was represented by Maureen Greene Q.C.,
Newfoundland Power Inc. was represented by Peter Alteen and Gerard Hayes.
The Industrial Customers were represented by Joseph S. Hutchings, Q.C. and Janet Henley Andrews, Q.C.
Mark Kennedy appeared for the Board as Hearing Counsel.

Dwanda Newman appeared as Board Counsel.

The following witnesses were called during the hearing:

For the applicant

(i) Panel 1

James R. Haynes, Vice-president, Production
Eric Downton, Director, Information Systems and Telecommunications
Gerard Dunphy, Manager, Infrastructure and Software Support
Kenneth McDonald, Labour Manager, Transmission and Rural Operations, Central

(ii) John Roberts, Vice-president, Finance and Chief Financial Officer

(iii) Panel 2

David Reeves, Vice-president, Transmission and Rural Operations
Fred Martin, Director, Engineering, Transmission and Rural Operations

For the Industrial Customers

(i) Stephen L. Barreca, President, Barreca Consulting and Research International

A Letter of Comment, dated July 9, 2003, was received from the Consumer Advocate, Dennis Browne, Q.C. in which he offered his opinion on Hydro's capital budget proposal to replace it's VHF mobile radio system. The Board thanks Mr. Browne for his letter.

SETTLEMENT CONFERENCE / MEDIATION

In preparing for the hearing the Board proposed a settlement conference to provide the parties with an opportunity to settle certain issues in advance of the hearing. The parties reached certain understandings which are contained in a settlement report filed as Consent Exhibit 2 attached as Appendix 1.
The Board appreciates the initiatives and cooperation demonstrated by all of the parties in their attempt to achieve a settlement of certain issues through this process in advance of the hearing. The Board has

considered the Settlement Report as a part of its deliberations and sets out below its decision on all outstanding matters before it including those addressed in the Settlement Report.

LEGISLATION

A public utility is required by Section 41 (1) of the Act to submit its annual capital budget of proposed improvements or additions to its property to the Board for approval not later than the 15th day of December in each year for the next calendar year. Section 41 (2) of the *Act* requires that the budget shall contain an estimate of future required expenditures on improvements or additions to the property of the public utility that will not be completed in the next calendar year.

Pursuant to Section 41 (3) of the *Act* a public utility shall not proceed with the construction, purchase or lease of improvements or additions to its property where

(a) the cost of the construction or purchase is in excess of $50,000; or
(b) the cost of the lease is in excess of $5,000 in a year of the lease

without the prior approval of the Board.

Section 3 of the *EPCA* sets out the power policy of the province and in Section 3(b) states that

"3. It is declared to be the policy of the province that

(b) all sources and facilities for the production, transmission and distribution of power in the province should be managed and operated in a manner

(i) that would result in the most efficient production, transmission and distribution of power,
(ii) that would result in consumers in the province having equitable access to an adequate supply of power,
(iii) that would result in power being delivered to consumers in the province at the lowest possible cost consistent with reliable service,
(iv) that would result in, subject to Part III, a person having priority to use, other than for resale, the power it produces, or the power produced by a producer which is its wholly owned subsidiary,

> *(v) where the objectives set out in subparagraphs (i) to (iv) can be achieved through alternative sources of power, with the least possible interference with existing contracts,*
>
> *and, where necessary, all power, sources and facilities of the province are to be assessed and allocated and re-allocated in the manner that is necessary to give effect to this policy.*"

CAPITAL BUDGET PROCESS

During this hearing, as in previous capital budget hearings for the utilities, the role of the Board in reviewing the capital budget of a utility came in for considerable discussion. The Board, in Orders P.U. 7(2002-2003) and in P.U. 36(2002-2003) ordered Hydro and Newfoundland Power Inc. respectively, to adhere to specific guidelines in submitting future capital budget applications. The Guidelines are attached as Appendix 2.

During the hearing Mr. Stephen L. Barreca, the expert presented by the Industrial Customers, offered some suggestions as to how the capital budget process may be improved. He suggested that a more formal classification of budget projects would resolve many associated problems and enhance the budget process and while such classifications should be kept to a minimum, they should be sufficient to support the review and approval process. He suggests a classification along the following lines may provide for the type of analysis necessary to support budgetary oversight.

> Essential Projects - These types of projects are must do projects where failure to complete them would result in unacceptable safety concerns, non-compliance with regulatory or legal requirements or pose unacceptable risk to operations or the loss of service quality. Where the company has latitude regarding how these projects are accomplished, a Discounted Cash Flow (DCF) analysis of the viable alternatives should be used or where a DCF model is not practical a qualitative analysis may be acceptable.

<u>*Necessary Projects*</u> - These projects, by their nature, are often ongoing and consisting of projects required to sustain normal growth and provide for replacements. A DCF analysis is not required and may be replaced by an analysis of historical expenditures and retirements along with an analysis of company demand forecasts.

<u>*Justifiable Projects*</u> - These projects, while not necessary or essential to the business, add value to the business by improving productivity of workers, decreasing operating cost, increasing revenues or increasing the quality of service. A DCF analysis should be used or where one is impractical, a qualitative analysis may be acceptable.

While the Board sees merit in these suggestions they may be addressed in the technical conference process that the Board initiated. In Order P.U. 36(2002-2003) the Board gave notice of a technical conference to be held for the purpose of clarifying the responsibilities of the utilities and the Board with respect to the capital expenditure approval process as required under the legislation. In that Order, Newfoundland Power Inc was put on notice that it will be required to attend the technical conference which, although not yet scheduled, is now expected to take place in early 2004. Hydro will also be required to attend the technical conference and will be given an opportunity to make submissions and participate in discussions to improve the capital expenditure application and approval process under which the utilities and the Board operate. Until that technical conference takes place the guidelines referred to above, and contained in Order P.U. 7 (2002-2003), will be used to assist the Board in making a determination on the reasonableness of Hydro's 2004 capital expenditures.

HYDRO'S PROPOSED 2004 CAPITAL BUDGET

Overview

On March 28, 2003, as required by section 41 of the *Act,* Hydro applied for approval of its 2004 capital expenditure budget in the amount of $34,465,000. Subsequently, by correspondence dated June 24, 2003, Hydro deferred one project, the JDE Migration Assessment Study, B-70 of the application, in the amount of $231,000. The total amount of the 2004 capital budget, therefore, for which Hydro sought approval, is $34,234,000 comprised of four main categories, as follows:

Generation	$5,079,000
Transmission & Rural Operastions	12,177,000
General Properties	15,978,000
Allowance For Unforeseen Events	1,000,000
Total Capital Budget	**$34,234,000**

In their prefiled production evidence Hydro reiterated the four main components of their capital budget criteria as including the following:

1. Public or employee safety.
2. Compliance with environmental legislation and regulations, as well as commitments and agreements with regulatory authorities.
3. Maintenance or improvement of reliability and availability of equipment to meet load growth.
4. Reduction of costs or improvements to efficiencies.

At the commencement of the hearing Hydro requested an Order of the Board granting approval of the purchase and installation of a transformer at Happy Valley Terminal Station in the amount of $1,244,000. This project was included in Section C of Hydro's capital budget application since it was subject to the minimum filing requirements of the Board. The Intervenors did not oppose this request and after due consideration the Board granted approval of the project and issued Order P.U. 20 (2003) on July 10, 2003, a copy of which is attached as Appendix 3.

Hydro supplies over 80% of the energy required in the Province of Newfoundland and Labrador and operates the bulk transmission grid to supply all provincial requirements. The system is unique in that it is isolated and not interconnected to any other system which may supply replacement power in the event of an outage or an emergency. Furthermore, there is a very narrow margin between the total energy generated by the system and the requirements of its customers. In these circumstances the Board believes it must be ever mindful of the importance of maintaining and renewing the various components of the system so as to guard against failure and enable Hydro to continue to provide reliable service at the lowest possible cost. To allow deterioration of any of the system's crucial components would be contrary to the provisions of Section 3 of the *EPCA* and, therefore not in the best interest of any of Hydro's stakeholders.

In the summary of the Board's analysis of the projects included in Hydro's 2004 capital budget application which follows, reference is made only to those projects that the Board recognized as being contentious, were the subject of considerable debate or were, on the merits of the evidence for and against, deserving of particular consideration. The remaining projects are dealt with without individual comment at the end of this Decision and Order.

Generation Projects

Replace Unit No.7 Exciter - Bay d'Espoir - $757,200 (B-5)

This project is for the purchase, installation and commissioning of the Unit No.7 Exciter at Bay d'Espoir. The program to replace exciters at Hydro's various generation sites began in 1995 and, to date, exciters have been replaced on six of seven units at Bay d'Espoir, two units at Holyrood and one unit at Cat Arm.

Hydro states that the existing exciter has been in service since 1977 and the supplier is no longer able to guarantee the availability of components needed to repair failed electronic cards.

A Report entitled *"A Condition Assessment of Exciters Within the Bay d'Espoir Powerhouse No.2, Hinds Lake, Upper Salmon, Cat Arm and Holyrood Generating Stations"* dated March 28, 2000 was prepared by Generation Engineering and was submitted to the Board as part of Hydro's 2003 Capital Budget Application. The Report summarized the service history of the No 7 exciter and the availability of technical support and spare parts from the original equipment manufacturer, General Electric. The Report also identified two cards that were obsolete and no longer manufactured.

Mr. Haynes testified that the cards from the six units previously replaced at Bay d'Espoir were not interchangeable with Unit No. 7 (Transcript, July 9, p. 228). Although Hydro has one of these cards in stock, General Electric would not guarantee the repair of failed cards but, according to the Report, they would provide technical support for the near future. The Report recommended the replacement of the Unit 7 exciter in 2004 which Hydro describes as a preventative measure to ensure that an exciter is in place that is fully supported by the manufacturer. The model proposed for Unit No. 7 is the same as the model used to replace the exciters on all of the other Bay d'Espoir Generation Units 1 - 6.

Hydro states that the impact of the loss of an exciter would vary depending on the time of the year but that the cost of replacement energy (150MW) from Holyrood would be approximately $168,000/day at current fuel prices. However, Hydro further states that the loss of this exciter would result in the loss of 150 MW out of the system which may make it difficult to meet customer expectation of load requirements (Transcript July 8, p. 24).

The Industrial Customers argued that there is no evidence of any significant problems with the No. 7 exciter and Hydro has not attempted to get a re-engineered card from General Electric or spare cards from other sources to extend the life of the existing exciter. It does not appear, the Industrial Customers argue, that proper planning was done to take advantage of the other alternatives consistent with reliable service. In addition, they argue that given the expected life of the electronic components it would be anticipated that a replacement of the original cards with spares would extend the life of the exciter to its full 30 year predicted life span.

Hydro did not indicate that the cost of maintaining the exciter for another year was considered as a potential least cost alternative and there is no evidence that the existing exciter is not operating efficiently at the present time or that it will not operate efficiently beyond 2004. Hydro has one of the two required electronic cards in stock but has not attempted to obtain a re-engineered card from General Electric or a spare card from another source. Both of these alternatives should have been explored in detail prior to the submission of the project.

Despite the failure of Hydro to fully address all the alternatives, the Board will approve this project to proceed in 2004 based on the critical importance of No. 7 Exciter at Bay d'Espoir.

<u>Replace Gate Hoist No. 2 at Ebbegunbaeg Control Structure - $507,900 (B-8)</u>

This project, as proposed by Hydro, consists of the replacement of the existing screw stem hoist mechanism with a wire rope hoist. The Ebbegunbaeg gates control the flow of water from Meelpaeg Lake into Upper Salmon and Bay d'Espoir power plants and are in virtually continuous use. The structure and equipment are 35 years old and parts are not available. Since 2000 there have been problems with the screw stems, drive nuts and extensions causing repairs and replacement parts to be installed. Since the structure is remotely controlled it is essential that the gates are capable of being operated at all times. Hydro states that the wire rope hoists are expected to be more reliable than the screw stem hoist and that the equipment removed from service will be used to maintain the other gates at the control structure. It is the opinion of Hydro's engineers that the replacement of the gate hoist as proposed is the most reliable solution (Transcript, July7, p. 160).

The Industrial Customers, while not questioning the high level of reliability required for the operation of the gate at Ebbegunbaeg, point out that Hydro has not provided any information concerning the cost of maintaining the existing gate hoist over the next three to five years nor have other alternatives been investigated.

Although Hydro has not included the estimated cost of maintaining the existing gate hoist over the next three to five years as suggested by the Industrial Customers the Board will approve this project since the structure is 35 years old, it is remotely controlled and there have been ongoing problems. In addition, the gates are very important to the operation of the Bay d'Espoir reservoir system and the gate hoist that is intended to be removed will provide spare parts for the remaining two gates.

<u>Replace Unit 2 Governor Controls at Cat Arm - $540,000 (B-10)</u>

This project as proposed by Hydro is required due to the manufacturer's decision to discontinue repair or replacement of electronic cards by the end of 2004 and because of continuing problems being experienced (Transcript, July 7, p. 43 and July 8, p. 28). The governor is original equipment put into service in 1984. A report titled *"Condition Assessment of Governor Controls for Upper Salmon and Cat Arm Units"* was prepared by Generation Engineering in June 2001. The Report reviewed the service history of the Cat Arm governor controls and the availability of technical support and spare parts from the original equipment manufacturer and recommended that the governor controls for one unit should be replaced in 2004 as a preventative measure which will ensure that a supply of spare parts is available beyond 2004 for the remaining unit.

In justification of this project Hydro stated in its application that the loss of the governor controls would result in the unit being out of service until repairs could be made. While spares are available, at least to the end of 2004, the problem can be corrected in a reasonably short time, however, they point out that after 2004 a failure could result in a lengthy outage to the unit while a replacement control system is purchased and installed.

During cross-examination by the Industrial Customers Mr. Haynes explained why Unit No. 2 was chosen over Unit No. 1 stating that it was the opinion of the plant engineer that Unit No.2 should get priority in 2004 and that he did not take exception to that opinion (Transcript, July 8, p. 34).

The Industrial Customers argued that the evidence in support of this project does not present any compelling reasons for the project to be carried out in the 2004 budget year. In support of their argument they point out that spare parts will be available to the end of 2004 and there will be some support available from the manufacturer (Transcript, July 8, p. 35).

The Board is not persuaded by the evidence that this project should get priority in Hydro's 2004 capital budget and, therefore, will not grant approval of this project. Hydro has not demonstrated that there is any urgency to carrying out this project due to any persistent problems and there is no evidence on the record to indicate that maintenance of the existing equipment will be a problem in 2004 or in 2005.

Replace Unit 2 Exciter at Cat Arm - $518,500 (B-12)

This project is for the purchase, installation and commissioning of a replacement static exciter for Unit No.2 at Cat Arm. Hydro explained that the original exciter has been in service since 1984 and that spare parts are no longer manufactured and technical support is no longer available from the manufacturer. The Report *"A Condition Assessment of Exciters within the Bay d'Espoir Powerhouse No.2, Hinds Lake, Upper Salmon, Cat Arm and Holyrood Generating Stations"* which was submitted to the Board as part of Hydro's 2003 Capital Budget Application reviewed the history of the exciter and the availability of technical support and spare parts from the original manufacturer. The manufacturer has advised that all spare parts are obsolete and no longer manufactured.

Under cross-examination by the Industrial Customers, Mr. Haynes agreed that the spare parts for the exciters procured in 1999 are still in inventory together with the spare parts generated when Unit No.1 was replaced in 2002. When asked by the Industrial Customers if Hydro had looked at the maintenance cost associated with keeping the existing exciter, Mr. Haynes confirmed that the maintenance capability is there providing Hydro is willing to accept a higher risk of unavailability if parts fail (Transcript, July 8, pp. 45 - 47).

The Board is not satisfied that there is sufficient urgency demonstrated by Hydro to justify this project proceeding in 2004. Under cross examination it was clear that the performance of the exciter over the last five years has been excellent and with the spare parts in inventory Mr. Haynes agreed that, on average, the exciter should be expected to last until 2011. Furthermore, the cost associated with maintaining the existing exciter was not explored by Hydro and not provided in evidence, and therefore not seriously considered as an alternative to the capital replacement of the unit(Transcript, July 8, pp 43 to 47). The Board will not grant approval for this project at this time.

Upgrade Controls Spherical Valve No.3 - $183,200 (B-14)

The project described on page B-14 of Hydro's application involves the upgrading of the control system for spherical valve No. 3 at Bay d'Espoir by replacing control valves, piping, tubing and the control panel. The control system is obsolete and replacement parts have to be reverse engineered and custom made. The project is a continuation of a program started in 2001 to upgrade control systems on spherical valves at Bay d'Espoir. The spherical valve is the main shut-off valve for the turbine and also functions as an emergency shut-off device. In the past five years, according to Hydro, there have been 28 maintenance events for this control system but none of the problems associated with these events have resulted in a catastrophic failure of the system.

The Industrial Customers, in final argument, made no submission with respect to this project.

Since this project involves the upgrading of a mechanism that performs as the main shut-off valve for the turbine and also as an emergency shut-off device, and considering that the device has been in operation since 1967, the Board will approve the project as submitted.

<u>Upgrade Control System at Holyrood - $1,552,600 (B-17)</u>

This project involves the replacement of an obsolete Distributed Control System(DCS) on the three Holyrood generation units. The DCS provides control for the boilers, boiler auxiliary systems, station service, burner management, turbine and generator monitoring and control for other plant systems. Hydro maintains that the system at Holyrood cannot operate without the DCS functioning properly. It is proposed that some parts of the overall system will be reused. The unit 1 and 2 DCS will be upgraded in 2004 and unit 3 in 2005. The existing DCS for units 1 and 2 was implemented in 1988 and for unit 3 in 1992. The manufacturer's commitment of support for these systems expired in January 2002 and January 2003 respectively and Hydro has been advised that parts are obsolete and the system is no longer supported. Based on the spare parts available and the failure history of the system Hydro can maintain and operate the system until 2004.

A cost analysis report dated November 2002 and titled *"Distributed Control System Lifecycle Planning"* recommended the implementation of an Ovation control system for stage 1 in 2004 and for stage 2 in 2005 and that this option has the lowest net present cost, the longest predictable life expectancy, the most reliability and will require the least maintenance resources.

The Industrial Customers argued that Hydro had not explored all the short and long term alternatives for the DCS replacement and suggested that for the short term it is possible to upgrade to a WDPF Level 8 System and migrate to the Ovation system over the long term. Mr. Haynes, during cross-examination by the Industrial Customers, stated that *"moving to the Ovation was the long term most economic thing to do, with a fair degree of present net worth benefit up until 2020"* (Transcript, July 8, p.71). In support of Hydro's choice of options he testified that *"The Holyrood plant basically is a 500 megawatt plant and Hydro is not prepared to dicker and jeopardize the reliability of the plant"* (Transcript, July 8, p.86).

The Life Cycle Planning Report dated November, 2002 and prepared by Hydro recommended implementation of the Ovation system over the two years, 2004 and 2005, as the alternative with the lowest net present cost, the longest predictable life expectancy, the most reliability and least maintenance cost.

The Board, having considered all of the evidence and argument submitted on this project, is convinced that the performance of the Holyrood Generating Station and its vital contribution to the reliability of the on-island system justifies the expenditure to upgrade the control system and will, therefore, approve the project as proposed.

Purchase and Install Ambient Monitoring System Enhancement - $728,100 (B-19)

This project involves the expansion of the emission measurement capabilities of the existing ambient monitoring stations to include continuous monitoring of fine particulates and nitrogen oxides (NOx). Particulate monitors will be installed at each of four remote monitoring sites and at the plant main gate and NOx monitors will be installed at each of the four remote sites, but not at the plant main gate. The Holyrood generating station has been in operation since 1971. The ambient monitoring stations were placed in service in 1996.

Hydro states that in recent years the Holyrood plant has been called upon for increased production arising from higher customer demand and a period of lower than normal inflow at Hydro's hydroelectric facilities. Since Holyrood is one of the most significant sources of environmental emissions in the Province, Hydro states it is committed to take a proactive approach on quantifying emissions with a view to identifying the most appropriate means to reduce the environmental impact of the facility on the surrounding environs. Air emissions from the Holyrood plant include particulate matter, NOx, Sulphur Oxides (SOx) and acid aerosols.

The current proposal will enhance the permanent ambient monitoring stations by adding NOx and fine particulate monitoring capability and will assist in the process of selection of the most cost effective abatement technologies from amongst the many that are available. Although current emissions are below the statutory limits, a 1999 report by Cantox concluded that further quantification of emissions is required (see NP-104 - Newfoundland Hydro's 2001 Rate Application).

Mr. Haynes testified that the purpose of the project is *"to establish...our total environmental footprint at Holyrood plant, which is one of the biggest polluters in the province, subject to many customer/consumer complaints"* (Transcript, July 8, pp.106 and 107) and to provide real in situ data to allow Hydro to address the obvious problems (Transcript, July 8, pp 91 and 92).

As pointed out by the Industrial Customers in final argument, there is no evidence that this project is required by any existing regulatory or governmental agency, is not required by statute and has no impact on service or Hydro's ability to supply its customers and therefore, the project should be rejected.

However one might wish to classify this project and its urgency, it is clear that reliance on the Holyrood generating station will not diminish in the foreseeable future. Since there are very few viable hydro alternatives left on the island portion of the province the Holyrood generating station can be expected to play a major role in providing for normal growth and peak demand. As a consequence of this, it can be expected that there will be a heightened awareness and scrutiny of the impact of emissions from the Holyrood plant on the local area. The Board feels it is essential, therefore, to have the best available historical data on which to base budget decisions so as to accurately provide for future emission control projects.

Having considered all of the evidence and argument submitted on this project the Board will grant approval for Hydro to proceed with the Ambiant air monitoring system expenditure in 2004.

Transmission and Rural Operations Projects

Upgrade Civil Structures at Holyrood - $78,500 (B-22)

The upgrading of the civil structures at Holyrood contemplates the expenditure of approximately $79,000 in 2004 to carry out engineering work to replace the interior steel liner of stack No 2 in 2005. The condition of the stack liner is similar to that of the No. 1 stack liner approved for replacement by the Board in 2003. The project justification states that stack inspections have identified increased metal loss and thin spots on the steel liner. A report titled *"Evaluation of Options to Refurbish Steel Stack Liner #2"* prepared by Generation Engineering in March of 2003 investigated and evaluated three options for the upgrade including (1) re-enforcement combined with inspection, maintenance and repair; (2) immediate repair and maintenance or (3) replacement of the entire stack liner.

Hydro has selected Option #3 as the option that provides for the highest degree of reliability and availability until 2020 at the lowest cost. This option also avoids the risk of catastrophic failure and its associated increased costs.

The Industrial Customers argued that the expenditure, which is for engineering and overheads, could be postponed and all of the work could be done in 2005.

The Board having considered all of the evidence and argument sees no practical benefit to postponing the engineering and related costs of this project into 2005 and hereby grants approval for Hydro to proceed as proposed.

<u>Upgrade TL214 - 138 kv Bottom Brook to Doyles - $2, 836,200 (B-25)</u>

The upgrade of TL 214 is a continuation of a project the Board approved engineering and related funds for in 2003 and involves the addition of structures, installation of counterweights and replacement of insulators over the whole line. As well, the proposal includes costs to provide temporary generation to serve customers during outages required to complete the upgrade.

TL 214 is a transmission line that was constructed in 1968 and no major upgrades have been carried out on this line since its construction. Outage records confirm that outages are caused mainly due to high winds, salt contamination and lightning. A condition assessment review was conducted to confirm the condition of the line and to recommend corrective action. This Review was submitted to the Board as part of Hydro's 2003 Capital Budget Application.

The Industrial Customers did not make a submission on this project.

The Board accepts Hydro's justification for the project and will approve this project to proceed as Hydro proposed.

<u>Replace Insulators on line TL233 (230kv Buchans to Bottom Brook - $1,054,600 (B-27)</u>
<u>Replace Insulators, Bottom Waters line 1, Fleur de Lys line 1 and South Brook line 1 - $944,500 (B-45)</u>

Both projects propose the replacement of insulators manufactured by Canadian Ohio Brass and installed approximately 30 years ago. These insulators are part of a group of insulators that have caused failures industry wide due to cement growth radial cracks that result in moisture intrusion causing line failures to occur. The problem was recognized in the 80's and a gradual replacement program has been carried out since that time to remedy the problem. The Board has approved the total replacement concept for both Hydro and Newfoundland Power Inc. in orders emanating from previous capital budget applications. Hydro states in its application that during the period 1996 to 2003 the lines have averaged two to four outages each year due to defective insulators.

Mr. Martin testified that the program falls into the category of preventative maintenance in the interest of reliability improvement and while an immediate problem does not appear to exist it will become one over time since the failure statistics are increasing (Transcript, July 11, pp 71 and 72).

The Industrial Customers argued that replacement program scheduled for 2004 could be delayed without seriously jeopardizing Hydro's reliability standard.

The Board believes that the project conforms with Hydro's overall plan to totally replace the defective insulators over time providing funds are available and are not limited by other priorities, therefore, approval will be granted to proceed as proposed.

Upgrade 138kv and 66kv Protection - $150,200 (B-29)

This project consists of the purchase and installation of microprocessor based relays to improve protection of designated 138kv lines at Deer Lake and Sunnyside Terminal Station and 66kv lines at Deer Lake Terminal Station.

Hydro submitted in evidence that the existing 30 year old electro mechanical relays will be removed as they are difficult to maintain and calibrate and have an adverse effect on system performance. The replacement relays can be remotely interrogated allowing timely analysis of problems on the lines or with the relays themselves. Mr. Martin testified that this project is part of an extensive ongoing program conducted over the past several years by Hydro in an effort to upgrade its protection and control capabilities on the bulk transmission system (Transcript, July 11, pp 75 - 77). He also testified, in cross examination by the Industrial Customers, that Hydro has experienced ten inadvertent trips of these relays in the last nine years but there is no indication that the situation is deteriorating (Transcript, July 11, p. 76 and 77).

The Industrial Customers argued that the relays sought to be replaced are functional and no compelling reason has been given to justify immediate replacement and that the project can be deferred.

Although Hydro did not consider the impact on maintenance cost or reliability of the system if this project were to be deferred, the Board will approve it since the anticipated improvement to the control capabilities on the bulk transmission system is an essential upgrade to improve system protection capabilities.

General Properties Projects

Replace Energy Management System at the Energy Control Centre - $4,292,700 (B-53)

This project is for the replacement of the existing Energy Management System (EMS) computer software and hardware infrastructure with state of the art hardware and software which provides greater flexibility for future technology changes and integration with Hydro's information technology (IT) infrastructure. Hydro stated in its application that the existing EMS is used by Hydro's Energy Control Centre to monitor, control and manage the power system and related water resources across the province and is critical to the efficient and reliable operation of the total system. The existing system was placed in service in August of 1990 and is reaching the end of its projected life of 15 years with manufacturer supplied spare parts discontinued and technical support severely limited.

This project is the second of a four year program commenced in 2003. Included as supporting documentation for this project with the 2003 capital budget application was a report by KEMA titled *"Newfoundland and Labrador Hydro Energy Management System Assessment"*. The report strongly recommended that Hydro begin the process of replacement of the EMS immediately because of the high risk of failure due to the age of the electronic components. KEMA identified four alternatives for the project and recommended that the least cost option would be to procure the system together with Churchill Falls Labrador Corporation (CFLCo). This joint procurement would save Hydro approximately $1,500,000. CFLCo has committed to Hydro's joint procurement proposal and Hydro's budget has been prepared on that basis.

The Industrial Customers argued that this project, because of its *"enormously high value"* should be subjected to an independent evaluation (IC Final Argument, p.41). As part of its 2003 capital budget application Hydro filed a report by KEMA, an independent consultant, which the Board accepted and relied on in approving the capital expenditure for this project starting with the 2003 capital budget.

The Board is not persuaded that there is sufficient justification to require Hydro to commission a second study of this project and accepts Hydro's justification for proceeding to carry out the 2004 capital expenditure. Therefore, the Board will approve Hydro's proposal to continue with the second year of the four year program to replace the Energy Management System at the Energy Control Centre.

Corporate Applications Environment - $540,000 (B-59)

The project proposed on page B-59 of Hydro's application includes upgrades to currently held software application products. Hydro maintains that software must be regularly upgraded to take advantage of the benefits of vendor advancements in system functionality and a stable application environment for Hydro's key business functions. Mr. Downton testified in response to cross-examination by Mr. Hutchings that *"...if you do not keep current, then basically you'll find that youwill not be able to get support from the vendors"* (Transcript, July 8, p.130).

In response to the Industrial Customers Request for Information IC-30, Hydro provided details of the software upgrades in the form of communications from vendors highlighting the upgrades. In cross examination by the Industrial Customers, Mr. Downton gave a further description of the details of the project and explained that it consists mainly of labour required to load and test the software upgrades for J. D. Edwards, Showcase Strategy, Lotus Notes and AS400 (Transcript, July 8, pp. 119 to 129).

In final argument the Industrial Customers questioned the need for the project suggesting Hydro's policy to implement these upgrades was being driven by the *"encouragement"* of vendors.

The Board believes it is necessary for Hydro to update its software regularly to take advantage of advancements in technology and, therefore, will approve this project to proceed as proposed.

Applications Enhancements $463,200 (B-60)

This project provides for: (1) the unforeseen modification, enhancements and additions to software to address the required changes to business processes initiated by customers, stakeholders and regulators or to provide efficiencies to existing processes; (2) the continuing design, building and implementation of enhancements to Hydro's Internet/Intranet; and (3) an Enterprise Project Management software application.

In justifying item (1) of this project Hydro states that it is imperative for it to be able to react to requests to provide enhancements to software applications in response to unforeseen requirements, such as legislative and compliance changes, vendor driven changes and enhancements designed to improve customer service or staff productivity.

Item (2) of this project involves the design, building and implementation of enhancements to Hydro's external web site to improve access to information to its customers and stakeholders.

The Enterprise Project Management software is a tool which Hydro maintains is required to improve the project management process and resource utilization to ensure that better real time decisions can be made.

In response to the Industrial Customers Request for Information IC-31, Hydro provided a breakdown of the estimated costs for each of the three elements of this project as follows:

(1)	$ 85,500
(2)	226,200
(3)	151,500
Total	**$ 463,200**

In his pre-filed evidence, Mr. Barreca testified that this project combines routine-type ongoing projects with un-related non-routine capital purchases thus allowing prudent projects to carry potentially non-prudent ones (Barreca (rev.), p. 3 of 21). He agrees that item (1) is a typical routine capital expenditure which should be funded each year, whereas items (2) and (3) should be funded only after economic justification is provided (Barreca (rev.), p. 3 and 4 of 21) Mr. Barreca suggests that this *"lack of structure and discipline"* (Barreca (rev.) p.3 of 21) impairs the ability of independent review and makes it virtually impossible to evaluate the prudence of the expenditures.

In direct testimony, Mr. Barreca stated that his personal experience dictates that Hydro should *"stay away from an enterprise project management software application. They never work and many companies have tried , but it may work for Hydro"* (Transcript, July 10, p.139).

While the Board agrees with Mr. Barreca that in the capital budget process there is room for improvement in respect of the classification of the various projects along the lines he suggests, the Board finds that it is imperative, therefore, for Hydro to be able to react to requests to provide

enhancement to software applications in response to unforeseen requirements. The Board will approve this project as proposed.

Replacement of Operational Data and Voice Network - Phase 2 - $971,000 (B-79)

This project represents the second year of a two year program to plan, design and install a wide area network (WAN) communications infrastructure to replace the existing System Control and Data Acquisition (SCADA) and operational voice network currently using General DataComm (GDC) infrastructure. The proposal is to provide an architecture that can support the operational data, administrative data and voice traffic over a standard network infrastructure. The existing operational data network supporting SCADA traffic was installed in 1988. In its prefiled evidence, Hydro states that the GDC is at the end of its useful life and the support by the supplier will soon be discontinued.

The evidence indicates that the upgraded communications network will support all applications and devices that have a standard protocol (IP centric) and will provide added functionality, reliability and manageability. Integrating all applications and devices, including SCADA, onto a single communications platform, as stated on page B-80 of the prefiled evidence, will streamline operational activities, and improve overall management and control of the WAN. Hydro states that the improved reliability will benefit the power grid management, provide better control and reduce operational costs.

In his prefiled evidence, Mr. Barreca states that combining critical SCADA functionality with non-critical voice and network needs, without detailed description and analysis, allows safety concerns to carry potentially unnecessary expenditures (Barreca, p.3 of 21). He further states that critical security and reliability concerns must be separately identified, quantified and evaluated since without such analysis it is impossible to ensure that safety and security concerns are met, and impossible to evaluate the economic prudence of the expenditures (Barreca, p. 4 of 21). This lack of structure and discipline in the budget preparation, he maintains, places inappropriate pressure on the Board to approve the budget as is (Barreca, p. 5 of 21).

In his direct evidence, Mr. Barreca testified that the reported incidents of failure of the existing GDC equipment, as detailed on page B-79 of the application, *"does not justify replacing anything"* (Transcript, July 10. p.135). He explained that in order to justify the project an analysis should have been carried out to determine what network element caused the failure (Transcript, July 10, p. 136).

The Industrial Customers argued that the failure statistics of the Operational Voice and Data System and the incident reports provided in response to IC - 35 were misleading in that some of the failures reported were not related to the equipment sought to be replaced.

Hydro argued that in considering acceptable alternatives it is necessary to remember that Hydro operates an isolated electrical system, not interconnected to any other system to which it can turn for replacement power in the event of an outage or an emergency. In addition, Hydro supplies over 80% of the energy required in the province and operates the bulk transmission grid to supply all provincial requirements and on this basis it is not prudent, nor acceptable, for Hydro to run to failure (Hydro Argument, p.12 of 34).

This project is the second year of a continuing program for which the Board granted approval of certain capital expenditures last year. For this reason, and because there is no compelling reason to halt the program at this time, approval will be granted for this proposed 2004 capital project.

Security Program Centralized Log Monitoring and Analysis System - $83,100 (B-62)

This project is for the provision of a server and associated software to centralize reporting and presentation of security data gathered from distributed operating systems. The project is intended to provide a central mechanism to gather security log information from the various systems, enhance analysis and reporting capabilities, and address due diligence and audit responsibilities as required by management. In justification of this project Hydro states that two of the main goals of IT security deal with integrity and the confidentiality of information and that having a centralized log monitoring and analysis system in place will provide these assurances.

Mr. Downton, in cross examination by the Industrial Customers, explained that *"we basically felt it prudent to look at a separate server for security rather than have it laid on top of other existing servers"* (Transcript, July 8, p.144).

The Industrial Customers argued that Hydro has not established the need for an additional server and suggested there must be a lesser cost option.

The Board has considered the evidence and argument submitted in support of this project and is persuaded that the security elements of confidentiality of information and integrity of the system justifies approval.

Security Program - Secure Remote Access - $75,100 (B-64)

The scope of this project focuses on the evaluation, design and implementation of a product that will ensure a secure method of accessing corporate information technology resources from multiple locations. The product, Hydro explains, will have to meet internal and external concerns, meet industry standards, address future operating applications and incorporate existing in-house technology where possible.

The Industrial Customers, in final argument, state that there is nothing in the application as filed or the evidence produced which shows that this project is either the preferred or the least cost option.

The Board will approve this project since it is convinced that the corporate information which the project is intended to protect is necessary for the security of the system.

End User and Server Evergreen Program $2,811, 400 (B-66)

This project represents the second year of a five year program to refresh the end user workstations, servers, operating systems and office productivity programs on a 3 to 5 year life cycle. Hydro maintains that this project will allow for reduced costs over the long term and improve efficiency through standardization and reduced support needs. This year's project will allow for the planning and migration to Microsoft's new operating system, Windows 2000.NET and the consolidation of the server infrastructure which, according to Hydro, will allow for a reduction in maintenance costs and system administration work load.

In response to questions by the Industrial Customers during cross examination, Mr. Downton indicated that Hydro looks at the best practices recommended by Gartner (Gartner Research) when determining the configuration of end user devices (Transcript, July 8, p.155). Hydro provided the Gartner guidelines in Undertaking # 19 which recommended that enterprises segment their users based on need, and that low end/mainstream users adopt a four year useful life for their PCs. Gartner states, however, that a four year useful life is not appropriate for all users (i.e., financial analysts, engineers) who are still best served by a three year or less refresh cycle.

This year's End User and Server Evergreen Program includes the replacement of 220 units made up of one third desktops, one third lap tops and one third thin client devices.

Mr. Barreca testified that while the description provided for this project appears consistent with the long term strategy detailed in Hydro's IT Technical Architecture Strategy report (Filed with the Board on March 1, 2002 arising from an undertaking Nov. 5, 2001 at Hydro's GRA hearing)) the capital cost is *"very high"* (Barreca, p.16 of 21) He also pointed out that the project description does not provide any details regarding what the money is being spent on and the costs are not documented (Transcript, July 10, p.154).

The Industrial Customers argued that Hydro did not provide full and accurate information but relied on *"Gartner's Best Practices"* which are put forward in support of Hydro's decision to carry out this project without indicating that Gartner is an appropriate standard for this utility.

The Board is not persuaded by the evidence and argument offered by Hydro that this project must be carried out in 2004. There has not been any convincing evidence or argument to suggest that all of the equipment proposed to be replaced or refreshed is necessary at this time. As a matter of fact, the cross examination of Hydro's witnesses determined that the $2,811,400 was not fully accounted for in the information they provided and the Board is not convinced that the project was thoroughly analyzed before being presented. Approval of this project is, therefore, denied.

Peripheral Infrastructure Replacement - $100,900 (B-69)

This project is to replace certain peripheral equipment such as printers, scanners and projectors described on page B - 69 of the application and is part of a five year replacement program.

In response to a request for information submitted by the Industrial Customers in IC - 33 Hydro provided a list of the equipment to be replaced showing the ages of the equipment to be between six and fifteen years as of the 2004 budget year. During cross examination by the Industrial Customers, Mr. Downton testified that some of the units coming out of service will be replaced by multi-functional devices (Transcript, July 9, p.26) and that the replacement program is on a five year cycle although in some cases the equipment will last longer (Transcript, July 9, p.25).

During cross examination the Industrial Customers asked Mr. Downton if he knew of any reason why all of the HP LaserJet Printers would stop functioning at the same time and the witness responded that he did not know (Transcript, July 9, p.30). It appears to the Board the program to replace peripheral infrastructure such as printers, scanners and projectors is more in keeping with the vendor's suggested life of the technology rather than the working life of the unit. It does not appear that Hydro made any attempt to screen the replacement unit requirements to determine the absolute necessity of replacing each unit based on its condition at the time the budget is prepared. Hydro maintains that this is the more economical approach.

The Industrial Customers argued that the least cost alternative for this project has not been explored and presented and that one of the alternatives is to wait a year before proceeding with the replacement plan.

The Board will approve this project as proposed, as it is not persuaded that the delay of one year suggested by the Industrial Customers is a least cost alternative in the long run.

<u>Replace VHF Mobile Radio System - $3,048,000 (B-71)</u>

The replacement of the VHF Mobile Radio System described on page B-71 of the application includes replacement of the equipment at 29 repeater sites, the replacement of a central switch located in Gander, the replacement of 250 mobile and base station radios and approximately 100 portable radios. The existing system was purchased in 1989 and, according to Hydro, is obsolete. This project was initially proposed as part of Hydro's 2002 capital budget and the Board, in its Order P.U. 7 (2002-2003), denied approval and required Hydro to provide additional justification including a cost benefit analysis of alternatives. The project was not included in Hydro's 2003 capital budget.

Hydro maintains that mobile communication is a fundamental requirement for an electric utility to provide for the efficient and safe completion of the required switching, live line maintenance, troubleshooting, emergency repairs and general maintenance work which must be undertaken on facilities to ensure continued reliability and to restore power as quickly as possible following outages. Mobile communications are used for employee dispatch, status communications, communications between crews working separately in a geographic area and for emergency communications.

Hydro's proposal, if approved, will cost $8,850,000 over the next two years with approximately $3,050,000 proposed to be spent in 2004.

Both the Industrial Customers and Newfoundland Power Inc. questioned the VHF proposal extensively and spent considerable time cross examining Hydro's witnesses regarding the evaluation and analysis carried out by Hydro to justify the expenditure to the Board. Both intervenors questioned the validity of the business case and the consultant's report since neither of those documents addresses the Passport system which Hydro now regards as the preferred alternative.

Mr. Barreca testified that although certain components of the existing system are said to be at the end of their expected average life it is not sufficient basis for concluding that many of the components could not provide adequate functional service into the future. He suggest two additional alternatives to those put forward by Hydro, as follows:

1. Replace the current switch in 2004 and, given the findings of the consultant, replace the remaining repeaters and expand the coverage area over the following 3 to 5 years. Additionally, this alternative should not move the existing repeater sites.

2. Identical to 1. above except that the repeater sites should be moved to company owned facilities.

A comparison of these two alternatives, Mr. Barreca maintains, would give valuable insight into the cost benefit of private ownership in this instance and improve the objectivity of this proposal.

Having briefly described the VHF Replacement project and the key objections of the intervenors the Board believes that it is incumbent upon it to consider another alternative that was mentioned during the hearing and dealt with specifically in Hydro's prefiled evidence and in the testimony of the witnesses. That is the design of a VHF system that will, over time, meet the requirements of both utilities as well as other potential users.

The provisions of Section 3(b)(iii) of the *EPCA* places a requirement on the Board to ensure that power is delivered to the consumers of the province *"...at the lowest possible cost consistent with reliable service,"*. The Board believes that the lowest possible cost scenario cannot be fully explored unless all of the known alternatives are thoroughly considered. That includes the design and operation of a VHF mobile radio system that provides for the combined requirements of both Hydro and Newfoundland Power Inc. with the capacity to accommodate other potential users such as the Department of Works, Services and Transportation which has already indicated its willingness to share in the capital and operating cost of the system proposed by Hydro. This alternative was partially explored by Hydro before presenting its 2004 capital budget application. Newfoundland Power Inc. advised that it is not ready to replace its current system for at least five years but the Board has not heard any compelling reasons why the design of a system could not be agreed on now to meet Hydro's immediate needs and Newfoundland Power's needs when it is ready to replace its current system.

The Board believes that the cost savings for the consumer of a combined system would be substantial in that it would eliminate the duplicate cost of one of the systems, approximately $8.5 million, and have the potential for additional savings if the capacity of the combined/shared system could accommodate other potential users.

On July 28, 2003, the final day of the hearing, Counsel for Hydro suggested that the Board may want to consider approval of Hydro's VHF project subject to the detailed engineering work being done to enable the tender call and evaluation to be carried out, followed by a report back to the Board before proceeding to award any specific elements of the work.

The Board concurs with Hydro's Counsel that a delay, at least, is required before this project should be given approval to proceed since it appears to the Board that in submitting this project in this capital budget application there was not sufficient firming up of the cost estimate and comparison of all of the viable alternatives.

In P.U. 7 (2002-2003) the Board set out guidelines and conditions for Hydro to follow in filing future capital budget applications. Exactly the same capital budget application guidelines and conditions were ordered in respect of Newfoundland Power Inc. in P.U. 36 (2002-2003). One of the guidelines required *"A description and related documentation outlining the results of any discussions of the project that have taken place between the utilities in an effort to reduce expenditures by avoiding duplication of services, or increased sharing of resources and expenses"*.

Board Hearing Counsel, in his final submission stated *"... that the failure to meet, discuss and develop realistic and operationally based plans to make sharing happen should be at the peril of both utilities. In a market space as small as Newfoundland's, every effort should be made to avoid duplication"*. (Kennedy, para. 46)

In his submission, Board Hearing Counsel outlined a process for the Board to follow to bring the parties to this worthwhile objective. The process, described in detail at paragraph 48 of Board Hearing Counsel's submission, would, in general terms, have Hydro and Newfoundland Power work together to explore the technical, functional and operational requirements of both utilities and the financial advantages for both if a common VHF mobile radio system is adopted. If this process fails to achieve positive results, Board Hearing Counsel suggests that the Board should initiate a show cause hearing at which hearing the utilities will be asked to account for the lack of agreement. If, on the other hand, agreement is reached Hydro would be required to submit a report indicating the basis on which the respective utilities would share in the capital and operating costs of the new VHF system.

The Board agrees, in principle, with Mr. Kennedy's suggestion as a means to investigate the substantial savings to the utilities and their customers through the creation of a common VHF mobile radio system.

Counsel for Newfoundland Power Inc., in final oral argument on July 28, at page 56 of the transcript, stated: *"All else being equal, it is the Board's obligation pursuant to the Electrical Power Control Act to approve only those capital expenditures that are consistent with the provision of least cost electrical service. If alternative viable solutions exist to an identified capital expenditure requirement, it is the utility's obligation to evaluate the pros and cons of those alternatives and to present those to the Board and the cost justifications so that the Board can discharge its obligations under the legislation:*'.(Emphasis added)

The Board, having considered the evidence and argument relating to this project, and in consideration of Hydro's suggestion to carry out the engineering work and tender call and return to the Board for approval at a latter date, will not grant approval of the project. Instead the utilities will be directed to enter into a co-operative process whereby:

1. **Newfoundland Power shall submit to Hydro a technical requirements document, including a detailed engineering assessment of the functional requirements needed by Newfoundland Power for operating a mobile VHF system into the foreseeable future.**
2. **Hydro shall generate a detailed working specification of the new VHF system that Hydro has selected and deliver a technical specification document, together with detailed capital costs to Newfoundland Power.**
3. **Newfoundland Power shall confirm, in writing to the Board, and to Hydro, whether the VHF replacement project and its technical specification as described by Hydro will meet Newfoundland Power's future operational requirements for a VHF radio system, together with a net present value calculation comparing the remaining life expectancy of Newfoundland Power's existing VHF system against adopting the new VHF system at 2, 3 and 5 years out and including confirmation of Newfoundland Power's participation in the new system once its existing system has reached the end of its useful life. As part of this exercise a determination and analysis must be carried out on the cost benefits to Newfoundland Power and to Hydro of (i) extending Hydro's VHF system to allow for the implementation of a common system at a future date or any other reasonable alternative that will allow the replacement of both systems and;(ii) accomodating Hydro on Newfoundland Power's existing VHF system.**

4. **In the event Newfoundland Power provides notice that it cannot, or will not, participate in a common VHF system the Board may order a hearing to investigate the matter.**
5. **In the event that Newfoundland Power provides notice that there is no technical or other impediment to its using a system in common with Hydro, both utilities shall provide confirmation of the basis on which they would share in the capital and operating costs of the new VHF mobile radio system.**
6. **Sharing agreements with the Works, Services and Transportation Department and others shall be firmed up to the extent possible to allow the Board to render a final decision on this project with all the available information.**

The Board may direct the utilities as to the substance of or timing of this process and may appoint a consultant to assist and advise throughout the process.

Replace Powerline Carrier Equipment Transmission System / West Coast - $419,000 (B-73)

The project to purchase, install and commission new Power Line Carrier (PLC) to replace the existing PLC's on line TL247 is the continuation of a project for which the Board approved funds in Hydro's 2003 capital budget. The equipment proposed for replacement has been in service for over 20 years and, according to Hydro's evidence, is now obsolete and no longer has the support of the manufacturer who has discontinued the manufacture of the equipment and replacement components. In addition, there is no known third party that provides repair services for defective modules.

Hydro maintains that continued utilization of this equipment poses a risk of failure and loss of communication required for the protection and control of the power system.

The Industrial Customers made no submission regarding this project. Mr. Barreca, however, in his prefiled evidence, commented that even though an economic analysis was not provided, replacement of the PLC appears to be warranted given the age of the equipment and the critical nature of the circuits.

The Board will approve this project to proceed as proposed by Hydro.

Replace Remote Terminal Units at Cat Arm, Hinds Lake, Long Harbour and Happy Valley - $313,800 (B-77)

This project is for the replacement of three Quindar Remote Terminal Units (RTUs) and one Westronic M4 RTU, all used for remote monitoring and control of plants and terminal stations from the Energy Control Centre (ECC). This is phase five of a nine phase plan to replace all obsolete RTUs.

Hydro, in its prefiled evidence, stated that the equipment has been in operation for over 20 years and is nearing the end of its useful life and is no longer supported by the manufacturer. It further advises that spare parts are no longer available from the manufacturer or from any third party and the replacement is necessary to maintain reliability of the equipment used to control and monitor Hydro's transmission and generation system. In its prefiled project justification Hydro stated that failure to replace the RTUs could result in reduced reliability which would extend or cause customer outages.

During cross examination by the Industrial Customers Mr. Downton testified that Cat Arm and Hinds Lake hydro generating stations are unmanned and that failure of the RTUs will *"incapacitate the energy control centre from being able to dispatch generation to those particular sites or not being able to control the water within the various structures at those particular sites"* (Transcript, July 9, p. 37). Mr. Haynes added that *"The RTUs are the lifeline connection to allow us to operate these systems without having people there 24 hours a day"* (Transcript, July 9, p.37).

In final argument Hydro submitted that there is no acceptable alternative to the replacement of the RTUs if reliable service is to be maintained.

The Industrial Customers argued that the record does not demonstrate that this project needs to be done in 2004 since a later expenditure of dollars is always a lesser cost alternative than earlier expenditure (IC Argument, p. 39).

The Board will approve this project as proposed.

<u>Replace Vehicles - 2003 - $1,142,200 (B-81)</u>
<u>Replace Vehicles - 2004 - $1,081,000 (B-83)</u>
<u>Replace Vehicles - 2005 - $1,181,200 (B-83)</u>

These projects are for the continuation of a project given approval by the Board in 2003 and is for the replacement of vehicles required in 2004 and 2005. In outlining its operating experience Hydro provided a summary of its replacement criteria and Mr. Reeves explained in evidence and cross examination how the criteria is applied (Transcript, July 11, p. 68 to p. 108). Mr. Reeves also explained that because of the long lead time for delivery of new vehicles it is necessary to have approval for 2005 so a commitment can be made to the supplier (Transcript, July 11, p.83). In response to Request For Information IC-36, Hydro provided a descriptive list of the vehicles to be replaced together with the year of manufacture and the number of kilometers accumulated on each vehicle.

The argument of the Industrial Customers against the proposals of Hydro to replace vehicles suggested the replacement criteria was not reasonable and that the Board should approve an allotment equal to one half of the dollar value sought by Hydro for approval thus requiring Hydro to prioritize their replacement list.

The Board is not persuaded by the argument of the Industrial Customers, which was not supported by any evidence, that Hydro's policy for replacement of vehicles requires any amendment or revision, or that the vehicle replacement criteria requires any further investigation or reference to a technical conference.

The Board will approve these projects including approval in principle of Hydro's 2005 vehicle replacement proposal.

Other Projects

The Board has considered all of the evidence as well as the Settlement Report of the parties and is satisfied that all of those projects which are not specifically addressed in this decision are justified.

All of the projects not otherwise addressed in this decision, including those set out in the Settlement Report, will be approved.

Approval of Total Capital Budget

The Board, in reaching its decisions on the capital budget, did not have available to it an assessment of all of the alternatives available to Hydro for each of the projects. For example, the analysis carried out by Hydro did not include a consideration of the status quo and therefore the cost of delaying certain projects for inclusion in future years' capital budgets was not offered as an alternative solution to the capital expenditure.

Since there was no prioritization of projects and a lack of details of many alternatives or evidence that, in fact, all practical and reasonable alternatives were fully explored in the budgeting process, it was difficult for the Board to be certain that the capital budget represents the least cost option consistent with reliable service. However, the Board concludes that Hydro, for the most part, observed the guidelines established by the Board. In light of the extensive documentation and evidence that was provided, the Board will approve the proposed total capital budget of the utility with a reduction to reflect the costs of those projects that the Board has denied.

The Board will approve the total capital budget for 2004 in the amount of $27,316,000.

Costs

The Board finds that Mr. Barreca made a valuable contribution to the hearing and the process in general. The evidence offered was relevant to all customers of Hydro. Therefore, the Board will allow the Industrial Customers costs in the amount of his fees and expenses including preparation time, hearing time, travel and accommodations and associated expenses.

The Board will order costs to the IC in the amount of the reasonable fees and expenses of Mr. Barreca upon receipt of an invoice setting out his fees and expenses. The Board will make no order as to costs of Hydro or Newfoundland Power Inc.

ORDER

IT IS THEREFORE ORDERED THAT

1. Pursuant to subsection 41(3)(a) of the *Act*, improvements and additions to Hdyro's property are approved for construction and purchases in excess of $50,000, as set out in Schedule A attached to this Order.

2. A 2004 capital budget for improvements and additions to Hydro's property in the amount of $27, 316,000 is approved pursuant to subsection 41(1) of the *Act*.

3. Hydro's proposed estimated contributions in aid of construction of $240,000 are approved provided that all such contributions are sought in accordance with the policies approved by the Board.

4. Hydro shall pay costs to the Industrial Customers in the amount of the reasonable fees and expenses of Mr. Barreca as determined by the Board upon receipt of an invoice setting out his fees and expenses.

5. Hydro shall pay all costs and expenses of the Board incurred in connection with this application.

Dated at St. John's, Newfoundland and Labrador, this 5th day of September, 2003.

____

G. Fred Saunders,
Presiding Chair.

____

Gerard Martin, Q.C.,
Commissioner.

____

Donald R. Powell, C.A.,
Commissioner.

____

G. Cheryl Blundon,
Board Secretary.

Appendix 1

SETTLEMENT REPORT – CONSENT # 2

Newfoundland and Labrador Hydro 2004 Capital Budget Application

Order No. P.U. 29 (2003)

IN THE MATTER OF the Public Utilities Act, R.S.N., c. P-42 (the "Act")

AND

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") pursuant to section 41 of the Act for approval of its 2004 Capital Budget.

Settlement Report

This Settlement Report is submitted to the Board of Commissioners of Public Utilities in accordance with the understandings reached by the parties as follows:

1. The undersigned parties have expressed final positions regarding certain capital projects as proposed by Hydro in its 2004 Capital Budget Application.

2. This agreement does not preclude any party from advocating an alternative position on the same or similar projects in other proceedings as they may deem appropriate.

3. This agreement is on a without prejudice basis to a party's right to address argument on the sufficiency of the documentation supplied to support a capital project generally or the principles and procedures applied in the capital budget process, including by reference for illustrative purposes to projects referred to herein.

4. The parties consent to the admission of pre-filed testimony and exhibits pertaining to the capital projects to which there is no objection as detailed herein (the "Projects") without the calling of witnesses for the purpose of cross-examination on the Projects.

5. The parties have no objection to the Board making its determination on the Projects based on the parties' pre-filed testimony and exhibits and the parties' positions on these Projects as stated in this Settlement Report.

PROJECTS

1. The parties do not object to the following capital projects (the "Projects"):

Description	Page Ref	Value ($)
Purchase and Install Transformer	C-2	1,244,200
Upgrade TL214	B-25	2,836,200
Pole Replacements	B-43	993,200
Insulator Replacements	B-45	944,500
Install Recloser	B-47	85,200
Replace Substation Transformer	B-48	75,800
Upgrade Generator Relaying Happy Valley Plant	B-51	170,000
Purchase Meters & Equipment	B-52	98,100
Service Extensions	B-39	1,558,000
Upgrade Distribution Systems	B-41	1,471,000
Purchase Cash Remittance Processor	B-85	60,000
Electronic Metering Reading	B-86	35,800
Allowance for Unforseen Events	N/A	1,000,000

2. The parties have no objection to the Board providing Hydro with an immediate order approving Project C-2, Purchase and Install Transformer, in order to enable Hydro to meet its objective of securing delivery of the appropriate equipment in time to place the asset in service as proposed.

Agreed to this day of June, 2003.

____
For Newfoundland and Labrador Hydro

____
For the Industrial Customers

____
For Newfoundland Power

____
Board Hearing Counsel

Appendix 2

GUIDELINES AND CONDITIONS FOR FILING OF FUTURE CAPITAL BUDGET APPLICATIONS ISSUED IN ACCORDANCE WITH

Order No. P.U. 7 (2002-2003)
and
Order No. P. U. 36 (2002-2003)

NLH shall file future capital budget applications in according with the following guidelines and conditions as outlined in Order No. P.U. 7 (2002-2003):

i) A concise description of the project, including classification and location.
ii) The projected cost of the project in the current year (year of budget).
iii) The anticipated future expenditures; shown by year, of the project.
iv) The current age of any plant being replaced or overhauled.
v) The measurable usage to date of any plant being replaced or overhauled.
vi) The date and cost of the most recent overhaul, repair, or replacement.
vii) Copies of any engineering studies, consultants' reports, environmental studies, or dealer documentation outlining the current condition and future requirements of the plant. If these documents are already on file with the Board, reference may be made to these documents
viii) A cost benefit analysis of all alternatives, both internal and external, that have been considered, including any DSM measures that have been evaluated.
ix) A description and related documentation outlining the results of any discussions of the project that have taken place between the utilities in an effort to reduce expenditures by avoiding duplication of services, or increased sharing of resources and expenses.
x) Documentation of any safety or reliability issues that have arisen, in this jurisdiction or elsewhere, indicating a need for the project at the time. (Describe any efforts that have already been made to deal with these issues, and outline any related costs that have been incurred.)
xi) Documentation, including maintenance records and reports of outages, that indicate whether this project is remedial or preventative, and that support the current undertaking of the project.
xii) A general description of any major replacements, upgrades, or repairs to this plant that are expected to be undertaken within the next three years.

Conditions for Future Filings

NP shall file future capital budget applications in accordance with the following guidelines and conditions:

i) A concise description of the project, including classification and location.
ii) The projected cost of the project in the budget year, showing a breakdown of material costs, labour costs (internal and external), engineering costs, and other associated costs where appropriate.
iii) The anticipated future expenditures; shown by year, of the project.
iv) The current age of any plant being replaced or overhauled.
v) The measurable usage to date of any plant being replaced or overhauled.
vi) The date and cost of the most recent overhaul, repair, or replacement.
vii) Copies of any engineering studies, consultants' reports, environmental studies, or dealer documentation outlining the current condition and future requirements of the plant. If these documents are already on file with the Board, reference may be made to these documents
viii) A cost benefit analysis of all alternatives, both internal and external, that have been considered, including any DSM measures that have been evaluated.
ix) A description and related documentation outlining the results of any discussions of the project that have taken place between the utilities in an effort to reduce expenditures by avoiding duplication of services, or increased sharing of resources and expenses.
x) Documentation of any safety or reliability issues that have arisen, in this jurisdiction or elsewhere, indicating a need for the project at the time. (Describe any efforts that have already been made to deal with these issues, and outline any related costs that have been incurred.)
xi) Documentation, including maintenance records and reports of outages, that indicate whether this project is remedial or preventative, and that support the current undertaking of the project.
xii) A general description of any major replacements, upgrades, or repairs to this plant that are expected to be undertaken within the next three years.

Appendix 3

Newfoundland and Labrador Hydro
2004 Capital Budget Application

Order No. P.U. 20 (2003)

P. U. 20 (2003)

IN THE MATTER OF THE *PUBLIC UTIITIES ACT*, (THE *"ACT"*);

AND

IN THE MATTER OF AN APPLICATION BY NEWFOUNDLAND AND LABRADOR HYDRO ("*HYDRO*") FOR APPROVAL OF: (i) ITS 2004 CAPITAL BUDGET PURSUANT TO SECTION 41(1) OF THE *ACT*; (ii) ITS 2004 CAPITAL PURCHASES, AND CONSTRUCTION PROJECTS IN EXCESS OF $50,000 PURSUANT TO SECTION 41(3)(a) OF THE *ACT*; AND (iii) ITS ESTIMATED CONTRIBUTIONS IN AID OF CONSTRUCTION FOR 2004 PURSUANT TO SECTION 41(5) OF THE *ACT*.

WHEREAS on March 28, 2003 Hydro filed with The Board of Commissioners of Public Utilities (the *"Board"*) an Application, requesting that the Board make an Order:

(i) Approving Hydro's 2004 Capital Budget, pursuant to Section 41(1) of the *Act*;
(ii) Approving 2004 capital purchases and construction projects in excess of $50,000.00, pursuant to Section 41(3) of the *Act*; and
(iii) Approving the proposed estimated contributions in aid of construction for 2004 pursuant to Section 41(5) of the *Act;* and

WHEREAS on May 2, 2003 Intervenor Submissions were filed on behalf of Newfoundland Power Inc., (*"Newfoundland Power"*) as well as Abitibi Consolidated Inc. (Grand Falls), Abitibi Consolidated Inc. (Stephenville), Corner Brook Pulp & Paper Limited and on May 15, 2003 North Atlantic Refining Limited (the *"Industrial Customers"*); and

WHEREAS notice of this application was subsequently issued and the hearing of the matter was ultimately scheduled to begin on July 7, 2003; and

WHEREAS the Board established a settlement conference day for June 18, 2003; and

WHEREAS the parties, after the settlement conference, agreed to file with the Board a report detailing the understanding of the parties, (the "Settlement Report"); and

WHEREAS the Settlement Report was filed as a consent document and is attached as Schedule "A" to this Order; and

WHEREAS in the Settlement Report the parties consent to the admission of the pre-filed testimony and exhibits in relation to certain projects, including project C-2, Purchase and Install Transformer in Happy Valley – Goose Bay ("Project C-2"), without the calling of witnesses for the purpose of cross-examination on the projects; and

WHEREAS in the Settlement Report the parties state that they have no objection to the Board making its determination on certain projects, including Project C-2, based on the parties' pre-filed testimony and exhibits and the parties positions on these projects as stated in this Settlement Report; and

WHEREAS Hydro advised in relation to Project C-2, that to meet the expected 2004 load growth in Happy Valley-Goose Bay it is necessary to make a commitment to the manufacturer now, to ensure delivery early in 2004; and

WHEREAS in the Settlement Report the parties state that they have no objection to the Board providing Hydro with an immediate order approving Project C-2 in order to enable Hydro to meet its objective of securing delivery of the appropriate equipment in time to place the asset in service as proposed; and

WHEREAS the Board has considered the Settlement Report, the pre-filed documentation and the submissions of the parties and is satisfied that approval of Project C-2 is reasonable and necessary at this time.

IT IS THEREFORE ORDERED THAT

1. Hydro's proposed 2004 expenditure, project C-2, Purchase and Install Transformer, is hereby approved without prejudice to the parties right to 1) address argument on the sufficiency of the documentation supplied to support a capital project generally or the principles and procedures applied in the capital budget process, or 2) advocate an alternative position on the project in other proceedings as they may deem appropriate.

Dated at St. John's, Newfoundland and Labrador, this 10th day of July, 2003.

G. Fred Saunders,
Presiding Chair.

Gerard Martin, Q.C.
Commissioner.

Don R. Powell, C.A.
Commissioner.

Barbara Thistle,
Assistant Board Secretary.

<u>SCHEDULE "A"</u>

<u>Settlement Report</u>

<u>(Consent # 2 filed July 7, 2003)</u>

IN THE MATTER OF the Public Utilities Act, R.S.N., c. P-42 (the "Act")

AND

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") pursuant to section 41 of the Act for approval of its 2004 Capital Budget.

Settlement Report

This Settlement Report is submitted to the Board of Commissioners of Public Utilities in accordance with the understandings reached by the parties as follows:

1. The undersigned parties have expressed final positions regarding certain capital projects as proposed by Hydro in its 2004 Capital Budget Application.

2. This agreement does not preclude any party from advocating an alternative position on the same or similar projects in other proceedings as they may deem appropriate.

3. This agreement is on a without prejudice basis to a party's right to address argument on the sufficiency of the documentation supplied to support a capital project generally or the principles and procedures applied in the capital budget process, including by reference for illustrative purposes to projects referred to herein.

4. The parties consent to the admission of pre-filed testimony and exhibits pertaining to the capital projects to which there is no objection as detailed herein (the "Projects") without the calling of witnesses for the purpose of cross-examination on the Projects.

5. The parties have no objection to the Board making its determination on the Projects based on the parties' pre-filed testimony and exhibits and the parties' positions on these Projects as stated in this Settlement Report.

PROJECTS

1. The parties do not object to the following capital projects (the "Projects"):

Description	Page Ref	Value ($)
Purchase and Install Transformer	C-2	1,244,200
Upgrade TL214	B-25	2,836,200
Pole Replacements	B-43	993,200
Insulator Replacements	B-45	944,500
Install Recloser	B-47	85,200
Replace Substation Transformer	B-48	75,800
Upgrade Generator Relaying Happy Valley Plant	B-51	170,000
Purchase Meters & Equipment	B-52	98,100
Service Extensions	B-39	1,558,000
Upgrade Distribution Systems	B-41	1,471,000
Purchase Cash Remittance Processor	B-85	60,000
Electronic Metering Reading	B-86	35,800
Allowance for Unforseen Events	N/A	1,000,000

2. The parties have no objection to the Board providing Hydro with an immediate order approving Project C-2, Purchase and Install Transformer, in order to enable Hydro to meet its objective of securing delivery of the appropriate equipment in time to place the asset in service as proposed.

Agreed to this 7th day of July, 2003.

For Newfoundland and Labrador Hydro
(*Original signed by Maureen P. Greene)*

For the Industrial Customers
(*Original signed by J.M. Henley Andrews)*

For Newfoundland Power
(*Original signed by Gerard Hayes)*

Board Hearing Counsel
(*Original signed by Mark Kennedy)*

Schedule 1

Newfoundland and Labrador Hydro
2004 Capital Budget Application

Order No. P.U. 29 (2003)

NEWFOUNDLAND & LABRADOR HYDRO

2004 CAPITAL BUDGET - OVERVIEW

($,000)

	Exp To 2003	2004	Future Years	Total
GENERATION	23	4,987	3,036	8,046
TRANSMISSION & RURAL OPERATIONS	111	10,251	0	10,362
GENERAL PROPERTIES	3,864	15,942	15,310	35,116
ALLOWANCE FOR UNFORSEEN EVENTS	0	1,000	0	1,000
TOTAL CAPITAL BUDGET	3,998	32,180	18,346	54,524

NEWFOUNDLAND & LABRADOR HYDRO
GENERATION
2004 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY

($,000)

PROJECT DESCRIPTION	Exp To 2003	2004	Future Years	Total	In-Ser Date	Explanation Page Ref.
Replace Unit No. 7 Exciter - Bay D'Espoir	13	757		770	Oct. 04	B-5
Replace Gate Hoist No. 2 - Ebbegunbaeg Control Structure	7	508		515	Sep. 04	B-8
Replace Unit 2 Governor Controls - Cat Arm		540		540	Oct. 04	B-10
Replace Unit 2 Exciter - Cat Arm		519		519	Nov. 04	B-12
Upgrade Controls Spherical Valve No. 3 - Bay D' Espoir		183		183	Aug. 04	B-14
Replace Loader/Backhoe - Bay D'Espoir	3	121		124	Nov. 04	B-16
Upgrade Control System - Holyrood		1,553	1,034	2,587	Aug. 05	B-17
Purch/Inst Ambient Monitoring System Enhancement		728		728	Oct. 04	B-19
Upgrade Civil Structures		78	2,002	2,080	Jul. 05	B-22
TOTAL GENERATION	23	4,987	3,036	8,046		

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2004 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY
($,000)

PROJECT DESCRIPTION	Exp To 2003	2004	Future Years	Total	In-Ser Date	Explanation Page Ref.
Upgrade TL214 - (138kV Bottom Brook - Doyles)	111	2,836		2,947	Sep. 04	B-25
Replace Insulators TL233 - (230kV Buchans - Bottom Brook)		1,055		1,055	Oct. 04	B-27
Replace Wood Poles - Transmission		325		325	Dec. 04	B-28
Upgrade 138kV and 66kV Protection - Deer Lake and Sunnyside		150		150	Dec. 04	B-29
Replace Digital Fault Recorder - Bay D'Espoir		77		77	Aug. 04	B-30
Install Motor Drive Mechanisms on Disconnect Switches - West Coast		207		207	Oct. 04	B-31
Replace Instrument Transformers		77		77	Dec. 04	B-33
Replace Surge Arrestors		70		70	Dec. 04	B-35
Replace 125V Battery Banks - Bottom Brook and Holyrood Terminal Stations		58		58	Jul. 04	B-37
Provide Service Extensions		1,558		1,558	Dec. 04	B-39
Upgrade Distribution Systems		1,471		1,471	Dec. 04	B-41
Pole Replacements		993		993	Sep. 04	B-43
Insulator Replacements		945		945	Oct. 04	B-45
Purchase and Install Recloser L6 - Bear Cove		85		85	Oct. 04	B-47
Replace Substation Transformer - Rigolet		76		76	Oct. 04	B-48
Upgrade Generator Relaying - Happy Valley North Plant		170		170	Sep. 04	B-51
Purchase Meters & Equipment - TRO System		98		98	Dec. 04	B-52
TOTAL TRANSMISSION & RURAL OPERATIONS	111	10,251	0	10,362		

NEWFOUNDLAND & LABRADOR HYDRO
GENERAL PROPERTIES
2004 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY
($,000)

PROJECT DESCRIPTION	Exp To 2003	2004	Future Years	Total	In-Ser Date	Explanation Page Ref.
Replace Energy Management System - Energy Control Centre	1,214	4,293	6,780	12,287	Oct. 06	B-53
Corporate Applications Environment		540		540	Dec. 04	B-59
Applications Enhancements		463		463	Dec. 05	B-60
Security Program - Centralized Log Monitoring & Analysis System	57	83		140	Dec. 04	B-62
Security Program - Secure Remote Access		75	76	151	Dec. 05	B-64
End User & Server Evergreen Program		2,811		2,811	Oct. 04	B-66
Peripheral Infrastructure Replacement - 2004		101		101	Dec. 04	B-69
JDE Migration Assessment Study		231		231	May. 04	B-70
Replace VHF Mobile Radio System		3,048	5,802	8,850	Dec. 05	B-71
Replace Powerline Carrier Equipment - Transmission System - West Coast	1,009	419		1,428	Dec. 04	B-73
Replace Battery System - Multiple Sites - 2004		274		274	Oct. 04	B-75
Replace Remote Terminal Unit for Hydro - Phase 5		314		314	Oct. 04	B-77
Replacement of Operational Data & Voice Network - Phase 2		971	1,247	2,218	Oct. 05	B-79
Replace Vehicles - Hydro System - 2003	1,584	1,142		2,726	Jun. 04	B-81
Replace Vehicles - Hydro System - 2004		1,081	1,181	2,262	Jun. 05	B-83
Purchase Cash Remittance Processor		60		60	Apr. 04	B-85
Electronic Metering Reading		36	224	260	Dec. 05	B-86
TOTAL GENERAL PROPERTIES	3,864	15,942	15,310	35,116		

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Unit No. 7 Exciter – Bay d'Espoir

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project for 2004 is the continuation of a project which the Board has approved funds for 2003. The project consists of the purchase, installation and commissioning of a replacement static exciter for Unit 7 at Bay d'Espoir. The exciter will be an ABB Unitrol P similar to that used on Units 1 to 6 at Bay d'Espoir. The installation will be done during the planned maintenance outage for Unit 7 in 2004. This project is part of an ongoing replacement program started in 1995. To date, exciters have been replaced on six units at Bay d'Espoir, two units at Holyrood and most recently on Unit 1 at Cat Arm in 2002.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	510.0	0.0	510.0
Labour	0.0	65.0	0.0	65.0
Engineering	12.0	63.0	0.0	75.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	1.1	119.2	0.0	120.3
Total	**13.1**	**757.2**	**0.0**	**770.3**

Operating Experience:

The existing exciter is part of the original equipment installed in 1977. It has been in service for 96300 hours. The most recent repair on the exciter is a fan failure in September 2000 which resulted in a unit trip.

Project Justification:

The existing General Electric (GE) Silcomatic IV exciter is the original equipment installed in 1977. GE is no longer able to guarantee the availability of components needed to repair failed electronic cards.

A report titled "A Condition Assessment of Exciters within the Bay d'Espoir Powerhouse No.2, Hind's Lake, Upper Salmon, Cat Arm and Holyrood Generating Stations" dated March 28, 2000 was prepared by Generation Engineering and was submitted to the Board as part of Hydro's 2003 Capital Budget Application (Section G, Appendix I).

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Unit No. 7 Exciter – Bay d'Espoir **(cont'd.)**

Project Justification: (cont'd.)
This report looked at the service history of the Unit 7 exciter and the availability of technical support and spare parts from the original equipment manufacturer (General Electric).

At the time of the report, GE identified two cards that were obsolete and no longer manufactured. Hydro has one of these cards in stock but not the other. As well, GE stated that they would provide technical support for the near future but could not guarantee the repair of failed cards as the electronic components to repair the cards may not be available. If parts were to fail and spares were not available, it could result in a lengthy outage.

The report recommended the replacement of the Unit 7 exciter in 2004. The average service life of the six exciters replaced in Bay d'Espoir and two in Holyrood between 1995 and 2000 was 27 years. Based on an in service date of 1977 for the Unit 7 exciter, 2004 is an acceptable time to replace it.

The replacement of the Unit 7 exciter is a preventative measure to ensure that an exciter is in place that is fully supported by the manufacturer. The same model of exciter used at Bay d'Espoir on Units 1 - 6 is proposed for the Unit 7 replacement in 2004. The training for this type of exciter has been done and maintenance and engineering personnel will have familiarity with this model.

The loss of the exciter on Unit 7 would result in the unit (150 MW) being out of service until repairs could be made. If a working spare part is available, the outage duration would be short. If the part is not available, the outage will be lengthy while a spare is being found or a new exciter has to be purchased and commissioned. This will impact the reliability and availability of the unit and it could affect Hydro's ability to supply all of its customers. Depending on the time of year when an outage occurs, replacement capacity, if available, would have to be obtained through increased thermal production at Holyrood or gas turbine sites at significantly higher costs. The cost of replacement energy from Holyrood arising from an outage of this unit

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Unit No. 7 Exciter – Bay d'Espoir **(cont'd.)**

Project Justification: (cont'd.)

is approximately $168,000/day assuming fuel at $29.20/bbl. As well, a lengthy outage would increase the risk of spill during high inflow periods.

Future Plans:

This project will complete the exciter replacement at Bay d'Espoir.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Gate Hoist No. 2 - Ebbegunbaeg Control Structure

Location: Ebbegunbaeg Control Structure

Division: Production

Classification: Hydro Plants

Project Description:

This project for 2004 is a continuation of a project for which the Board has approved funds for 2003. The project consists of the replacement of the existing screw stem hoist mechanism on gate No. 2 at the Ebbegunbaeg Control Structure with a wire rope type hoist.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	279.0	0.0	279.0
Labour	0.0	106.0	0.0	106.0
Engineering	6.0	22.0	0.0	28.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	9.0	0.0	9.0
Corp O/H, AFUDC, Esc. & Contingency	0.6	91.9	0.0	92.5
Total	**6.6**	**507.9**	**0.0**	**514.5**

Operating Experience:

The Ebbegunbaeg gates control the flow of water from Meelpaeg Lake into the Upper Salmon and Bay d'Espoir power plants and is in virtually continuous use. The structure and equipment are 35 years old. In 2000, two screw stems, drive nuts and extensions were replaced at a cost of $52,000. Engineering, delivery and installation took 5 months. Since then, slight bends have developed and drive nuts had to be replaced again.

Project Justification:

The existing screw stem hoists are 35 years old and require significant maintenance. Although screw stem gates are common across Canada, each installation is custom designed and "off the shelf" parts are not available for hoists of this age. Screw stems bend frequently, are expensive to replace and have a long lead time for manufacture. The gear boxes and other components are obsolete and replacement parts must be reverse engineered and custom manufactured. Depending on which component fails, a gate could be out of service for several months awaiting a replacement part. As the structure is remotely controlled, it is essential that the gates are capable of being operated at all times. If a screw stem were to break or brass drive nut strip during gate closure, the gate indication could be "closed" at the Energy Control Centre, while

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Gate Hoist No. 2 - Ebbegunbaeg Control Structure **(cont'd.)**

Project Justification: (cont'd.)
the gate is actually in the open position. Were such an event to occur when the unit at Upper Salmon is not available, water would have to be spilled around the Upper Salmon facility. The value of this lost production is equivalent to approximately 3,200 barrels of oil per day at Holyrood. At $29.20/barrel, this would represent a loss of $93,000 per day.

The Ebbegunbaeg gates are very important in the operation of the Bay d'Espoir reservoir system. The hoist removed will be retained to provide spare parts for the remaining two gates. For normal operation only one gate is used at Ebbegunbaeg. Gate No. 2 hoist will be replaced because, as the center gate, it is hydraulically preferred and receives the most use. Replacing the hoist mechanism with a new assembly will ensure that the most frequently operated gate has high reliability. Wire rope hoists are expected to be more reliable than screw stem hoists.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:
None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Controls Spherical Valve No. 3

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project involves the upgrading of the control system for spherical valve No. 3 by replacing components, including control valves, piping, tubing, and control panel. It is a continuation of a program started in 2001 to upgrade control systems on spherical valves at Bay d'Espoir. The Board has previously approved upgrades on three of the six systems at Bay d'Espoir powerhouse No. 1. The new controls will have stainless steel mechanical components for corrosion protection and a programmable logic controller with manual overrides.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	100.0	0.0	0.0	100.0
Labour	39.0	0.0	0.0	39.0
Engineering	6.0	0.0	0.0	6.0
Project Management	7.0	0.0	0.0	7.0
Inspection & Commissioning	2.0	0.0	0.0	2.0
Corp O/H, AFUDC, Esc. & Contingency	29.2	0.0	0.0	29.2
Total	**183.2**	**0.0**	**0.0**	**183.2**

Operating Experience:

Bay d'Espoir unit No. 3, along with the spherical valve and control system became, operational in October 1967. This generating unit typically operates for 5,500 hours each year. The spherical valve is the main shut-off valve for the turbine and also functions as an emergency shut-off device. In the last five years, there have been 28 maintenance events for this control system, which is much higher than expected. Control systems on Unit No. 4 and Unit No. 2 were upgraded in 2001 and 2002 respectively and the upgrade for Unit No. 1 is expected to be completed during 2003.

Project Justification:

The control system for spherical valve No. 3 is obsolete and unreliable. Replacement parts have to be reversed engineered and custom made. The failure of the existing control system can result in the following events:

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Controls Spherical Valve No. 3 – Bay d'Espoir **(cont'd.)**

Project Justification: (cont'd.)

a) Single unit outage (75 MW) due to spherical valve not operating, with loss of generation and an extended outage;

b) Outage (150 MW) of two units on the same penstock and potential damage to the unit if the spherical valve stays open during a unit runaway condition and forcing the head gate closure.

c) Loss of all six units (450 MW) in powerhouse No. 1 if the spherical valve or seals fail while the turbine access door is open for maintenance resulting in the flooding of powerhouse No. 1, with the potential for loss of life.

Depending on the time of year when a failure occurs, replacement capacity and energy, if available, would have to be obtained through increased thermal production at Holyrood or gas turbine sites at significantly higher costs. As well, a lengthy outage would increase the risk of spill during high inflow periods. The cost of replacement energy from Holyrood arising from an outage of two units (150 MW) is approximately $168,000/day assuming fuel at $29.20/bbl. Given the significance of the generating capacity to the overall system, it would be unacceptable to maintain the status quo and risk the loss of capacity.

Future Plans:

It is currently planned to have control systems upgraded on two more units at Bay d'Espoir over the next two years.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Loader/Backhoe

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project is a continuation of a project for which the Board has approved funds for 2003. The project consists of the replacement of loader/backhoe - V9770 at Bay d'Espoir.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	115.0	0.0	115.0
Labour	0.0	0.0	0.0	0.0
Engineering	3.0	0.0	0.0	3.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	0.1	5.6	0.0	5.7
Total	**3.1**	**120.6**	**0.0**	**123.7**

Operating Experience:

The current machine is a 1990 JCB Model 1400 loader with an attached backhoe. It is the only loader/backhoe at the Bay d'Espoir facility and it is used extensively for maintenance on dams, dykes, roads and grounds at Bay d'Espoir, Upper Salmon, Hinds Lake, Cat Arm and Paradise River. It is also used for winter road maintenance such as clearing snow and handling salt and sand. Corrective maintenance costs on this machine has been averaging $9,000 annually, excluding preventative maintenance and routine maintenance costs.

Project Justification:

This machine is critical to the maintenance programs at the hydroelectric sites. A mechanical evaluation has indicated symptoms of serious engine deterioration and the body structure is showing signs of major wear. The number of breakdowns and associated repair costs have been increasing and the machine is nearing the end of its useful life.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for this equipment.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Control System

Location: Holyrood

Division: Production

Classification: Generation - Thermal

Project Description:

This project involves the replacement of an obsolete Distributed Control System (DCS) on the three Holyrood units, which provide control for the boilers, boiler auxiliary systems, station service, burner management, turbine and generator monitoring and control for other plant systems. Replacement parts for these existing controls are no longer available from the vendor and only limited vendor support is available. It is proposed that some parts of the overall system (cabinets, I/O cards and terminations) will be reused. The unit 1 and 2 DCS will be upgraded in 2004 and Unit 3 in 2005.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	1,000.0	790.0	0.0	1,790.0
Labour	35.0	28.0	0.0	63.0
Engineering	277.0	30.0	0.0	307.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	240.6	186.1	0.0	426.7
Total	**1,552.6**	**1,034.1**	**0.0**	**2,586.7**

Operating Experience:

The existing DCS for Units No. 1 and 2 was implemented in 1988 and for Unit No. 3 in 1992. The manufacturer's commitment of support for these systems expired in January 2002 and January 2003 respectively.

Project Justification:

The manufacturer has informed Hydro that parts of the Distributed Control System (DCS) are obsolete and the system is no longer supported. Based on the spare parts available in Hydro's inventory and failure history, sufficient spare parts are available to maintain and operate the systems until 2004. Beyond this date it is expected that only used or refurbished parts would be available for some repairs, however, their availability would be uncertain. The Holyrood units cannot operate without the DCS functioning properly and a replacement is necessary to maintain plant availability and reliability. An outage to a unit (150-175 MW) could affect Hydro's ability to supply customers. Depending on the time of year, replacement capacity, if available,

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Control System **(cont'd.)**

Project Justification: (cont'd.)

may have to be obtained from gas turbines at significantly higher costs (e.g. $400,000/day assuming fuel is at $0.333/ℓ). It is proposed that the replacement be sourced to the same vendor (Westinghouse Process Controls Inc.) as parts of the existing system can be reused at a savings compared to a full replacement with another system. Based on the information from the vendor, the new technology would have guaranteed support for ten (10) years and it is expected that with minor software upgrades it will serve the plant for the next fifteen (15) years. A cost analysis report titled "Distributed Control System Lifecycle Planning" is attached in Section G, Appendix 2.

Besides improving plant reliability the replacement system will improve boiler efficiency due to a faster control system.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase/Install Ambient Monitoring System Enhancement

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

This project involves the expansion of the emission measurement capabilities of the existing ambient monitoring stations to include continuous monitoring of fine particulates and NOx (nitrogen oxides). These stations currently monitor ambient SO_2. Particulate monitors will be installed at each of four remote monitoring sites and at the plant main gate and NOx monitors will be installed at each of the four remote sites, but not at the plant main gate. (NOx will not be monitored at the main gate because this location is too close to the source for gas to reach ground level.)

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	523.0	0.0	0.0	523.0
Labour	36.0	0.0	0.0	36.0
Engineering	26.0	0.0	0.0	26.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	143.1	0.0	0.0	143.1
Total	**728.1**	**0.0**	**0.0**	**728.1**

Operating Experience:

The Holyrood Thermal Generating Station has been in operation since 1971. The ambient monitoring stations were placed in service in 1996.

Project Justification:

In recent years, the Holyrood plant has been called upon for increased production arising from higher customer demand and a period of lower than normal inflow at Hydro's hydroelectric facilities. This has resulted in increased scrutiny by the Provincial Department of Environment and the public, particularly those living in close proximity to the plant. Holyrood is one of the most significant sources of environmental emissions in the Province and as Hydro has made a commitment to take a proactive position with respect to environmental responsibility and stewardship, attention has been focused on quantifying these emissions with a view to identifying the most appropriate means to reducing the facilities environmental impact on the

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase/Install Ambient Monitoring System Enhancement **(cont'd.)**

Project Justification: (cont'd.)
surrounding environs. Air emissions from the Holyrood plant include particulate matter, NOx, SOx, and acid aerosols. To quantify emissions at the source and as it impinges on the surrounding area, the following projects have been implemented or are in progress:

- In 1996, four permanent ambient monitoring stations were installed at locations identified through a computer dispersion model. These sites currently measure only SO2 and total suspended particulates (TSP);

- In 1999 and 2000, opacity meters were installed on the stacks to monitor visible emissions (smoke density) of the exit gases;

- In 2002, approval was received for a continuous emission monitoring (CEM) system to measure NOx, SO2, CO2, CO and O2 at the stacks and provided a means to manage emissions directly at the source through control of the combustion process. This project is expected to be completed this year: and,

- In 2002, approval was received for a mobile ambient monitoring station to monitor fine particulates, NOx and SOx at locations not covered by existing permanent monitoring stations. This was to address concerns that air quality events were occurring at locations other than the existing monitoring sites and not as predicted by dispersion models. As well, Hydro received approval for a study to investigate technologies to reduce air emissions including particulates at Holyrood.

The current proposal will enhance the permanent ambient monitoring stations by adding NOx and fine particulate monitoring capability. These stations along with the other monitoring facilities enable emission measurement at the source and in the surrounding area and where problems are identified will assist in the process of selection of the most cost effective abatement technologies from amongst the many that are available.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase/Install Ambient Monitoring System Enhancement **(cont'd.)**

Project Justification: (cont'd.)
Although current emissions are by and large below the statutory limits, a health risk assessment report by Cantox in 1999 concluded that further quantification of emissions is required. This report was supplied in response to NP-104 at Hydro's 2001 Rate Application. The expansion of monitoring capability at the permanent sites will provide additional data to support dispersion modeling. As well, the Department of Environment recommends monitoring fine particulate fallout.

To ensure that this project will be completed at the lowest possible cost, Hydro will solicit competitive bids for all material and external Labour.

Future Plans:
None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Civil Structures – Holyrood

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

1. Boiler Stack

   The main components of Stack #2 are: concrete shell, steel liner, stack breeching and associated utilities. The scope of work involves the replacement of the interior steel liner. The liner consists of ¼" thick steel shell and has a diameter of 13.5 ft. and height of 302 ft. It is supported at the base by 35 ft. high steel framing. A similar replacement of the stack liner on Unit No. 1 was approved by the Board in 2003.

2. CW Screen Structure

   There are four Circulating Water (CW) screen structures located in pumphouse #1 and their function is to screen the salt water required for plant cooling. Two of the structures have been approved by the Board for replacement in 2003. The scope of this proposal involves the replacement of the two remaining steel structures that support the traveling screens. Each structure is 32 ft. high and fabricated from 3/8" thick angle iron and has a foot print of 5 ft. x 7 ft.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	0.0	1,355.0	0.0	1,355.0
Engineering	70.0	100.0	0.0	170.0
Project Management	0.0	140.0	0.0	140.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	8.5	406.5	0.0	415.0
Total	**78.5**	**2,001.5**	**0.0**	**2,080.0**

Operating Experience:

1. Boiler Stack

   The stack and steel liners are 34 years old and are in use whenever the unit is operating. The cost to provide inspection and emergency maintenance for the steel liner during the last 6 years was $232,300.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Civil Structures – Holyrood **(cont'd.)**

Operating Experience: (cont'd.)

2. <u>CW Screen Structure</u>

   The CW Screen structures are 34 years old and are located in 20 ft. of salt water. They are in use whenever the units are operating. In 2000 the traveling screens and rollers were replaced because of increased operating and maintenance costs.

Project Justification:

1. <u>Boiler Stack</u>

   Regular annual inspections revealed the need for major upgrade work for Stack No. 2. Stack inspections in 2001 and 2002 identified increased metal loss and thin spots on the steel liner. The probability of liner buckling and failure continues to increase. Emergency repairs undertaken during the last several years involved covering holes with steel patches or rings. This approach is believed to be no longer sufficient to prevent buckling or to provide the level of reliability required.

   Several options to upgrade the steel liner were explored. Each of the options results in a similar overall cost to extend the life of the steel liner to 2020, however, replacement of the steel liner will provide the best reliability over the remaining plant life. The liner replacement will be done during the major outage to Unit No. 2 and therefore will have minimal impact on its availability for generation.

   Failure to replace the liner as recommended would result in continued deterioration of the steel liner until buckling occurs and then failure. This would result in costly repairs with the unit out-of-service for the duration of the repairs, which would impact the supply of power to customers.

   An analysis of the possible options report titled "Evaluation of Options to Refurbish Stack Liner #2" is attached in Section G, Appendix 3.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Civil Structures - Holyrood **(cont'd.)**

Project Justification: (cont'd.)

2. <u>CW Screen Structure</u>

   Inspections done in 1999 and 2000 confirm severe corroding, metal loss and the need for planned replacements of the CW screen structures. The probability of structure failure is increasing with time, corrosion, and mechanical wear.

   The failure to replace the structures as recommended would result in continued deterioration of the structures until their failure. This would result in costly repairs and reduced unit availability for the duration of the repairs, which would impact the supply of power to the customer.

   To ensure that this project will be completed at the lowest possible cost, Hydro will solicit competitive bids for all material and external labour.

Future Plans:

Work associated with this project is expected to be completed by 2005.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade TL214 (138kV Bottom Brook - Doyles)

Location: Bottom Brook and Doyles

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

This project for 2004 is the continuation of a project which the Board has approved funds for 2003. The project involves the addition of structures, installation of counterweights and replacement of insulators, over the whole line. The proposal includes costs to provide temporary generation to serve customers during outages required to complete the upgrade.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	740.0	0.0	740.0
Labour	0.0	770.0	0.0	770.0
* **Engineering**	78.0	570.0	0.0	648.0
Environment	14.0	67.0	0.0	81.0
Internal Construction	0.0	40.0	0.0	40.0
Land and Survey	10.0	0.0	0.0	10.0
Project Management	0.0	90.0	0.0	90.0
Inspection & Commissioning	0.0	25.0	0.0	25.0
Corp O/H, AFUDC, Esc. & Contingency	8.7	534.2	0.0	542.9
Total	**110.7**	**2,836.2**	**0.0**	**2,946.9**

* **Cost of Alternative Generation Included in Engineering Cost**

Operating Experience:

TL214 is a 138kV transmission line which was constructed in 1968. Outage records confirm that outages are caused mainly due to high winds, salt contamination and lightning. No major upgrades have been carried out on this line since its construction.

Project Justification:

The TL214 transient outage frequency rate is 8.31 per 100 km/year, and the sustained outage frequency is 1.90 per 100 km/year. From 1990 - 2001 there have been 46 interruptions attributed to lightning and salt contamination and 83 interruptions due to wind related causes.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade TL214 (138kV Bottom Brook - Doyles) **(cont'd.)**

Project Justification:

A condition assessment review was conducted to confirm the condition of the line and to recommend corrective action. The full report titled "TL214 Condition Assessment and Recommendations for Upgrading" was submitted to the Board as part of Hydro's 2003 Capital Budget Application (Section G, Appendix 3).

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

This is a two-year project with detailed engineering work and material ordering taking place in 2003 and the construction work taking place in 2004. There is no future work planned beyond 2004.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators TL233 (230kV Buchans - Bottom Brook)

Location: Buchans and Bottom Brook

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

TL233 is a 230kV transmission line that runs from Buchans to Bottom Brook, a distance of 135 km. It is an H-Frame wooden pole line, which was constructed in 1973. This project is to replace all of the remaining Canadian Ohio Brass (COB) insulators on the line, from structure 250 to 577, inclusive.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	500.0	0.0	0.0	500.0
Labour	236.0	0.0	0.0	236.0
Engineering	62.0	0.0	0.0	62.0
Project Management	46.0	0.0	0.0	46.0
Inspection & Commissioning	14.0	0.0	0.0	14.0
Corp O/H, AFUDC, Esc. & Contingency	196.6	0.0	0.0	196.6
Total	**1,054.6**	**0.0**	**0.0**	**1,054.6**

Operating Experience:

During the 2000 preventative maintenance program, a total of 1950 insulators were tested, with 77 insulators being found defective (i.e. 4%). During the 2001 program a total of 115 defective insulators were found (i.e.6%). Each year a significant quantity of defective COB insulators are found and defective insulators are showing up on strings that have had replacements during previous maintenance cycles (i.e. 5 years).

Project Justification:

This is the continuation of a program to replace pre-1974 vintage insulators manufactured by COB. These COB insulators are part of a group of insulators that has experienced industry-wide failures due to cement growth causing radial cracks that resulted in moisture intrusion. The section of line from structure 250 to 577 is the only section on TL233 with COB insulators in service. The insulators in the remaining section (structure 1 to 249) have been changed. Replacement is essential to maintain system security and reliability.

To ensure that the project will be completed at lowest possible cost, Hydro will solicit competitive bids for all materials and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Wood Poles - Transmission

Location: Various Sites

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

This project consists of the replacement of deteriorated wood poles on Hydro's bulk electrical transmission system.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	90.0	0.0	0.0	90.0
Labour	175.0	0.0	0.0	175.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	60.9	0.0	0.0	60.9
Total	**325.9**	**0.0**	**0.0**	**325.9**

Operating Experience:

Newfoundland and Labrador Hydro operates approximately 2500 km of wood pole transmission lines at various voltage levels from 69kV to 230kV. This includes the maintenance of 26,000 transmission poles to deliver power to Hydro's terminal stations located on the Island and in Labrador. Approximately 35% of these poles are in excess of thirty-years old.

Project Justification:

Through the 2003 transmission preventative maintenance program, a number of wood poles will be identified which will require replacement in 2004 due to significant deterioration. Replacement of these poles will be essential to maintaining power system reliability.

To ensure that this project will be completed at the lowest possible cost, Hydro will solicit competitive bids for all material and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade 138kV and 66kV Protection

Location: Deer Lake and Sunnyside Terminal Stations

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of microprocessor based relays to improve protection on the 138kV lines: TL239 and TL245 at Deer Lake; 100L and 109L at Sunnyside; and, 66kV lines - TL225 and TL226 at Deer Lake. The existing relays will be removed and the new equipment installed on modified protection panels.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	80.0	0.0	0.0	80.0
Labour	31.0	0.0	0.0	31.0
Engineering	20.0	0.0	0.0	20.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	19.2	0.0	0.0	19.2
Total	**150.2**	**0.0**	**0.0**	**150.2**

Operating Experience:

The existing electromechanical relays are approximately 30 years old and are difficult to maintain and calibrate. As a result, system performance levels are adversely affected.

Project Justification:

This project will improve the protection on 138kV and 66kV lines which currently have electromechanical relays for both phase and ground protection. The relays will also provide faster back-up clearing times. They will have enhanced capabilities, self-diagnostics and alarm in the event of an internal failure. These relays can be remotely interrogated thus enabling more timely analysis of problems on the lines or with the relays themselves. This is part of ongoing initiative to improve protection systems on the bulk transmission system.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Digital Fault Recorder - Bay d'Espoir

Location: Bay d'Espoir Terminal Station

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase, installation and commissioning of a new 16 channel Digital Fault Recorder at Bay d'Espoir Terminal Station #2 to replace the existing unit.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	41.5	0.0	0.0	41.5
Labour	12.1	0.0	0.0	12.1
Engineering	6.6	0.0	0.0	6.6
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	2.2	0.0	0.0	2.2
Corp O/H, AFUDC, Esc. & Contingency	14.6	0.0	0.0	14.6
Total	77.0	0.0	0.0	77.0

Operating Experience:

The existing recorder is approximately 16 years old. The technology is outdated and there are continuing problems with the operation of the unit.

Project Justification:

Fault recorders are required to provide real time and historical information on equipment operation during faults which will be used in the identification of problems which, when corrected, will enhance performance thereby improving customer service and reliability.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Motor Drive Mechanisms on Disconnect Switches - West Coast

Location: West Coast

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project consists of the installation of motor drive mechanisms on seven 230kV disconnect switches at Stephenville (2), Massey Drive (4), and Bottom Brook (1). This will allow the disconnects to be motor operated rather than the current manual operation.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	51.0	0.0	0.0	51.0
Labour	58.0	0.0	0.0	58.0
Engineering	22.0	0.0	0.0	22.0
Project Management	11.0	0.0	0.0	11.0
Inspection & Commissioning	24.0	0.0	0.0	24.0
Corp O/H, AFUDC, Esc. & Contingency	41.3	0.0	0.0	41.0
Total	**207.3**	**0.0**	**0.0**	**207.3**

Operating Experience:

Disconnects are used for equipment isolations either for system operations or for regular maintenance activities. These disconnects are the original 230kV units that were installed with the stations when they were first constructed in the late 1960's. They are inspected regularly, lubricated as required and insulators are replaced when they fail in service.

Project Justification:

When originally installed, the normal design practice was that disconnects be manually operated. The only motorized disconnects provided were those used for transformer protection and isolation. However, since that time, a workplace safety concern has identified the requirement for motorized disconnects.

The arrangement of the 230kV disconnect switches is such that the operator has to stand directly under the switch to operate it. From this position, the operator does not have a full clear view of the switch and cannot observe strain or breakage on the associated station post insulators and other switch components and is therefore at risk of serious injury.

2004 CAPITAL PROJECTS OVER $50,000 EXPLANATIONS

Project Title: Install Motor Drive Mechanisms on Disconnect Switches - West Coast **(cont'd.)**

Project Justification: (cont'd.)

During the period from 1988 to 1999, Hydro experienced three incidents associated with the failure of station post insulators on 230kV disconnects. This resulted in regular inspections being carried out to identify faulty insulators and have them replaced prior to in-service failure. However, this practice will not completely eliminate the risks associated with manual switching.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

This is the second year of a three-year program to install motor operators on all manual 230kV disconnects on the system.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Instrument Transformers

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project involves the purchase and installation of replacement instrument transformers (potential transformers, capacitive voltage transformers and current transformers) at various terminal stations across the system.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	60.0	0.0	0.0	60.0
Labour	3.2	0.0	0.0	3.2
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	13.8	0.0	0.0	13.8
Total	**77.0**	**0.0**	**0.0**	**77.0**

Operating Experience:

Instrument transformers have a typical service life of 30-40 years, depending on the service conditions. Units are inspected and tested regularly and replacements are made based on these maintenance assessments or on 'in-service' failures. The maintenance assessments for instrument transformers are visual inspection and voltage/current checks of the secondary circuits. Typically, approximately 6 instrument transformers fail or need to be replaced each year.

Project Justification:

Instrument transformers provide critical input to protection, control and metering equipment required for the reliable operation and protection of the electrical system. Instrument transformers which fail in-service can result in faults on the electrical system and outages to customers.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Instrument Transformers **(cont'd.)**

Project Justification: (cont'd.)

When these units fail, the normal utility practice is to replace, as they are not repairable and to hold a reserve inventory sufficient to replace service units based on maintenance assessments or failure.

Project estimates are based on an equal number of units in each voltage class (69kV, 138kV and 230kV) requiring replacement.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials.

Future Plans:

This is an annual allotment, which will be adjusted from year to year depending on ongoing performance.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Surge Arrestors

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project involves the purchase and installation of replacement surge arrestors at various terminal stations across the system.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	46.8	0.0	0.0	46.8
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	13.5	0.0	0.0	13.5
Total	70.3	0.0	0.0	70.3

Operating Experience:

Surge arrestors provide critical overvoltage protection of the power system equipment from lightning and switching surges. Throughout the regions there are surge arrestors in the 69kV, 138kV and 230kV voltage classes, in service. Replacements are typically required as a result of maintenance assessments, in-service failures, and equipment that has reached the end of its useful service life. Equipment manufacturers indicate the useful service life of surge arrestors as 20 years. Typically, 15 surge arrestors will require replacement per year across the system.

Project Justification:

In-service failures due to severe lightning strikes and switching surges are unavoidable and require immediate replacement to ensure system overvoltage protection. Replacements based on maintenance assessments and the manufacturers' recommended useful service life are required to prevent additional in-service failures. Lightning arrestors can fail catastrophically resulting in system disturbances, and high potential for damage to adjacent equipment. The timely replacement of surge arrestors prior to age or condition related in-service failures will improve system reliability.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Surge Arrestors **(cont'd.)**

Project Justification:

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials.

Future Plans:

This is an annual allotment, which will be adjusted from year to year depending on ongoing performance.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace 125V Battery Banks

Location: Bottom Brook and Holyrood Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project consists of the purchase and installation of a new 60 cell, 125 volt, and 300 ampere hour stationary battery bank for each of the terminal stations at Bottom Brook and Holyrood. Each battery will be a lead calcium flooded cell type. The new batteries will be designed to be compatible with the existing chargers at each station.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	37.0	0.0	0.0	37.0
Labour	8.0	0.0	0.0	8.0
Engineering	6.0	0.0	0.0	6.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	7.0	0.0	0.0	7.0
Total	**58.0**	**0.0**	**0.0**	**58.0**

Operating Experience:

The current station batteries were originally installed in 1984 and will be in service for 20 years by 2004. Regular maintenance work involves voltage, specific gravity and load discharge tests. For the two stations, the DC load requirements have not changed. Therefore, there is no requirement to change the capacity of the battery bank.

Project Justification:

The station battery bank provides the DC supply for the station and transmission line protection equipment, control and operation. Routine maintenance tests have confirmed a general deterioration in the battery cell conditions and a 15 to 20% reduction in battery cell capacity.

2004 CAPITAL PROJECTS OVER $50,000 EXPLANATIONS

Project Title: Replace 125V Battery Banks **(cont'd.)**

Project Justification: (cont'd.)

The batteries have shown the normal expected life deterioration until the past two years, when regular maintenance tests indicated an increased rate of growth of cell plates and a decrease in loading capability to less than 80% of the full battery rating. This increased rate of deterioration indicates that the battery is at the end of its life. The normal expected life of this type of battery is 18 to 20 years.

If the batteries are not replaced, remote control of the station from ECC will not be possible during system outages and the system protection and control equipment will not function properly and this will result in reduced system reliability.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Service Extensions

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project is an annual allotment based on past expenditures to provide for service connections (including street lights) to new customers. This summary identifies the total budget for all regions.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	725.0	0.0	0.0	725.0
Labour	696.0	0.0	0.0	696.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	137.0	0.0	0.0	137.0
Total	1,558.0	0.0	0.0	1,558.0

Operating Experience:

An analysis of average historical expenditure (i.e. 1998 - 2002) on new customer connections is shown in the following table. All historical dollars were converted to 2002 dollars using the GDP Implicit Price Deflator and a 5-year average calculated.

Region	**Avg. Yearly Expenditures (1998 - 2002) ($000)**
Central	$ 484
Northern	$ 447
Labrador	$ 569
Total	$ 1,500

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Service Extensions **(cont'd.)**

Project Justification:

Based on the 5-year average of service extension expenditures for the period 1998 - 2002 (in 2002 dollars) the following budget was developed assuming escalation in 2003 and 2004 of approximately 2.0%.

Region	2004 Budget ($000)
Central	$ 503
Northern	$ 464
Labrador	$ 591
Total	$ 1,558

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

This is an annual allotment, which will be adjusted from year to year depending on historical expenditures.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Systems

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project is an annual allotment based on past expenditures to provide for the replacement of deteriorated poles, substandard structures, corroded and damaged conductors, rusty and overloaded transformers/street lights/reclosers and other associated equipment. This upgrading is identified through preventive maintenance inspections or damage caused by storms and adverse weather conditions and salt contamination. This summarizes the total budget for all regions.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	773.0	0.0	0.0	773.0
Labour	560.0	0.0	0.0	560.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	138.0	0.0	0.0	138.0
Total	**1,471.0**	**0.0**	**0.0**	**1,471.0**

Operating Experience:

An analysis of historical expenditures (i.e. 1998 - 2002) on distribution upgrades is shown in the following table. All historical dollars (table below) were converted to 2002 dollars using the GDP Implicit Price Deflator and 5-year average calculated.

Region	**Avg. Yearly Expenditures (1998 - 2002) ($000)**
Central	$ 511
Northern	$ 588
Labrador	$ 316
Total	$ 1,415

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Systems **(cont'd.)**

Project Justification: (cont'd.)

Based on this 5-year average for distribution system upgrades for the period 1998 - 2002 the following budget was developed using an escalation in 2003 and 2004 of approximately 2.0%.

Region	2004 Budget ($000)
Central	$ 531
Northern	$ 611
Labrador	$ 329
Total	$ 1,471

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

This is an annual allotment which will be adjusted from year to year depending on historical expenditures.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Pole Replacements

Location: Distribution Lines in Bottom Waters and St. Anthony Systems

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of 75 deteriorated poles on the Bottom Waters distribution system and 168 deteriorated poles on the St. Anthony system between Ship Cove and Raleigh.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	195.0	0.0	0.0	195.0
Labour	388.0	0.0	0.0	388.0
Engineering	91.0	0.0	0.0	91.0
Project Management	35.0	0.0	0.0	35.0
Inspection & Commissioning	84.0	0.0	0.0	84.0
Corp O/H, AFUDC, Esc. & Contingency	200.2	0.0	0.0	200.2
Total	**993.2**	**0.0**	**0.0**	**993.2**

Operating Experience:

The systems are operating satisfactorily. As deteriorated poles fail, repair crews are dispatched to do the repairs. Customer outages are incurred during these repairs. Outages are extensive if the repair site is difficult to access.

Project Justification:

The Preventative Maintenance Program, identified selected poles on each system which were rated "B" condition (replace within 5 years). It is determined that a certain number of these poles must be replaced in 2004 in order to maintain service reliability. The remainder of the poles are regularly inspected to determine their deterioration rate and these will be replaced as required. A deteriorated pole represents a safety hazard to lineworkers in the event the pole has to be climbed for planned or emergency maintenance. Failure of a pole also has a significant impact on the performance for the system. This is due to the higher probability of failure under adverse weather conditions, and the length of time it takes to replace a pole, especially in the case of a remote location. Often, failures of deteriorated poles causes a domino affect resulting in more failures of consecutive poles, which might not be deteriorated.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Pole Replacements **(cont'd.)**

Project Justification: (cont'd.)

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Insulator Replacements

Location: Distribution Lines Bottom Waters, Fleur de Lys and South Brook

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of suspension and pin type insulators that were manufactured by Canadian Ohio Brass (COB) and Canadian Porcelain (CP) and installed on the following distribution lines:

1. Bottom Waters Line 1, which serves the communities of Paquet and Mings Bight, and the Stogger Tite Mine. This line was constructed in 1973.

2. Fleur de Lys Line 1, which serves the community of Fleur de Lys and Line 2 which serves the community of Coachman's Cove. Both lines were constructed in 1970.

3. South Brook Line 1, which serves the community of South Brook. This line was constructed in 1968.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	250.0	0.0	0.0	250.0
Labour	363.0	0.0	0.0	363.0
Engineering	52.0	0.0	0.0	52.0
Project Management	33.0	0.0	0.0	33.0
Inspection & Commissioning	93.0	0.0	0.0	93.0
Corp O/H, AFUDC, Esc. & Contingency	153.5	0.0	0.0	153.5
Total	**944.5**	**0.0**	**0.0**	**944.5**

Operating Experience:

Bottom Waters

Line 1 has experienced 18 major outages, due to defective insulators, from September 1996 to February 2003.

Fleur de Lys

Lines 1 and 2 have experienced a total of 27 major outages, due to defective insulators, from January 1996 to February 2003.

South Brook

Line 1 has experienced 30 major outages, due to defective insulators, from December 1996 to February 2003.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Insulator Replacements **(cont'd.)**

Project Justification:

The design of the insulation system for distribution lines includes multiple suspension insulators in a string, along with pin or post-type single multi-skirt units mounted on top of the poles and cross arms. Therefore, having an individual suspension or pin-type insulator fail usually causes an immediate reliability problem.

In the 1980s, Hydro, through its transmission preventative maintenance (PM) inspections, detected an insulator problem similar to that being experienced by other utilities. It was determined that some COB suspension insulators were prematurely failing due to a cement problem. However, on Hydro's distribution systems, testing was not performed due to safety hazards associated with testing the relatively lower number of insulator units per insulator string.

This project is the continuation of the initiative to replace pre-1974 vintage COB suspension insulators. These insulators are part of a group that has experienced industry-wide failures due to cement growth causing radial cracks that resulted in moisture intrusion. Pin-type insulators, particularly double-skirt COB and CP insulators at the 12.5kV to 25kV levels, have been experiencing the same problems resulting in the tops of these insulators cracking off. Replacement of both types is essential to improve system security and reliability. A normal life expectancy for an insulator is approximately 40 years, however for these COB insulators, the life has been between 10 - 30 years.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Recloser on Feeder L6 - Bear Cove
Location: Bear Cove
Division: Transmission & Rural Operations
Classification: Distribution

Project Description:

This project consists of the purchase and installation of a 3-phase recloser and associated equipment on 12.5kV feeder L6 at Bear Cove.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	20.0	0.0	0.0	20.0
Engineering	7.0	0.0	0.0	7.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	18.2	0.0	0.0	18.2
Total	**85.2**	**0.0**	**0.0**	**85.2**

Operating Experience:

A power line fault which involves some level of fault impedance is very typical for distribution systems, in particular those that are more susceptible to conductor contact and/or breakage during severe storms. Sleet storms that involve heavy ice and wind have resulted in the most severe power line damage over the last two decades, with the latest storm in Feb., 2003 causing conductor contact and breakage on overhead distribution lines throughout Northern Newfoundland.

Project Justification:

The fault protection for the 12.5kV Bear Cove distribution feeder L6 is currently provided by one 3-phase recloser at the terminal station. The addition of a new 3-phase recloser downstream of the terminal station will provide more sensitive ground protection should the conductor break and fall. It will provide the detection and isolation required for the various types of distribution system faults which are potentially harmful to the distribution system and its customers.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labor.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Substation Transformer

Location: Rigolet

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the purchase and installation of a 1000kVA 600/2400V transformer bank and removal of the existing 500kVA diesel plant step-up transformer bank.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	50.4	0.0	0.0	50.4
Labour	5.0	0.0	0.0	5.0
Engineering	3.0	0.0	0.0	3.0
Project Management	3.0	0.0	0.0	3.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	14.4	0.0	0.0	14.4
Total	75.8	0.0	0.0	75.8

Operating Experience:

The original 500kVA bank went into service in 1983. The existing transformers will be removed and returned to inventory.

Project Justification:

Projected load growth will result in overloading the 500kVA diesel plant substation step-up transformer bank during peak demand periods. A 1000kVA bank is sufficient to address the peak demand for the foreseeable future.

The following was derived from Hydro's latest projections as presented in Economic Analysis' Operating Load Forecast Hydro Rural Systems 2002 - 2007 (November 2002):

Year		2003	2004	2005	2006	2007
Peak Demand (kW) (Net)		512	526	539	551	564
Peak Demand (kVA@0.9pf)		569	588	599	612	627
% Overload (Existing Bank)	14%	18%	20%	22%	25%	

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Substation Transformer **(cont'd.)**

Project Justification: (cont'd.)

Other options considered:

1. The opportunity for a Demand Side Management (DSM) based capital deferral was reviewed and it was determined that DSM was not a viable alternative resource in this particular circumstance. See analysis on next page.

To ensure that this project will be completed at the lowest possible cost, Hydro will solicit competitive bids for all material and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Demand Side Management Analysis for Capital Budget Proposal

Project Title: Rigolet - Replace Substation Transformers
Description: replace 3 x 167 kVa with 3 x 333 kVa in 2004

Overview: NLH views DSM as an opportunity to defer or postpone capital costs. The deferral can be evaluated in economic terms as the difference in the present value of the utility revenue requirement under varying commencement years for the investment. The difference represents a DSM budget constraint and is the maximum amount of money that can be expended in order to defer the investment. The analysis proceeds by determing the necessary demand or energy savings required to defer the investment and then evaluates whether the DSM budget constraint can achieve the required saving. This DSM review represents a preliminary screening to ensure there are no obvious DSM opportunities missed.

The most economic peak demand DSM option, namely, domestic hot water (DHW) load control, is evaluated against the required demand savings with the calculated DSM budget.

Conclusion :
The DSM deferral budget does not provide sufficient funds to achieve the load deferral targets. DSM is not a viable alternative in this circumstance. The salient details of the DSM review follow below.

	2004	2005	2006	2007	
Load Forecast (HR OPLF Dec 2002)					
Peak Demand Forecast (Net kW)	526	539	551	564	
Domestic Customers	126	129	132	135	
Existing Transformer Capacity	500	kVa			
Capital Budget Proposal for Transformer Replacement	$76,000				

	1 Yr	2 Yr	3 Yr	4 Yr	-
Required Demand Savings for Capital Deferral (kW) (Difference of forecast peak amp demand and existing rating)	76	89	101	114	
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% isolated debt cost as per 2002 COS)					
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	20.5%
Total DSM Deferral Budget	$3,202	$6,262	$9,180	$11,955	$14,588
DSM Budget Per Required Demand Savings kW	$42	$70	$91	$105	na

* Percentage of capital cost that can be incurred to defer project for 1 to 5 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW Achieved	$/kW*
Cooking Range Fuel Substitution	$1,294
Domestic Hot Water (DHW) Fuel Substitution	$1,290
Compact Fluorescent Lighting (CFL)	$352
Domestic Hot Water (DHW) Load Control	$344

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction (Max kW reduction at lowest DSM supply cost and full DSM deferral budget)	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
DHW Load Control	9	18	27	35	na
Achievable DSM Versus Required DSM Savings	(67)	(71)	(74)	(79)	na

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Generator Relaying Happy Valley North Plant

Location: Goose Bay North Side Diesel Plant

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of new generator relaying equipment for the eight standby diesel units at the North Plant. A multi-function microprocessor relay will be installed on each unit. The existing relays will be removed.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	110.0	0.0	0.0	110.0
Labour	25.0	0.0	0.0	25.0
Engineering	15.0	0.0	0.0	15.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	20.0	0.0	0.0	20.0
Total	**170.0**	**0.0**	**0.0**	**170.0**

Operating Experience:

The existing relay equipment has been in service for 30 to 50 years. There are no technical manuals or spare parts available. Although the relays are operable, there is no way to function test them against prescribed specifications to ensure they will operate properly under fault conditions.

Project Justification:

The existing relays are antiquated. There is no overcurrent protection on three of the units; there is no differential protection on one unit. The proposed relays are required to provide adequate protection to the plant, operations and maintenance personnel and the public. This protection will continue to ensure the service reliability of the North Diesel Plant.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Meters & Equipment - TRO System

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: General

Project Description:

This project consists of the purchase of demand/energy meters, current and potential transformers, metering cable and associated hardware for use throughout the Transmission & Rural Operations system.

Project Cost: *($ x1,000)*	2004	2005	Beyond	Total
Material Supply	96.0	0.0	0.0	96.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	2.1	0.0	0.0	2.1
Total	**98.1**	**0.0**	**0.0**	**98.1**

Operating Experience:

Revenue meters are required for new customer services and the replacement of old, worn, damaged or vandalized meters.

Project Justification:

As a rule, meters are expected to last a minimum of twenty years. Each is evaluated after that time for condition and either retired from service or refurbished and returned to service. Failure to supply metering equipment as required could result in customer hook-up delays of up to three months.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials.

Future Plans:

This is an annual allotment which will be adjusted from year to year depending on historical information.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Energy Management System - Energy Control Centre

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project for 2004 is the second year of a four (4) year project for which the Board has approved funds for 2003. The project consists of the replacement of the existing Energy Management System (EMS) computer software and hardware infrastructure with state of the art hardware and software which provides greater flexibility for future technology changes and integration with Hydro's IT Infrastructure. The existing EMS is used by Hydro's Energy Control Centre to monitor, control and manage the power system and related water resources across the Province. The EMS is critical to the continued efficient and reliable operation of the electric power system and generation facilities owned by Hydro. The EMS is reaching the end of its projected life of 15 years with manufacturer supplied spare parts discontinued and technical support severely limited.

Project costs are based on a joint procurement with Churchill Falls (Labrador) Corporation.

Project Cost: *($ x1,000)*	2003	2004	2005	Beyond	Total
Material Supply	544.5	2,238.0	2,178.0	544.5	5,505.0
Labour	0.0	18.0	64.0	0.0	82.0
Engineering	453.8	1,315.2	1,326.2	115.2	3,210.4
Project Management	97.2	103.2	151.9	13.2	365.5
Inspection & Commissioning	0.0	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	118.0	618.3	1,038.5	1,349.5	3,124.3
Total	1,213.5	4,292.7	4,758.6	2,022.4	12,287.2

Operating Experience:

The Energy Management System was purchased from Harris Controls (now a part of General Electric) on the 15th of March 1988 and placed in service on the 20th of August 1990. It has been in continuous operation since that time. In 1993 an Information System was added to allow the export of EMS data to a server platform to make information easily accessible to internal users over the corporate Local Area Network. Used parts were purchased over a period of time and in 1999 a spare computer was obtained when another utility retired its system. There have been no other upgrades or major repairs. Our current operating status can be summarized as

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Energy Management System - Energy Control Centre **(cont'd.)**

Operating Experience: (cont'd.)

(1) System Availability has averaged 99.985% over the system's lifetime; (2) there are no functional deficiencies; (3) there is no vendor support available; and (4) new spare parts are not available.

Project Justification:

Please refer to the documents Energy Management System Replacement Project Justification on the following pages and a report by KEMA titled "Newfoundland and Labrador Hydro Energy Management System Assessment" which was filed with the Board as part of Hydro's 2003 Capital Budget Application (Section G, Appendix 5).

Future Plans:

The KEMA report in Section 7.11 outlines the "Life Cycle Management" of the EMS. The new EMS will be using "non-proprietary" hardware and therefore will offer more flexibility for maintenance, upgrading and replacement. However, this type of equipment quickly becomes obsolete as vendors of computer hardware upgrade their systems. Therefore the EMS hardware will require an "Evergreening Program" similar to other IT Infrastructure. KEMA recommends that 20 to 33% of the base hardware costs be budgeted each year to keep hardware current. This is forecast to be $350,000 per year beginning in the third year following the system commissioning.

Similarly software upgrades will be required periodically. This cost will depend on the frequency of vendor software upgrades. KEMA are suggesting this will amount to approximately $700,000 every 3 years following project in service.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

HYDRO
THE POWER OF COMMITMENT

ENERGY MANAGEMENT SYSTEM REPLACEMENT

PROJECT JUSTIFICATION

August, 2002

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Introduction

An assessment of Hydro's EMS was conducted by KEMA Consulting, an industry leader in studying and assisting utilities in their EMS and SCADA projects. The results of the study are provided in the attached report entitled "Newfoundland and Labrador Hydro Energy Management System Assessment". This report makes a strong recommendation to begin the process of replacement immediately because of the high risk of a failure of the EMS as the age of its electronic components is beyond their design life. Concurrent with the study on Hydro's EMS, KEMA performed a similar assessment for Churchill Falls (Labrador) Corporation (CF(L)Co) on their Supervisory Control and Data Acquisition (SCADA) system. This system was also identified to require replacement in the next several years.

Alternatives for this project were identified and discussed in Section 5 of the KEMA report. These are as follows:

1. Maintain Existing Systems and Process
2. Implement New EMS Independent of CF(L)Co
3. Implement New EMS Together with CF(L)Co
4. Purchase a Turnkey System implemented by the Vendor.

Cost of EMS Failure

In addition to the discussion in the KEMA report on the advantages and disadvantages of each of the alternatives the following highlights the critical nature of the EMS and the costs of a major failure of the EMS.

The EMS provides a mission critical function for Hydro and the operation of the Interconnected Power System. If this system failed for an extended period of time while a replacement was procured the reliability of the power system and electrical service to all of Hydro's customer would fall to unacceptable levels. Remote control of any station would be impossible and therefore all major stations would have to be staffed. There are eight stations that would have to be staffed 24 hours per day with 16 others having to be staffed for varying

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

durations depending on the system condition. The eight stations alone would cost, provided staff are available, approximately $41,000 per week in overtime. This will result in a significant reduction in maintenance activity, as the staff performing monitor and control functions normally performs maintenance. In order to continue with routine maintenance additional staff would have to be hired and trained to replace those assigned to operating duties. This could add an additional $32,000 per week, while repairs or replacement are being done. If the failure was catastrophic and full replacement was the only option the cost of the foregoing could be as high as $3.8M per year.

In addition to the wage costs there would be a cost of lost efficiency due to the loss of economic dispatch functionality. At $28 per barrel this can quickly add a significant expense to the loss of the EMS. Economic Dispatch balances the load between all generating units so that the water at each plant is used as efficiently as possible with consideration to electrical losses from the plant to customer loads. Without Economic Dispatch this balancing between plants would be very difficult and ineffective resulting in loss of efficiency.

There would also be a severe loss in reliability. During the last major outage to the Avalon Peninsula in October 1998, customers were restored between 8 and 53 minutes using the EMS. Without the EMS this can be estimated to take at least two to three times longer if all stations on the Avalon Peninsula were staffed. If some stations were not staffed outages would extend for several hours allowing for contact and for travel. This would result in an intolerable level of service. Similar and more severe service deterioration would occur throughout the system particularly in remote areas and during poor weather conditions.

A delay in approving the project increases the probability of failure because as the electronic components age the likelihood of failure increases. A decision to delay is a risk assessment on how long the EMS could perform at an acceptable level. The failure rate cannot be estimated by KEMA as it does not have data on EMS systems failures because most other similar EMS computer systems have already been removed from service and replaced before this point in their service life. While we have done well to-date without major problems, KEMA have suggested in the report that this risk of failure is high, and we should not delay replacing the existing GE/Harris EMS system.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

The alternatives mentioned above are highlighted in the KEMA report. The report clearly identifies the least cost option is alternative 3 which is to procure the system at the same time as CF(L)Co. In addition to the savings in system procurement costs identified by KEMA there are internal engineering and project management cost savings of $560,000 and corporate overhead, AFUDC, Escalation and Contingency savings of $390,000. Therefore the total savings for a joint procurement are approximately $1,500,000. Hydro has obtained a commitment by CF(L)Co for joint procurement and therefore the cost estimate has been prepared on that basis.

Operator Training Simulator

There is an option mentioned in the KEMA report that may be included in the EMS replacement depending on the purchase, implementation and operating cost. It is an Operator Training Simulator (OTS). An OTS is a power system simulator used to train power system operators. It is used by setting up scenarios on the EMS to train operators how to respond to certain incidents or conditions on the power system, similar to a flight simulator used by aircraft pilots. These scenarios would include replaying disturbances on the power system for staff that were not working at the time of the disturbance. In this way operator response to these incidents will be enhanced and customer service restoration improved during real situations.

The need for an OTS has increased with recent retirements of experienced staff. Many of the staff have not experienced black-outs to major portions of the power system such as the entire east or west coast because of reliability improvements and cooperative weather, however they must be ready at all times for such circumstance. An OTS would simulate these incidents and help train the operators for the appropriate response.

Safety Issues

There are no direct safety issues that require the EMS to be replaced. Safety issues may arise if there was a failure of the EMS. The EMS provides methods for the system operators to track workers on transmission lines for contact if any incident should arise. This functionality would be lost. However, a paper tracking system could be implemented to ensure safety. The impact would then be reflected in loss of work time and slower maintenance activities.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Corporate Applications Environment

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project includes labour to apply modifications and test the applications affected by the vendor upgrade. Software requiring upgrades are:

a) JDEdwards;

b) Showcase Strategy ;

c) Lotus Notes; and,

d) AS400 O/S.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	30.0	0.0	0.0	30.0
Engineering	352.0	0.0	0.0	352.0
Project Management	132.0	0.0	0.0	132.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	26.0	0.0	0.0	26.0
Total	**540.0**	**0.0**	**0.0**	**540.0**

Operating Experience:

N/A

Project Justification:

This project includes upgrades to currently held software application products. Software must be regularly upgraded to maintain the benefits of vendor advancements in system functionality. As well, this provides continued vendor support of applications and a stable application environment for Hydro's key business functions. Out-dated and non-maintained software would lead to breakdowns in business functions that would ultimately yield higher costs.

Future Plans:

Software vendor maintenance and upgrades is an on-going occurrence.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Applications Enhancements

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

The application enhancement project provides for:

(1) The unforeseen modification, enhancements & additions to software to address the required changes to business processes initiated by Customers, Stakeholders & Regulators or to provide efficiencies to existing processes.

(2) The continuing design, build and implementation of enhancements to Hydro's Internet/Intranet.

(3) An Enterprise Project Management Software Application.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	113.0	0.0	0.0	113.0
Labour	70.5	0.0	0.0	70.5
Engineering	190.0	0.0	0.0	190.0
Project Management	44.0	0.0	0.0	44.0
Inspection & Commissioning	27.0	0.0	0.0	27.0
Corp O/H, AFUDC, Esc. & Contingency	18.7	0.0	0.0	18.7
Total	**463.2**	**0.0**	**0.0**	**463.2**

Operating Experience:
N/A

Project Justification:
This project involves:

a) Various Minor Enhancements:
It is imperative that Hydro be able to react to requests to provide enhancements to software applications in response to unforeseen requirements, such as legislative and compliance changes; vendor driven changes, and enhancements designed to improve customer service or staff productivity. Previous changes have included changes initiated by Canada Post, changes to income tax calculations, providing equal billing to customers, and other enhancements to provide environmental & operational processes.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Applications Enhancements **(cont'd.)**

b) Internet/Intranet:

This involves the design, build and implementation of enhancements to Hydro's external Web site to improve access to information to our customers and stakeholders. Additions and enhancements to Hydro's Intranet will allow staff and customers access to information. This will improve information flow, eliminate redundant processes and reduce the manual effort associated with distributing information and provide an enhanced level of customer service.

c) Enterprise Project Management software:

In order to ensure that better real time decisions regarding resource needs and the portfolio of projects can be made, a tool is needed to improve the project management process and resource utilization. To ensure efficiencies in the completion of multi department and external projects, this tool will provide integrated collaboration between the different projects and to automate skillset and resource management. This software tool will be introduced to the IS&T department and then rolled out to other groups within Hydro.

Future Plans:

Application enhancements are a continuing requirement.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program Centralized Log Monitoring & Analysis System

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project for 2004 is the continuation of a project which the Board has approved funds for 2003. The scope of this project is to purchase and implement a server and associated software to centralize reporting and presentation of security data gathered from distributed operating systems. This project will provide a central mechanism to gather security log information from the various systems, enhance analysis and reporting capabilities, and address due diligence and audit responsibilities as required by management.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	30.0	35.0	0.0	65.0
Labour	0.0	0.0	0.0	0.0
Engineering	24.0	26.4	0.0	50.4
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	3.3	21.7	0.0	25.0
Total	**57.3**	**83.1**	**0.0**	**140.4**

Operating Experience:

N/A

Project Justification:

A key to an effective security program is the ability to detect any suspicious activity. There are numerous system and application logs that keep track of any user activity within the Hydro Group's networks. Disseminating the volume of information generated by these logs is not easily done yet, however, reviewing these logs on a timely basis and taking appropriate action is mandated by our internal and external audit departments. Centralizing all logging activity and producing meaningful reports from this information is the key goal of this project.

Two of the main goals of IT security deal with integrity and the confidentiality of information. Users have the right to expect that the data they work with on a daily basis is not disclosed to unauthorized individuals and not destroyed or modified - either intentionally or accidentally. Having a centralized log monitoring and analysis system in place will provide these assurances.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program Centralized Log Monitoring & Analysis System **(cont'd.)**

Project Justification: (cont'd.)

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program - Secure Remote Access

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

The scope of this project focuses on the evaluation, design and implementation of a product(s) that will ensure a secure method of accessing corporate Information Technology resources from multiple locations. The product chosen will have to meet industry standards, address the inter-operability of existing and future applications, and incorporate existing in-house technology where possible. The chosen product must address both internal (employees accessing the company network) and external (vendors connecting to the Hydro Group's network for different transactions) concerns.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	35.0	35.0	0.0	70.0
Labour	0.0	0.0	0.0	0.0
Engineering	30.0	30.0	0.0	60.0
Project Management	3.0	3.0	0.0	6.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	7.1	8.1	0.0	15.2
Total	**75.1**	**76.1**	**0.0**	**151.2**

Operating Experience:

N/A

Project Justification:

Secure remote access involves development of a solution for Hydro Group employees and vendors. This project will include recommendations and implementation of the most economical and secure solution for the Hydro Group. The solution may include one method of access or an effective combination to meet all corporate needs and will attempt to incorporate the Hydro Group’s existing investment in both RSA’s Secure ID technology and Virtual Private Network (VPN) technology where applicable.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program - Secure Access **(cont'd.)**

Project Justification: (cont'd.)

Access to computer based information in a timely manner from a mobile workforce is essential for business. Hydro Group employees benefit from the ability to access computer resources quickly and efficiently. Properly securing this remote access is essential to ensure that this access is granted to the employees and vendors who are authorized and all other invalid attempts to access the information are denied.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Peripheral Infrastructure Replacement

Location: Hydro System

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of peripherals such as printers, projectors, scanners in area offices and Hydro Place .

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	73.0	0.0	0.0	73.0
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	17.9	0.0	0.0	17.9
Total	**100.9**	**0.0**	**0.0**	**100.9**

Operating Experience:

As the age of the peripherals increase so does the operating and maintenance expenses.

Project Justification:

A five-year replacement program for peripheral equipment is in place. This project is to allow for the refresh of peripheral equipment.

To ensure that this project will be completed at the lowest possible cost, Newfoundland & Labrador Hydro will solicit bids for all materials and external labour.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: JDE Migration Assessment Study

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

The scope of this project will be an assessment study of the business and technology issues that need to be addressed to support the migration of Hydro's existing JDE's World Vision implementation to JDE's One World implementation. The study will provide a migration strategy which will address the business and technology requirements of the migration as well as identifying the opportunities to leverage the technology to further improve the business processes. The study will also provide an implementation plan which will identify the timing and sequencing of the various JDE modules as well as identifying the resource requirements to support the migration.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	0.0	0.0	0.0	0.0
Engineering	190.0	0.0	0.0	190.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	41.2	0.0	0.0	41.2
Total	**231.2**	**0.0**	**0.0**	**231.2**

Operating Experience:

N/A

Project Justification:

The JDE World Vision financial suite was implemented in 1999. One World, a business process based implementation has been released to replace the World Vision. This study will identify the business and technology issues associated with this migration. This assessment will enable Hydro to properly identify the costs and risks associated with this migration.

One World has functionality which will enable and enhance workflow capability and functionality in areas like depreciation calculations which will better support the cost of service model.

Future Plans:

Future plans for the JDE financial suite will be determined by this project.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Powerline Carrier Equipment Transmission System - West Coast

Location: Various

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project for 2004 is the continuation of a project which the Board approved funds for 2003. In 2004, this Project requires the purchase, installation and commissioning of new Power Line Carrier (PLC) to replace the existing PLC's on TL247. Associated PLC equipment, including wavetraps, line matching units, teleprotection and high voltage coupling equipment will be replaced in a phase-to-phase arrangement.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	757.0	269.0	0.0	1,026.0
Labour	33.7	39.2	0.0	72.9
Engineering	28.2	22.0	0.0	50.2
Project Management	6.3	5.0	0.0	11.3
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	183.8	83.8	0.0	267.6
Total	**1,009.0**	**419.0**	**0.0**	**1,428.0**

Operating Experience:

The equipment proposed for replacement was installed during the power system generation additions in the early 1980's at Hinds Lake, Upper Salmon and Cat Arm. During the 20+ year operating life of this equipment, there have been many requirements for corrective maintenance and upgrades. With each additional year of operation, the inventory of spare modules decreases due to increased equipment failures, and the in-house expertise for corrective maintenance and, when possible, the repair of modules is dwindling due to technical personnel retirements.

Project Justification:

Most of the equipment slated for replacement has been in service for over 20 years and is now obsolete. The manufacturer no longer supports the product, and has discontinued the manufacture and sale of replacement components. In addition, there is no known third party that provides repair services for defective modules. Continued utilization of this equipment poses the risk of failure and hence loss of communications required for the protection and control of the power system.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Powerline Carrier Equipment Transmission System - West Coast **(cont'd.)**

Project Justification: (cont'd.)

Hydro has standardized on ABB PLC radio equipment. As such, Hydro will sole source this equipment to ABB. This allows Hydro to minimize its spares inventory and standardize on training, documentation and maintenance practices, thus reducing costs.

Future Plans:

There are no plans for any major replacements, upgrades or repairs to this plan expected to be undertaken within the next three years.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery System - Multiple Sites - 2004

Location: Bottom Brook, Hardwoods, Holyrood, Massey Drive & Stephenville

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the supply and installation of five (5) 48 VDC battery systems at the Bottom Brook Terminal Station, Hardwoods Terminal Station, Holyrood Terminal Station, Massey Drive Terminal Station and the Stephenville Gas Turbine Station. This includes all 240 VAC to 48 VDC rectifiers, rectifier control panels, battery banks and associated cabling.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	161.2	0.0	0.0	161.2
Labour	36.4	0.0	0.0	36.4
Engineering	22.1	0.0	0.0	22.1
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	54.5	0.0	0.0	54.5
Total	**274.2**	**0.0**	**0.0**	**274.2**

Operating Experience:

There have been no failures to date for the battery banks, primarily due to a rigorous preventative maintenance program and the nature of flooded cell technology. Annual maintenance costs is about $800 per battery per year consisting of two procedures per year including capacity testing and conductance measurements. All test results confirm the natural expected degradation with time for these type of batteries. It should be noted that the maintenance procedures and their costs will not be affected by the installation of new battery banks which require an equal amount of maintenance.

Project Justification:

The equipment has been in operation for 20+ years which has exceeded the 20 year design life and proven industry standard life expectancy of large stationary batteries of the flooded cell type. In some sites cell plates are warping and showing signs of deterioration. In some sites there is significant corrosion of battery terminals. The capacitors in some older types of rectifiers are deteriorating. This replacement is necessary to provide emergency power to equipment necessary for the remote control and monitoring of Hydro's transmission and

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery System - Multiple Sites **(cont'd.)**

Project Justification: (cont'd.)

generation system and is justified by reliability considerations. Failure to replace this equipment will result in a battery bank failure or reduced reliability which will extend or cause customer outages. An unacceptable failure probably will occur after the battery design life is exceeded.

To ensure that this project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labour.

Future Plans:

None. While this is part of a multi-year plan to replace battery systems, this budget does not include any future commitments to replace battery systems in other years.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Remote Terminal Units for Hydro - Phase 5

Location: Cat Arm, Hinds Lake, Long Harbour and Happy Valley

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of three (3) Quindar Remote Terminal Units (RTUs) and one (1) Westronic M4 Remote Terminal Unit used for remote monitoring and control of plants and terminal stations from the Energy Control Center. The sites are: Cat Arm Plant, Hinds Lake Plant, Long Harbour Terminal Station and Happy Valley terminal station. This is phase five of a nine-phase plan to replace all obsolete RTUs. The de-commissioned equipment has no value and will be scrapped.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	148.1	0.0	0.0	148.1
Labour	70.2	0.0	0.0	70.2
Engineering	33.4	0.0	0.0	33.4
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	62.1	0.0	0.0	62.1
Total	313.8	0.0	0.0	313.8

Operating Experience:

There have been few failures of this equipment to date. The average mean time between failures experienced in the last few years is approximately seven years with an estimated repair cost of $1800 dominated by circuit board repair costs.

Project Justification:

The equipment has been in operation for over 20 years and is nearing the end of its useful life. It is no longer supported by the equipment manufacturer, and spares are no longer available for these systems. Third party spares and repair services are not available. This is a replacement necessary to maintain reliability of equipment for the control and monitoring of Hydro's transmission and generation system. Failure to replace this equipment could result in reduced reliability which would extend or cause customer outages. The replacement RTUs will support additional functionality such as newer protocols and polling of Intelligent Electronic Devices (IEDs). The replacement of the Hinds Lake RTU will allow the obsolete binary coded decimal analogs in the plant control cubicle to be upgraded.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Remote Terminal Unit for Hydro - Phase 5 **(cont'd.)**

Project Justification: (cont'd.)

Hydro has standardized on the General Electric (GE) line of Remote Terminal Units. As such, Hydro will sole source this equipment to the manufacturer, GE. This allows Hydro to minimize its spares inventory and standardize on training, documentation and maintenance practices.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000 EXPLANATIONS

Project Title: Replacement of Operational Data & Voice Network - Phase 2

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This is phase 2 of a two-year program to plan, design and install a wide area network (WAN) communications infrastructure to replace the existing operational data (SCADA) and operational voice network currently using General DataComm (GDC) infrastructure. This will provide an architecture that can support the operational data, administrative data and voice traffic over a standard network infrastructure.

Project Cost: *($ x1,000)*	**2004**	**2005**	**2006**	**Beyond**	**Total**
Material Supply	512.0	503.0	0.0	0.0	1,015.0
Labour	180.0	228.0	0.0	0.0	408.0
Engineering	199.0	199.0	0.0	0.0	398.0
Project Management	33.0	37.8	0.0	0.0	70.8
Inspection & Commissioning	0.0	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	47.0	279.0	0.0	0.0	326.0
Total	971.0	1,246.8	0.0	0.0	2,217.8

Operating Experience:

The existing operational data network supporting SCADA traffic was installed in 1988, and is now 15 year-old technology. It is a Time Division Multiplex architecture with General DataComm (GDC) equipment designed to carry the SCADA traffic between remote RTU's and the energy management system (Harris) at Hydro Place, and operational voice traffic between the sub-stations & plants and the energy control centre (ECC).

The GDC equipment is at the end of its useful life. GDC will soon discontinue support and thus problems will no longer be investigated and resolved. The following table gives the number of incidents recorded over the past 8 years and this year to-date.

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Incidents Reported	4	10	6	23	11	11	15	19	16

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Operational Data & Voice Network - Phase 2 **(cont'd.)**

Project Justification:
GDC is no longer in the transport market segment but have focused their strategic direction elsewhere. Table 5, page 19, of the Telecommunications Plan, which was submitted to the Board as part of Hydro's 2003 Capital Budget Application (Section H), indicates that the GDC equipment that Hydro has installed over the past 15 years is no longer under development and many components have been manufacturer discontinued for a number of years.

The operational, administrative and voice traffic currently run on separate communications equipment and standards. This upgrade would combine these services into one communications system with common equipment and standards. This would decrease the demands on staff to be trained to support different communications protocols and equipment.

This upgraded communications network will support all applications and devices that have a standard protocol (IP centric). All existing administrative applications support this protocol and the upgrade to the Energy Management System will have this as a requirement. All new RTU devices will have IP as a communications protocol. This new technology will provide added functionality, reliability and manageability.

Integrating all applications and devices, including SCADA, onto a single communications platform will streamline operational activities and improve overall management and control of the WAN. The improved reliability will benefit the power grid management, provide better control and reduce operational costs.

To ensure that the project will be completed at the lowest possible cost, Newfoundland and Labrador Hydro will solicit competitive bids for all materials and external labour.

Future Plans:
There are no further plans under consideration at this time.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - 2003

Location: System Wide

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

This project for 2004 is the continuation of a project given approval by the Board in 2003. The project involves replacing 28 light vehicles (cars, pick-ups and vans) and 17 medium/heavy vehicles (line trucks and boom trucks).

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	1,520.0	844.0	0.0	2,364.0
Labour	0.0	0.0	0.0	0.0
Engineering	10.0	10.0	0.0	20.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	53.7	288.2	0.0	341.9
Total	1,583.7	1,142.2	0.0	2,725.9

Operating Experience:

It has been our experience that vehicles experience increased downtime and decreased reliability as they reach the replacement criteria outlined below.

REPLACEMENT CRITERIA VEHICLES			
Category	**Description**	**REPLACEMENT CRITERIA**	
		Age	**Other**
1000	Cars/Mini-vans	5-7 yrs.	>150,000 kms, maintenance cost, condition
2000	Pick-ups/Service Vans	5-7 yrs.	>150,000 kms, maintenance cost, condition
3000	Light Trucks	6-8 yrs.	>180,000 kms, maintenance cost, condition
4000	Medium/Heavy Trucks	7-9 yrs.	>200,000 kms, maintenance cost, condition

Category 1000 and 2000 vehicles being replaced will have an average age of six years and 150,000 km, while category 3000 will have an average age of eleven years and 100,000 km and category 4000 will have an average age of 10 years and 200,000 km.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - Hydro System - 2003 **(cont'd.)**

Project Justification:

New vehicles are required in order to ensure maximum reliability with minimum equipment downtime. Having work crews equipped with reliable and technologically current work vehicles, ensures their safety while at the same time enhancing efficient delivery of services. Operating vehicles beyond their economical life cycle will result in delays to work crews and have a negative impact on customer service.

Vehicles are screened against a replacement criteria before being evaluated for replacement. When a unit has met the age or kilometer criteria, the unit is further evaluated for its condition and maintenance history.

The budget for each class of vehicle is shown below.

Vehicle Class	Budget Amount
1000 (Cars/Mini-vans)	$ 250,600
2000 (Pick-up/ Service Vans)	497,700
3000 (Light Trucks)	78,400
4000 (Medium/Heavy Trucks)	1,557,300
Contingency	341,900
Total	**$ 2,725,900**

New vehicles are acquired through competitive tendering with a lease/purchase analysis used to determine the least cost alternative.

Future Plans:

Categories 1000, 2000, and 3000 vehicles will be purchased in 2003, however due to long delivery schedules of category 4000 vehicles, these vehicles will not be delivered until 2004.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - 2004

Location: System Wide

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

This project involves replacing 33 light vehicles (cars, pick-ups and vans) and 11 medium/heavy vehicles (line trucks and boom trucks).

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	1,020.0	912.0	0.0	1,932.0
Labour	0.0	0.0	0.0	0.0
Engineering	10.0	10.0	0.0	20.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	10.0	0.0	10.0
Corp O/H, AFUDC, Esc. & Contingency	51.2	259.2	0.0	310.4
Total	**1,081.0**	**1,181.2**	**0.0**	**2,262.4**

Operating Experience:

It has been our experience that vehicles experience increased downtime and decreased reliability as they reach the replacement criteria outlined below.

REPLACEMENT CRITERIA VEHICLES			
Category	**Description**	**REPLACEMENT CRITERIA**	
		Age	**Other**
1000	Cars/Mini-vans	5-7 yrs.	>150,000 kms, maintenance cost, condition
2000	Pick-ups/Service Vans	5-7 yrs.	>150,000 kms, maintenance cost, condition
3000	Light Trucks	6-8 yrs.	>180,000 kms, maintenance cost, condition
4000	Medium/Heavy Trucks	7-9 yrs.	>200,000 kms, maintenance cost, condition

Category 1000 and 2000 vehicles being replaced will have an average age of seven years and 165,000 km, while category 3000 will have an average age of seven years and 220,000 km and category 4000 will have an average age of 10 years and 200,000 km.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - Hydro System - 2004 **(cont'd.)**

Project Justification:
New vehicles are required in order to ensure maximum reliability with minimum equipment downtime. Having work crews equipped with reliable and technologically current work vehicles, ensures their safety while at the same time enhancing efficient delivery of services. Operating vehicles beyond their economical life cycle will result in delays to work crews and have a negative impact on customer service.

Vehicles are screened against a replacement criteria before being evaluated for replacement. When a unit has met the age or kilometer criteria, the unit is further evaluated for its condition and maintenance history.

The budget for each class of vehicle is shown below.

Vehicle Class	Budget Amount
1000 (Cars/Mini-vans)	$ 250,000
2000 (Pick-up/ Service Vans)	530,000
3000 (Light Trucks)	200,000
4000 (Medium/Heavy Trucks)	972,000
Contingency	310,400
Total	**2,262,400**

New vehicles are acquired through competitive tendering with a lease/purchase analysis used to determine the least cost alternative.

Future Plans:
Categories 1000, 2000, and 3000 vehicles will be purchased in 2004, however due to long delivery schedules of category 4000 vehicles, these vehicles will not be delivered until 2005.

2004 CAPITAL PROJECTS OVER $50,000 EXPLANATIONS

Project Title: Purchase Cash Remittance Processor

Location: Hydro Place

Division: Finance

Classification: Administrative

Project Description:

This project consists of the replacement of the existing cash remittance processor which processes mail-in customer payments.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	57.7	0.0	0.0	57.7
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	2.3	0.0	0.0	2.3
Total	**60.0**	**0.0**	**0.0**	**60.0**

Operating Experience:

The existing equipment was acquired in 1999.

Project Justification:

The current processor was acquired when Hydro ceased to use Newfoundland Power to manage its customer billings and payments processes and implemented the Utility Customer Information System (UCIS) and will reach its projected useful life of five-years in 2004. The equipment provides for electronic capture and storage of customer payment data, which would be much more labour-intensive and costly using manual processes.

Future Plans:

None.

2004 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Electronic Metering Reading

Location: Hydro Place

Division: Finance

Classification: Administrative

Project Description:

This project consists of a study to provide recommendations on a replacement system for the Radix FW200 in 2004 and to purchase equipment and install the system in 2005.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	0.0	180.0	0.0	180.0
Labour	35.0	35.0	0.0	70.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	0.8	8.5	0.0	9.3
Total	**35.8**	**223.5**	**0.0**	**259.3**

Operating Experience:

N/A

Project Justification:

The handheld meter-reading units facilitate meter reading and billing processes and it is essential that a source is available for equipment maintenance and support.

Hydro has been notified by the Radix Corporation that the FW200 handheld meter-reading unit presently being used by Hydro is being phased out in 2003 and they will support Hydro's system through 2005. The equipment estimate used for this budget is based on prices provided by the Radix Corporation to upgrade to the FW300 handheld model but other suppliers will also be evaluated.

Future Plans:

None.

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2004 CAPITAL BUDGET
PROJECTS SUBJECT TO MINIMUM FILING REQUIREMENTS - OVERVIEW
($,000)

PROJECT DESCRIPTION	Exp To 2003	2004	Future Years	Total	In-Ser Date	Explanation Page Ref.
Purchase and Install Transformer Addition - Happy Valley Terminal Station	7	1,244		1,251	Nov. 04	C-2
TOTAL TRANSMISSION & RURAL OPERATIONS	7	1,244	0	1,251		

Purchase and Install Transformer – Happy Valley Terminal Station

1. Project Description

This project includes all work involved with the purchase and installation of a 30/40/50 MVA 138/25kV transformer and associated terminal station equipment to replace one of the existing 15/20/25/28 MVA units

2. Project Scope

This project is being justified on the basis that additional transformer capacity will be required to meet the anticipated load requirements in Happy Valley – Goose Bay.

The scope of work is as follows:

- Replace one of the existing 138/25kV 15/20/25/28 MVA transformers with a 30/40/50 MVA unit.
- Install a new 25kV circuit breaker and two 1200 amp disconnect switches
- Upgrade 25kV bus conductor from 559.5 mcm to 1192.5 mcm

The new equipment will be installed on the existing foundations and structures and no foundation modifications are expected to be required. The existing circuit breaker's current transformers (C.T.'s) are rated at 600 amps which is not adequate for the increased transformer capacity resulting in the requirement for the new breaker. Likewise the existing 25kV bus conductor cannot carry the additional capacity resulting in the requirement for the bus conductor upgrade.

3. Project Timetable/Cash Flow

The preliminary design and engineering work will commence in the late fall of 2003 with the actual installation taking place in the fall of 2004.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Total**
Material Supply	0.0	875.0	875.0
Labour	0.0	54.0	54.0
Engineering	7.0	32.0	7.0
Project Management	0.0	8.0	8.0
Inspection & Commissioning	0.0	35.0	35.0
Corp O/H, AFUDC, Esc. & Contingency	0.4	240.2	40.6
Total	**7.4**	**1,244.2**	**1,251.6**

Purchase and Install Transformer – Happy Valley Terminal Station (cont'd.)

4. Customer Impact

If additional transformer capacity is not added at Happy Valley - Goose Bay the existing transformers will be approximately 4% overloaded during the 2004 peak load period. Continued operation in an overloaded state will result in loss of transformer life and premature failure resulting in an outage to customers.

5. Statement of Need

At present there are two 15/20/25/28 MVA transformers at the Happy Valley Terminal Station for an installed capacity of 56 MVA. Based on Hydro's December 2002 load forecast these units will be slightly overloaded during the 2003 peak and by 2004 the overload at time of peak will be approximately 4%. Hydro's criteria for its major power transformers, which is consistent with industry standard, is to add capacity when projected load exceeds the transformer installed nameplate rating, which in the case of Happy Valley is 56 MVA. The projected load for the period 2003 – 2007 and the resultant % station loadings are shown below:

YEAR	MVA LOAD	%STATION LOAD
2003	56.9	101.6
2004	58.3	104.1
2005	60.0	107.1
2006	61.2	109.3
2007	62.6	111.8

6. Description of Corrective Options

The alternatives investigated for Happy Valley were to change out one of the existing transformers for a larger unit or to add a third transformer of equal rating to the existing units. The transformer change out, as being proposed, has a cost of $1.25 million while the addition of a third unit would cost approximately $ 2.4 million where the additional cost is attributed to the station expansion required to accommodate a third transformer.

Purchase and Install Transformer – Happy Valley Terminal Station (cont'd.)

7. Documentation of Decision Rational

Based on the forecasted load growth in Happy Valley- Goose Bay it is essential that additional transformer capacity be added by 2004 if the capability of the system is to be maintained. Of the alternatives investigated, it is recommended that the lower cost alternative of the transformer change out be implemented. While the addition of the third unit does offer minor improvements in operating flexibility it is believed that the additional expenditure is not warranted. It is proposed that the unit being removed from service be maintained as a system spare that will be kept at Happy Valley but made available to other areas on the system if required. Demand Side Management was investigated as an option to mitigate the load increase but it was determined the project could not be deferred through the application of this measure (see analysis on next page).

Demand Side Management Analysis for Capital Budget Proposal

Project Title: Happy Valley Goose Bay - Transformer Replacement
Description: Replace 15/20/25 MVA transformer with 30/40/50 MVA

Overview: NLH views DSM as an opportunity to defer or postpone capital costs. The evaluated in economic terms as the difference in the present value of the utility revenue varying commencement years for the investment. The difference represents a DSM budget is the maximum amount of money that can be expended in order to defer the investment. The proceeds by determing the necessary demand or energy savings required to defer the investment evaluates whether the DSM budget constraint can achieve the required saving. This DSM review a preliminary screening to ensure there are no obvious DSM opportunities

The most economic peak demand DSM option, namely, domestic hot water (DWH) load evaluated against the required demand savings with the calculated DSM

Conclusion
The DSM deferral budget does not provide sufficient funds to achieve the load deferral targets. DS viable alternative in this circumstance. The salient details of the DSM review follow

	2004	2005	2006	2007	2008
Load Forecast (HR OPLF Dec					
Peak Demand Forecast	58,271	59,712	61,161	62,618	na
Domestic	3,660	3,765	3,876	3,975	na
Existing Transformer	56,000	kva, unit power			
Capital Budget	$1,251,60				

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral	2,271	3,712	5,161	6,618	na
DSM Budget Calculation (Calculated assuming 2% inflation and 7.2% rate base return as per					
Capital Budget Deferral	4.9%	9.5%	13.9%	18.0%	22.0%
Total DSM Deferral	$57,209	$110,916	$162,288	$210,157	$256,85
DSM Budget Per Required Demand Savings	$25	$30	$31	$32	na

* Percentage of capital cost that can be incurred to defer project for 1 to 5 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW	$/kW*
Cooking Range Fuel	$1,331
Domestic Hot Water (DHW) Fuel	$1,327
Compact Fluorescent Lighting	$362
Domestic Hot Water (DHW) Load	$354

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand (Max kW reduction at lowest DSM supply cost and full DSM deferral budget)	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
DHW Load	162	314	459	594	na
Achievable DSM Less Required DSM	(2,109)	(3,398)	(4,702)	(6,024)	na

NEWFOUNDLAND & LABRADOR HYDRO

2004 LEASING COSTS

ITEM	***2004 COST***

There are no new leases identified for 2004.