Newfoundland & Labrador
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF THE

2007 CAPITAL BUDGET APPLICATION

FILED BY

NEWFOUNDLAND AND LABRADOR HYDRO

DECISION AND ORDER OF THE BOARD

ORDER No. P.U. 35 (2006)

BEFORE:

Robert Noseworthy
Chair and Chief Executive Officer

Darlene Whalen
Vice-Chair

P. U. 35(2006)

IN THE MATTER OF the *Public Utilities Act*, RSNL 1990, c. P-47 (the "*Act*");

and

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for an Order pursuant to Sections 41 and 78 of the *Act*:

(a) approving its 2007 Capital Budget of $41,421,000;
(b) approving 2007 capital purchases and construction projects in excess of $50,000;
(c) approving the proposed estimated contributions in aid of construction for 2007; and
(b) fixing and determining its average rate base for 2005 in the amount of $1,473,759,000.

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Vice-Chair

TABLE OF CONTENTS

I BACKGROUND

1. Current Industry Structure

Electrical services in the Province of Newfoundland and Labrador are provided by two utilities: Newfoundland and Labrador Hydro Corporation (Hydro), which is a Crown Corporation; and Newfoundland Power Inc. (NP), an investor owned subsidiary of Fortis Inc. Hydro is principally responsible for generation and transmission in the Province, with a relatively small amount of distribution in rural areas. NP operates on the Island portion of the Province and is primarily a distribution utility with some generating capacity.

On the Island Interconnected system Hydro owns and operates 1526 MW of hydro and thermal generation assets. On the Labrador Interconnected system Hydro owns and operates 38 MW of thermal generation, and on the 21 isolated rural systems Hydro owns and operates 29 MW of diesel generation. Hydro also owns and operates 3,742 km of transmission lines at voltages of 230 kV, 138 kV and 69 kV and approximately 3,334 km of distribution lines.

Together, Hydro and NP generate, transmit and distribute electricity to approximately 262,947 domestic and general service customers. NP's operations on the Island service 227,617 customers or 86.5% of all general service and domestic customers. Hydro serves the remaining 13.5% or 35,330 customers on the Island and in Labrador, as well as five Island Industrial customers and NP, two Labrador Interconnected Industrial customers, and a Labrador Interconnected secondary energy customer.

2. The Application

In accordance with the provisions of the *Act*, Hydro filed its 2007 capital budget application (the "Application") with the Board of Commissioners of Public Utilities (the "Board") on July 14, 2006. In the Application Hydro requests that the Board make an Order pursuant to Sections 41 and 78 of the *Act*:

a) approving its 2007 Capital Budget of $41,421,000;
b) approving 2007 capital purchases and construction projects in excess of $50,000;
c) approving the proposed estimated contributions in aid of construction for 2007; and
d) fixing and determining its average rate base for 2005 in the amount of $1,473,759,000.

The Application, in accordance with historical practice, Board guidelines, and relevant legislation includes a detailed explanation of each proposed expenditure setting out a description, justification, projected expenditures, costing methodology and future commitments, if applicable. Additional studies and reports, including detailed engineering reports, are provided in relation to a number of projects.

3. Board Authority

i) Legislation

Section 41 (1) of the *Act* requires a public utility to submit an annual capital budget of proposed improvements or additions to its property to the Board for approval no later than December 15th in each year for the next calendar year. In addition, the utility is also required to include an estimate of contributions toward the cost of improvements or additions to its property, which the utility intends to demand from its customers.

Section 41 (3) prohibits a utility from proceeding without the prior approval of the Board 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.

Section 78 gives the Board the authority to fix and determine the rate base for the service provided or supplied to the public by the utility and also gives the Board the power to revise the rate base. Section 78 also provides the Board with guidance on the elements that may be included in the rate base.

Board procedures and process are established by regulation, guideline or rules of procedure established in accordance with this legislation. Capital Budget Guidelines applicable to this Application were established provisionally by the Board in June of 2005.

ii) Process

Starting on July 29, 2006 notice of the Application was published in various newspapers in the Province inviting participation in the review of the Application or letters of comment. Details of the Application and supporting documentation were posted on the Board's website.

Subsequent to this notice, Notices of Intention to intervene in the Application were received from Hydro's Island Industrial Customers (Abitibi-Consolidated Company of Canada Limited, Grand Falls Division; Aur Resources Inc.; Corner Brook Pulp and Paper Limited; North Atlantic Refining Limited; and Voisey's Bay Nickel Limited) and also from Newfoundland Power Inc. No other Notices of Intention to Participate were received by the Board.

Pursuant to Section 14 (1) of the Board's Regulations, information requests were directed to Hydro by the Board, the Island Industrial Customers and NP. Hydro responded to all of the information requests.

On September 1, 2006 Hydro provided a presentation and site tour of the Holyrood Thermal Generation Station for the Intervenors and Board staff. The Chair and CEO of the Board also attended this presentation. A technical conference was held on September 5, 2006 during which

Hydro provided a presentation and clarification on certain aspects of the proposed capital budget to Intervenors and Board staff.
Based on the documentation filed and in the absence of a request by any party for a hearing the Board determined that a public hearing was not required and the Application would be considered on the basis of the written record.

On October 6, 2006 the Island Industrial Customers and NP both filed written submissions with the Board.

Hydro filed a written submission on October 13, 2006.

The Island Industrial Customers filed a further submission on October 17, 2006.

II PROPOSED 2007 CAPITAL BUDGET

1. Overview

Hydro's proposed total capital budget for 2007 is $41,421,000. The proposed expenditures by asset class are as follows:

Asset Class	Budget (000s)
Generation	$ 13,354
Transmission and Rural Operations	19,544
General Properties	7,523
Unforeseen Allowance	1,000
Total	**$ 41,421**

The proposed 2007 capital budget is comparable to Hydro's capital budgets proposed and approved in recent years. The amount approved for 2005 was $42,431,000 [P.U. 53(2004)] and for 2006 the Board approved Hydro's proposed budget of $42,636,000 [P.U. 31(2005)].

2. Intervenor Submissions

In its written submission to the Board the Island Industrial Customers stated that they have significant concerns about Hydro's 2007 proposed capital budget. In particular the Island Industrial Customers raised issues with Hydro's capital project screening process, the increasing annual expenditures and also identified concerns with several specific projects. These concerns and the disposition advocated, along with Hydro's response and the Board's findings for each, are set out in the following sections.

i) Capital Project Screening Process

In its response to IC-4 Hydro identified the four broad evaluation criteria used to screen capital projects: i) safety of the public; ii) compliance with environmental regulations; iii) maintain or improve reliability and availability of an acceptable level of service to customers; and iv) reduce costs or improve efficiencies. Hydro stated that *"Projects that meet one or more of these criteria will receive approval by Hydro."*

The Island Industrial Customers submitted that there is no evidence in Hydro's response to IC-4 that Hydro even attempts, by way of an approach to screening capital projects applying all four criteria in an integrated fashion, to prioritise its capital projects.

In its written submission Hydro suggested that the manner in which this issue was addressed by the Island Industrial Customers is suggestive of a lack of understanding or appreciation for Hydro's statutory process to provide reliable power and an acceptable level of service. Hydro reiterated its screening process and pointed out that, in addition to these criteria, Hydro also endeavors to ensure that the total of Hydro's capital projects in a year would not normally exceed cash flow from operations, consisting primarily of net income, depreciation and some other non-cash items.

The Island Industrial Customers responded in its October 17th letter that Hydro's submissions on the capital project screening process offer no insight as to why it should be accepted that every capital project proposed by Hydro is equally necessary to the stated goal of achieving an acceptable level of least cost reliable service. The recognition of a limit on its annual capital expenditures is, according to the Island Industrial Customers, an indication that Hydro is capable of prioritising capital projects – those projects that would increase spending beyond the guideline must presumably be cancelled or deferred. The Island Industrial Customers argued that the goal of regulation is to attempt to replicate, as far as possible, the discipline imposed on the private sector by the economic reality that money is not always available to proceed with every desired project. Hydro needs to, according to the Island Industrial Customers, discipline itself to economize, both in capital and operational spending.

With a view to the current capital budget review process, the importance of minimizing capital spending is acknowledged. Hydro has a responsibility to provide safe and reliable least cost power to all areas of the Province and has stated that, in meeting this standard, it applies the four broad evaluation criteria set out above. The review of Hydro's proposed capital budget by the Board contains a number of checks and balances to ensure a prudent yet practical regulatory review. As required by legislation each project over $50,000 is presented to the Board for review and approval, along with the total capital budget. The capital budget filing is required to contain certain minimum information as required by the Board's Capital Budget Guidelines. The Board's review of these proposed projects and the total capital budget is undertaken in a manner which ensures that interested parties can participate in the review. The Board and interested parties can ask questions, request further information and, if necessary, the Board can hold a

public hearing. The process is intended to ensure that every opportunity is provided to ensure that all the projects are reasonably tested and reviewed as part of the Board approval process. This is the process under which this 2007 capital budget and associated projects were reviewed.

The current Capital Budget Guidelines contemplate some prioritising as the projects must be classified as either mandatory, normal or justifiable. The Island Industrial Customers suggest that the projects be prioritised further. The Board does not wish to address this proposed change in the Board's guidelines in the context of a particular capital budget application for a particular utility which may not allow the full participation of all potentially interested persons. This concept can and should be addressed in the context of a general discussion of the capital budget guidelines. It is anticipated that the provisional Capital Budget Guidelines will be formalized by the Board in the next year. In accordance with the recent process all interested persons will be given an opportunity to provide commentary on the existing provisional guidelines and make suggestions for improvements. The Island Industrial Customers can bring forward this and other commentary at that time.

The Board will continue to review the capital projects of Hydro (and NP) in this context of the statutory obligation of both Hydro and the Board. The Board will not impose specific limits on capital spending or put in place arbitrary guidelines which would then have to be enforced regarding prioritising capital projects. The Board is satisfied that the existing process for reviewing proposed capital projects and associated expenditures provides an acceptable model which has been agreed to by the parties ensuring appropriate analysis and cost effective review.

ii) Increasing Annual Capital Expenditures

The Island Industrial Customers pointed out that Hydro's actual average annual capital expenditure over the seven-year period 1999 to 2005 is $36,768,000. The approved capital expenditure budget of $42,636,000 for 2006 is now projected to reach $48,922,000. The Island Industrial Customers further noted that Hydro's annual capital expenditures for the period 2006-2010 are projected to average $44,584,000, a 21% increase in annual average capital expenditures over the 1999-2005 period. The Island Industrial Customers urged the Board to consider whether there is sufficient justification for this increased level of expenditure by Hydro in 2007.

In its written submission Hydro stated that the recent level of increase in Hydro's capital budget as observed by the Island Industrial Customers is a direct result of operating and maintaining an aging generating, transmission and distribution plant in a harsh environment. Hydro argued that:

> *"It would be irresponsible for Hydro to set arbitrary limits as to the level of capital investment. Hydro is required by the governing legislation to continue to provide least cost reliable service to its customers and a crucial aspect of delivering reliable service is to ensure that its assets are sound and adequate for that purpose."*

Each project is justified individually as being necessary to provide least cost reliable power. The Board approves the total capital budget and the individual projects based on the evidence filed,

subsequent information provided through information requests, technical conferences and public hearings where necessary, along with written submissions. Because of the nature of the system Hydro operates it is reasonable to expect variation in annual capital budgets and the nature of projects to be undertaken in any given year would be expected to be different. The Board is of the view that to set a targeted limit on the level of capital investment is inappropriate and may deny consideration of projects that are justified.

iii) Individual Projects Objected to by the Island Industrial Customers.

Upgrade Access Roads – Upper Salmon (p. B-5) $674,500 and Burnt Dam (p. B-6) $309,200

These projects involve the upgrading of access roads in both locations. At Upper Salmon the project involves the preparation and placement of road gravel on 48 km of the Upper Salmon Access Road. At the Burnt Dam Access Road the project involves ditching, replacement of approximately 20 culverts, upgrading of low areas that are subject to flooding annually and the installation of road gravel where necessary.

The Island Industrial Customers submitted that, based on the evidence, these projects are not urgent for 2007 and should be deferred, given that the combined cost of both these projects approaches $1.0 million. Hydro's responses to IC-6 and IC-7 indicate that there have been no reports of accidents or fuel spills on either road. According to the Island Industrial Customers, at most the condition of the Upper Salmon Access Road may be contributing to some increased maintenance and repair to Hydro vehicles. It was questioned whether the examples noted by Hydro (broken engine oil pan, broken axle retaining bolts, and broken trailer tow bar) are due to normal wear and tear on these vehicles. There have been no reports at all of damages to vehicles due to the condition of the Burnt Dam Access Road.

In its written submission Hydro reiterated that both these access roads provide important transportation routes to its hydroelectric facilities and that this investment is needed to ensure that these roads can be maintained in a state that is suitable for safe and efficient transporting of equipment and personnel so that Hydro's generation operations are not compromised.

Based on the evidence filed by Hydro the Board is satisfied that these two projects should be approved as proposed. These roads are essential for operations and maintenance of plant structures. As set out in Hydro's project justification the roads have been subjected to 25-35 years of continuous service and regular maintenance. The proposed upgrades are, in the Board's view, reasonable and expected under the circumstances.

Construct Contaminated Water Treatment Plant – Holyrood (p. B-18) $276,100

This project consists of the construction, testing and optimisation of a pilot scale treatment plant at the Holyrood Generating Station to treat ammoniated wastewater produced by the regeneration of condensate polisher resins. The pilot plant will be used to optimise the design and operation of the process and to prepare preliminary designs and detailed capital and operating cost

estimates for the production scale facility. The proposal includes an expenditure of $276,100 in 2007 and a further $62,400 in 2008, for a total project cost of $338,500 over two years.

According to the Island Industrial Customers Hydro has failed to provide any evidence that the regulator is requiring Hydro to eliminate or reduce the presence of ammonia in its wastewater discharge. It was suggested that the Board consider whether Hydro has demonstrated that there is in fact a deleterious environmental impact from the Holyrood wastewater discharge and, if so, whether the proposed expenditure is the reasonably necessary or prudent method to address that impact.

The Board notes that Hydro has classified this project as mandatory under the existing Capital Budget Guidelines, which means that the project is necessary to satisfy legislative requirements, safety issues or risk to the environment. According to Hydro's response to IC-3 the work is required by legislation as the wastewater streams of concern are discharged untreated to the environment, in contravention of the *Environment Control Water and Sewer Regulations* of the *Water Resource Act* of the Province. As set out in the response to PUB-27 Hydro has discharged these waste streams with the permission of the provincial regulator. Hydro noted in this response:

> *"Both parties were operating under the assumption that the only characteristic of concern was pH excursions, which although beyond regulated limits, were not of great concern to the regulator. However, recent testing has revealed that, unknown to both parties, these waste streams also contain high levels of ammonia, which is toxic to fish and other marine organisms."*

However Hydro confirmed in its response to IC-42 that there is "no wording in the existing Certificate of Approval that specifically supports Hydro's assertion that Hydro is in violation of the Regulations." In this same response Hydro stated that the Holyrood plant also provides monthly data to the Department of Environment and Conservation related to the sampling of waste water streams that Hydro is required to monitor and report on, including the wastewater treatment plant and solid waste disposal site leachate collection systems. These filings have not resulted in any specific direction from the environmental regulator to alter the existing wastewater treatment processes. Further there is no direction or order from any other municipal, provincial or federal authority on the record requiring Hydro to treat this wastewater stream as a condition of operation.

Based on the evidence the Board is not persuaded that this project should in fact be classified as mandatory, as the Certificate of Approval under which Hydro operates the Holyrood plant does not require the treatment of these wastewater discharge and, presumably, Hydro has been operating in compliance with the conditions of its Certificate of Approval. However the Board does accept that it is reasonable and prudent for Hydro to undertake to study the best option to treat the ammoniated wastewater with the expectation that such an order will be issued or that the Certificate of Approval will be modified to require treatment of the wastewater stream now that the presence of ammonia has been confirmed. The Board will approve Hydro's proposal to construct a pilot scale treatment plant for ammoniated wastewater at the Holyrood Thermal Generating Station. The Board notes that a subsequent capital budget proposal will be required

when the decision has been made to proceed with a full-scale treatment plant as required to meet all necessary environmental regulations and to be in compliance with its Certificate of Approval.

Supply and Installation of Bridge – TL233 at South West River (p. B-35) $211,900

This project involves the construction of a 25 m long by 5 m wide pre-engineered steel panel-type bridge on South West River. According to Hydro this bridge is necessary to provide Hydro personnel access to TL233, a 230 kV transmission line situated in western Newfoundland that connects Hydro's Buchans and Bottom Brook terminal stations. The original bridge over South West River was owned by Abitibi Consolidated Inc. and was used by Hydro for 32 years to access TL233. Due to its unsafe condition Abitibi removed the bridge in the fall of 2004.

The Island Industrial Customers submitted that Hydro has not demonstrated that expending $211,900 to construct a new bridge is the lowest possible cost option consistent with reliable service and pointed out that Hydro has stated that there are alternatives for regular and emergency access.

In its written submission Hydro stated that there are significant delay issues associated with using alternative routes that would add costs for regular maintenance activities and would likely cause delays in restoring power in emergency outage incidents.

The Board is satisfied that this project should be approved as proposed. While three alternatives were presented for alternate access, two involve fording a scheduled salmon river and the third involves travelling 38 km along a forest access road starting at the Bottom Brook Terminal Station. Fording a salmon river requires permission from DFO and, even with permission, the river would not be able to be crossed for two months each year during spring breakup. Hydro stated that the third option would add 20 to 24 hours travel time in summer, which would be much higher in winter conditions, and would result in damage to dragged poles. All three options would have associated added costs. The Board accepts Hydro's position that this bridge is necessary to provide safe and rapid access to enable Hydro's line crews to respond quickly to minimize the duration of line outages and to perform routine repairs and maintenance in an expeditious manner.

Microwave Site Refurbishing – Godaleich Hill (p. B-98) $364,200

This project involves the refurbishment of a microwave site located at Godaleich Hill including ice protection installation, foundation refurbishment, anti-climb system installation, electrical upgrades, and other associated infrastructure refurbishing. According to Hydro this project is part of a program to refurbish the West Coast Microwave sites infrastructure. Three similar projects were approved by the Board in recent past capital budgets – Mary March Hill in 2005 ($293,800) and Blue Grass Hill and Bay d'Espoir Hill in 2006 ($407,300). Upgrades to other sites will be proposed in future budget applications.

The Island Industrial Customers requested that the Board consider deferral of any capital expenditure on this site until Hydro presents a project for an extension of its useful life going beyond a mere 5-10 years.

In written submission Hydro pointed out that the microwave facilities being refurbished under this program are links in a chain that together constitute a vital communications system for the operation of Hydro's generation and transmission systems. Refurbishment of the Godaleich Hill site is required to ensure that this 25-year old facility remains reliable and will extend its useful life by 5-10 years. According to Hydro the alternative to not carrying out this project is to risk failure of the facility which could cause a failure of the power grid control by Hydro's Energy Control Centre possibly leading to power outages or considerable delays in power restoration.

The Board agrees with Hydro's position that this project is necessary to ensure that the communications system remains reliable. It is noted that the Godaleich Hill facility is 25 years old and the work being proposed is similar in scope and cost to those approved by the Board in the last two capital budget applications as part of the microwave site refurbishment program. The Board recognizes the importance of these communication sites to the operation of Hydro's systems on the Island and is not prepared to defer this project as requested by the Island Industrial Customers.

Holyrood Condition Assessment (p. B-14) $3,334,900

According to Hydro's application this project involves assessing the condition of the components of the Holyrood Generating Station and investigating the redevelopment options for this site. The proposed study includes: 1) life assessment of the entire Holyrood site to determine what must be done to ensure that it can be operated at an acceptable level of reliability to 2043; 2) preparation of a feasibility study for conversion of the existing units to dual firing (#6 oil/natural gas); 3) preparation of a feasibility study for conversion of the existing units to combined cycle operation; and 4) preparation of a feasibility study for installing scrubbers and precipitators on the existing units.

The Island Industrial Customers do not dispute the need for long-range planning by Hydro with respect to power generation for the Island. However they do dispute whether a Holyrood Condition Assessment at a level of a single-year expenditure of $3.3 million (representing 8% of the 2007 proposed capital expenditure) is a necessary or prudent means of arriving at this goal. Several reasons were noted by the Island Industrial Customers for this concern, primarily that there was no detailed scope prepared and that there is no urgency to proceed with this project at this time.

According to the Island Industrial Customers the preparation of a detailed scope of the proposed condition assessment is required before the Board can determine whether the proposed expenditure is prudent and necessary, or whether a lesser level of condition assessment and consequent expenditure would be sufficient.

The urgency to complete a condition assessment of the Holyrood Plant in 2007 was also questioned. The Island Industrial Customers argued that Hydro's suggestion that the Holyrood DAFOR (Derate Adjusted Forced Outage Rate) statistics for the period 1997 to 2006 support the view that Holyrood is exhibiting an ever increasing failure rate was not supported by similar data for the ten-year period 1986-1995. According to the Island Industrial Customers the data for 1986-1995 shows that Holyrood's annual average DAFOR for this period was 20.44%, compared to the 8% estimated from the graphical representation for the data for 1997-2006.

The Island Industrial Customers also submitted that Hydro's 1999 report "Prime Thermal Asset Remaining Life Assessment" supports the view that the proposed 2007 condition assessment can be prudently postponed for several years. The following excerpt from the report (page 20) was referenced by the Island Industrial Customers in written submission:

> *"On this basis, the useful life of the Holyrood Plant can be said to be only half expended [as of 1999] and another 20 to 25 years of economic operation can reasonably be expected. This statement is supported by the trend observed in other utilities which have older thermal plants that have operated at much higher annual load factors than Holyrood. These utilities begin to consider life assessment programs at 150,000.00 to 200,000.00 hours and begin implementation of life extension programs at 250,000.00 to 300,000.00 hours.* (underlining added)."

According to the Island Industrial Customers none of the three Holyrood generating units will have reached 200,000 hours operating life in 2014, let alone the 250,000 to 300,000 usually considered as the point where life extension programs are to be implemented. Holyrood's favourable DAFOR rates in the last ten years gives reason to have continuing confidence that the Holyrood plant as currently configured can be prudently said to have a remaining useful life of at least up to 2019 and this should be the target date for life extension programs. The Island Industrial Customers also suggested that the future of Holyrood should not be considered in isolation and that other external developments, such as the availability of natural gas or the potential for a Labrador Interconnect, may also impact what kind of "replacement" may be needed to the current Holyrood plant. It was submitted that this possibility, together with the other concerns identified above, all militate against a premature condition assessment in 2007.

The Board agrees that redevelopment options should be appropriately formulated and assessed for the Holyrood Thermal Generating Station in light of the age of the plant and the anticipated expenditures in maintenance and capital improvements that may be required in future. The Board also accepts that detailed inspections and condition assessment tests for the components of the Holyrood Thermal Generating Station are a necessary first step in developing a long-term plan for this plant. It is understood that, with normal maintenance and justified capital expenditures, the plant in its present form should continue to operate until 2019. The objective of the proposed condition assessment is to determine what life extension activities would be required to extend the plant life to 2043, at which time it is expected that energy would be brought to the Island from the Upper Churchill development (PUB-173 NLH).

The Board acknowledges the importance of proper and timely system planning. As such it may be prudent to conduct a review of the Holyrood plant, an aging plant that serves as an integral

part of the power supply of the Province. However, the nature, scope and timing of the review must be justified as being reasonable and prudent in the circumstances. The Board notes that this proposed project is the largest project in Hydro's capital budget at $3,334,900. In support of this project Hydro filed one page of information with the application, which was subsequently supplemented with responses to requests for information, a site visit and a technical conference. Hydro indicated in PUB11.0 that the proposed study has two principal components: condition assessment and several related feasibility studies. In its response to PUB 153.0 Hydro provided a breakdown of the costs for the total project. The condition assessment is expected to cost $2,500,000, the feasibility studies will cost an additional $350,000, with the remainder of the cost ($484,900) allocated for internal labour and administration and contingency. According to Hydro the cost estimate for the condition assessment is based on the cost of a similar assessment project undertaken by another utility and discussions with the engineering company that performed the work. The cost estimate for the feasibility studies was based on similar feasibility studies performed by Hydro and in consultation with an engineering company (PUB 11.0). In PUB 155.0 Hydro confirmed that the only details provided to the engineering company which was consulted to discuss this project were the age, operating hours and general condition of the Holyrood Plant. There is no scope provided for the specific work to be undertaken setting out associated costs for either the condition assessment or the feasibility studies. It is the Board's opinion that the support for this magnitude of capital expenditure should at least contain a detailed explanation of the various components of the work to be done along with adequate justification and a breakdown of associated costs determined in respect of the actual facility being assessed. In the Board's view the level of information provided is insufficient to justify a proposed expenditure of over $3.3 million.

The Board will not approve Hydro's proposed capital expenditure for the Holyrood Condition Assessment based on the information provided and will reduce the proposed 2007 capital budget by the amount of $3,334,900, the proposed expenditure for this project.

Upgrade Unit No. 3 Turbine/Generator (p. B-16) $1,654,300

This project consists of a general upgrade to the Unit No. 3 turbine/generator at the Holyrood Generating Plant. This upgrade will include: upgrade turbine nozzle block; upgrade lower valve assembly; upgrade high and intermediate diaphragm spill pressure strips; upgrade 7^{th} stage blades; upgrade 7^{th} stage diaphragms; rewedge generator; boroscope inspection ports and monitoring equipment; and upgrade turbine seals.

The Island Industrial Customers submitted that this proposed project is not required to address any service reliability concerns, and that consideration of this project can be prudently deferred. It was argued that there is a contradiction between Hydro's contention that it needs to be in a position to identify a Holyrood generating facility life extension plan so as to be able to implement it as early as 2014, and a project whose sole purpose is to extend the overall interval for Unit 3 from the current 6 years to 9 years. According to the Island Industrial Customers even if a life extension plan for Holyrood is not implemented until 2019 or later, the number of Unit 3 overhauls required in the intervening period will have only been reduced by the proposed

upgrade by one before the current usage of Unit 3 becomes subject to the implementation of a life extension plan for the facility as a whole.

The report "Holyrood Unit No. 3 Turbine & Generator Upgrade" prepared in June 2006 and filed with the Application provided an economic analysis of continuing the existing six-year overhaul interval or moving to a nine-year interval with the necessary upgrades. This analysis showed that there is significant economic benefit associated with this project in terms of reducing future operating and maintenance costs. Units 1 and 2 have already been placed on a nine-year overhaul schedule and only Unit 3 required the identified upgrades to enable the outage intervals to be similarly extended to nine-years. This project is not related to the proposed Holyrood Condition Assessment and is designed to ensure the plant achieves its original design life. The Board is satisfied that this project should proceed as proposed.

Gas Turbine Condition Assessments – Hardwoods and Stephenville (p. B-24) $307,100
&
Replace Fuel Piping – Hardwoods and Stephenville (p. B-23) $529,800

The proposed assessment of the condition of the Hardwoods and Stephenville gas turbines will identify potential problems and estimate costs to correct those problems. The work will include preliminary cost estimates for the redevelopment of both sites, and evaluating the options of replacing one site and using the components for spares for the other.

In written submission the Island Industrial Customers questioned whether, in the long term, both or either of the Hardwoods and Stephenville facilities will be required. According to the Island Industrial Customers Hydro is (or ought to be) presently considering other generation options, given that future generation requirements have only been deferred by 2-3 years as a result of the shutdown of the Stephenville mill. The Island Industrial Customers also suggested that, even though the service history suggests that these facilities are subject to increased maintenance issues due to the age of the turbines, there is little evidence to suggest that service levels have been affected or that current service levels are not sustainable, at least until Hydro addresses in the near-term its future generation requirements. As well, given the uncertain future need for the gas turbine facilities the Island Industrial Customers submitted that it would be imprudent to approve the proposed $529,800 expenditure for replacement of fuel lines for the Stephenville facility based on conjecture about their condition. Empirical evidence about the condition of the Stephenville lines should be required in order to approve the project as proposed.

The Board is satisfied that the assessment of the condition of the gas turbines at Hardwoods and Stephenville should proceed as proposed. According to Hydro's response to NP-1 the present age of these two facilities is five to ten years older than the generally accepted useful life for a gas turbine plant and the condition of the equipment is such that overhauls of at least two of the gas generators would be required within the next five years. Hydro's responses to NP-3 and PUB-149 also confirm that there have been operating problems for both Stephenville and Hardwoods over the last five years, including numerous trips and failures and failed starts, which can be attributed to the age and condition of the equipment. The equipment manufacturer has also stopped manufacturing certain components and is only providing limited servicing on the

equipment. However, both the Stephenville and Hardwoods gas turbines continue to be required to support the east cost voltage, particularly at peak load and during the summer when Holyrood is not operating. Given these circumstances the Board agrees with Hydro's proposal to undertake a complete assessment of the condition of both facilities with a view to determining if further overhauls should be undertaken as well as identifying all options for these two sites. This approach is in the Board view a reasonable and prudent one.

With regard to the replacement of fuel piping at Hardwoods and Stephenville the Board notes the position of the Island Industrial Customers regarding the lack of empirical evidence regarding the condition of the pipeline. However the Board notes these pipes are 30 years old and are single walled, which was accepted practice when installed. In its response to IC-13 Hydro stated that a pipeline inspection has not been performed at Stephenville since this would require excavating the underground piping followed by backfilling and pavement repairs, at an estimated cost of 50% of the cost to excavate and replace the existing pipeline. Hydro is proposing this project based on its experience with the unplanned replacement of corroded leaking pipes at Hardwoods, which were in a similar installation as Stephenville. The Board accepts Hydro's position that this project is necessary to prevent possible environmental damage and the associated expenditures that would be required to replace failed pipes and remediate the contaminated soil.

3. Other Projects

The Board has reviewed the remaining projects as proposed by Hydro, along with the additional information filed in response to Requests for Information and the written submissions of both the Island Industrial Customers and Hydro. The Board is satisfied that the remaining projects should be approved as presented with one exception. The project outlined on page B-32 to construct transmission line equipment off-loading ramps is not, in the Board's view, one which should be approved as presented. This project and the Board's decision are described below.

<u>Construct Transmission Line Equipment Off-Loading Ramps (p. B-32) $402,000</u>

Hydro is proposing to construct or upgrade off-loading ramps/access ramps for transmission line maintenance vehicles at various sites along provincial highways. The 2007 proposal involves 30 of the approximately 150 locations to be upgraded over a five-year period, starting in 2006. The work will consist of widening the existing highway shoulder to 6 m for a length of 25 m in each location and may require the installation of culverts and the sloping of embankments. According to Hydro the transmission line crews are, in many locations, currently unloading mobile equipment at roadsides and then parking the transporting vehicles at another safe location, which can be a considerable distance away. The development of these off-loading ramps would, in Hydro's view, provide an increased level of safety for employees and the general public. In addition, efficiency would be increased as the transporting vehicles would remain at the off-loading ramps.

The Board requested additional information on this project from Hydro (PUB 50.0 NLH to PUB 64.0 NLH). In its responses Hydro provided the following additional information and clarification:

- The ramps are to be used for both routine and emergency access.
- The total capital cost for the five-year program is $2,094,000.
- The distances travelled to safely and legally park vehicles can be up to three kilometres.
- Signage will be used to keep the general public from accessing these ramps.

In addition, although Hydro indicated there are no operating costs in the foreseeable future, it was confirmed in PUB 59.0 that snow clearing would be carried out on as needed basis by contractors engaged by Hydro. Hydro indicated however that this cost is expected to be minimal since most routine line maintenance is carried out outside of winter months. Snow clearing would be required for emergency winter access. Hydro will also maintain the ramps as needed.

In response to a question regarding which legislation makes Hydro responsible for the construction and maintenance of all loading ramps/access ramps on public highways in the Province, Hydro responded that the Occupational Health and Safety Act and the Highway Traffic Act were operative. In addition Hydro confirmed that there have been no discussions with the provincial Department of Transportation and Works about this project.

On the basis of the information filed the Board is not satisfied that this project should be approved as presented. In particular the Board is concerned that there appears to have been no correspondence with the Department of Transportation and Works about this project, even though this project involves establishing infrastructure on or abutting the provincial highway system. Without some barrier method to restrict access and use by the public it is also possible that the ramps, while constructed by Hydro for its own use, will not be available when needed due to parked vehicles and trailers etc. It is also not clear how or where the 30 ramps proposed for 2007 will be located, or how or where the remaining 120 to be built over the next 4 four years will be located. While the Board acknowledges that safety of the public and personnel are paramount there is insufficient evidence in the Board's view to justify this project on that basis.

The Board will not approve the project proposed to construct off-loading ramps/access ramps for transmission line maintenance vehicles along provincial highways and will reduce the proposed 2007 capital budget by the amount of $402,000, the proposed expenditure for this project.

4. Total Capital Budget

On the basis of the documentation and evidence presented by Hydro and the additional evidence provided in response to Requests for Information and written submissions, the Board finds that a total capital budget of $37,684,100 should be approved. This approved budget has been reduced to reflect the projects which the Board has found to be not justified or supported by Hydro's evidence, specifically the Holyrood Condition Assessment ($3,334,900) and the Construct Transmission Line Equipment Off-Loading Ramps ($402,000).

III. 2005 AVERAGE RATE BASE

The following table, taken from Section I of the Application, shows the calculation of the actual average rate base for 2005 compared with 2004:

	(000's)	
	2004	**2005**
Capital Assets	$1,922,374	$1,939,115
Less		
Accumulated Depreciation	481,801	506,391
Contributions in Aid of Construction	85,081	84,627
Net Assets not in Service/Non-Regulated	2,153	2,138
Net Capital Assets	1,353,339	1,345,959
Balance Previous Year	1,360,754	1,353,339
Average Capital Assets	1,357,047	1,349,649
Working Capital	2,943	2,711
Fuel	15,611	21,506
Supplies Inventory	18,615	20,084
Average Deferred Charges	82,506	79,809
Average Rate Base at Year End	**$ 1,476,722**	**$ 1,473,759**

The actual average rate base for 2005 has decreased from 2004 primarily due to a decrease in net plant investment as well as a decrease in average deferred charges.

Grant Thornton, the Board's Financial Consultant, reviewed the calculation of the actual average rate base for 2005 as contained in Section I of the Application, and concluded that the calculation is accurate and in accordance with previous Board Orders.

Pursuant to Section 78 of the *Act,* the Board will approve all the components of and Hydro's average rate base for 2005 in the amount of $1,473,759,000.

IV ORDER

IT IS THEREFORE ORDERED THAT:

1. **Pursuant to Section 41 of the *Act,* Hydro's capital purchases and construction projects in excess of $50,000, as set out in Schedule A to this Order, are approved.**

2. **Pursuant to Section 41 of the *Act*, the following projects as proposed by Hydro are not approved:**

   (i) **Holyrood Condition Assessment (p. B-14) $3,334,900; and**
   (ii) **Construct Transmission Line Equipment Off-Loading Ramps (p. B-32) $402,000.**

3. **Pursuant to Section 41 of the *Act,* the 2007 Capital Budget for improvement and additions to Hydro's property in an amount of $37,684,100 is approved.**

4. **Pursuant to Section 78 of the *Act,* the rate base for the year ending December 31, 2005 is hereby fixed and determined at $ 1,473,759,000.**

5. **Unless otherwise directed by the Board, Hydro shall file an annual report to the Board on its 2007 capital expenditures by March 1, 2008.**

6. **Unless otherwise directed by the Board, Hydro shall provide in conjunction with the 2008 Capital Budget Application, a status report on the 2007 capital budget expenditures showing for each project:**

   (i) **the approved budget for 2007;**
   (ii) **the expenditures prior to 2007;**
   (iii) **the 2007 expenditures to the date of the application;**
   (iv) **the remaining projected expenditures for 2007;**
   (v) **the variance between the projected total expenditures and the approved budget; and**
   (vi) **an explanation of the variance.**

7. **Hydro shall pay all costs and expenses of the Board incurred in connection with the Application.**

Dated at St. John's, Newfoundland and Labrador this 3rd day of November 2006.

Robert Noseworthy
Chair and Chief Executive Officer

Darlene Whalen, P.Eng.
Vice-Chair

G. Cheryl Blundon,
Board Secretary.

SCHEDULE A

ORDER NO. P. U. 35(2006)

ISSUED: November 3, 2006

NEWFOUNDLAND AND LABRADOR HYDRO

2007 CAPITAL BUDGET APPLICATION

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Access Road

Location: Upper Salmon

Category: Generation - Hydro Construction

Type: Other

Classification: Normal

Project Description:

This project involves the preparation and placement of an estimated 52,000 tonnes of road gravel on 48 kilometers of the Upper Salmon Access Road. The material will be placed in a 100 mm thick layer using standard road construction techniques. The average width of the road is 6 m. Suitable material will have to be processed at 3 locations along the route. Placement is expected to be done over a two-month period.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	36.0	0.0	0.0	36.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	520.0	0.0	0.0	520.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	62.9	0.0	0.0	62.9
Contingency	55.6	0.0	0.0	55.6
Total	**674.5**	**0.0**	**0.0**	**674.5**

Operating Experience:

This road is used on a daily basis to access an 86 MW hydro plant and several critical structures (North and West Salmon Spillways, Intake Structure, and several dykes and dams). Operators are required to travel to the site to ensure plant reliability and inspectors are required to travel to the site to complete dam safety reviews.

Project Justification:

The plant and spillways are equipped with diesel generators which require fuel deliveries on an annual basis. The road is essential for operations and maintenance of the plant structures and for the delivery of fuel. The road must be kept in a safe and passable condition to ensure both employee and public safety, and to avoid the potential for major uncontrolled releases of fuel. After 25 years of continuous use and regular maintenance, the road requires significant upgrades to extend its service life and provide safe and reliable access.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Burnt Dam Access Road

Location: Burnt Dam Spillway

Category: Generation - Hydro Construction

Type: Other

Classification: Normal

Project Description:

This project involves ditching, replacement of approximately twenty culverts, upgrading of three low areas that are subject to flooding annually and the installation of 22,000 tonnes of road gravel. The road gravel will be taken from two existing stockpiles located at Burnt Dam and Granite Canal. No processing of road gravel will be required at this time but replacement of stockpiles may be considered in the future.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	44.0	0.0	0.0	44.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	210.0	0.0	0.0	210.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	29.8	0.0	0.0	29.8
Contingency	25.4	0.0	0.0	25.4
Total	**309.2**	**0.0**	**0.0**	**309.2**

Operating Experience:

The Burnt Dam Access Road is the only road access to critical spillway and control structures (Burnt Spillway and Victoria Control) and a number of dams and dykes that help form Granite Lake, Burnt Pond and Victoria Reservoirs.

Project Justification:

Burnt Spillway and Victoria Control Structures currently are staffed year round. The facilities are powered by diesel generators which have an associated fuel storage capacity of 64,000 litres. In addition, these remote sites are supported by helicopters which have an associated fuel storage capacity of 18,000 litres. The storage facilities are filled annually by tanker trucks that travel to the site over this road. In order to ensure this fuel supply, the roads must be safe and passable. Poor road conditions contribute to the potential for major uncontrolled release of these fuels during transport and increase the potential for accidents and loss of life.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Cooling Water System Units No's 1 and 2

Location: Bay d'Espoir

Category: Generation Hydro Construction

Type: Other

Classification: Normal

Project Description:

This project will involve replacement of all surface air-cooling supply and discharge piping and its components including the system cooling water strainers. The piping will be replaced with stainless steel equipment with quick release fittings to allow ease of inspection and maintenance.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	36.0	0.0	0.0	36.0
Labour	55.0	0.0	0.0	55.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	12.1	0.0	0.0	12.1
Contingency	9.1	0.0	0.0	9.1
Total	**112.2**	**0.0**	**0.0**	**112.2**

Operating Experience:

This system has been in service since 1966 and since that time there have been no upgrades, only regular corrective and preventive maintenance. There have been numerous instances of fouled and leaking piping and it is prudent to replace the piping to prevent unit outages during the time of peak generation.

Project Justification:

The piping and its components, as confirmed by preventive maintenance inspections, are extensively fouled and corroded to the extent that the only option is to replace the system with new components. This has to be done to avoid forced outages and/or derating of the plant output.

Future Plans:

Similar upgrades for other units will be proposed in future budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Station Service Control Replacement

Location: Bay d'Espoir

Category: Generation - Hydro Construction

Type: Other

Classification: Normal

Project Description:

This project involves the purchase, installation and commissioning of a new dual Programmable Logic Controller (PLC) system configured to provide hot standby, in the case of a failure of one PLC. The existing PLC is now obsolete and has limited spares in the event of its failure. The existing PLC and associated inverter will be utilized as spares for the Cat Arm station service PLC. A review of the existing PLC control program will be conducted to identify any potential improvements.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	36.0	0.0	0.0	36.0
Labour	45.5	0.0	0.0	45.5
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	5.9	0.0	0.0	5.9
O/H, AFUDC & Escalation	9.0	0.0	0.0	9.0
Contingency	8.8	0.0	0.0	8.8
Total	**105.2**	**0.0**	**0.0**	**105.2**

Operating Experience:

The existing PLC system has been in place since 1989 and is obsolete. The PLC's inverter was replaced in September, 2003 following a failure that caused a loss of PLC control and resulted in a loss of station service to the powerhouse. This eventually led to the unavailability of five generating units.

Project Justification:

A high degree of reliability of the Bay d'Espoir plant is required to contribute to a reliable supply of electricity to the Island portion of Newfoundland and Labrador. The plant's station service must be controlled using equipment that provides high reliability to ensure the generating units stay on-line when a station service source is lost.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Air Dryer

Location: Cat Arm Generating Station

Category: Generation - Hydro Construction

Type: Other

Classification: Normal

Project Description:

This dryer will replace the existing original dryer that has been in continuous operation since 1986.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	28.5	0.0	0.0	28.5
Labour	23.0	0.0	0.0	23.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	9.6	0.0	0.0	9.6
O/H, AFUDC & Escalation	8.7	0.0	0.0	8.7
Contingency	6.1	0.0	0.0	6.1
Total	**75.9**	**0.0**	**0.0**	**75.9**

Operating Experience:

There has been an increase in the degree of corrective maintenance required to maintain the reliability of the existing air dryer. The equipment is no longer operating at a high efficiency which results in damage to components that require dry air.

Project Justification:

The dry air is used to supply critical control valves throughout the plant, in particular for the penstock water supply, and the flow control valves on the cooling water systems for the two units. The air system also supplies heating and ventilating system dampers, sump level control systems, and the unit brakes. Loss of the dry air, or admission of wet air into the plant systems could cause production loss. In the case of failure of the braking system this would mean the inability to stop the unit potentially causing damage to the bearing(s), resulting in significant downtime and high corrective maintenance costs.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Paradise River Bridge Replacement

Location: Paradise River

Category: Generation - Hydro Construction

Type: Other

Classification: Normal

Project Description:

The scope of work involves the removal of an existing local timber crib bridge, including abutments, decking running boards and railings, on the Paradise River Access Road and replacement with new squared timber bridge.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	15.0	0.0	0.0	15.0
Labour	40.0	0.0	0.0	40.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	5.8	0.0	0.0	5.8
Contingency	5.5	0.0	0.0	5.5
Total	**66.3**	**0.0**	**0.0**	**66.3**

Operating Experience:

The bridge provides access to the Paradise River Generating Station. This bridge was originally constructed as a short-term access bridge, constructed of local round timber. Repairs have been made to the abutments over the years to maintain the life of the bridge, but these temporary repairs are no longer effective. It has now reached the point that complete replacement is required. The attached photographs further illustrate the condition of the bridge.

Project Justification:

The bridge is now 20 years old and has reached the end of its useful life. This replacement is required to maintain access to the Paradise River Generating Station.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Unit No. 3 Turbine/Generator
Location: Holyrood

Category: Generation - Thermal Construction

Type: Other

Classification: Justifiable

Project Description:

This project consists of a general upgrade to the Unit No. 3 turbine/generator. This upgrade will include: upgrade turbine nozzle block; upgrade lower valve assembly; upgrade high and intermediate diaphragm spill pressure strips; upgrade 7th stage blades; upgrade 7th stage diaphragms; rewedge generator; boroscope inspection ports and monitoring equipment; and upgrade turbine seals.

This upgrade will permit the extension of the six-year overhaul period to nine years.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	1,300.0	0.0	0.0	1,300.0
Labour	40.0	0.0	0.0	40.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	180.3	0.0	0.0	180.3
Contingency	134.0	0.0	0.0	134.0
Total	**1,654.3**	**0.0**	**0.0**	**1,654.3**

Operating Experience:

Major overhaul outages have been performed since 1979 as per schedule. Initially the overhaul interval was four years and is currently six years. Experience has indicated that performing the correct maintenance overhaul during outage periods allows for reliable operation of both turbine and generator until the next scheduled overhaul. There has not been a situation where either the turbine or generator had to undergo an unscheduled overhaul during the past twenty-six years of operation. This complies with the observations and recommendations of Hartford Steam & Boiler to extend the major overhaul interval to the nine-year period provided that these upgrades are performed in 2007. During periods of major overhaul, the unit availability for voltage support on the east coast is also limited due to the extended down time, thus, imposing additional constraints and cost on the power system generation.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Unit No. 3 Turbine/Generator **(cont'd.)**

Project Justification:

The major overhaul on Unit No. 3 turbine/generator in 2001 was completed at a cost of $2.39 million. The 2007 major overhaul is projected to cost $2.4 million. Upgrading Unit No. 3 to a condition that would extend the overhaul period from the current six-year schedule (2007 - 2013) to a nine-year schedule (2007 - 2016) would result in significant savings to the Holyrood operating budget in future years and other savings to Hydro. This upgrade would be a one-time capital expenditure that would defer the currently scheduled major overhaul in 2013 at a cost of $2.4 million (today's dollars) to 2016. Subsequent Unit No. 3 major overhaul costs beyond 2016 would occur on a nine-year schedule with similar escalated savings.

Unit No. 3 turbine/ generator has two modes of operation, generation mode or synchronous condenser mode. Eliminating the 2013 overhaul will increase the unit availability for an extra six weeks of generation or twelve weeks of synchronous condenser operation depending on the systems requirements at the time. Please refer to report titled "Holyrood Unit No. 3 Turbine & Generator Upgrade" in Section H, Tab 1 which includes a net present value of alternates.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Construct Contaminated Water Treatment Pilot Plant

Location: Holyrood

Category: Generation -Thermal Construction

Type: Other

Classification: Mandatory

Project Description:

This project consists of the construction, testing and optimization of a pilot scale treatment plant to treat ammoniated wastewater produced by the regeneration of condensate polisher resins. The pilot plant will be used to optimize the design and operation of the process, prepare preliminary designs and detailed capital and operating cost estimates for the production scale facility.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	75.0	0.0	0.0	75.0
Labour	50.0	10.0	0.0	60.0
Consultant	95.0	10.0	0.0	105.0
Contract Work	25.0	0.0	0.0	25.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	31.1	15.9	0.0	47.0
Contingency	0.0	26.5	0.0	26.5
Total	**276.1**	**62.4**	**0.0**	**338.5**

Operating Experience:

Wastewater streams have been discharged to the environment since the plant was constructed in the 1960's. Beginning in the early 1990's, Hydro began diverting the wastewater streams to a containment and treatment facility. Only two waste streams remain and the treatment of one stream, condensate polisher regeneration wastewater, poses the greatest challenge. The goal of this project is to develop and optimize a method to treat this waste stream in an environmentally acceptable manner so that the discharge into Conception Bay meets all environmental regulations.

Project Justification:

The current practice of discharging wastewater streams to the environment violates the Environmental Control Water and Sewage Regulations, of the Water Resources Act of the Province of Newfoundland and Labrador.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Contaminated Water Treatment **(cont'd.)**

Future Plans:

Once the design of a treatment methodology has been established, a capital budget proposal for the modification of the existing treatment plant to treat regeneration wastewater will be submitted for approval.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Install UPS Battery Monitoring System

Location: Holyrood

Category: Generation - Thermal Construction

Type: Other

Classification: Normal

Project Description:

This project consists of the purchase and installation of a battery monitoring system for all four Holyrood Uninterruptible Power Supply (UPS).

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	36.0	0.0	0.0	36.0
Labour	27.7	0.0	0.0	27.7
Consultant	0.0	0.0	0.0	0.0
Contract Work	32.5	0.0	0.0	32.5
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	8,9.4	0.0	0.0	89.4
Contingency	64.0	0.0	0.0	64.0
Total	**79.1**	**0.0**	**0.0**	**79.1**

Operating Experience:

An open-circuit failure of one battery in the bank is an operational failure of the entire bank. There have been multiple occurrences of failed batteries in the past five years. These failed batteries are identified through regular maintenance inspections. UPS batteries have a typical life expectancy of five to twenty years, depending on the type, but Holyrood has typically experienced battery failures prior to this time period.

Project Justification:

Implementation of this system is required to improve generation reliability. Although battery failures have not caused a unit production failure to-date, the high occurrence of battery failures shows that without quick identification, unit production failure is highly probable. The latest incident occurred on March 29, 2006, when a failed battery resulted in the failure of UPS#4, causing the Station Service 600V breakers to default to the open position, thus causing isolated power outages in the Plant. Had this occurred on either of the remaining UPSs then there would have been a Unit outage and possible under-frequency load shedding. This monitoring system will monitor the batteries and be able to detect a degrading battery. This early detection will allow for battery replacement before it fails. If one battery

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Holyrood UPS Battery Monitoring Program **(cont'd.)**

Project Justification: (cont'd.)

fails and the main source of power is interrupted, the UPS will not be able to maintain uninterrupted power as it is intended.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Unit 3 Air Preheater Steam Condensate System

Location: Holyrood

Category: Generation - Thermal Property Additions

Type: Other

Classification: Normal

Project Description:

This project consists of a general upgrade to the steam condensate system on Unit No. 3 to provide for pumped condensate to the deaerator. The current system will be retired. Generally the new system will be the same as that presently in service on Units No. 1 and 2 where similar modifications were made about ten years ago. Those units have performed well since that time.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	55.0	0.0	0.0	55.0
Labour	93.0	0.0	0.0	93.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	342.0	0.0	0.0	342.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	59.5	0.0	0.0	59.5
Contingency	49.0	0.0	0.0	49.0
Total	**598.5**	**0.0**	**0.0**	**598.5**

Operating Experience:

Operators have to maintain a large amount of steam in the air preheaters in order to force condensate up to the deaerator. This results in a high boiler exhaust gas temperature which causes an efficiency reduction. Sometimes the quantity of steam admitted to the preheater is uneven which causes condensate stagnation and then water hammer. This has sometimes resulted in damage to the piping system which necessitated boiler shut down for repairs. On occasion, stagnant condensate has had to be drained to prevent damage, contributing to a loss of thermal efficiency.

Project Justification

The proposed pumped condensate system will result in a fuel savings estimated to be $160,000 per year, and avoidance of equipment damages due to water hammer.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Fuel Piping

Location: Hardwoods and Stephenville

Category: Generation - Gas Turbines

Type: Pooled

Classification: Normal

Project Description:

This project consists of the replacement of the main fuel forwarding lines for the Hardwoods and Stephenville Gas Turbines.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	1.0	0.0	0.0	1.0
Labour	213.5	0.0	0.0	213.5
Consultant	0.0	0.0	0.0	0.0
Contract Work	386.0	0.0	0.0	386.0
Other Direct Costs	3.0	0.0	0.0	3.0
O/H, AFUDC & Escalation	63.9	0.0	0.0	63.9
Contingency	42.4	0.0	0.0	42.4
Total	**529.8**	**0.0**	**0.0**	**529.8**

Operating Experience:

In 2005 underground fuel pipes running between the fuel forwarding module and the gas engines at the Hardwoods gas turbine developed leaks caused by corrosion. Soil contamination resulted, along with an unscheduled production outage. Stephenville is one year older than Hardwoods and is therefore considered to be generally of the same condition.

Project Justification:

A fuel leak in an underground pipe could result in an unplanned outage and disruption to customer service. Environmental damage would result in the form of soil contamination. The cost to repair/ replace the failed pipes and remediate the contaminated soil would be significant.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Gas Turbine Condition Assessments

Location: Hardwoods and Stephenville

Category: Generation - Gas Turbines

Type: Other

Classification: Normal

Project Description:

This project consists of a detailed assessment of the condition of the Hardwoods and Stephenville gas turbines. The study will identify potential problems and estimate costs to correct. The work will include preliminary cost estimates for the redevelopment of both sites, and evaluating the options of replacing one site and using the components for spares for the other.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	60.0	0.0	0.0	60.0
Consultant	200.0	0.0	0.0	200.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	5.0	0.0	0.0	5.0
O/H, AFUDC & Escalation	15.6	0.0	0.0	15.6
Contingency	26.5	0.0	0.0	26.5
Total	**307.1**	**0.0**	**0.0**	**307.1**

Operating Experience:

In recent years the number of operating problems with these two generating plants have increased dramatically. The plants have reached the end of the design life for gas turbine plants (thirty years) which is evidenced by the increasing number of operating problems. The original equipment manufacturer has stopped manufacturing some components and is only providing limited servicing on this equipment.

Project Justification:

These two gas turbine plants are used for voltage support and supplying peak loads on the transmission system. In order to maintain system reliability and performance levels, this assessment, and subsequent upgrades are required.

Future Plans:

Upgrades identified in this study will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Wood Pole Line Management Program

Location: Various Sites

Category: Transmission

Type: Pooled

Classification: Normal

Project Description:

The project is the third year of an ongoing program of inspection, treatment and replacement of line components (poles, conductor and hardware) on Hydro's transmission system.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	306.0	0.0	0.0	306.0
Labour	1,102.7	0.0	0.0	1,102.7
Consultant	50.0	0.0	0.0	50.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	282.0	0.0	0.0	282.0
O/H, AFUDC & Escalation	232.7	0.0	0.0	232.7
Contingency	174.1	0.0	0.0	174.1
Total	**2,147.8**	**0.0**	**0.0**	**2,147.8**

Operating Experience:

Hydro operates approximately 2800 km (26,000 poles) of wood pole transmission lines operating at 69, 138 and 230 kV. Historically, Hydro's pole inspection and maintenance practices followed the traditional utility approach of sounding inspections, only. In 1998, Hydro took core samples on selected poles to test for preservative retention levels and pole decay. The results of these additional tests raised concerns regarding the general preservative retention levels in wood poles. Between 1998 and 2003, additional coring and preservative testing confirmed that there were a significant number of poles which had a preservative level below what was required to maintain the design criteria for the lines. During this period, certain poles were replaced because the preservative level had lowered to the point that decay had advanced and the pole was no longer structurally sound. These inspections and analysis confirmed that a more formal wood pole line management program was required.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Wood Pole Line Management Program **(cont'd.)**

Project Justification:

A report titled "Wood Pole Line Management Using RCM Principles" was filed with Hydro's 2005 Capital Budget Application under Section G: Appendix 2. This report recommended that a formal program be established to manage wood pole line assets. The program consists of visual inspection, non-destructive testing and selected treatment of the wood poles. Poles that are deteriorated beyond the point where treatment could extend the life are identified for replacement. Field data is collected and stored electronically, and a comprehensive database of the program results is maintained. The program will extend the life of the wood pole assets by an average of ten years with a net benefit of $4.5 million in deferred replacement costs over that same period.

An Executive Summary Report is included in Section H, Tab 2, of the Application which provides an update of the 2005 program, a progress report of 2006 work and a forecast of the proposed objectives for 2007 and beyond.

Future Plans:

This is an ongoing program that will provide for all poles to be inspected and treated and any poles rejected will be replaced.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators

Location: TL234, TL251 and TL252

Category: Transmission

Type: Pooled

Classification: Normal

Project Description:

TL234 is a 230 kV radial transmission line running from Upper Salmon to Bay d'Espoir - a distance of 51.5 km. It consists of H-Frame wooden pole structures and steel towers. The line was constructed in 1981 to connect the Upper Salmon Generating Station. TL251 and TL252 are 69 kV radial transmission lines that run from Howley to Hampden, a distance of 48 km and from the Hampden to Jackson's Arm, a distance of 53 km respectively. Both are single wood pole lines which were constructed in 1981. This project consists of the replacement of all remaining Canadian Ohio Brass (COB) insulators on the three lines.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	717.0	0.0	0.0	717.0
Labour	23.7	0.0	0.0	23.7
Consultant	20.0	0.0	0.0	20.0
Contract Work	698.0	0.0	0.0	698.0
Other Direct Costs	49.0	0.0	0.0	49.0
O/H, AFUDC & Escalation	224.7	0.0	0.0	224.7
Contingency	172.1	0.0	0.0	172.1
Total	**2,117.8**	**0.0**	**0.0**	**2,117.8**

Operating Experience:

Each year of the annual preventive maintenance cycle, approximately 20% of the lines undergo insulator testing and defective COB insulators are detected. Over a five-year cycle, the number of structures with defective insulators averages 13%. This failure rate is typical of the COB insulators failing in a random manner and thus insulators tend to fail without warning. As has been seen with other lines on the system, this trend is expected to continue with each inspection cycle making the replacement of only the defective insulators cost prohibitive and a poor long-term strategy.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators **(cont'd.)**

Project Justification:

The insulators presently in-service on the lines were manufactured by COB and were installed during the original construction. These COB insulators are a part of a group of insulators that have experienced industry wide failures due to cement growth causing radial cracks that result in moisture intrusion. Given the industry wide failure rates for COB insulators of this vintage, replacing them at this time represents the least customer impact as well as the most cost effective strategy and will result in the increased reliability of this system.

On TL234, the combined generation capacity of 125 MW from Upper Salmon and Granite Canal, is critical to system reliability, especially during periods of peak loading. Loss of this line during periods of generation would have system-wide ramifications through the Under-Frequency Load Shedding Scheme or possibly spilling water around plants which could ultimately have to be replaced through oil at Holyrood.

On TL251 and TL252 outages impact approximately 811 customers on the Jackson's Arm, Hampden, and Coney Arm Distribution Systems and the Rattle Brook Generating Station.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Reliability Upgrades - Frequency Converter

Location: Corner Brook Frequency Converter

Category: Transmission

Type: Clustered

Classification: Normal

Project Description:

This project consists of the rewinding of the 50 Hz machine rotor, installation of an oil spill containment and fire protection system around the main transformers, general upgrades of wall trusses, and doors; replacement of the unit auto-synchronizer; the replacement of the lube oil pump; and replacement of 69kV entrance bushings.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	352.4	0.0	0.0	352.4
Labour	83.5	0.0	0.0	83.5
Consultant	0.0	0.0	0.0	0.0
Contract Work	645.0	0.0	0.0	645.0
Other Direct Costs	2.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	129.0	0.0	0.0	129.0
Contingency	108.3	0.0	0.0	108.3
Total	**1,320.2**	**0.0**	**0.0**	**1,320.2**

Operating Experience:

In the past five years there have been significant problems with regard to operating and maintaining the Corner Brook Frequency Converter. All of the equipment is 1960's vintage and as it ages, more maintenance and operational problems arise. Currently there are known problems within the controls, synchronizing equipment, ventilation system and insulators. The building requires significant repairs, and the rotating parts of the converter are suspect.

Project Justification:

This work is part of an overall upgrade program recommended in an internal Hydro report entitled "Engineering Condition Assessment of the Corner Brook Frequency Converter - April 7, 2005". This report consisted of a review of the general condition of the converter and the facility and a comparison of the present condition of the facility to that which was stated by Acres Engineering in their report titled the "Condition Assessment of 50/60 Cycle Frequency Final Report", which was prepared for Hydro in September 1998.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Reliability Upgrades - Frequency Converter **(cont'd.)**

Project Justification: (cont'd.)

The condition of the insulation of the rotors (especially the 50 Hz rotor) was identified by Acres as very low. This issue has not been addressed. Readings of the insulation values of the 50 Hz rotor since 1998 remain very low (approximately 200 to 3000 kilo-ohms). These low values are indicative of a failure within the next few years, but failure could occur at any time. As a result, a rewind of the 50 Hz rotor is required.

The oil spill containment and drainage system around the main transformer requires improvements in order to contain a spill, and the transformers located inside the building have no fire protection system. For environmental compliance and to protect the assets the oil spill containment and fire protection systems must be installed.

Numerous building cracks have allowed wood debris, associated with operation of the paper mill, to enter the converter building. As a temporary repair, caulking has been applied to building cracks, where possible, to decrease the ingress of dirt and dust. Permanent upgrades to the concrete and masonry must be done as soon as possible to minimize the contaminants building up on the rotating equipment, and jeopardizing the equipment reliability and performance.

From an operational perspective, the failure of the auto-synchronizer makes it difficult to synchronize the 50 Hz side of the converter to the 50 Hz Deer Lake Power system and to synchronize the 60 Hz side of the converter to the 60 Hz Hydro system. The auto-synchronizer requires replacement.

The condition of the doors throughout the facility is poor. These doors must be replaced to prevent the accumulation of dust and debris inside the facility.

The lube oil pump is nearing the end of its service life and has shown operational problems in recent years and must be replaced.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Reliability Upgrades - Frequency Converter **(cont'd.)**

Project Justification: (cont'd.)

The current age of the 69 kV entrance insulators at the Corner Brook frequency converter is forty years. During this time, falling ice and snow from the roof of the building has damaged the insulators beyond repair. The manufacturer of this type of insulator has been out of business for more than twenty years, therefore, identical replacement units are no longer available. Due to the deteriorated condition, it is necessary that these insulators be replaced in order to ensure a reliable energy supply for Corner Brook Pulp and Paper.

Future Plans:

Further upgrades will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Supply and Installation of Bridge

Location: TL233 at South West River

Category: Transmission

Type: Other

Classification: Normal

Project Description:

This project involves the supply of all material, equipment and labor necessary to construct an approximately 25 m long by 5 m wide pre-engineered steel panel-type bridge, on South West River.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	20.0	0.0	0.0	20.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	147.0	0.0	0.0	147.0
Other Direct Costs	7.0	0.0	0.0	7.0
O/H, AFUDC & Escalation	20.5	0.0	0.0	20.5
Contingency	17.4	0.0	0.0	17.4
Total	**211.9**	**0.0**	**0.0**	**211.9**

Operating Experience:

The original bridge over South West River was owned by Abitibi Consolidated Inc. and used by Hydro for 32 years to access Transmission Line TL233. Due to its unsafe condition, Abitibi removed the bridge in the fall of 2004. Abitibi has confirmed they have no plans to access this area under their current operating plan and will not be replacing the bridge.

Project Justification:

Although TL233 has performed well to-date, it is now 32 years old and with every passing year the probability of problems associated with the transmission line increases. There have been no major upgrades completed over its lifetime.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: South West River - Supply and Installation of a Bridge **(cont'd.)**

Project Justification: (cont'd.)

Four options to access the transmission line were investigated.

1) Traveling along a forest access road starting at the Bottom Brook Terminal Station (Structure #577), approximately 38 km from the old bridge site,
2) Fording the Southwest River in the vicinity of Structure #410,
3) Fording the Southwest River at a site approximately 500 meters west of the original bridge site, and
4) Install a new bridge installed at the site previously occupied by the old bridge.

The problems associated with the first option included an approximate 20 to 24 hour travel time in summer by a tracked vehicle to reach the section of TL233 in the vicinity of the old bridge location. In winter the travel time could be doubled or tripled. Poles get damaged when dragged along this route.

The problems associated with the options 2 and 3 are as follows:

1) Environmental issues associated with crossing a scheduled salmon river. It is unlikely permission would be given to ford other than on an emergency basis.

2) It is physically impossible for a tracked vehicle to cross the river for approximately two months each year when the river is in full flood during spring breakup.

The fourth option would be to build a new bridge in the same location as the old Abitibi bridge. This bridge would be a pre-engineered panel type which can be constructed on one side and pushed across avoiding work in the river. This would be environmentally acceptable, eliminate the need for fording and would provide year around access for maintenance requirements on the TL233 transmission line.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Disconnect Switch

Location: Transmission System TL220

Category: Transmission

Type: Other

Classification: Normal

Project Description:

This project consists of the construction of a 69 kV structure and the installation of a High Voltage Disconnect switch, downstream of the Conne River tap.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	34.0	0.0	0.0	34.0
Labour	11.0	0.0	0.0	11.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	30.0	0.0	0.0	30.0
Other Direct Costs	3.0	0.0	0.0	3.0
O/H, AFUDC & Escalation	8.5	0.0	0.0	8.5
Contingency	7.8	0.0	0.0	7.8
Total	**94.3**	**0.0**	**0.0**	**94.3**

Operating Experience:

TL220 is a 69 kV radial transmission line that runs from Bay d'Espoir to Barachoix substation, to serve the Connaigre Peninsula.

Project Justification:

When outages occur on the TL220 downstream of Conne River, and the repair time is extensive, service to the community of Conne River is affected. The line cannot be sectionalized therefore the community cannot be restored to service until the whole line is repaired and re-energized. Installation of this disconnect switch will significantly reduce the duration of outages to Conne River.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: 138 kV Protection Upgrades

Location: Springdale, Indian River and Howley Terminal Stations

Category: Transmission - System Performance & Protection

Type: Other

Classification: Normal

Project Description:

This project consists of an upgrade of the 138 kV line protection on TL223 between Springdale and Indian River, lines TL224, TL243 and TL245 at Howley and line 363L at Indian River. The work involves the replacement of the old electro-mechanical relays with microprocessor based relays.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	78.5	0.0	0.0	78.5
Labour	96.0	0.0	0.0	96.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	1.0	0.0	0.0	1.0
O/H, AFUDC & Escalation	21.8	0.0	0.0	21.8
Contingency	17.6	0.0	0.0	17.6
Total	**214.9**	**0.0**	**0.0**	**214.9**

Operating Experience:

The existing line protection relays are approximately thirty years old and are difficult to maintain and calibrate. These new relays will be more compatible with the newer relays used on the 230 kV system.

Project Justification:

This project will improve the protection on targeted 138 kV lines which presently have electromechanical relays for both phase and ground protection. Critical clearing time issues will be addressed, and the upgrades will enhance ground protection capability and the provision for a third zone of protection for remote backup requirements on the 138 kV loop. The new relays will be self-monitoring so that if there are problems with a relay it will be alarmed and functionally blocked. The problem can then be investigated and corrected.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: 138 kV Protection Upgrades **(cont'd.)**

Project Justification: (cont'd.)

The upgrades will also provide fault distance location, remotely retrievable where accessible, assisting in the location of any problems on the line which are intermittent or permanent. This upgrade is an improvement to line reliability by enabling better and timelier analysis of problems on the line.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Safety and Reliability Upgrade

Location: Hawkes Bay Terminal Station

Category: Transmission - Terminals

Type: Clustered

Classification: Normal

Project Description:

This project consists of general upgrades to the Hawkes Bay terminal station involving: re-insulation of the 66 kV bus; replacement of poles and crossarms; fence upgrades; relocation of 66 kV potential transformers; upgrade of the 12.5 kV bus arrangement and relocation of the station service supply; upgrade of metering circuits; and construction of a second equipment access to the station.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	86.0	0.0	0.0	86.0
Labour	790.0	0.0	0.0	790.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	107.0	0.0	0.0	107.0
Other Direct Costs	8.0	0.0	0.0	8.0
O/H, AFUDC & Escalation	41.2	0.0	0.0	41.2
Contingency	28.0	0.0	0.0	28.0
Total	**349.2**	**0.0**	**0.0**	**349.2**

Operating Experience:

This station is the only transmission terminal station serving the general area of Hawkes Bay, Port Saunders, Port aux Choix and neighboring communities. The operating experience has been generally good, and the major equipment provides reliable cost effective service. However, the buswork, structures and hardware, etc., are in poor condition and present safety and maintenance problems for operating personnel.

Project Justification:

Insulators and Structures: All equipment is original to the station and is approximately thirty years old. Recent inspections confirmed that 25-30% of all insulator strings had two or more discs fail under standard meggar tests. The glass is fractured or cracked and there are signs of cement growth. The crossarms on the 66 kV side of the station, show signs of decay and/or organic growth. On the 12.5 kV side of the station, the condition of the wood structures presents a climbing hazard to Operational and Maintenance staff for normal maintenance work the insulators and crossarms presents a safety hazard for employees working in the station.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Safety and Reliability Upgrade **(cont'd.)**

Project Justification: (cont'd.)

Station Fence: The fence is not built to Hydro's present standard. This fence is only four feet high in some locations and does not provide security for the property or public safety.

Station Access: The structure guys and general layout of the station makes equipment access restrictive. The second access is required to enable equipment to be moved into certain parts of the station to facilitate maintenance and repair thus improving overall service.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators

Location: Various Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

Project Description:

This project involves the purchase and installation of 230, 138, 69 and 25 kV, station post and suspension insulators, at various terminal stations in the Central Region. Due to the quantity of insulators to be replaced and the number of outages required to complete the work, the plan is to complete the replacements over a five-year period. This capital budget proposal is for year two of the five-year plan.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	120.0	0.0	0.0	120.0
Labour	114.0	0.0	0.0	114.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	14.0	0.0	0.0	14.0
O/H, AFUDC & Escalation	40.2	0.0	0.0	40.2
Contingency	24.8	0.0	0.0	24.8
Total	**313.0**	**0.0**	**0.0**	**313.0**

Operating Experience:

Canadian Ohio Brass (COB), multicone and cap and pin insulators are known to have cement growth problems which result in insulator failures causing bus or station outages. Cement growth occurs when moisture is absorbed in the cement and through the thermal cycle process pressure is applied to the porcelain resulting in cracks in the insulator. Such cracks will reduce the electrical and mechanical strength of the insulator. This problem has been well documented in the utility industry and as a result, Hydro has been replacing COB insulators on its transmission lines for several years. In terminal stations, there has been several in-service failures causing major outages to customers. An example of this was the failure of a cap and pin insulator on Bus 4 disconnect at Massey Drive Terminal Station in 2002 which resulted in process interruptions for Corner Brook Pulp and Paper. Also, insulators have broken off while crews have been performing maintenance, creating unsafe conditions for workers.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators **(cont'd.)**

Project Justification:

Insulators provide electrical insulation between energized and de-energized equipment and ground. When insulators fail they provide a short circuit to ground, which could result in an outage to customers. To help prevent such outages from occurring, Hydro plans to replace all COB, multicone and cap and pin insulators in all of its terminal stations within the next five years. Year one of this five-year plan began in 2006 with the replacement of 20% of the problem insulators.

Future Plans:

Future replacements will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Circuit Breakers

Location: Various Terminal Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

Project Description:

This project consists of an upgrading program to refurbish all Brown Boveri DCVF, DCF, and DLF styles of air blast breakers. The upgrade consists of replacement of all seals and gaskets as well as overhauls of all valves, interrupters and contacts assemblies. This project is the first year of a long-term plan to upgrade all air blast breakers on this system. During 2007 Hydro will upgrade four air blast breakers.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	100.0	0.0	0.0	100.0
Labour	87.0	0.0	0.0	87.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	15.5	0.0	0.0	15.5
O/H, AFUDC & Escalation	35.0	0.0	0.0	35.0
Contingency	20.3	0.0	0.0	20.3
Total	**257.8**	**0.0**	**0.0**	**257.8**

Operating Experience:

The first generation of Air Blast breakers on Hydro's system is approaching forty years of service. In recent years problems have occurred with air leaks, valves sticking, etc. resulting in increased maintenance cost as well as breaker unavailability. In particular there have been numerous problems with the unit breakers at Bay d'Espoir resulting in generating units being unavailable. These problems are common with other utilities and owners of DCF/DCVF Breakers. There are sixty-six breakers of this type in service on the Hydro system and they are critical to maintain reliable system operations.

Project Justification:

Upgrading these breakers will provide a life extension which is considered more cost effective than a replacement program. The upgrades will restore the full level of reliability and performance that is necessary for these breakers.

Future Plans:

Upgrades of breakers in future years will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Breaker B7C1

Location: Hardwoods Terminal Station

Category: Transmission - Terminals

Type: Other

Classification: Normal

Project Description:

Purchase and install a new 69 kV breaker to replace B7C1 at Hardwoods Terminal Station. The new breaker will be designed to fit the existing foundation. Existing control cables will be reused. The old breaker will be returned to Salvage Stores in Bishop's Falls for disposal.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	70.0	0.0	0.0	70.0
Labour	40.0	0.0	0.0	40.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	15.0	0.0	0.0	15.0
Contingency	11.0	0.0	0.0	11.0
Total	**136.0**	**0.0**	**0.0**	**136.0**

Operating Experience:

Maintenance records indicate extensive maintenance work has been completed on breaker B7C1 since 1999. Insulating gas was added to the breaker interrupters on eleven occasions, repair and replacement of latching relays and trip coils was required six times, and repairs were made to the compressor on several occasions. In 2004, the compressor became unrepairable and had to be replaced. The operating mechanism tie bar had also failed on four occasions since the early 1990's, the latest occurring in 2005. After the tie bar failure in 2000, a manufacturer's representative was on-site to oversee the repairs and confirm the breakers integrity but the tie bar failed again in 2005. This breaker is subject to significant vibration during operation and maintenance personnel have indicated the vibration is the primary cause of the repeated failures. This breaker has operated on average 250 times a year since 1981.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Breaker B7C1 **(cont'd.)**

Project Justification:

Breaker B7C1 is a Westinghouse SF6 type 690SP2500 circuit breaker manufactured in 1981. It is used to switch a capacitor bank at Hardwoods Terminal Station which provides voltage support to the Eastern Avalon and is critical in maintaining acceptable system voltages.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Instrument Transformers

Location: Various Terminal Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

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.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	60.0	0.0	0.0	60.0
Labour	4.5	0.0	0.0	4.5
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.6	0.0	0.0	0.6
O/H, AFUDC & Escalation	8.1	0.0	0.0	8.1
Contingency	6.5	0.0	0.0	6.5
Total	**79.7**	**0.0**	**0.0**	**79.7**

Operating Experience:

Instrument transformers have a typical service life of thirty - forty years, depending on the service conditions. Units are inspected and tested regularly and replacements are made based on these maintenance assessments or in-service failures. The maintenance assessments for instrument transformers are visual inspection and voltage/current checks of the secondary circuits. In the last two years there were fourteen instrument transformers replaced and as the remaining instrument transformers age it is expected the number of failures will increase. As a result, in future years, the capital budget for instrument transformer replacements may increase. This proposal provides for an allowance of capital dollars for replacements on an 'as required' basis.

Project Justification:

Instrument transformers provide critical inputs 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.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

Replacement of instrument transformers is the only option available. When these units fail, they are not repairable and require replacement. The normal utility practice in North America is to hold a reserve inventory and replace units as they fail. Project estimates are based on an equal number of units in each voltage class failing, or requiring replacement. It has also been identified that older vintage instrument transformers may contain PCBs, and Hydro has a program in place to reduce PCBs in its system of assets, requiring PCB filled instrument transformers to be replaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Compressors

Location: Hardwoods

Category: Transmission - Terminals

Type: Other

Classification: Normal

Project Description:

This project consists of the replacement of two Ingersoll Rand 15T2 model T30, three-stage high pressure compressors at the Hardwoods Terminal Station complete with condensate oil/water separator.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	45.0	0.0	0.0	45.0
Labour	15.8	0.0	0.0	15.8
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	2.6	0.0	0.0	2.6
O/H, AFUDC & Escalation	8.6	0.0	0.0	8.6
Contingency	6.3	0.0	0.0	6.3
Total	**78.3**	**0.0**	**0.0**	**78.3**

Operating Experience:

In recent years corrective maintenance costs for the compressors at the Hardwoods Terminal Station have been significant. These compressors have been in service since the early 1970's and each has approximately 14,000 operating hours. Since late 1999, there have been forty-one corrective maintenance interventions on these compressors resulting in significant maintenance costs.

Project Justification:

As noted in the operating experience, there has been a high failure rate and increased maintenance costs associated with these compressors. By comparison, an installation at Stoney Brook with new compressors installed in 1999 has seen only three corrective maintenance interventions completed to-date at a cost of $2,500 versus forty-one corrective maintenance interventions at a cost of $40,250 at Hardwoods. This illustrates that improved reliability and significantly lower operating costs will result from complete replacement of compressors.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery Banks

Location: Stony Brook and Western Avalon Terminal Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

Project Description:

This project consists of the Purchase and installation of a new lead calcium flooded cell station battery bank at each station. Batteries will be designed to be mounted on the existing battery racks. The old batteries will be removed from service and will be disposed of at an approved disposal site. The replacement batteries will be the same size and rating of the existing units as the station DC load requirements have not changed. The new batteries will be designed to be compatible with the existing chargers.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	18.0	0.0	0.0	18.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	7.9	0.0	0.0	7.9
Contingency	5.8	0.0	0.0	5.8
Total	**71.7**	**0.0**	**0.0**	**71.7**

Operating Experience:

The station batteries targeted for replacement under this Capital Budget Proposal are approaching or beyond the normal expected service life. In Stoney Brook, the Valve Regulated batteries installed in 1995 will be at the end of the expected service life of ten to twelve years in 2007. In Western Avalon, the flooded cell batteries installed in 1987 have shown signs of deterioration and will be at the limit of the expected eighteen to twenty year service life in 2007.

Project Justification:

The station battery banks provide the DC supply for the station protection and controls, and equipment operation. This DC source is an integral component to the relay protection systems for the station equipment, the transmission lines and the Energy Management System. Routine maintenance tests and inspections are done on an annual basis. These tests and inspections have confirmed a deterioration in the battery cell condition to the point that system reliability and integrity will be compromised if the batteries are not replaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery Chargers

Location: Various Terminal Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

Project Description:

Purchase and installation of new battery chargers for Howley, Sunnyside and Long Harbour Terminal Stations. The battery chargers will be designed to be compatible with the existing battery banks.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	38.0	0.0	0.0	38.0
Labour	20.0	0.0	0.0	20.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	7.8	0.0	0.0	7.8
Contingency	5.8	0.0	0.0	5.8
Total	**71.6**	**0.0**	**0.0**	**71.6**

Operating Experience:

Due to higher than normal instances of battery charger failures at these terminal stations in recent years, a review of the maintenance history on battery chargers was completed. This review indicated that a significant number of the problems recorded were caused by Staticon and Cigentic chargers which were fifteen years old or greater. The Cigentic charger in Howley was installed in 1981. The Staticon Chargers in Long Harbour and Sunnyside were installed in 1979 and 1985 respectively. These units have required recent repairs and are approaching or are beyond the normal expected service life.

Project Justification:

The DC station service system consists of a battery charger, battery bank and DC distribution panel. This DC source provides the control voltage for the station protection, remote and local controls, event logging, and annunciation. With the loss of the charger, the battery bank will discharge such that station protection and control and information to the Energy Control Centre would be unavailable. Given the criticality of the battery chargers to the system reliability, it is necessary to replace the chargers.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Surge Arrestors

Location: Various Terminal Stations

Category: Transmission - Terminals

Type: Pooled

Classification: Normal

Project Description:

This project involves the purchase and installation of replacement surge arrestors at various terminal stations across the three operating regions of Hydro.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	48.0	0.0	0.0	48.0
Labour	10.0	0.0	0.0	10.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	7.5	0.0	0.0	7.5
Contingency	5.8	0.0	0.0	5.8
Total	**71.3**	**0.0**	**0.0**	**71.3**

Operating Experience:

The operating experience for surge arrestors is that they fail because of lightning strikes and switching surges, and generally these failures are unpredictable. An exception to these failures is for the older gap type arrestors which have an expected useful life of approximately twenty to twenty-five years. In these cases, the manufacturer's recommendation is that the arrestors be replaced with the new gapless type arrestor. Typically, across the system, there has been an average of fourteen surge arrestors replaced each year.

Project Justification:

Surge arrestors provide critical over voltage protection of power system equipment from lightning and switching surges. Units that fail are not repairable and the only option available is to replace them. Surge arrestors are inspected and tested regularly and replacements are made based on maintenance assessments as well as in-service failures. This capital proposal provides for the replacement of the units that fail in service as well as those identified during testing as needing to be replaced.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

Due to the wide variety of service conditions it is difficult to estimate the useful life or predict failures in surge arrestors. However, manufacturers recommend twenty years as a suitable replacement period depending on the service conditions and the lightning activity in the area.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Provide Service Extensions

Location: All Service Areas

Category: Distribution

Type: Pooled

Classification: Normal

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 three operating regions.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	886.0	0.0	0.0	886.0
Labour	851.0	0.0	0.0	851.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	159.0	0.0	0.0	159.0
Contingency	189.0	0.0	0.0	189.0
Total	**2,085.0**	**0.0**	**0.0**	**2,085.0**

Operating Experience:

An analysis of average historical expenditure (i.e. 2001 - 2005) on new customer connections is shown in the following table. All historical dollars were converted to 2005 dollars using the GDP Implicit Price Deflator and a 5-year average was calculated.

Region	**Avg. Annual Expenditures (2001 - 2005) (2005 $Thousands)**
Central	$ 812
Northern	$ 595
Labrador	$ 598
Total	$ 2,005

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

Based on the five-year average of service extension expenditures for the period 2001 - 2005 the following budget was developed assuming escalation in 2006 and 2007 of approximately 2.0%.

Region	**2007 Budget ($000)**
Central	$ 844
Northern	$ 618
Labrador	$ 622
Total	$ 2,085

Future Plans:

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

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Systems

Location: All Service Areas

Category: Distribution

Type: Pooled

Classification: Normal

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 three regions.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	865.0	0.0	0.0	865.0
Labour	830.0	0.0	0.0	830.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	154.0	0.0	0.0	154.0
Contingency	186.0	0.0	0.0	186.0
Total	**2,035.0**	**0.0**	**0.0**	**2,035.0**

Operating Experience:

An analysis of historical expenditures (i.e. 2001 - 2005) on distribution upgrades is shown in the following table. All historical dollars (table below) were converted to 2005 dollars using the GDP Implicit Price Deflator and 5-year average calculated.

Region	**Avg. Annual Expenditures (2001 - 2005) (2005 $Thousands)**
Central	$ 775
Northern	$ 839
Labrador	$ 342
Total	$ 1,957

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

Based on this five-year average for distribution system upgrades for the period 2001 - 2005 the following budget was developed using an escalation in 2006 and 2007 of approximately 2.0%.

Region	**2007 Budget ($000)**
Central	$ 806
Northern	$ 873
Labrador	$ 356
Total	$ 2,035

Future Plans:

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

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Feeders

Location: Various Systems

Category: Distribution

Type: Pooled

Classification: Normal

Project Description:

The project consists of general upgrades to the following distribution systems:

1. Hr. Breton System: Barachoix feeder L4 serving the community of Hr. Breton.
2. Farewell Head System: Feeders L2 and L3 serving the communities on Change Islands.
3. Rocky Hr. System: Feeders L1 and L2 serving the communities of Rocky Hr. and Norris Point.
4. St. Anthony System: Feeder L1 serving a total of fifteen communities from St. Anthony to Boat Hr.

For the Hr. Breton system the work involves the replacement of the Canadian Ohio Brass (COB) insulators.

On the Farewell Head system, the work involves the replacement of all the old pin type and suspension insulators; #4 copper primary conductor and #4 and #6 secondary conductor. This equipment is all original equipment installed in the mid 1960's.

The work on the Rocky Hr. and St. Anthony systems covers replacement of blackjack poles, pin type and suspension type insulators, cut-out disconnects, and crossarms.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	446.0	0.0	0.0	446.0
Labour	157.0	0.0	0.0	157.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	468.0	0.0	0.0	468.0
Other Direct Costs	47.7	0.0	0.0	47.7
O/H, AFUDC & Escalation	163.5	0.0	0.0	163.5
Contingency	111.5	0.0	0.0	111.5
Total	**1,383.2**	**0.0**	**0.0**	**1,383.2**

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Description: (cont'd.)

The breakdown of costs by individual systems is as follows:

Project Cost: *($ x1,000)*	**Hr. Breton System**	**Farewell Hd. System**	**Rocky Hr. System**	**St. Anthony System**
Material Supply	33.5	117.0	175.0	120.5
Labour	18.0	70.0	46.0	23.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	40.0	100.0	175.0	143.0
Other Direct Costs	6.5	22.2	12.5	6.5
O/H, AFUDC & Escalation	12.2	45.2	64.1	42.0
Contingency	9.9	30.9	40.9	29.3
Total	**120.1**	**385.3**	**513.5**	**364.3**

Operating Experience:

For all these systems, the poles, conductors, hardware, etc. is the original equipment, and has been in service for approximately 30 years or more. The systems are in coastal regions where they are regularly subjected to extreme winds and salt spray off the ocean. Over the years, numerous outages have occurred due to long spans, salt contamination and insulator failures. Past upgrading has included midspan pole installations and some insulator and cross arm replacements which have improved feeder performance.

The systems have a high number of blackjack poles that have been in place since the original construction and have been identified as "B" condition (one - five years life remaining). The insulators are the original equipment that have a history of failure due to cement growth and hairline cracks of the porcelain which results in electrical and mechanical breakdown. The conductor is the original and in many cases has a steel core which is corroded. The cutouts are prone to porcelain failure when being opened or closed and are a safety hazard to employees.

Project Justification:

The deteriorated poles on these systems create climbing hazards for line personnel due to spur kick out and/or pole failure which is more prevalent with the blackjack species. The insulators have been identified as a problem throughout the Hydro system and have been targeted for replacement due to the undesirable impact they have on the system performance. Safety Alerts have been issued on these insulators due to the possibility of insulator failure while a worker is climbing the pole. This could create a flash incident, or possible injury from falling porcelain. The cutouts are prone to failure

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

of the porcelain when opened or closed and are a safety risk to employees. Falling shards of the broken porcelain pose a risk to the worker and the dangling energized lead could contact other equipment putting the worker at risk of electrical contact. In summary, this project is proposed in order to improve distribution feeder performance and to eliminate the safety hazards caused by old and worn equipment.

Hydro conducts a yearly review of its isolated and interconnected distribution feeders to determine which systems should be targeted for reliability improvements. These reliability improvements are prioritized to justify capital spending in future years. The performance indices for all feeders are analyzed and improvement targets for the poor performers are established. Based on these targets, upgrades to specific feeders or groups of feeders are defined and scheduled to be completed over a five-year period. These upgrades are intended to bring the indices to the target values identified for each of the systems.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Distribution Poles

Location: Hr. Breton, St. Brendan's and Farewell Head Systems

Category: Distribution

Type: Pooled

Classification: Normal

Project Description:

The project consists of pole replacements on the following distribution systems:

1. Hr. Breton: Barachoix feeders L1, L2 and L4 serving the communities of Hr. Breton, Hermitage, Seal Cove and Gaultois.
2. St. Brendan's: Feeder L1 serving the community of St. Brendan's.
3. Farewell Head: Feeders L2 and L3 serving the communities on Change Islands.

The project consists of the replacement of fifty poles, on the Barachoix system, thirty poles in St. Brendan's and seventy-five poles on the Farewell Head (Change Islands) system.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	182.0	0.0	0.0	182.0
Labour	150.0	0.0	0.0	150.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	236.0	0.0	0.0	236.0
Other Direct Costs	35.0	0.0	0.0	35.0
O/H, AFUDC & Escalation	80.5	0.0	0.0	80.5
Contingency	60.5	0.0	0.0	60.5
Total	**744.0**	**0.0**	**0.0**	**744.0**

The breakdown of costs by individual systems is as follows:

Project Cost: *($ x1,000)*	**Barachoix System**	**St. Brendans System**	**Farewell Hd. System**
Material Supply	58.0	36.0	88.0
Labour	45.0	38.0	67.0
Consultant	0.0	0.0	0.0
Contract Work	75.0	46.0	115.0
Other Direct Costs	10.0	10.0	15.0
O/H, AFUDC & Escalation	23.0	16.0	41.5
Contingency	18.9	13.1	28.5
Total	**229.9**	**159.1**	**355.0**

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Distribution Poles **(cont'd.)**

Operating Experience:

The distribution systems were constructed in the mid 1960's, and the poles proposed to be replaced are part of the original systems. The systems have been operating satisfactorily, however, when deteriorated poles fail, customer outages occur and repair crews are dispatched to execute repairs. Extensive outages occur on these occasions where the repair site is a significant distance from the crew dispatch point or difficult to access.

Project Justification:

Preventative maintenance inspections identified poles on these distribution systems to be of substandard quality due to age deterioration. The existing poles are over thirty-five years old and were identified as being "B" condition which indicates that they be replaced in one to five years. These poles create climbing hazards for the line personnel. In the interest of safety, system reliability and to minimize the outage duration, it is recommended the work be completed under planned conditions rather than emergency call out conditions. Failure to complete this work could result in significant interruptions of power supply to Hydro's customers in these communities and continue to pose a safety hazard to employees.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Distribution Lines

Location: South Brook and Hr. Breton Systems

Category: Distribution

Type: Pooled

Classification: Normal

Project Description:

The project consists of replacement of sections of lines on the following systems:

1. South Brook: Replacement of the 2.5 km section of line L5 from the Triton Substation to the community of Brighton.
2. Hr. Breton System: Replacement of the 11.5 km section of line L5 from the community of Seal Cove to the Pass Island Aerial Crossing.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	176.5	0.0	0.0	176.5
Labour	118.2	0.0	0.0	118.2
Consultant	0.0	0.0	0.0	0.0
Contract Work	279.0	0.0	0.0	279.0
Other Direct Costs	33.5	0.0	0.0	33.5
O/H, AFUDC & Escalation	74.8	0.0	0.0	74.8
Contingency	60.7	0.0	0.0	60.7
Total	**740.5**	**0.0**	**0.0**	**740.5**

The breakdown of costs by individual systems is as follows:

Project Cost: *($ x1,000)*	**South Brook System**	**Hr. Breton System**
Material Supply	44.5	132.0
Labour	37.0	81.0
Consultant	0.0	0.0
Contract Work	64.0	215.0
Other Direct Costs	12.5	21.0
O/H, AFUDC & Escalation	19.1	53.7
Contingency	15.8	44.9
Total	**192.9**	**547.6**

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Distribution Lines **(cont'd.)**

Operating Experience:

On the South Brook system, the section of line L5 serving the community of Brighton was built in 1968 in an inaccessible, rough terrain area. Since construction, the community has been linked by road and a bridge to the Island. The line is in a deteriorated condition and prone to failure due to age, ice loading and salt contamination from the seacoast. Repairs are hampered by poor weather conditions and inaccessibility.

On the Hr. Breton system, the line serving the Pass Island system was built in 1969. Similar to Brighton, this line is also in a deteriorated condition and located mostly in inaccessible areas. Recent inspections identified most of the poles as class "B" (i.e. replace in five years) and several poles as class "C" (i.e. replace in one year). Replacement of the line had been postponed pending Canadian Coast Guard's review of the Pass Island lighthouse site and they have decided to continue to operate this site.

Project Justification:

In both cases, the lines are so significantly deteriorated that most poles, conductor and hardware need replacement. The poles show severe decay and large vertical cracks rendering them unsafe to climb. Inaccessibility of the lines results in extensive outages in order to execute repairs.

In the interest of safety to Hydro personnel, system reliability and to minimize outage duration, it is required that these lines be relocated to a more accessible location.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Diesel Unit 290 & Upgrade Fuel Storage System

Location: Williams Harbour Diesel Plant

Category: Rural Systems - Construction - Generation

Type: Pooled

Classification: Normal

Project Description:

This project consists of the replacement of existing diesel unit #290 (136kW, Catepillar D3303, 1976) with a new unit of the same size. The existing switchgear will be upgraded to meet controls requirements of the new generating unit.

This project also consists of replacement of the existing fuel storage tanks, and earthen dyke, with two new 55,000 litre capacity, double walled, vacuum sealed fuel storage tanks, and modifications to the existing fuel header system to accommodate the new tanks.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	244.0	0.0	0.0	244.0
Labour	106.2	0.0	0.0	106.2
Consultant	0.0	0.0	0.0	0.0
Contract Work	21.0	0.0	0.0	21.0
Other Direct Costs	16.3	0.0	0.0	16.3
O/H, AFUDC & Escalation	50.8	0.0	0.0	50.8
Contingency	39.0	0.0	0.0	39.0
Total	**479.3**	**0.0**	**0.0**	**479.3**

Operating Experience:

The diesel unit #290 is operating satisfactorily and parts for minor repairs are available in 2 - 3 days, but parts for major repairs require long delivery times. The fuel storage system is also operating satisfactorily but does not comply with environmental regulations.

Project Justification:

The generating unit No. 290 is scheduled for its sixth major overhaul in 2007. At next overhaul, the unit will have accumulated in excess of 80,000 operating hours. Based on age and operating hours the unit should be replaced instead of overhauled. A new replacement unit will offer improved fuel efficiency, lower emissions, and reduced maintenance costs thus improving the plant's overall performance and reliability.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Diesel Unit 290 & Upgrade Fuel Storage System **(cont'd.)**

Project Justification: (cont'd.)

The four existing 45,000 litre capacity tanks are not ULC compliant. Any repair work on a ULC certified tank has to be completed by a ULC certified contractor and then inspected by a ULC representative. In addition, the tanks need to be painted and upgraded to make them compliant with new fall arrest and travel restraint legislation and need new water drain valves installed. As well, the earthen dyke will require permeability tests to ensure it meets GAP regulations. It is estimated that the cost of repairs to the system will be more than the replacements. Therefore to meet environmental regulations, the tanks and dykes should replaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Exhaust Stacks

Location: Grey River

Category: Distribution

Type: Other

Classification: Normal

Project Description:

This project involves the upgrade of the existing exhaust stacks at the Grey River Diesel Plant. Two new mufflers, expansion joints, and stack piping will be installed. The effective stack length will be reduced, and the exhaust will be sized to minimize soot emissions. The stacks will be insulated for noise control.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	77.2	0.0	0.0	77.2
Labour	40.9	0.0	0.0	40.9
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	6.0	0.0	0.0	6.0
O/H, AFUDC & Escalation	14.2	0.0	0.0	14.2
Contingency	12.4	0.0	0.0	12.4
Total	**150.7**	**0.0**	**0.0**	**150.7**

Operating Experience:

Accumulations of soot in the stacks require that they be disassembled and cleaned every 1,500 operating hours, which equates to approximately four person days per year. Despite this regular manually cleaning, soot releases persist in the community of Grey River. The process of cleaning the stacks reduces but does not eliminate soot discharge. In recent years, Hydro has completed repairs to personal property such as painting of siding and decks due to such soot releases.

Project Justification:

Upgrading the stacks will reduce the amount of soot emissions and noise levels in the community to acceptable levels. It will eliminate future damage claims and cleaning costs, and shorten required engine downtime thus improving plant reliability and improving service to customers.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Spare Transformer

Location: Upper Salmon Generation Station

Category: Transmission - Generation

Type: Other

Classification: Normal

Project Description:

Purchase a new 230 - 13.8 kV, wye-delta, 64/84/95 MVA, transformer, to be used as a spare for generating transformer at Upper Salmon. The unit will also be suitable as a spare for Bay d'Espoir and Granite Canal. The transformer will be partially assembled and commissioned and stored on a newly constructed concrete pad.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	1,050.0	0.0	0.0	1,050.0
Labour	63.5	0.0	0.0	63.5
Consultant	7.9	0.0	0.0	7.9
Contract Work	7.4	0.0	0.0	7.4
Other Direct Costs	4.2	0.0	0.0	4.2
O/H, AFUDC & Escalation	119.4	0.0	0.0	119.4
Contingency	113.3	0.0	0.0	113.3
Total	**1,365.7**	**0.0**	**0.0**	**1,365.7**

Operating Experience:

The transformer at the Upper Salmon Generation Plant has continuously shown higher than normal operating temperatures. Inspections show the operating temperature to be consistently 8 - 10ºC higher than other similar transformers.

Project Justification:

The existing transformer is twenty-two years old and is exhibiting operating characteristics of a much older unit. The operating temperature is 8ºC - 10ºC higher than expected and oil analysis indicate deterioration. The present condition of this transformer is much poorer than similar transformers located at Bay d'Espoir, that have been in service for thirty-six years.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Spare Transformer **(cont'd.)**

Justification: (cont'd.)

The failure of the Upper Salmon transformer would result in a total plant shutdown until the failed transformer can be repaired or replaced. Without a spare transformer, the plant shutdown could be of twelve-month or more duration. During an outage at Upper Salmon, water is diverted around the plant resulting in lost production which must be replaced with energy generated at Holyrood. Based on a ten-year average reservoir levels, assuming a fuel cost of $55/bbl and an efficiency of 630 kWh/bbl at Holyrood, it is estimated that a twelve-month outage at Upper Salmon would cost an additional $37-45 million.

As stated previously, the majority of unit transformers throughout the system are aging and the probability of failure is increasing with time. This budget proposal is targeting a spare unit transformer for Upper Salmon because of its condition and the substantial financial impact of a failure. This spare transformer can also serve as a spare for Bay d'Espoir Units 1, 2, 3, 4, 5, 6 and 7 (with unit at reduced output) and Granite Canal.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Obsolete Diesel Unit Breakers

Location: Mary's Harbour

Category: Transmission - Generation

Type: Other

Classification: Normal

Project Description:

This project consists of the replacement of the obsolete "Unelec" breakers on diesel units 2037, 2038 and 2048. It is proposed to replace the existing breakers with the standard draw-out type breaker.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	44.0	0.0	0.0	44.0
Labour	39.0	0.0	0.0	39.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	11.0	0.0	0.0	11.0
O/H, AFUDC & Escalation	10.4	0.0	0.0	10.4
Contingency	9.4	0.0	0.0	9.4
Total	**113.8**	**0.0**	**0.0**	**113.8**

Operating Experience:

The existing breakers are operating satisfactorily, but parts and servicing are unavailable.

Project Justification:

The existing model S 800 Unelec breakers are obsolete and Alsthom Unelec is no longer guaranteeing any type of support. Alsthom Unelec has moved all representation out of North America. If there was a component failure on any of these breakers there would be lengthy delays while trying to find the part(s) required for repairs with no assurance that these parts would be available. Any delays in breaker repairs could mean power interruptions if there was a failure on either of the other generating units at the same time. In order to maintain reliability and continuity of supply, the breakers must be replaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Automatic Meter Reading

Location: St. Anthony, Bay d'Espoir

Category: Transmission - Metering

Type: Other

Classification: Justifiable

Project Description:

This project is to implement a one-way automatic meter reading (AMR) system in the Bay d'Espoir and St. Anthony service areas. The proposed system utilizes a one-way power line carrier communications system that is designed for rural area applications. It includes telephone communications to head office from local substations and computer applications to interface with Hydro's customer billing systems.

This proposal is for the first year of multi-year program executed on a system by system basis considering such factors, as staffing, reading cost per meter, etc.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	383.2	0.0	0.0	383.2
Labour	187.1	0.0	0.0	187.1
Consultant	0.0	0.0	0.0	0.0
Contract Work	52.1	0.0	0.0	52.1
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	42.4	0.0	0.0	42.4
Contingency	31.1	0.0	0.0	31.1
Total	**695.9**	**0.0**	**0.0**	**695.9**

Operating Experience:

This system will replace manual handheld devices and local supporting infrastructure (computers and modems). The head office supporting infrastructure for handheld devices will remain in place for all remaining service areas.

The system being implemented was piloted in the St. Brendan's service area in 2003/04 and proved to be reliable and accurate.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Automatic Meter Reading **(cont'd.)**

Project Justification:

In these areas Hydro's present operating cost for meter reading is $32/meter per year. The implementation of this project will lower this cost to $9/meter per year. The cumulative present worth analysis of AMR and the current system has a positive net present value starting in 2016 (10 years), and totals approach $260,000 in 2022, as per the attached table.

In addition to the financial justification, implementing AMR will result in the following customer benefits:

1. Eliminate meter reading errors;
2. Eliminate requirement for estimated readings;
3. Provide more detailed consumption reporting (daily and monthly); and
4. Provide more flexible billing options such as consolidated bills and customer selected bill dates.

Future Plans:

Further expansions of the AMR program will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Meter Shop - Purchase Meters and Equipment

Location: Hydro Place

Category: Transmission - Metering

Type: Other

Classification: Normal

Project Description:

This project consists of the purchase of demand/energy meters, current and potential transformers, metering cable and associated hardware, and release of residential meters and instrument transformers from inventory for use throughout the system as required.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	90.0	0.0	0.0	90.0
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	3.7	0.0	0.0	3.7
Contingency	0.0	0.0	0.0	0.0
Total	**93.7**	**0.0**	**0.0**	**93.7**

Operating Experience:

Meters and associated equipment are required for new customer services and the replacement of old, worn, damaged or vandalized equipment.

Project Justification:

For revenue metering of new and upgraded customer services and replacement of worn or obsolete meters and metering equipment. A minimum and uninterrupted inventory of all types of revenue meters must be maintained to ensure the availability of equipment required to meter customers' services for revenue purposes.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Fall Protection/Travel Restraint Systems

Location: Various Locations

Category: Transmission - Properties

Type: Other

Classification: Mandatory

Project Description:

The work consists of the design, supply and installation of fall protection systems at all locations where required. These locations include fuel storage tanks, powerhouses, office buildings, terminal station control buildings, accommodation trailers, water control structures, power transformers and any auxiliary buildings or structures. The installations will be prioritized upon approval to proceed.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	30.0	0.0	0.0	30.0
Labour	40.0	0.0	0.0	40.0
Consultant	3.0	0.0	0.0	3.0
Contract Work	130.0	0.0	0.0	130.0
Other Direct Costs	6.0	0.0	0.0	6.0
O/H, AFUDC & Escalation	41.9	0.0	0.0	41.9
Contingency	0.0	0.0	0.0	0.0
Total	**250.9**	**0.0**	**0.0**	**250.9**

Operating Experience:

Accessing structures where there are no fall protection/travel restraint systems in place has been deferred, if possible. Where not possible to defer, temporary measures have been taken to comply with regulations.

Project Justification:

Provincial legislation requires fall arrest/travel restraint systems be used by all workers when accessing an elevated surface which is 3 m above the next lower level. Personnel need to access building roofs, fuel storage tank roofs, water control structures and elevated equipment to perform operational and maintenance tasks. Some of these tasks, such as measuring depth of fuel via a roof top vent for reconciliation of fuel use records, are required by legislation. The intention is to provide fall arrest/travel

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Fall Protection/Travel Restraint Systems **(cont'd.)**

Project Justification: (cont'd.)

restraint systems to protect workers during performance of core duties, i.e. those performed on a regular basis, and to outline procedures/measures to be put in place for work which is performed on an infrequent basis.

Future Plans:

Review and revise the priority list on a yearly basis.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Fuel Storage

Location: Norman Bay

Category: Transmission - Property Additions

Type: Other

Classification: Normal

Project Description:

This project involves the purchase and installation of two new 31,800 litres, double walled fuel storage tanks at the diesel plant site in Norman Bay, Labrador. Work shall include, cleaning and relocating existing tanks to the rear of site, installing new tanks on timber foundations, remedial work to the existing fuel header system to accommodate new tanks, new pipe stands, connecting up piping to plant, pressure testing and painting.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	95.0	0.0	0.0	95.0
Labour	70.0	0.0	0.0	70.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	17.0	0.0	0.0	17.0
O/H, AFUDC & Escalation	22.0	0.0	0.0	22.0
Contingency	18.2	0.0	0.0	18.0
Total	**222.2**	**0.0**	**0.0**	**222.2**

Operating Experience:

The Norman's Bay Diesel Plant average monthly fuel consumption is 6500 litres. Marine fuel deliveries are twice per year and usually occur in June and December.

Project Justification:

Both tanks were cleaned and inspected in July of 2002 revealing heavy interior rusting and contamination. With an increase in filter blockage and failed fuel pumps, an operating budget proposal was prepared in 2005 to have both tanks cleaned and inspected again in 2006. Due to the age, harsh weather conditions and salt contamination, the exterior paint is in deteriorating condition. Considering the condition of both tanks, i.e. age, exterior condition, interior corrosion, remote location and that one tank cannot be recertified and registered, it is recommended that the fuel storage system be replaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Card Access Security Systems

Location: Bishop's Falls & Whitbourne

Category: Transmission - Property Additions

Type: Pooled

Classification: Normal

Project Description:

This project consists of the upgrade of the card access security systems at the Whitbourne and Bishop's Falls Offices. The work in Whitbourne will involve the installation of two long-range card readers, and a new motorized vehicle access gate for general site security. The work in Bishop's Falls will involve the installation of eight card readers, eight electronic door locks, and two large network panels, one of which will be available for future security requirements.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	5.8	0.0	0.0	5.8
Labour	11.0	0.0	0.0	11.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	88.4	0.0	0.0	88.4
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	14.6	0.0	0.0	14.6
Contingency	10.6	0.0	0.0	10.6
Total	**131.0**	**0.0**	**0.0**	**131.0**

Operating Experience:

At Whitbourne, there is no fenced secured area and keyed building locks. At Bishop's Falls, there is limited card access to the building and the site has security fencing with card operated gate controls.

Project Justification:

The upgrade of the electronic security systems will provide complete control of access to Hydro property and monitor traffic on a continuous basis. Each employee will be issued a photo ID card which will allow the employee access to only those areas identified as required. All cards will be personal issue and can be upgraded or rejected at any time by the system controller. With the new electronic security system, lost cards can be immediately disabled, whereas the present system, requires replacement of the lock whenever a key is misplaced.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Survey of Hydro's Primary Distribution Line Right of Way

Location: Various Locations

Category: Transmission - Property Additions

Type: Other

Classification: Normal

Project Description:

This project consists of legal surveys and preparation of documentation to acquire Crown Lands easements for approximately 500 kilometers of primary distribution line in operation throughout the Province.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	35.0	0.0	0.0	35.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	5.0	0.0	0.0	5.0
O/H, AFUDC & Escalation	6.8	0.0	0.0	6.8
Contingency	4.0	0.0	0.0	4.0
Total	**50.8**	**0.0**	**0.0**	**50.8**

Operating Experience:

Many of the older distribution lines were constructed without obtaining easements. The effort to obtain easement title to the primary distribution lines on Crown Land began in 2004. Assuming continued funding, title for the distribution systems located on Crown Land will be in place by the end of 2010.

Project Justification:

The distribution lines occupy Crown Land contrary to the Crown Lands Act and lack of adequate title is a significant risk to the operation should competing requirements for the land arise. In addition, maintenance and upgrading of the lines is cumbersome and costly without appropriate legal easements.

Future Plans:

Capital funding for legal surveys for future years will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Off-Road Tracked Vehicle (7696)

Location: Cow Head

Category: Transmission - Tools & Equipment

Type: Other

Classification: Normal

Project Description:

This project involves the replacement of Unit No. V7696, a 1987 model heavy-duty off-road tracked vehicle, at Cow Head. The unit being replaced is a muskeg/dump combination and will be replaced with a muskeg/boom/dump configured unit as recommended in the 2003 fleet review.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	276.0	0.0	0.0	276.0
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	8.0	0.0	0.0	8.0
Contingency	23.0	0.0	0.0	23.0
Total	**307.0**	**0.0**	**0.0**	**307.0**

Operating Experience:

The unit will be twenty years old at the time of replacement. Normal life expectancy for this type equipment is from fifteen to twenty years depending on location and usage. Experience demonstrates that the heavy-duty off-road tracked equipment is subject to rapid escalation in downtime as it ages.

Project Justification:

The replacement criteria for heavy-duty off-road tracked equipment is fifteen-twenty years, depending on condition, the extent of repairs needed and the level of compliance with current safety and health standards. The 2003 fleet review recommended that the transmission line maintenance crews be equipped with a boom/dump combination unit as opposed to dump only units. This would provide the least cost alternative where maintenance crews need material handling (boom) capability as well as material carrying (dump) capability.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Light Duty Mobile Equipment

Location: Various Locations

Category: Transmission - Tools & Equipment

Type: Other

Classification: Normal

Project Description:

This project consists of the replacement of nineteen snowmobiles; fourteen ATVs; one snowmobile trailer and one pole trailer.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	213.3	0.0	0.0	213.3
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	6.2	0.0	0.0	6.2
Contingency	21.3	0.0	0.0	21.3
Total	**240.8**	**0.0**	**0.0**	**240.8**

Operating Experience:

Operation and maintenance staff regularly use snowmobiles and ATV's to access remote areas for maintenance, repair and operation of the transmission system. The equipment being used requires regular replacement.

Project Justification:

This equipment is at the end of its life cycle and is no longer dependable. The units being replaced meet or exceed replacement criteria. The light-duty mobile equipment being replaced is comprised of nineteen snowmobiles (Average age 6 years); fourteen ATVs (Average age 7 years); one Snowmobile trailer (Age 12 years); one pole trailer (Age 18 years).

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Light Duty Mobile Equipment **(cont'd.)**

Project Justification: (cont'd.)

The life expectancy of light duty mobile equipment varies significantly dependant on a number of factors, including location, annual utilization and the conditions under which the equipment is used. This type of equipment is assessed for replacement as it reaches the established replacement criteria;

Snowmobiles:	Line Crews*	-	3-5 years, condition
	Others	-	5-7 years, condition
ATVs:	Line Crews*	-	3-5 years, condition
	Others	-	5-7 years, condition
Trailers:	Light	-	8-10 years, condition
	Heavy	-	10-20 years, condition
Attachments:		-	10-20 years, condition.

*The lower life for line crew snowmobiles and ATVs is a reflection of the extensive use of the equipment over very harsh terrain.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Doble Relay Test Equipment

Location: Northern and Labrador Regional Operations

Category: Transmission - Tools & Equipment

Type: Pooled

Classification: Normal

Project Description:

This project consists of the purchase of two 3-phase Doble test sets: one for use in the Northern Region and one for use in the Labrador Region. The new Doble test set is a 3-phase unit which can fully test multifunction relays. All tests are downloadable from a PC and the results are stored.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	145.0	0.0	0.0	145.0
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	14.1	0.0	0.0	14.1
Contingency	14.5	0.0	0.0	14.5
Total	**173.6**	**0.0**	**0.0**	**173.6**

Operating Experience:

Doble relay test units are used to test relays used in the protection of major terminal station and diesel plant equipment as well as testing transducers, meters and any electrical equipment requiring an AC or DC current or voltage input.

Project Justification:

Northern Region is presently using an older version of Doble test equipment for testing, troubleshooting and commissioning high voltage terminal stations and diesel plants. Doble cannot commit to repairs and software support after December 31, 2006 because the test equipment is considered obsolete and has been replaced by a new series. The Labrador Region does not have any Doble test equipment and must borrow it from Central Regional Operations, thus relay testing is often delayed or cancelled due to unavailability of equipment. This test equipment is required to assist system operations investigate outages and ensure protection systems are tested regularly to verify that they operate properly ensuring that the faults and internal problems are properly cleared before a catastrophic failure occurs.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Heavy-Duty Off-Road Tracked Vehicle

Location: Flower's Cove

Category: Transmission - Tools & Equipment

Type: Other

Classification: Normal

Project Description:

This project involves the replacement of Unit No. 7734, a 1991 model heavy-duty off-road tracked vehicle, at Flower's Cove. The muskeg/backhoe/boom unit currently in service is being replaced with an excavator as recommended in the 2003 fleet review.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	126.0	0.0	0.0	126.0
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	2.3	0.0	0.0	2.3
Contingency	11.0	0.0	0.0	11.0
Total	**139.0**	**0.0**	**0.0**	**139.0**

Operating Experience:

This unit will be sixteen years old at the time of replacement. Normal life expectancy for this type equipment is from fifteen to twenty years dependant on location and usage. Experience shows that heavy off-road tracked equipment is subject to rapid escalation in downtime as it ages.

Project Justification:

The replacement criteria for heavy-duty off-road tracked equipment is fifteen to twenty years, depending on its condition, the extent of repairs needed and the level of compliance with current standard safety and ergonomic features. Safety improvements in the newer units include interlocks on the doors to prevent operation of the unit with the doors open and an automatic braking system. The 2003 fleet review recommended that the distribution crews be equipped with one muskeg and one excavator. This would provide the least cost alternative where crews require two off-road tracked vehicles.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Application Enhancements

Location: St. John's

Category: General Properties - Information Systems

Type: Pooled

Classification: Normal

Project Description:

The application enhancement projects proposed are as follows:

- Minor enhancements to applications in response to unforeseen requirements such as legislative and changing business requirements.
- Ltrax has been used for the past eight years to predict and track lightning patterns across Newfoundland and has been very effective in minimizing the effects of lightening related trips of equipment. This application is presently available on only one of the two control room operator consoles. This proposal will enable both operators to have this data readily available.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	10.0	0.0	0.0	10.0
Labour	21.8	0.0	0.0	21.8
Consultant	0.0	0.0	0.0	0.0
Contract Work	99.5	0.0	0.0	99.5
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	4.1	0.0	0.0	4.1
Contingency	13.1	0.0	0.0	13.1
Sub-Total	**148.5**	**0.0**	**0.0**	**148.5**
Cost Recoveries	(27.0)	0.0	0.0	(27.0)
Total	**121.5**	**0.0**	**0.0**	**121.5**

Operating Experience:

In order to maintain and improve efficiency Hydro must continue to leverage its applications portfolio. The applications allow Hydro to achieve operating efficiencies and improve customer service. When Hydro selects application enhancement projects it uses the following criteria:

(1) existing solutions and services will be considered first before seeking alternatives; and

(2) if business needs are not adequately satisfied, purchased solutions and services will be evaluated before building solutions or services unless there is a compelling business reason to do so.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

1) **Minor Enhancements**

Total: $135,000 CF(L)Co: $27,000 Net: $109,000

Minor enhancements are justified on the basis of meeting business requirements during the year. The focus of these enhancements is to increase operational efficiencies and improve customer service. This project has been used in the past to create enhancements to safety, environmental compliance and audit applications as well as to fulfill Board directed initiatives such as equalized billing.

2) **Ltrax System Total: $13,500**

This project is to expand the Ltrax lightning monitor system to allow it to be used by both operators in the control system. This system allows for the tracking of lightning storm patterns to allow for planning of the elimination of electrical supply outages due to lighting strikes on transmission lines.

Future Plans:

Application enhancements are a continuing requirement in order for Hydro to ensure efficiencies.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Corporate Application Environment

Location: St. John's

Category: General Properties - Information Systems

Type: Pooled

Classification: Normal

Project Description:

This project includes upgrades to enterprise applications software to realize the benefits in performance and functionality. The projects which are pooled under this proposal are:

- Enterprise Resource Planning technology upgrade to the next available version; and
- iSeries Operating System upgrade.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	118.5	0.0	0.0	118.5
Labour	136.4	0.0	0.0	136.4
Consultant	0.0	0.0	0.0	0.0
Contract Work	72.5	0.0	0.0	72.5
Other Direct Costs	5.0	0.0	0.0	5.0
O/H, AFUDC & Escalation	10.9	0.0	0.0	10.9
Contingency	33.2	0.0	0.0	33.2
Sub-Total	376.5	0.0	0.0	376.5
Cost Recoveries	(75.3)	0.0	0.0	(75.3)
Total	**301.2**	**0.0**	**0.0**	**301.2**

Operating Experience:

There are approximately 43 applications and supporting systems that enable Hydro to operate and provide least cost and reliable power to customers. In order to accomplish this, upgrades to application environments through their life cycle is a normal and necessary requirement. Each year, Hydro reviews its application portfolio and uses two main criteria to determine if an upgrade to an environment is warranted. First, the status of vendor support for all applications is reviewed. Next, any functionality improvements are reviewed in the context of providing business value either in terms of efficiencies gained through improved functionality or improvements in service.

Project Justification:

Continued growth of the application environment provides the flexibility to meet new business requirements.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Corporate Application Environment **(cont'd.)**

Project Justification: (cont'd.)

1) **iSeries Operating System upgrade**
Total: $109,700 CF(L)Co: $22,000 Net: $87,700

The iSeries computer hosts the JD Edwards software. The operating system on the iSeries computer was last upgraded in 2006. This operating system upgrade allows for the ongoing support of the operating system and enhancements to the system.

2) **JD Edwards upgrade**
Total: $266,800 CF(L)Co: $53,400 Net: $213,400

This software is used by Hydro employees on a day-to-day basis from the accounting department to field personnel. Keeping this software up to date allows for high availability of these systems, support from the software vendors and increased functionality**.**

Future Plans:
Application enhancements and upgrades are an ongoing life cycle based on business demands and vendor support levels.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Enterprise Storage

Location: Multiple Sites

Category: General Properties - Computer Operations

Type: Pooled

Classification: Normal

Project Description:

This project is for the implementation of software that will help manage existing disk storage that resides in the SAN (Storage Area Network). The SAN was installed in 2003 to provide the efficient management and growth of the disk storage for the iSeries and Intel Servers.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	125.3	0.0	0.0	125.3
Labour	4.2	0.0	0.0	4.2
Consultant	35.7	0.0	0.0	35.7
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	4.0	0.0	0.0	4.0
Contingency	16.5	0.0	0.0	16.5
Sub-Total	185.7	0.0	0.0	185.7
Cost Recoveries	(37.1)	0.0	0.0	(37.1)
Total	**148.6**	**0.0**	**0.0**	**148.6**

Operating Experience:

Disk capacity has grown at a rate of 30% per year over the last 5 years and is projected to grow at this rate in the future. Operating experience has been to add more disks as the existing space is used up. The implementation of this tool will allow Hydro to manage and allocate the usage of disk space to reduce the growth requirement into the future.

Project Justification:

The servers that are attached to the storage area network are used by Hydro employees to run the business on a daily basis. Loss of the performance of these servers due to disk space unavailability would have a negative effect on employee productivity and customer service. The current capacity growth rate can be lowered by using tools to manage the existing disk space more efficiently. This will free up existing disk space to be used for future growth.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User Evergreening Program

Location: Multiple Sites

Category: General Properties - Computer Operations

Type: Pooled

Classification: Normal

Project Description:

This project consists of the replacement of 127 personal computers that were deployed in 2003.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	280.0	0.0	0.0	280.0
Labour	20.0	0.0	0.0	20.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	50.0	0.0	0.0	50.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	10.0	0.0	0.0	10.0
Contingency	35.0	0.0	0.0	35.0
Total	**395.0**	**0.0**	**0.0**	**395.0**

Operating Experience:

Hydro's end-user computer equipment consists of a mixture of notebooks, desktops and thin-client devices. Hydro is able to achieve a four to six year life cycle with its end user equipment.
(Note: a thin-client is a networked computer without a hard disk drive, where the data processing occurs on a server or multiple servers. This allows the end-user to access files and application software without the need to install them locally.)

Minimum specifications for replacement of personal computers are reviewed on an annual basis to ensure that the equipment in service continues to remain effective. Industry best practices, technology and application trends are taken into consideration when specifications for computer devices are decided for the current year.

Project Justification:

Hydro has over 800 end-user personal computers in service. It is important to refresh this equipment on a regular cycle to keep the technology current to maintain an efficient and productive workforce.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User Evergreening Program **(cont'd)**

Project Justification: (cont'd.)

The North American industry standard life cycle for end user devices is 2-3 years for notebooks, 3-4 years for desktops and 4-5 years for thin clients. Hydro's 4, 5 and 6 year evergreen plan exceeds these guidelines and has proven a reliable and cost effective solution.

Future Plans:

The personal computer infrastructure will be refreshed on an ongoing basis.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Peripheral Infrastructure Replacement

Location: Hydro Place

Category: General Properties - Computer Operations

Type: Pooled

Classification: Normal

Project Description:

This project consists of the replacement of four Multi-Function Devices used for printing, copying and scanning.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	112.0	0.0	0.0	112.0
Labour	12.0	0.0	0.0	12.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	3.0	0.0	0.0	3.0
Contingency	12.4	0.0	0.0	12.4
Total	**139.4**	**0.0**	**0.0**	**139.4**

Operating Experience:

The units scheduled for replacement have been in service for six years and have exceeded 500,000 copies with an average volume of 20,000 copies per month. As the devices reach and exceed their rated capacity, they require more maintenance and service time resulting in loss of reliability and productivity. Industry best practices indicate that the typical service life for a peripheral device is five years.

Project Justification:

This is the continuation of the evergreen program to replace peripheral devices as they reach the end of their useful life. Hydro's infrastructure is supported by the manufacturer's maintenance agreement that covers the cost of consumables (except paper) and maintenance based on a monthly price per page. It is economical to replace the older, higher cost units with new lower cost ones. The ongoing plan involves a coordinated effort to keep Hydro's peripheral infrastructure in good working order; using current technologies while delivering a cost effective solution to the end-user.

Future Plans:

Further replacements will be proposed in future capital budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Information Management System

Location: Hydro Place

Category: General Properties - Computer Operations

Type: Pooled

Classification: Normal

Project Description:

The Security Information Management System will provide the means to perform threat and vulnerability assessments, enforce policy directives and integrate log and audit files. The system will be able to work with the existing intrusion detection/intrusion prevention systems to ensure infrastructure security. Mitigation and remediation techniques will be used to address any security concerns before they become threats to our architecture and other corporate IT services. This project will be staged over two years.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	47.2	42.6	0.0	89.8
Labour	17.9	17.6	0.0	35.5
Consultant	4.2	2.2	0.0	6.4
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	2.1	3.2	0.0	5.3
O/H, AFUDC & Escalation	1.8	3.7	0.0	5.5
Contingency	0.0	13.7	0.0	13.7
Sub-Total	73.2	83.0	0.0	156.2
Cost Recoveries	(14.6)	(16.6)	0.0	(31.2)
Total	**58.6**	**66.4**	**0.0**	**125.0**

Operating Experience:

Hydro's administration and operational network infrastructures are growing and becoming more sophisticated. These systems support employees, customers and vendors and take advantage of web-enabled technologies and the enhanced functionality offered by remote access capabilities. In order to ensure the integrity, accessibility and availability of these features, a security information management system will be designed and implemented.

Currently, Hydro has many devices and applications that produce very detailed logs and audit trails. These reports give detailed descriptions of the activity within the networks. The amount of data produced by these reports is currently unmanageable simply because there is no effective way of filtering, aggregating, and analyzing the huge volumes of data produced. Any advantage gained by

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Information Management System **(cont'd.)**

Operating Experience: (cont'd)

having these security devices installed and positioned is degraded by not having an effective management system in place.

Project Justification:

In order to ensure secure operations in a heterogeneous environment, a management tool is required to aggregate, filter, and then normalize the data and produce useful information. Currently data from key infrastructure devices (firewalls, routers, IDS, etc.) is being produced in massive amounts. The data is not reviewed in a timely manner.

Consolidating and analyzing the data and then presenting it in a timely fashion that will ensure any potential threat is dealt with in a pro-active manner. Key security devices will be monitored in the customer network including firewalls, routers, switches, Windows servers, AS/400, etc. The extensive reporting capabilities for operators and administrators will enable them to understand changes in traffic patterns and to detect emerging attacks that may not be evident from a single venue.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Server Technology Program

Location: Multiple Sites

Category: General Properties - Computer Operations

Type: Pooled

Classification: Normal

Project Description:

This project is a part of Hydro's evergreen program and involves the replacement, addition and upgrade of hardware components and software related to the Corporation's shared server infrastructure and upgrades to the server-based office productivity tools. Based on the age of existing servers, each year an appropriate number of servers will be refreshed. This infrastructure ensures that the Corporation has a reliable secure infrastructure environment required to support efficient operations.

The scope of the proposed Server and Operating System Evergreen Program includes the replacement of four (4) servers within the Hydro System.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	36.0	0.0	0.0	36.0
Labour	14.0	0.0	0.0	14.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	21.0	0.0	0.0	21.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	3.7	0.0	0.0	3.7
Contingency	7.1	0.0	0.0	7.1
Total	**81.8**	**0.0**	**0.0**	**81.8**

Operating Experience:

Hydro's server infrastructure supports the applications that are used by its employees in carrying out its day-to-day business. This project is necessary to maintain current performance on its servers. Hydro uses its existing servers for office productivity tools e.g. Word, Excel, email, Intranet/Internet and various database systems as well as software tools required to monitor and manage servers and its infrastructure.

Project Justification:

Hydro needs to keep its server and operating systems current in order to adequately support and protect the IT infrastructure required to operate its business. Failure to keep this infrastructure

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Server Technology Program **(cont'd.)**

Project Justification: (cont'd)

current will put Hydro at risk. The replacement, addition and upgrading of hardware components to achieve this goal requires investment over the lifecycle of the infrastructure.

Hydro needs to replace and upgrade its server environment so that it can:

- Address obsolescence/maintaining vendor support;
- Provide security/managing the infrastructure;
- Support current versions of applications; and,
- Exploit technology advances.

Obsolescence/Vendor Support - Without vendor support, the functions and services reliant on the server infrastructure are at risk as security and support patches for the operating system will no longer be available. As a result, Hydro's ability to support and ensure continuation of the functions and services is impeded.

Servers - Industry standards indicate that due to technical and physical obsolescence, server devices have a useful life of 5 years and beyond that timeframe, reliability and continued support become issues. At this time the Vendor support and inventory of spare parts are discontinued. As the servers are used to provide support in running the business on a daily basis, loss of availability of these servers would have a negative effect on employee productivity by not allowing access to software applications that are used by them to run the business.

Future Plans:

This proposal is part of an ongoing refresh program to maintain server performance.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Battery Replacements

Location: Various Locations

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project consists of the supply and installation of six battery banks at West Salmon Spillway, Gull Pond Hill (2), Mary March Hill, Blue Grass Hill and Sandy Brook Hill. For West Salmon Spillway, the battery charging and power distribution equipment will be replaced as well.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	225.7	0.0	0.0	225.7
Labour	108.7	0.0	0.0	108.7
Consultant	0.0	0.0	0.0	0.0
Contract Work	33.9	0.0	0.0	33.9
Other Direct Costs	27.0	0.0	0.0	27.0
O/H, AFUDC & Escalation	50.2	0.0	0.0	50.2
Contingency	39.5	0.0	0.0	39.5
Total	**485.0**	**0.0**	**0.0**	**485.0**

Operating Experience:

The Blue Grass Hill and Mary March Hill batteries were capacity tested in 2004 and were both below 80% capacity. The West Salmon Spillway battery capacity test in 2005 passed; however, the bank was installed in 1987 and is nearing the end of its twenty-year design life. The batteries at Gull Pond Hill, in a critical cycle-charge site, are showing signs of deterioration. The 48 V battery at West Salmon Spillway is also being replaced, as this type of equipment has recorded significant numbers of failures in recent years.

Project Justification:

The battery replacements required at this time are based on observation and testing. The batteries have met or exceeded their design life.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Microwave Site Refurbishing

Location: Godaleich Hill

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project involves the refurbishing of a microwave site located at Godaleich Hill including: ice protection installation; foundation refurbishment; anti-climb system installation; electrical upgrades; and other associated infrastructure refurbishing.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	5.0	0.0	0.0	5.0
Labour	72.0	0.0	0.0	72.0
Consultant	19.2	0.0	0.0	19.2
Contract Work	180.0	0.0	0.0	180.0
Other Direct Costs	20.0	0.0	0.0	20.0
O/H, AFUDC & Escalation	38.4	0.0	0.0	38.4
Contingency	29.6	0.0	0.0	29.6
Total	**364.2**	**0.0**	**0.0**	**364.2**

Operating Experience:

The Godaleich Hill Microwave site has been in operation since 1982 with no major refurbishing conducted although minor maintenance has been completed annually. This project will extend the useful life of the site.

Project Justification:

The microwave system is a major component of the power system. It is required to aid the reliable generation and transmission of electricity across the province. Without this work, the Godaleich Hill microwave site will deteriorate to a level where catastrophic structural failure could occur, resulting in a loss of power grid control by the Energy Control Center (ECC) and possibly causing or extending power outages. As well, the loss of teleprotection signals on the transmission lines could cause severe damage to equipment and further extend power outages.

Future Plans:

This project is part of a program to refurbish the West Coast Microwave sites infrastructure. Upgrades to other sites will be proposed in future budget applications.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Remote Terminal Unit Replacement

Location: Various Locations

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

The project consists of the replacement of four RTUs at Paradise River Generating Station, Bear Cove Terminal Station, Berry Hill Terminal Station and Cow Head Terminal Station.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	153.8	0.0	0.0	153.8
Labour	89.6	0.0	0.0	89.6
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	15.6	0.0	0.0	15.6
O/H, AFUDC & Escalation	35.9	0.0	0.0	35.9
Contingency	25.9	0.0	0.0	25.9
Total	**320.8**	**0.0**	**0.0**	**320.8**

Operating Experience:

The RTUs being replaced are 18-20 years old. Each location has had parts replaced in the past due to failures.

Project Justification:

Failure to replace this equipment may result in an impact on service to our customers in either reduced reliability or extended customer outages. The RTUs being replaced are critical to the operation of the Island power grid.

Future Plans:

This is year eight of a nine-year program to replace all obsolete RTUs.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Radio Replacement

Location: Burnt Dam and Granite Canal Hill

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project consists of the replacement of the point-to-point radio link between the Burnt Dam site and Granite Canal Hill. The radio system provides voice communications between Burnt Dam and the Bay d'Espoir Hydro Generating Plant.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	95.0	0.0	0.0	95.0
Labour	52.9	0.0	0.0	52.9
Consultant	0.0	0.0	0.0	0.0
Contract Work	3.0	0.0	0.0	3.0
Other Direct Costs	31.1	0.0	0.0	31.1
O/H, AFUDC & Escalation	25.4	0.0	0.0	25.4
Contingency	18.2	0.0	0.0	18.2
Total	**225.6**	**0.0**	**0.0**	**225.6**

Operating Experience:

The existing radio has been in service since 1991 and is the only radio of this type currently in operation within Hydro. The manufacturer has replaced this model and spare parts are not readily obtainable. The radio provides essential voice communications to this remote location. The radio has experienced several module failures in the past.

Project Justification:

The Burnt Dam site is critical to the control of water into the Bay d'Espoir reservoir system, a system utilized by the Granite Canal, Upper Salmon, and Bay d'Espoir Hydro Plants. This radio link provides direct voice communications to personnel located at Burnt Dam and is essential In providing reliable voice communications to control flooding and the flow of water into the reservoir system.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install PC Device Time Synchronization

Location: Various Locations

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project will provide a facility to ensure that substation devices are synchronized, allowing comparison of records between devices, both within the same location and between different locations. This equipment will allow existing Global Positioning System (GPS) in these stations to be distributed to these devices. This project will supply and install all cabling and distribution modules needed to provide the time source at the following twenty-one locations; Bay d'Espoir Plant, Bay d'Espoir Terminal Station #2, Bottom Brook, Buchans, Cat Arm Plant, Come-By-Chance, Daniels Harbour, Deer Lake, Hardwoods, Hinds Lake Plant, Holyrood Terminal Station, Indian River, Massey Drive, Peter's Barren, Oxen Pond, Plum Point, Springdale, Stony Brook, Sunnyside, Upper Salmon Plant and Western Avalon.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	14.6	0.0	0.0	14.6
Labour	44.7	0.0	0.0	44.7
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	24.1	0.0	0.0	24.1
O/H, AFUDC & Escalation	11.2	0.0	0.0	11.2
Contingency	8.3	0.0	0.0	8.3
Total	**102.9**	**0.0**	**0.0**	**102.9**

Operating Experience:

When System Operations prepares a report on an outage they gather the GPS time stamped Sequence of Events (SOE) data from the SCADA system and send it to System Performance and Protection (SP&P) for analysis. SP&P then retrieves event data in the protection relays and fault recorders from the plants or terminal stations for the time of the outage. The protection relays and fault recorders are not GPS time stamped, therefore the events do not correlate with the SCADA SOE therefore preventing proper event analysis.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install PC Device Time Synchronization **(cont'd.)**

Project Justification:

This project is justified because of the need for common time stamps on all events that are collected. By synchronizing all information gathered, engineering time for surge and trouble analysis and completing reports will be reduced and the accuracy of the analysis guaranteed.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Communications Network Technology Refresh

Location: Various Locations

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project consists of the replacement of several obsolete network components. In addition, the project includes the installation of facilities required to extend network access as well as upgrade technology due to unforeseen circumstances.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	24.3	0.0	0.0	24.3
Labour	58.8	0.0	0.0	58.8
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	10.4	0.0	0.0	10.4
Contingency	8.3	0.0	0.0	8.3
Total	**101.8**	**0.0**	**0.0**	**101.8**

Operating Experience:

Hydro's refresh life cycle for network devices is eight years. The network components being replaced under this project have reached the end of their useful lives and are now obsolete. As well, the devices are not able to support desired expanded functionality including security and performance improvements.

Project Justification:

The networking devices are obsolete and do not meet current functionality requirements. As the data network expands into the more remote sites (offices, terminal stations, power plants and repeater sites), and provides access to more services by more employees, infrastructure upgrades will be required at various sites to accommodate the extra traffic and maintain reliability. The demand for new services includes a mixture of office automation traffic such as e-mail, work requests and database

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Communications Network Technology Refresh **(cont'd.)**

Project Justification: (cont'd.)

access to substation automation functions such as remote high-speed access to meters and Intelligent Electronic Devices (IEDs). Low speed data access or no data access at all into remote sites is no longer an efficient communications means for the industry.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Microwave Quad-Diversity Upgrade

Location: Various

Category: General Properties - Telecontrol

Type: Other

Classification: Normal

Project Description:

This project will upgrade the current diversity configuration of the microwave radio system between Square Pond Hill and Sunnyside to quad diversity with split transmitters. It will include modifications to the existing microwave radio equipment at each end of the radio hop. The objective of this project is to improve the availability of the microwave radio, with success determined by a decrease in the number of outage events and the related unavailable time.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	13.6	0.0	0.0	13.6
Consultant	0.0	0.0	0.0	0.0
Contract Work	77.3	0.0	0.0	77.3
Other Direct Costs	2.1	0.0	0.0	2.1
O/H, AFUDC & Escalation	11.9	0.0	0.0	11.9
Contingency	9.3	0.0	0.0	9.3
Total	**114.2**	**0.0**	**0.0**	**114.2**

Operating Experience:

When designing microwave radio systems, atmospheric models are used to estimate radio performance. After a number of years with the microwave radio system in service, the effects of atmospheric ducting and multipath propagation of the radio signal have manifested themselves much more than were anticipated in the design, especially in the summer months. As such, intermittent outages to the microwave radio system have been experienced to a degree that is unacceptable for SCADA and teleprotection signals.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Microwave Quad-Diversity Upgrade **(cont'd.)**

Project Justification:

This is an essential project that must be completed as soon as possible so as not to jeopardize operation and control of the electrical power system. Failure to address this issue can result in a situation where signal fading condition could occur at a time when control of the power system is essential for system restoration or generation control. In the case of the former, customers would be without power longer than required. For the latter case, the inability to control generation could result in load shedding and the eventual loss of power to customers.

Future Plans:

Other sites requiring upgrades may be identified in future years.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles and Aerial Devices

Location: Various Locations

Category: General Properties - Transportation

Type: Other

Classification: Normal

Project Description:

This project involves replacing twenty-four transportation vehicles (cars, pick-ups and vans) and eleven work vehicles (line trucks and boom trucks).

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	2,371.0	0.0	0.0	2,371.0
Labour	0.0	0.0	0.0	0.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	77.8	0.0	0.0	77.8
Contingency	237.1	0.0	0.0	237.1
Total	**2,685.9**	**0.0**	**0.0**	**2,685.9**

Operating Experience:

The vehicles being replaced have become unreliable and are uneconomical to maintain. These vehicles fall within the established replacement criteria for age and kilometers as follows:

Transportation Vehicles: 5 - 7 years or 150,000 kms

Work Vehicles: 7 - 10 years or 200,000 kms

Project Justification:

Newfoundland and Labrador Hydro requires reliable vehicles for efficient delivery of its service. The vehicles being replaced are at the end of their life cycle and are no longer dependable. The transportation vehicles being replaced have an average of seven years service and 173,000 kms. The work vehicles have an average age of ten years and 210,000 kms. Vehicles being replaced meet or exceed the replacement criteria guidelines.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Pick-Ups and Snowmobiles

Location: Various Locations

Category: General Properties - Transportation

Type: Clustered

Classification: Normal

Project Description:

To supply seven pick-ups, fourteen snowmobiles, and storage buildings for use at Nain, Makkovik, Postville, Hopedale, Cartwright, Rigolet and Black Tickle.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	575.0	0.0	0.0	575.0
Labour	147.0	0.0	0.0	147.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	21.0	0.0	0.0	21.0
O/H, AFUDC & Escalation	24.9	0.0	0.0	24.9
Contingency	74.3	0.0	0.0	74.3
Total	**842.2**	**0.0**	**0.0**	**842.2**

Operating Experience:

Maintenance crews are required to transport tools and equipment to work sites in remote isolated communities. Items that are left outside are subject to security risks, damage and theft. Private citizens are often reluctant to rent their vehicles and equipment for transportation of Hydro equipment.

Project Justification:

The North Coast Isolated Communities do not have a transportation system that will allow Hydro to move tools and equipment. These pick-ups and snowmobiles will be used by maintenance staff and other Hydro employees working in these communities. Reliability of service to the customer will be greatly improved in response time, by having vehicles and snowmobiles available at all times. As well there will be a decrease in the risk of musculoskeletal injuries resulting from the handling of heavy tools and equipment. To protect and secure these vehicles, buildings are required and are included in this proposal. These buildings will require an electrical service for lighting and to plug in the vehicles during the winter.

Future Plans:

None.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: System Security Upgrades

Location: Various Sites

Category: General Properties - General Administration

Type: Other

Classification: Normal

Project Description:

This project is the first year of a three-year program to upgrade Hydro's physical security systems. The project will consist of the installations of additional security fences/gates, outdoor lighting systems, closed circuit cameras, cards access systems, property key - locking systems, secured file systems (electronic and hard copy) intrusion alarms, and anti climbing devices, etc. The various sites across the systems will be prioritized and appropriate security upgrades will be installed.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	250.0	0.0	0.0	250.0
Labour	250.0	0.0	0.0	250.0
Consultant	65.0	0.0	0.0	65.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	27.0	0.0	0.0	27.0
O/H, AFUDC & Escalation	75.9	0.0	0.0	75.9
Contingency	0.0	0.0	0.0	0.0
Total	**667.9**	**0.0**	**0.0**	**667.9**

Operating Experience:

Following Sept 11, 2001, the Canadian Electrical Association established as Critical Infrastructure Protection group (CIP). The CIP mandate was to promote initiatives to strengthen the protection of Canada's critical energy infrastructure and to provide a network of liaison within the utility industry to deal with issues related to emergency preparedness, safety and security. It was through Hydro's involvement in CIP that it recognized the need for assessing and upgrading major infrastructure and property security. In 2003 and 2005 Hydro commissioned consultant managed studies of several of its facilities. These studies resulted in general recommendations for security upgrades. These general recommendations will be developed into specific security upgrades over a three-year period beginning in 2007.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: System Security Upgrades **(cont'd.)**

Project Justification:

Since Sept 11, 2001, the role of security has changed dramatically. A properly structured and deployed security program will reduce the possibility and possibly eliminate some preventable losses by implementation of crime control, opportunity reduction and security awareness training programs. There are a several established professional and legal standards that set an industry specific standard of care precedent. In order for Hydro to reduce its liability, it is imperative that Hydro's security program meet or exceed industry's practices in policy, procedure, physical and technical security countermeasures. Hydro considers these security upgrades on a corporate wide basis as being vital to maintaining reliable service to its customers.

Future Plans:

This proposal is for the first year of a three-year program to upgrade security systems across the Hydro system.

2007 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Storage Ramp

Location: Bishop's Falls

Category: General Properties - General Administration

Type: Other

Classification: Normal

Project Description:

This project consists of the construction of a 3.0 m x 60.0 m storage ramp to replace an existing ramp at Bishop's Falls. The ramp will be a steel frame with a treated timber platform.

Project Cost: *($ x1,000)*	**2007**	**2008**	**Beyond**	**Total**
Material Supply	25.0	0.0	0.0	25.0
Labour	25.0	0.0	0.0	25.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	0.0	0.0	0.0	0.0
O/H, AFUDC & Escalation	7.3	0.0	0.0	7.3
Contingency	5.0	0.0	0.0	5.0
Total	**62.3**	**0.0**	**0.0**	**62.3**

Operating Experience:

The existing storage ramp is approximately 30 years old and is constructed from concrete, steel and wood. The ramp is subjected to rough use and sudden shock loads from mobile equipment when storing and retrieving heavy materials and equipment. The concrete piers have deteriorated at the ground level and have also been subject to damage by snow clearing equipment.

Project Justification:

The existing ramp, built on concrete pillars with steel "I" beam supports and decked with wood is in a deteriorated condition. A ramp in similar conditions failed in 2004 and it is prudent to replace this ramp before it fails and possibly damages equipment stored on it or injures personnel. See attached photographs.

Future Plans:

As the condition of other similar storage ramps at the Bishop's Falls facility deteriorate, proposals for their replacement will be submitted for approval.

Newfoundland & Labrador
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