P.U. 53 (2004)

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

and

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

(i) approving its 2005 Capital Budget of $42,431,000;
(ii) approving its 2005 Capital Purchases, and Construction Projects in excess of $50,000;
(iii) approving its Leases in excess of $5,000;
(iv) approving its estimated Contributions in Aid of Construction for 2005; and
(v) fixing and determining, pursuant to s. 78 of the *Act*, its Average Rate Base for 2003 in the amount of $1,422,412,000.

WHEREAS Hydro is a corporation continued and existing under the *Hydro Corporation Act,* is a public utility within the meaning of the *Act* and is also subject to the provisions of the *Electrical Power Control Act, 1994;* and

WHEREAS Hydro submitted the Application on August 10th, 2004; and

WHEREAS at the direction of the Board, a Notice of Public Hearing in respect of the Application was published in various newspapers in circulation throughout the Province; and

WHEREAS following the published Notice of Public Hearing, Notices of Intervention to participate were received by the Board from:

1. Newfoundland Power Inc. (NP); and
2. Industrial Customers Companies, identified as Abitibi-Consolidated Company of Canada, Stephenville and Grand Falls divisions; Corner Brook Pulp and Paper Limited; North Atlantic Refining Limited; and Voisey's Bay Nickel Company Limited (the "IC"); and

WHEREAS the Public Hearing commenced on October 6th, 2004 and continued on October 7th, 8th and 18th, with written submissions filed by all parties by November 1, 2004; and

WHEREAS the Board has carefully considered all the evidence and submissions made and issues this Order with reasons to follow.

IT IS THEREFORE ORDERED THAT:

1. **Pursuant to subsection 41(3) of the *Act*, improvements and additions to Hydro's property for construction and purchases in excess of $50,000, and leases in excess of $5,000 in a year, as set out in Schedule "A" attached to this Order are approved.**

2. **Pursuant to subsection 41(1) of the *Act,* the 2005 Capital Budget for improvements and additions to Hydro's property in the amount of $42,431,000 is approved.**

3. **Pursuant to section 78 of the *Act* Hydro's average rate base for the year ending December 31st, 2003 is hereby fixed and determined at $1,422,412,000.**

4. **An allowance for unforeseen events of $1,000,000 is approved as part of the 2005 Capital Budget which allowance remains subject to the five conditions in respect thereof more particularly set forth in Order No. P.U. 7 (2002-2003).**

5. **Each party shall bear its own costs incurred in connection with this Application.**

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

DATED at St. John's, Newfoundland and Labrador, this 23rd day of December, 2004.

J. William Finn, Q.C.
Presiding Chair.

Gerard Martin, Q.C.,
Commissioner.

Donald R. Powell,
Commissioner.

G. Cheryl Blundon,
Board Secretary.

Schedule “A”

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Slope Stabilization - Upper Salmon Power Canal

Location: Upper Salmon Generating Station

Division: Production

Classification: Hydro Plants

Project Description:

This project for 2005 is the continuation of a project for which the Board approved funds for 2004. The project is proposed to be carried out in two phases over a two-year period. The first phase consists of an engineering study during 2004 to determine the most appropriate method to address concerns with slope instability at a section of the Upper Salmon power canal. The study will evaluate options and prepare the final design and cost estimate. During the second phase, in 2005, the repair will be completed. The Upper Salmon power canal is 3.8 km in length and was constructed through the excavation of overburden and bedrock and the building of earth fill dykes. Settlement, cracking and slumping has been identified over the past several years along a 400 m section of the north slope of the canal, which was constructed to a slope of 2.0 H: 1.0 V. As well, this area has a high ground water table and is subject to localized flash flooding and wave action from the adjacent lake. Hydro's Dyke Board of Consultants (the Dyke Board) has recommended that the canal's slope in this area be revised to 2.5 H: 1.0 V.

The cost estimates listed below for 2005 are preliminary and will be revised pending completion of the engineering study. By completing the engineering study in the first year, it will permit proper planning of all aspects of the work, thereby minimizing the impacts on the operation of the Upper Salmon plant. It is expected that outage schedules elsewhere on the system will be impacted depending on the length of the outage at Upper Salmon plant. As well, this will lessen the probability of spilling around the facility. Acres International Ltd. is carrying out this engineering study and a report is expected in late August of 2004. This project will require approval(s) from the Provincial Department of the Environment.

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	0.0	660.0	0.0	660.0
Engineering	90.0	90.0	0.0	180.0
Project Management	0.0	45.0	0.0	45.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	12.0	208.0	0.0	220.0
Total	**102.0**	**1,003.0**	**0.0**	**1,105.0**

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Slope Stabilization - Upper Salmon Power Canal **(cont'd.)**

Operating Experience:

Problems encountered during the construction of the power canal in 1982 included erosion along the canal slopes and localized slope failures. To reduce these problems a drainage system was incorporated into the final design. The canal has been in continuous operation since construction, with no interruption of service.

Since construction of the canal, concerns have persisted with repeated formation of cracks, minor slumping of the slopes, runoff carrying silts and debris from the adjacent hillside and the blockage of the drainage ditches with snow, ice and vegetation growth. As well, numerous washouts along the canal slope have had to be repaired. Remedial measures have included cleaning the drainage ditches and construction of beams on the upper slope to intercept silt moving down from the main borrow area. A number of means have been employed to monitor the situation including: the installation of settlement monuments to quantify movement of the slope; the installation of piezometers to monitor water levels in the slope; underwater inspections of the canal; and cross sectional surveys.

Over the past five years, at the recommendation of the Dyke Board, Hydro has retained consultants to conduct a slope stability assessment of the area, investigate possible movement of the slope and recommend remedial measures that might be taken to alleviate any further movement. These measures, in addition to the maintenance work outlined above, cost in the order of $130,000.

Project Justification:

Since the construction of the power canal in 1982, the Dyke Board in their annual reports has on fourteen occasions made reference to the condition of canal. Over the past several years, the Board has become increasingly concerned with the continued operation of the canal based on their observations and review of Hydro's annual inspection reports, particularly considering the consequences of a slope failure causing a partial or complete blockage of the canal. This, in turn, could lead to a failure or breach of the dyke on the south side of the canal.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Slope Stabilization - Upper Salmon Power Canal **(cont'd.)**

Project Justification:

The following are excerpts from the Dyke Board Report:

"This 400 m long section is located adjacent to high ground which required an excavation to accommodate the canal. Two notable aspects of the hillside are its height which rose about 40 m above the canal, and the high ground water it contained.

The high ground water presented some difficulty during the construction of the canal in 1983. This difficulty was compounded by inclement and sometimes stormy weather. It was necessary to control the outflow of ground water into the canal excavation by means of a drainage system installed in the left side. Also a change in soils in the hillside was noted from dense impervious glacial till to pervious sand and gravel. Various measures were undertaken in this area to defend against adverse conditions. By and large, the canal and associated elements have performed satisfactorily over the past twenty years. The relatively low seepage from the canal and the satisfactory piezometric level are indicative of excellent impermeability containment of the canal.

However, some concerns persisted after construction over the repeated formation of cracks, minor slumping of slopes, runoff carrying silts and debris from the hillside, and the blockage of drainage ditches with snow, ice and growth. The concern of the Dyke Board in this area began to grow in the last several years, particularly in light of consequences, which could result from a blockage in the canal.

Among other factors, the 11.25 m high underwater slope is central to the Board's concern. A report dated October 1999 by Agra of St. John's examined the stability of the left bank, and concluded that the 2.0 H : 1: 0 V lower slope has low and marginal stability and reaches a factor of safety of 1.0 only by assuming an unrealistically high strength for the slope.

The main thrust of the solution must be to induce greater stability in the lower slope. Accordingly, deformations and resulting creep of the lower slope has been continuing sporadically for many years, and must be arrested before a significant slump occurs.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Slope Stabilization - Upper Salmon Power Canal **(cont'd.)**

Project Justification: (cont'd.)

It is recommended that the lower slope of the canal be flattened to 2.5 H: 1.0 V, from station 1 + 700 to station 2 + 100".

This particular section of the canal has received much attention over the years. However, continued problems associated with the formation of longitudinal cracks, slumping of the slopes and washouts due to loss of ditching has now prompted the Dyke Board to recommend significant work. The Dyke Board believes that the slope should now be flattened as soon as possible before a large slump occurs. This section of the canal is showing "early" signs of slope instability and Hydro has made several efforts to determine the cause and to correct the slope deterioration. A decision not to stabilize this section of the canal as recommended would result in continued deterioration until a failure occurs. This would result in costly repairs and damage to the local environment with the Upper Salmon generating unit out of service for the duration which depending on the time of year could be for up to four or five months which would impact the supply of power to customers. Besides the loss of significant capacity (84 MW), a blockage and extended outage would result in lost energy production at Upper Salmon, as the plant would have to be bypassed to ensure sufficient water for operations at the downstream Bay d'Espoir plants. As well, there would be lost energy production if the failure were to result in a breach on the south side of the canal. An outage to the Upper Salmon Plant of this duration would mean additional thermal energy production at Holyrood at a cost of approximately $12.2 million assuming fuel at $32.20 per barrel.

Future Plans:

All work associated with this project is expected to be completed by the end of 2005.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Underground Fuel Tanks - Upper Salmon Generation Facility

Location: Upper Salmon Powerhouse, North Salmon Spillway, West Salmon Spillway

Division: Production

Classification: Hydro Plants

Project Description:

This project involves the replacement of three existing underground bulk fuel storage tanks and associated day tanks at the Upper Salmon Powerhouse, North Salmon Spillway and West Salmon Spillway. It includes the design, supply and installation of aboveground double wall bulk storage fuel tanks along with day tanks at each site. Construction activities at each location include site work, concrete foundations, tank installation, fuel piping modifications, and instrumentation. The original tank capacity will be maintained at the Upper Salmon Powerhouse and West Salmon Spillway while at the North Salmon Spillway the bulk storage tank capacity will be reduced from 22,725 litres to 7,728 litres. The replacement systems will include provisions for secondary containment, leak detection, and fuel use reconciliation.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	84.0	0.0	0.0	84.0
Labour	145.0	0.0	0.0	145.0
Engineering	21.0	0.0	0.0	21.0
Project Management	28.0	0.0	0.0	28.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	49.3	0.0	0.0	49.3
Total	**327.3**	**0.0**	**0.0**	**327.3**

Operating Experience:

The 22,725-litre fuel storage tanks at the Upper Salmon Powerhouse and the North Salmon Spillway, and respective day tanks (1,137 litre and 909 litre) were fabricated and installed in 1982. The 7,728-litre fuel storage tank and 909-litre day tank at the West Salmon Spillway were fabricated and installed in 1987. All these facilities have been in constant operation without any significant maintenance work performed since they were installed.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Underground Fuel Tanks - Upper Salmon Generation Facility **(cont'd.)**

Project Justification:

The existing underground bulk storage at each of the 3 sites consists of single wall fiberglass tanks. None of these bulk storage tanks, the day tanks, or the piping systems have secondary containment or leak detection measures. As well, none of the three systems have any means of quantifying the amount of fuel used by the diesel generators for reconciliation purposes. Environmental compliance audits have identified that the installations are in contravention of the current Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products, and the Provincial Gasoline and Associated Products (GAP) Regulations. The replacement fuel storage systems will meet current CCME Guidelines and the Provincial GAP Regulations.

Future Plans:

No repairs, upgrades, or replacements are anticipated at either location in the near future.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Controls Spherical Valve No. 6

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project involves the upgrade of the control system for spherical valve No. 6 by replacing components, including control valves, piping, tubing and control panel. It is a continuation of a program started in 2001 to upgrade control systems on spherical valves at Bay d'Espoir. The Board has previously approved upgrades on four of six systems at Bay d'Espoir Powerhouse No.1. The new controls will have stainless steel mechanical components for corrosion protection and a programmable logic controller with manual over-rides.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	100.0	0.0	0.0	100.0
Labour	45.0	0.0	0.0	45.0
Engineering	3.0	0.0	0.0	3.0
Project Management	6.0	0.0	0.0	6.0
Inspection & Commissioning	3.0	0.0	0.0	3.0
Corp O/H, AFUDC, Esc. & Contingency	39.1	0.0	0.0	39.1
Total	**196.1**	**0.0**	**0.0**	**196.1**

Operating Experience:

Bay d'Espoir unit No. 6 along with the existing spherical valve and control became operational in January 1972. This generating unit typically operates for 5,500 hours each year. In the last five years there have been thirty-four maintenance events for this control system, which is much higher than expected for this type of system. Control systems on unit No.1, 2, 3 and 4 have been upgraded since 2001.

Project Justification:

The control System for spherical valve No. 6 is obsolete and unreliable. Replacement parts have to be reverse engineered and custom made. The spherical valve is the main valve controlling water flow to the turbine. The failure of the existing control system can result in the following events:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Controls Spherical Valve No. 6 **(cont'd.)**

Project Justification: (cont'd.)

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

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

Depending on the time of year when a failure occurs, replacement capacity and energy, if available, would have to be obtained through increased thermal production at Holyrood or gas turbine sites at significantly higher cost. As well, a lengthy outage would increase the risk of spill during high inflow periods. The cost of replacement energy from Holyrood arising from an outage of two units (150 MW) is $184,000/day assuming fuel at $32.20 per barrel. It would be unacceptable to maintain the status quo and risk the loss of capacity given the significance of this generation capacity to the overall system.

Future Plans:

It is currently planned to have the control system upgraded on one more unit at Bay d'Espoir in the following year.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Penstock - Snook's Arm Generating Station

Location: Snook's Arm

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the design and construction of a penstock for the 590 kW generating station at Snook's Arm. The work includes the design, supply and installation of a new penstock including excavation, backfilling and anchoring as well as removal and disposal of the old wood stave penstock. The existing wood stave penstock is 750 mm in diameter and 930 m long and was constructed in 1956. Approvals and permitting from the Provincial Department of Environment will be required for the removal and disposal of the existing penstock and construction of the new penstock. Project design will be completed in 2005 with construction to be completed in 2006.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour *(Incl Const. Contracts)*	0.0	1310.0	0.0	1310.0
Engineering	102.0	58.0	0.0	160.0
Project Management	0.0	75.0	0.0	75.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	13.0	372.0	0.0	385.0
Total	**115.0**	**1,815.0**	**0.0**	**1,930.0**

Operating Experience:

Please refer to the report in section G, Appendix 1 titled " Snook's Arm Wood Stave Penstock - Evaluation, Recommendation and Estimated Cost for Replacement", January 2004.

Project Justification:

Typically, wood stave penstocks have a design life of 40 years. This penstock, if replaced in 2006, will be fifty years old. The penstock is significantly beyond its design life and has a number of identified problem areas. It continues to deteriorate with maintenance costs increasing. The risk of a collapse or failure of the penstock is increasing and unless the condition is corrected, continued deterioration will eventually lead to a rupture resulting in property damage, costly repairs and the potential for loss of life. A number of options to deal with the problems have been investigated and the recommended option is the replacement of the entire penstock. An economic analysis indicates

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Penstock - Snook's Arm Generating Station **(cont'd.)**

Project Justification (cont'd.):

a net present value benefit of between $585,923 and $862,672 at the end of the thirty-year analysis and a payback in ten to thirteen years. (See report in section G, Appendix I)

Future Plans:

No future commitments are required. The work will be completed in one construction season during 2006.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Dry Ice Cleaning System

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the purchase of a Minibar Dry Ice Cleaning System. This CO_2 cleaning system uses a combination of compressed air and dry ice to clean dirty equipment.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	55.0	0.0	0.0	55.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	3.6	0.0	0.0	3.6
Total	**58.6**	**0.0**	**0.0**	**58.6**

Operating Experience:

The rotors and stators of generating units collect brake dust from generator brakes and oil mist from thrust and guide bearing assemblies. This brake and oil residue has the potential to cause major operating problems and significantly reduce the life expectancy of generator units. Currently, Hydro has at least one unit cleaned each year under contract at a cost of $15,000 per unit.

Project Justification:

The purchase and use of the proposed cleaning system by internal staff will result in lower overall annual cost than contracting out the work. Even at a minimum rate of one unit per year the purchase will provide a payback in five years. A CO_2 Cleaning System is safe, environmentally friendly; very effective, and can reduce cleaning time by 50 - 60%. The alternative of cleaning with chemicals poses safety and health risks, environmental problems, and is not entirely effective, as many areas cannot be accessed for cleaning.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Control System

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

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

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

Operating Experience:

The existing DCS for Units No. 1 and 2 was implemented in 1988 and for Unit No. 3 in 1992. The manufacturer's commitment of support for these systems expired in January 2002 and January 2003 respectively. These systems are in use whenever the units are operating. Maintenance costs are increasing each year (less than $30,000 before 2001, $60,900 in 2001, $62,600 in 2002, and approximately $90,000 in 2003) and obsolete component stocks are being depleted. As the existing Unit No. 3 DCS is one level higher than the replaced control system, some critical components are not compatible to use as spares for Unit No. 3.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

The manufacturer has informed Hydro that parts of the Distributed Control System (DCS) are obsolete and the system is no longer supported. Based on the spare parts available in Hydro's inventory and failure history, sufficient spare parts are available to maintain and operate the systems until 2005. Beyond this date, it is expected that only used or refurbished parts would be available for some repairs, however, their availability would be uncertain. The Holyrood units cannot operate without the DCS functioning properly and a replacement is necessary to maintain plant availability and reliability. An outage to a unit (150-175 MW) could affect Hydro's ability to supply customers. Depending on the time of year, replacement capacity, if available, may have to be obtained from gas turbines at significantly higher costs.

In the 2004 Capital Budget submission, Hydro had proposed to source the replacement to the original equipment manufacturer, Westinghouse Process Controls now Emerson. Since then, Hydro has kept abreast of the developments within the industry in an effort to arrive at the best decision on DCS replacement equipment. This involved a closer evaluation, which determined that sourcing to Foxboro was a also viable option. Eventually, proposals were received from both the original equipment manufacturer (Emerson) and Foxboro. All other DCS vendors would have had to replace cabinets and terminations, which would drastically increase the cost and extent of work required for this project. It was decided to source the replacement to Foxboro and not Emerson for the following reasons:

1) Foxboro's proposal included new Input/Output (I/O) cards that will fit into our existing cabinets without having to re-terminate field wiring. New I/O cards would improve system reliability due to age related failures. Emerson's proposed to use existing I/O cards although they are developing a program for 2005 to migrate their older I/O cards to new technology. They do not currently plan to declare the older I/O cards obsolete, but it is believed that maintenance costs for existing I/O cards will escalate once a migration program is in place;

2) Foxboro has a more flexible service agreement. Foxboro will allow a 10% cost overrun on equipment replacement and provides flexibility to transfer funds between service modules and into future years. Emerson provides some flexibility to transfer funds between service modules but an additional module must be purchased when equipment replacement limits are reached. Year-end balances would be forfeited under the proposed Emerson service agreement;

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

3) Emersons proposed to use conversion tools to automatically upgrade software. This is a proven labour saving process although the converted software is tedious to interpret and maintain. Foxboro will re-write software which will result in a more organized product that will be easier to maintain;

4) Recent clients of both migration processes were contacted and were pleased with their new systems. One Emerson client suggested re-writing software instead of using the tools and plans a re-write in the next phase of his migration. Foxboro clients were more enthusiastic about the migration process and their system; and

5) Foxboro has a superior history of long- term support commitment through their "backwards compatibility" policy - new equipment is designed to be compatible with all older equipment in the same system family. Emerson has a 10-year support commitment policy that guarantees support for 10 years after a component is no longer the current technology.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase/Installation Anti-Fouling System for Cooling Water Systems

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

This project includes the supply and installation of anti-fouling systems for the cooling water systems on Units 1, 2 and 3 at the Holyrood Generation Station. The anti-fouling systems will be located in the Stage I and II pump houses and will use the copper ion injection method.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	390.0	0.0	0.0	390.0
Labour	117.0	0.0	0.0	117.0
Engineering	12.4	0.0	0.0	12.4
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	45.0	0.0	0.0	45.0
Corp O/H, AFUDC, Esc. & Contingency	140.1	0.0	0.0	140.1
Total	**704.5**	**0.0**	**0.0**	**704.5**

Operating Experience:

The Holyrood plant has been in operation since 1969. The current method used for removal of mussel infestation consists of manual cleaning using several laborers and a vacuum truck. The cooling water systems for each unit are cleaned once per year.

Project Justification:

Mussel infestation can gradually restrict flow and reduce the efficiency of cooling systems. In more extreme cases, pipes can become completely blocked, resulting in unit outages. Additionally, the yearly cost associated with lower generation efficiency and the manual cleaning and removal of mussel infestation for the three units amounts to $185,000. This installation will eliminate these costs and be more cost effective with a payback in five years.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase/Install Fire Protection System - Microwave Radio Room

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

This project consists of the supply and installation of an Inergen fire protection system to protect the communications equipment in the Holyrood microwave radio room. It includes the modification of the existing sprinkler system to remove two water sprinkler heads from the room. The project's design will require approval by Hydro's insurance underwriter prior to installation.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	7.0	0.0	0.0	7.0
Labour	35.0	0.0	0.0	35.0
Engineering	0.0	0.0	0.0	0.0
Project Management	5.0	0.0	0.0	5.0
Inspection & Commissioning	3.0	0.0	0.0	3.0
Corp O/H, AFUDC, Esc. & Contingency	11.0	0.0	0.0	11.0
Total	**61.0**	**0.0**	**0.0**	**61.0**

Operating Experience:

The microwave radio room has fire protection sprinkler heads, which would prevent a fire from spreading to the remainder of the plant. However, should it ever operate, water from the sprinklers would damage the communications equipment in the room.

Project Justification:

The proposed Inergen fire protection system would extinguish a fire in the room without damaging the communications equipment. This equipment is important to the operation of the system as it provides SCADA, JDE, Lotus Notes and telephone telecommunication circuits for the Holyrood Generating Station as well as teleprotection circuits for transmission lines TL242, TL218 and TL217. Loss of this equipment due to fire would result in loss of all Hydro-owned telecommunication facilities to the Holyrood Plant and the Holyrood Terminal Station.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Civil Structures

Location: Holyrood Generating Station

Division: Production

Classification: Generation - Thermal

Project Description:

This project for 2005 is the continuation of a project which the Board has approved funds for 2004. The project consists of two components:

1. Boiler Stack

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

2. CW Screen Structure

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

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

Operating Experience:

1. Boiler Stack

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Operating Experience: (cont'd.)

2. CW Screen Structure

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

Project Justification:

1. Boiler Stack

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

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

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

   An analysis of the possible options report titled "Evaluation of Options to Refurbish Stack Liner #2" was provided in Hydro's 2004 capital budget submission to the Board in Section G, Appendix 3.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

2. CW Screen Structure

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

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

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Main Fuel Line Valves

Location: Hardwoods Gas Turbine

Division: Transmission & Rural Operations

Classification: Gas Turbines

Project Description:

This project consists of the supply and installation of two motorized valves at Hardwoods Terminal Station in the main fuel pipeline between the storage tank and the fuel forwarding module on the gas turbine.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	23.0	0.0	0.0	23.0
Labour	42.0	0.0	0.0	42.0
Engineering	5.0	0.0	0.0	5.0
Project Management	3.5	0.0	0.0	3.5
Inspection & Commissioning	1.0	0.0	0.0	1.0
Corp O/H, AFUDC, Esc. & Contingency	16.5	0.0	0.0	16.5
Total	**91.0**	**0.0**	**0.0**	**91.0**

Operating Experience:

The gas turbine fuel system does not meet the requirements of the Provincial Gasoline and Associated Products Regulations.

Project Justification:

The Provincial Gasoline and Associated Products Regulations as administered by the Department of Environment, Government of Newfoundland and Labrador, for operation of the fuel storage and distribution systems requires that the system be designed to limit the fuel leakage (in case of a line failure) to less than 2,300 litres. The proposed modifications will ensure compliance of the system with the Regulations.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Installation of Diesel Generating Set

Location: Stephenville Gas Turbine

Division: Transmission & Rural Operations

Classification: Gas Turbine

Project Description:

This project consists of the installation of a 40 kW diesel generator to provide reserve capability for the DC power systems. The project includes the construction of a new building to house the generator and associated equipment which have been removed from Petites.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	27.4	0.0	0.0	27.4
Labour	18.8	0.0	0.0	18.8
Engineering	11.8	0.0	0.0	11.8
Project Management	5.4	0.0	0.0	5.4
Inspection & Commissioning	7.4	0.0	0.0	7.4
Corp O/H, AFUDC, Esc. & Contingency	15.8	0.0	0.0	15.8
Total	**86.6**	**0.0**	**0.0**	**86.6**

Operating Experience:

The black-start capability at the Stephenville Gas Turbine has been compromised by the inability to maintain a full charge on the station batteries. For example, on March 4, 2003, the gas turbine was operating as a synchronous condenser and was approximately one hour into the ninety-minute post-lube process. At that time, a system power interruption occurred and a black-start of the gas turbine was requested. When the interruption occurred, the post-lube process automatically switched to the station batteries for the remainder of the ninety-minute shutdown cycle. Approximately ten minutes after the switch to battery reserve, a low DC voltage trip occurred and locked out any attempt to start the turbine.

Project Justification:

The installation and automation of a diesel generator will enhance the reliability of the DC systems at the Stephenville Gas Turbine by providing the capability to maintain a full charge on the battery system at all times. Whenever the diesel starts it will function as a DC source for the gas turbine

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Installation Diesel Generating Set **(cont'd.)**

Project Justification: (cont'd.)

systems and will prevent the station batteries from discharging. A fully charged battery system will ensure that the gas turbine can be safely rundown at all times without risk of interrupting the necessary shutdown sequences. This increased assurance of battery integrity will enhance the gas turbine's reliability and black-start capability. In addition, the diesel will also be used to recharge the gas turbine air start system and provide a virtually unlimited number of starting attempts, should they be required.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery Bank

Location: Hardwoods Gas Turbine

Division: Transmission & Rural Operations

Classification: Gas Turbine

Project Description:

This project consists of the purchase and installation of a replacement 125 volt, 900 ampere hour stationary battery bank for the Hardwoods Gas Turbine. The existing battery charger does not need to be replaced at this time.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	5.0	0.0	0.0	5.0
Engineering	2.0	0.0	0.0	2.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	10.7	0.0	0.0	10.7
Total	**57.7**	**0.0**	**0.0**	**57.7**

Operating Experience:

The Valve Regulated Lead Acid (VRLA) batteries at Hardwoods were installed approximately ten years ago. Routine maintenance and inspections involve conductance, specific gravity and load discharge tests. In the past year, the conductance tests indicated erratic results from cell to cell which indicates a high probability of failure when the bank is placed under load. This increased rate of deterioration indicates that the battery bank is at the end of its life. The normal expected life of this type of VRLA battery bank is ten to twelve years.

Project Justification:

This battery bank provides the DC supply for the gas turbine's protection and controls and auxiliary equipment operation. This DC source is an integral component to the DC lube pumps for the generator's main bearings. If the batteries are not replaced at this time, the DC lube pumps may not function properly which could lead to extensive damage to the gas turbine. In addition, should the DC supply to switchgear equipment fail, the system protection and control equipment will not function and system reliability will be compromised.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Wood Poles - Transmission

Location: Various Sites

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

The project is the first year of a multi-year program of inspection, treatment and replacement of line components (poles, conductor and hardware) on Hydro's transmission system.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	382.0	0.0	0.0	382.0
Labour	1,492.0	0.0	0.0	1,492.0
Engineering	278.0	0.0	0.0	278.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	435.6	0.0	0.0	435.6
Total	**2,587.6**	**0.0**	**0.0**	**2,587.6**

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 decided to take 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.

Project Justification:

The report titled "Wood Pole Line Management Using RCM Principles" is contained in Section G, Appendix 2. This report recommends 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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Wood Poles - Transmission **(cont'd.)**

Project Justification: (cont'd.)

extend the life, are identified for replacement. Field data is collected and stored electronically, and a comprehensive data base of the program results is maintained.

The study concludes that 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.

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.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade TL221 - (66 kV Peter's Barren - Hawkes Bay)

Location: Peter's Barren to Hawkes Bay

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

This project consists of the upgrade of a 27 km section of line TL221 from Peter's Barren to River of Ponds. This upgrade will include all work necessary to replace existing insulators and wood cross arms for the entire 27 km section. Guying will be added to selected structures to improve the stability of the line.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	272.7	0.0	0.0	272.7
Labour	292.9	0.0	0.0	292.9
Engineering	25.8	0.0	0.0	25.8
Project Management	37.4	0.0	0.0	37.4
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	145.3	0.0	0.0	145.3
Total	**774.1**	**0.0**	**0.0**	**774.1**

Operating Experience:

TL221 was constructed in 1970 and is 53.2 km long. It was built with single wood pole structures and is operating at 69 kV. The line is located generally parallel to the coast resulting in exposure to extreme wind and heavy salt contamination. These conditions have led to frequent outages due to flashovers caused by the salt accumulation on the insulators. The operating experience is that a severe salt accumulation event occurs approximately every three years. An engineering site assessment conducted in the fall of 2003 confirmed the poles to be in good condition and should continue to provide dependable service for at least another twenty years.

Project Justification:

The site assessment and review of the outage statistics confirmed that replacement of the insulators and crossarms is the most prudent course of corrective action to take. The outage frequency rate for the 1999-2003 period was 18.79 per 100km/year for both momentary and sustained. The Hydro average for this class of line is 7.11 and the CEA All Canada Rate is 5.71. Implementing these improvements will result in a reduction in the outage frequency.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade TL221 - (66 kV Peter's Barren - Hawkes Bay) **(cont'd.)**

Project Justification: (cont'd.)

The Acres International report "System Performance Review Great Northern Peninsula" (June 2003) submitted to the Board in June, 2003 and included in the response to IC-231 NLH at Hydro's 2003 General Rate Application, also recommends implementing corrective measures for the most exposed sections of TL221.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators TL243 - (138 kV Hinds Lake - Howley)

Location: Hinds Lake to Howley

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:
TL243 is a 15 km 138 kV radial transmission line running from Hinds Lake to Howley. It consists of 74 H-Frame wooden pole structures. The line was constructed in 1978 to connect the Hinds Lake Generating Station to the system. This project consists of the replacement of all the remaining Canadian Ohio Brass (COB) insulators on the line.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	65.0	0.0	0.0	65.0
Labour	64.0	0.0	0.0	64.0
Engineering	34.0	0.0	0.0	34.0
Project Management	12.0	0.0	0.0	12.0
Inspection & Commissioning	10.0	0.0	0.0	10.0
Corp O/H, AFUDC, Esc. & Contingency	43.2	0.0	0.0	43.2
Total	**228.2**	**0.0**	**0.0**	**228.2**

Operating Experience:
The preventative maintenance (PM) cycle inspections, over the last four years, shows an increase in the number of defective COB insulators on this line.

Project Justification:
These insulators were manufactured by the Canadian Ohio Brass Company, and were installed during the original construction. They are a part of a group of insulators that have experienced industry wide failures due to cement growth resulting in moisture intrusion and causing radial cracks. The percentage of defective insulators is expected to increase with each PM cycle (i.e. five years) making the replacement of only the defective insulators cost prohibitive and a poor long-term maintenance strategy. The most cost effective remedy at this time is to replace all remaining units.

The Hinds Lake plant has a capacity of 75 MW and the loss of this line would isolate that capacity from the system and impact the supply of power to customers via an under-frequency load shedding event. Until the failed section is found and corrected and depending on the time of year, replacement capacity, if available, would have to be supplied by more expensive thermal generation.

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Provide Remote Control

Location: Farewell Head Terminal Station

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of equipment at the Farewell Head Terminal Station to provide supervisory control and power system equipment monitoring and alarms to the Energy Control Centre (ECC).

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	75.0	0.0	0.0	75.0
Labour	15.0	0.0	0.0	15.0
Engineering	10.0	0.0	0.0	10.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	4.0	0.0	0.0	4.0
Corp O/H, AFUDC, Esc. & Contingency	22.7	0.0	0.0	22.7
Total	**126.7**	**0.0**	**0.0**	**126.7**

Operating Experience:

Presently, there is no provision for active system status or control for power equipment in the station. Hydro's Energy Control Centre cannot react immediately when a local system trip occurs nor can they attempt power restoration to the Farewell Head, Change Islands, and Fogo Island systems. The ECC is notified of power outage(s) on the Farewell Head system by Hydro customers who call in and report a power outage in their area. Only after these customer outage reports have been received from Change Islands and/or Fogo Island does ECC determine the extent of the system outage and whether there has been a complete system trip originating at Farewell Head Terminal Station. The five-year average for SAIFI on the Farewell Head system is 10.12 and for SAIDI is 31.7. The present system wide five-year average for SAIFI is 7.67 and for SAIDI is 12.08. There is a total of 1,743 customers on the Farewell Head system.

Project Justification:

The addition of supervisory equipment to this terminal station will provide remote monitoring, alarms and control to ECC which will greatly improve the response time for power restoration and the dispatch of operating and maintenance crew(s) from Bishop's Falls to the area.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Provide Remote Control **(cont'd.)**

Project Justification: (cont'd.)

The ECC will also be provided with system fault information including possible cause and location which in turn, will be provided to the line crew(s) in order to shorten the time for isolation and/or repair of the faulted power system equipment. With this equipment in place, the SAIFI and SAIDI indices for this system are expected to be closer to the company's five-year average for the overall system.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase & Install Digital Fault Recorder

Location: Bottom Brook

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of a 32 channel Digital Fault Recorder at the Bottom Brook Terminal Station.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	66.0	0.0	0.0	66.0
Labour	18.0	0.0	0.0	18.0
Engineering	15.0	0.0	0.0	15.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	22.5	0.0	0.0	22.5
Total	**121.5**	**0.0**	**0.0**	**121.5**

Operating Experience:

Statistics show that more than 10% (27% in 2001) of protection operations occurred in the Bottom Brook area and historically there has been a high number of transmission line outages. There is no fault recording equipment at this station at the present time.

Project Justification:

Fault recorders are required to provide real-time and historical information on equipment operation during faults which will be used in the identification of problems which, when corrected, will enhance performance thereby improving customer service and reliability. This information assists the System Performance & Protection personnel in determining if the protection operated correctly and provides useful information in determining the root cause of system events. Following this root cause analysis, remedial actions are documented and acted on. This recorder would be particularly valuable in the analysis of faults in the Stephenville area such as those affecting TL209 and Doyles/Port aux Basques, TL214, and local equipment in Bottom Brook and adjacent stations.

To ensure that this project is completed with the lowest possible cost, Hydro will solicit competitive bids for all materials.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase & Install 66 kV Breaker Fail Protection

Location: Massey Drive Terminal Station

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of a 66 kV breaker failure protection at the Massey Drive Terminal Station.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	26.0	0.0	0.0	26.0
Labour	22.0	0.0	0.0	22.0
Engineering	17.6	0.0	0.0	17.6
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	15.8	0.0	0.0	15.8
Total	**81.4**	**0.0**	**0.0**	**81.4**

Operating Experience:

Presently there is no local 66 kV station back-up protection at Massey Drive Terminal Station to protect equipment and maintain system integrity in the event of a 66 kV breaker failure.

Project Justification:

Breaker failure is considered to be a low probability but a high consequence event. Without a breaker failure scheme, such incidents can cause a partial or complete collapse of the system due to extreme slow clearing of faults.

In recent years, Hydro installed 138 kV breaker failure schemes in various terminal stations to reduce the probability of a system collapse due to a breaker failure. The same protection philosophy is now being expanded to the 66 kV system. The first installation is at the Massey Drive Terminal Station.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Protection 66 kV Lines

Location: Daniel's Harbour, Peter's Barren

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of microprocessor based relays and associated equipment, to upgrade the protection on 66 kV lines TL262 and TL221.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	28.0	0.0	0.0	28.0
Labour	0.0	0.0	0.0	0.0
Engineering	16.0	0.0	0.0	16.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	26.0	0.0	0.0	26.0
Corp O/H, AFUDC, Esc. & Contingency	8.2	0.0	0.0	8.2
Total	**78.2**	**0.0**	**0.0**	**78.2**

Operating Experience:

The existing protection equipment for these lines is the older type electromagnetic relays, which are difficult to maintain and calibrate.

Project Justification:

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

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of motor drive mechanisms on eight existing 230 kV disconnect switches in the East Coast Terminal Stations. The disconnects are located in the following stations: Western Avalon - 2, Oxen Pond - 4, Holyrood - 1, Long Harbour - 1.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	65.0	0.0	0.0	65.0
Labour	48.0	0.0	0.0	48.0
Engineering	16.0	0.0	0.0	16.0
Project Management	8.0	0.0	0.0	8.0
Inspection & Commissioning	18.0	0.0	0.0	18.0
Corp O/H, AFUDC, Esc. & Contingency	27.8	0.0	0.0	27.8
Total	**182.8**	**0.0**	**0.0**	**182.8**

Operating Experience:

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

Project Justification:

The normal design practice, in the late 1960's, was that disconnects be manually operated. The only motorized disconnects provided were those used for transformer protection and isolation. However, since that time, a workplace safety concern has identified the requirement for motorized disconnects.

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery Banks

Location: Various Stations and Lines

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase and installation of new 60 cell, 125 volt, lead calcium flooded cell station battery banks for Stephenville (SVL) (200 A-Hr), Bay d'Espoir (BDE) (250 A-Hr), Corner Brook Frequency Converter (CBK FRC) (200 A-Hr), and Massie Drive (MDR) (250 A-Hr). 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. These chargers are fully operational and do not need to be replaced at this time.

This project also includes the replacement of the storage battery banks for the aircraft markers on TL233 at the Grand Lake Crossing.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	80.0	0.0	0.0	80.0
Labour	50.4	0.0	0.0	30.4
Engineering	5.0	0.0	0.0	5.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	30.3	0.0	0.0	30.3
Total	**165.7**	**0.0**	**0.0**	**165.7**

Operating Experience:

Regular maintenance work involves voltage, specific gravity and load discharge tests. The batteries to be replaced under this proposal are approaching or beyond the normal expected service life. In SVL, the Valve Regulated Lead Acid (VRLA) batteries installed in 1990 and the batteries on TL233, have shown signs of deterioration and are currently beyond the expected ten-twelve year service life of this type of battery bank. For BDE, CBK FRC, and MDR stations the flooded cell batteries installed in 1982, 1983 and 1986 respectively have also shown signs of deterioration and are approaching or beyond their expected 18-20 year service life for a flooded cell battery bank.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery Bank Various Stations **(cont'd.)**

Project Justification:

The 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 EMS system. Routine maintenance tests and inspections are done on an annual basis. These tests and inspections have confirmed a deterioration in the battery cell conditions to the point that system reliability and integrity is compromised if replacement is not undertaken.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Instrument Transformers

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	60.0	0.0	0.0	60.0
Labour	3.2	0.0	0.0	3.2
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	11.8	0.0	0.0	11.8
Total	**75.0**	**0.0**	**0.0**	**75.0**

Operating Experience:

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

Project Justification:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Surge Arrestors

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	46.8	0.0	0.0	46.8
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	11.6	0.0	0.0	11.6
Total	**68.4**	**0.0**	**0.0**	**68.4**

Operating Experience:

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

Project Justification:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase & Install Conduit & Control Cables

Location: Bay d'Espoir

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project consists of the purchase and installation of replacement conduit and control cable between the 230/69 kV Terminal Station and the powerhouse at Bay d'Espoir.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	15.5	0.0	0.0	15.5
Labour	24.0	0.0	0.0	24.0
Engineering	4.0	0.0	0.0	4.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	6.0	0.0	0.0	6.0
Corp O/H, AFUDC, Esc. & Contingency	11.2	0.0	0.0	11.2
Total	**60.7**	**0.0**	**0.0**	**60.7**

Operating Experience:

The existing direct buried control cables were installed in 1976, and have been damaged and severed on two occasions by construction activity. The most recent damage occurred in 2003. Temporary repairs were made at the time.

Project Justification:

This terminal station provides the station service supply for the Bay d'Espoir generation plant and any loss of service will critically affect the entire bulk electrical system. Repairs made to the cables are not of a permanent nature and are not adequate to ensure the long-term security and reliability of the Bay d'Espoir facility. Therefore, the existing damaged and spliced cables must be replaced.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Interconnect - Rencontre East

Location: English Harbour West Distribution Line to Rencontre East

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the construction of a single phase 14.4 kV distribution line from the English Harbour West distribution system to the community of Rencontre East. The project includes the installation of a voltage regulator, single-phase recloser and the conversion of the community of Rencontre East from the existing 7.2 kV to 14.4 kV.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	586.0	0.0	0.0	586.0
Labour	1,488.0	0.0	0.0	1,488.0
Engineering	365.0	0.0	0.0	365.0
Project Management	46.0	0.0	0.0	46.0
Inspection & Commissioning	155.0	0.0	0.0	155.0
Corp O/H, AFUDC, Esc. & Contingency	610.1	0.0	0.0	610.1
Total	**3,250.1**	**0.0**	**0.0**	**3,250.1**

Operating Experience:

This is a new interconnection to the Rencontre East distribution system. The community is currently served by a temporary diesel generation plant, which was installed when the permanent plant was destroyed by fire in 2002.

Project Justification:

The temporary generation plant was constructed as an emergency facility to re-power the community after the fire. It does not meet the various legislative and regulatory requirements for such facilities and thus is not acceptable for long-term operation. The "Rencontre East Interconnection Study – April 2004" (Section G, Appendix 3) identified this interconnection as the most cost effective method of servicing the community in the long-term.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Provide Service Extensions

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	804.0	0.0	0.0	804.0
Labour	772.0	0.0	0.0	772.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	152.0	0.0	0.0	152.0
Total	**1,728.0**	**0.0**	**0.0**	**1,728.0**

Operating Experience:

An analysis of average historical expenditure (i.e. 1999 - 2003) on new customer connections is shown in the following table. All historical dollars were converted to 2003 dollars using the GDP Implicit Price Deflator and a 5-year average calculated.

Region	**Avg. Yearly Expenditures (1999 - 2003) ($000)**
Central	$ 595
Northern	$ 484
Labrador	$ 581
Total	$ 1,660

2005 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 1999 - 2003 (in 2003 dollars) the following budget was developed assuming escalation in 2004 and 2005 of approximately 2.0%.

Region	**2005 Budget ($000)**
Central	$ 619
Northern	$ 504
Labrador	$ 605
Total	$ 1,728

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Systems

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	842.0	0.0	0.0	842.0
Labour	609.0	0.0	0.0	609.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	150.0	0.0	0.0	150.0
Total	**1,601.0**	**0.0**	**0.0**	**1,601.0**

Operating Experience:

An analysis of historical expenditures (i.e. 1999 - 2003) on distribution upgrades is shown in the following table. All historical dollars (table below) were converted to 2003 dollars using the GDP Implicit Price Deflator and 5-year average calculated.

Region	**Avg. Yearly Expenditures (1999 - 2003) ($000)**
Central	$ 555
Northern	$ 640
Labrador	$ 344
Total	$ 1,539

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

Based on this five-year average for distribution system upgrades for the period 1999 - 2003 the following budget was developed using an escalation in 2004 and 2005 of approximately 2.0%.

Region	**2005 Budget ($000)**
Central	$ 628
Northern	$ 616
Labrador	$ 357
Total	$ 1,601

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Insulator Replacements

Location: Distribution Lines Hawkes Bay, Plum Point and Farewell Head

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

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

1. Hawkes Bay Line 3, which serves the communities from Hawkes Bay North to Port au Choix and Eddies Cove. This line has been in service for approximately thirty years.

2. Plum Point Line 1, which serves the communities from Reef's Harbour to Castor's River South. The line has been in service for approximately thirty-five years.

3. Farewell Head Line 6, which serves seven communities on Fogo Island. This line has been in service for approximately thirty-five years.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	285.0	0.0	0.0	285.0
Labour	427.0	0.0	0.0	427.0
Engineering	48.5	0.0	0.0	48.5
Project Management	20.5	0.0	0.0	20.5
Inspection & Commissioning	52.0	0.0	0.0	52.0
Corp O/H, AFUDC, Esc. & Contingency	138.7	0.0	0.0	138.7
Total	**971.7**	**0.0**	**0.0**	**971.7**

Operating Experience:

The insulators on these lines were manufactured by Canadian Ohio Brass and Canadian Porcelain. These insulators have been a problem throughout the Hydro system where failures generally occur during adverse weather conditions and restoration times are impacted considerably. Inspections have identified hairline cracks in the porcelain and in the cement bondings between the porcelain.

Hawkes Bay L3 – For the period 2001 to 2003 there has been a total of 15,890 customer outage hours due to defective insulators.

Plum Point L1 – For the period 2001 to 2003 there has been a total of 5,570 customer outage hours due to defective insulators.

Farewell Head L6 – For the period 2001 to 2003 there has been a total of 15,030 customer outage hours due to defective insulators.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

The cracking porcelain and consequent decrease in mechanical strength has the potential of the insulator breaking apart during climbing activities, and thus presents a safety hazard for lineworkers.

A review of the performance indices reveals the potential for improvement of the composite indices, through insulator replacements on these lines as follows:

Hawkes Bay L3 – Expected reduction in SAIFI from 3.94 to 3.26 and lower SAIDI from 7.19 to 3.98.

Plum Point L1 – Expected reduction in SAIFI from 4.17 to 2.53 and lower SAIDI from 6.97 to 2.51.

Farewell Head L6 – Expected reduction in SAIFI from 11.20 to 7.41 and lower SAIDI from 28.97 to 18.64.

The average composite indices across the Hydro system are SAIFI = 7.58 and SAIDI = 11.94.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Line L7

Location: St. Anthony to Cook's Harbour

Division: Transmission & Rural Operations

Classification: Rural Systems

Project Description:

This project consists of the replacement of 7 km of 3-phase distribution line serving the communities of Cook's Harbour, Wild Bight, Boat Harbour and Cape Norman; and the installation of approximately 65 midspan poles between the communities of Cook's Harbour and Boat Harbour.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	165.0	0.0	0.0	165.0
Labour	290.0	0.0	0.0	290.0
Engineering	85.0	0.0	0.0	85.0
Project Management	24.0	0.0	0.0	24.0
Inspection & Commissioning	51.0	0.0	0.0	51.0
Corp O/H, AFUDC, Esc. & Contingency	102.5	0.0	0.0	102.5
Total	**717.5**	**0.0**	**0.0**	**717.5**

Operating Experience:

The Cook's Harbour line is one of the most exposed distribution lines on the GNP, and possibly in the province. This area is subjected to some of the harshest weather conditions on the Island due to the barren country with no protection from the elements. It is very common to get winds in excess of 100 kms/hour in this area. In the past ten to fifteen years, approximately six poles and many cross-arms have broken off, conductor has snapped and insulators have broken due to high winds and icing conditions. During a storm in January 1999, eleven cross-arms snapped and the conductor broke. The conductor has a steel core and is subject to corrosion due to salt spray. It has been damaged by slapping in the high winds, and has reduced strength and increased sag caused by heavy icing conditions. The section of line between the communities of Cook's Harbour and Boat Harbour have span lengths in excess of 100 meters, where as the design standard is 70 meters.

Project Justification:

This line area is one of the main causes for numerous momentary and sustained outages in the area. The many problems experienced has resulted in the indices for the area being SAIFI = 8.90

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

and SAIDI = 30.13 as compared to the Hydro average of SAIFI = 7.58 and SAIDI = 11.94. The replacement of this section of line is expected to result in reducing the SAIFI and SAIDI indices for this system to a level closer to the Hydro average.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution System

Location: L'Anse au Loup

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of:

a) approximately 1000 pin type and suspension insulators;
b) relocation of a section of distribution line from structure No. 58 to 386;
c) upgrading of a section of the distribution line from English Point to Forteau; and,
d) replacement of the river crossing structures at Forteau River.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	195.0	0.0	0.0	195.0
Labour	243.0	0.0	0.0	243.0
Engineering	43.0	0.0	0.0	43.0
Project Management	16.0	0.0	0.0	16.0
Inspection & Commissioning	44.0	0.0	0.0	44.0
Corp O/H, AFUDC, Esc. & Contingency	94.6	0.0	0.0	94.6
Total	**635.6**	**0.0**	**0.0**	**635.6**

Operating Experience:

Distribution lines L1 and L2 on the L'Anse au Loup System service 949 customers and include the entire distribution system servicing the area from L'Anse au Claire north 78 km to Red Bay.
The section of line to L'Anse Amour was constructed in 1965 with pre-cast concrete and wooden poles. Weather conditions have deteriorated the concrete poles to a point where approximately 60 - 70% of the outer shell is missing leaving the steel rebar exposed. Nearly every spring, a number of the poles have to be plumbed as a result of snow conditions over the winter. In May 2002, a late spring storm caused significant damage to several structures between the Forteau River bridge and English Point. In general, the L'Anse au Loup system has experienced a number of insulator and pole failure related outages in recent years resulting in poor reliability.

Project Justification:

Without this upgrade, there will be further deterioration and a worsening of the performance level for the L'Anse au Loup system and customers will experience increased outages. The performance indices indicate composite indices for this system of SAIFI = 27.44 and SAIDI = 23.57.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

These pole and insulator replacements provide the potential to reduce the SAIFI to 24.61and the SAIDI to 19.99.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Relocate Substation

Location: Robert's Arm/Triton System

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of:

a) relocation of all equipment from the substation at Robert's Arm to the existing substation at Triton;
b) installation of a group operated disconnect in Line 5 outside the Triton station;
c) expansion of the Triton station by 15 m x 6 m to accommodate this move;
d) conversion of a section of L4 in the community of Robert's Arm to 25 kV; and,
e) relocation of the voltage regulators RA4-VR1 to a new location approximately 4 km from the Triton station.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	85.0	0.0	0.0	85.0
Labour	110.0	0.0	0.0	110.0
Engineering	51.0	0.0	0.0	51.0
Project Management	9.0	0.0	0.0	9.0
Inspection & Commissioning	5.0	0.0	0.0	5.0
Corp O/H, AFUDC, Esc. & Contingency	58.6	0.0	0.0	58.6
Total	**318.6**	**0.0**	**0.0**	**318.6**

Operating Experience:

The station was constructed in 1967. The pole structures have deteriorated to the point where it is unsafe to work. The location of this station makes it very difficult to access with a vehicle, particularly in winter and there is no room in the yard for maintenance vehicles. The access road is narrow and too steep to operate maintenance equipment safely. (Please see the pictures on the following pages.)

Project Justification:

The station is located between two steep hills and there is no room for expansion or to rebuild to current standards. The station grounding is below current standards and needs to be upgraded.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Relocate Substation **(cont'd.)**

Project Justification:

The station has to be completely rebuilt because all wood pole structures are deteriorated to the point where failure can occur and create a safety hazard for maintenance personnel. It is not practical to have the station reconstructed on the existing site, and it is proposed that it be relocated to the existing Triton substation. This will eliminate 5 km of 12.5 kV distribution line and increase the capacity of the Triton station. The Triton transformer is currently fully loaded, and with the load growth predicted it would have to be replaced in the next five years. Relocating the Roberts Arm transformer now will provide the additional benefit of adequate transformer capacity to address load growth into the foreseeable future.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase & Install Electronic Reclosers

Location: Makkovik & Hopedale

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

The project consists of the purchase and installation of electronic reclosers to replace the existing hydraulic reclosers at these two sites.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	75.0	0.0	0.0	75.0
Labour	20.0	0.0	0.0	20.0
Engineering	6.0	0.0	0.0	6.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	24.3	0.0	0.0	24.3
Total	**125.3**	**0.0**	**0.0**	**125.3**

Operating Experience:

The existing hydraulic reclosers are approximately thirty-years old and have failed in service and do not provide satisfactory protection levels for the distribution system.

Project Justification:

These hydraulic reclosers are the primary protection devices for faults on the distribution system and are required to be reliable. Due to age, and the harsh operating environment, failures of these reclosers have occurred causing customer outages and reliability issues. Replacement parts are also difficult to obtain. To correct this system reliability problem, 3-phase electronic reclosers will be installed to replace the hydraulic reclosers with the control panel installed inside the plant for more efficient operation and also phone modem interwiring, for remote monitoring.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Distribution Line Pole Replacements

Location: English Harbour West System

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of thirty-five deteriorated poles on the English Harbour West distribution system.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	38.0	0.0	0.0	38.0
Labour	55.0	0.0	0.0	55.0
Engineering	17.0	0.0	0.0	17.0
Project Management	8.0	0.0	0.0	8.0
Inspection & Commissioning	19.0	0.0	0.0	19.0
Corp O/H, AFUDC, Esc. & Contingency	30.9	0.0	0.0	30.9
Total	**167.9**	**0.0**	**0.0**	**167.9**

Operating Experience:

The system is operating satisfactorily, however as deteriorated poles fail, repair crews are dispatched to do the repairs, and customer outages occur during these repairs. Extensive outages have occurred on those occasions when it is difficult to gain access to the repair site.

Project Justification:

The Preventative Maintenance Program identified selected poles on this system which were rated "B" condition (replace within five years). It has been determined that a certain number of these poles must be replaced in 2005 in order to maintain service reliability. The remainder of the poles are regularly inspected to determine their deterioration rate and these will be replaced as required. A deteriorated pole represents a safety hazard to lineworkers in the event the pole has to be climbed. Failure of a pole has a significant impact on the performance for the system, especially under adverse weather conditions. Often, failures of deteriorated poles cause a domino effect resulting in more failures of consecutive poles, which might not be deteriorated.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Increase Generation

Location: L'Anse au Loup

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the transfer of existing Unit No. 2041 (1,100 kW) complete with radiator, from Nain to replace the existing 600 kW unit at the L'Anse au Loup Diesel Plant. The project will include purchase of a new 4,160 volt generator and an upgrade to the existing switchgear.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	149.0	0.0	0.0	149.0
Labour	101.9	0.0	0.0	101.9
Engineering	35.9	0.0	0.0	35.9
Project Management	5.0	0.0	0.0	5.0
Inspection & Commissioning	29.2	0.0	0.0	29.2
Corp O/H, AFUDC, Esc. & Contingency	70.7	0.0	0.0	70.7
Total	**391.7**	**0.0**	**0.0**	**391.7**

Operating Experience:

This unit was originally installed in Nain in 1994 and has been operated for approximately 35,000 hours. It has recently undergone a major overhaul and is suitable for continued service at L'Anse au Loup.

Project Justification:

For the isolated diesel systems, firm capacity is normally defined as the installed capacity of the diesel plant less the largest unit. However, with the interconnection to Hydro Quebec's North Shore and the resulting line capacity being treated as the largest unit on the system, the firm capacity on the L'Anse au Loup System is now the total installed capacity in the diesel plant.

Based on the most recent load forecast, the peak load for L'Anse au Loup will exceed firm capacity in 2005. The replacement of an existing 600 kW unit with a 1,100 kW unit will insure the firm capacity for the system beyond the forecast period.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Increase Generation **(cont'd.)**

Project Justification: (cont'd.)

Currently Installed: 1 - 1100 kW unit; 2 - 800 kW units; and 2 - 600 kW units yielding a system firm capacity of 3900 kW.

Proposed Installed: 2 - 1100 kW units; 2 - 800 kW units; and 1 - 600 kW unit yielding a system firm capacity of 4400 kW.

Forecast peak loads for L'Anse au Loup System are:

Year	2004	2005	2006	2007	2008	2009	2010
kW	3,869	3,944	4,020	4,096	4,173	4,250	4,328

Other options considered:

1. Purchase and install a new 1100 kW generator set, and radiator to replace the existing 600 kW unit in the L'Anse au Loup plant. The estimated cost for this alternative is $669,800 which is significantly higher than the recommended proposal, therefore, this option was not considered further.

2. Purchase and install a 1000 kW mobile generator set for L'Anse au Loup. The estimated cost for this alternative is $748,900 which is again significantly higher than the recommended proposal, therefore, this option was not considered further.

3. The opportunity for a Demand Side Management (DSM) based capital deferral was reviewed (refer to the attached) and it was determined that DSM was not a viable alternative resource in this particular circumstance.

Future Plans:

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2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Diesel Generating Unit No. 266

Location: William's Harbour

Division: Transmission & Rural Operations

Classification: Generation

Project Description:
This project consists of the replacement of a 136 kW diesel generator, complete with radiator, unit switchgear, and exhaust modifications.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	165.0	0.0	0.0	165.0
Labour	40.0	0.0	0.0	40.0
Engineering	21.2	0.0	0.0	21.2
Project Management	15.0	0.0	0.0	15.0
Inspection & Commissioning	10.0	0.0	0.0	10.0
Corp O/H, AFUDC, Esc. & Contingency	52.8	0.0	0.0	52.8
Total	**304.0**	**0.0**	**0.0**	**304.0**

Operating Experience:
Unit No. 266 has been in service since 1975 and has been overhauled five times. Maintenance costs were nominal up to 2001, at which point the unit experienced failures. Maintenance costs from 2001 – 2004 averaged $11,200 annually. Average annual normal maintenance costs for this size diesel generator would be approximately $2,700.

Project Justification:
Replacement is justified on the basis of above average maintenance costs and the age of the unit. Unit No. 266 has been in service for twenty-nine years. It has been overhauled five times and is at the end of its useful life. Experience has shown that it is generally not practical to overhaul an engine more than five times, which makes this unit due for replacement in 2005. In addition to the initial savings on maintenance and overhaul costs, a new unit will provide greater fuel efficiency and reduced emissions. A direct replacement with no increase in generating capacity will be sufficient to meet demand as there is no requirement for additional capacity over the immediate peak period.

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

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Dam - Roddickton Mini Hydro

Location: Roddickton

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the removal and replacement of the existing rock filled timber crib dam. Due to environmental concerns, untreated timber will be used and the existing rock fill will be reused. No work is required for the penstock.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	150.0	0.0	0.0	150.0
Engineering	9.0	0.0	0.0	9.0
Project Management	5.0	0.0	0.0	5.0
Inspection & Commissioning	24.0	0.0	0.0	24.0
Corp O/H, AFUDC, Esc. & Contingency	43.5	0.0	0.0	43.5
Total	**231.5**	**0.0**	**0.0**	**231.5**

Operating Experience:

The dam was constructed twenty-three years ago and the timbers are deteriorating to the point where considerable difficulty was experienced in locating solid timber to attach the dam facing and decking. Engineering assessments indicated that, due to the homogeneous construction of the structure, it was not feasible to repair/replace individual section(s) of the dam but that it would have to be replaced in its entirety. (Please see the pictures on the following pages.)

Project Justification:

The existing dam is leaking a significant volume of water and since it is constructed with untreated timber, there is concern with respect to its structural strength. If the dam were to fail, there would be extensive damage to the penstock and powerhouse as well as the Roddickton water supply, which is directly downstream.

The annual energy production at Roddickton offsets approximately 1,600 barrels of oil at Holyrood each year. An economic analysis indicates that this project has a payback of nine years. The project has a net present worth preference of $287,000 over twenty-five years when compared to the plant retirement alternative.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Dam - Roddickton Mini Hydro **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Installation of Fall Arrest Equipment

Location: Various Facilities

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the design, supply and installation of fall protection equipment at all Hydro 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. There are approximately 310 locations, and installations will be prioritized upon approval to proceed.

Project Cost: *($ x1,000)*	**2005**	**2006**	**2007**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0	0.0
Labour	150.0	138.0	138.0	138.0	564.0
Engineering	12.0	12.0	12.0	12.0	48.0
Project Management	5.0	5.0	5.0	5.0	20.0
Inspection & Commissioning	15.0	15.0	15.0	15.0	60.0
Corp O/H, AFUDC, Esc. & Contingency	24.2	43.9	66.2	166.6	300.9
Total	**206.2**	**213.9**	**236.2**	**336.6**	**992.9**

Operating Experience:

There is no fall arrest or restraint equipment at these locations at present. When work is undertaken, temporary arrest and restraint equipment is used.

Project Justification:

In 1999, the Provincial Government passed legislation requiring that 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 tops, 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.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Shut-Off Valves

Location: Various diesel Sites

Division: Transmission & Rural Operations

Classification: Generation

Project Description:
This project consists of the installation of fuel shut-off valves in the plant fuel supply lines where they enter the plant building. Shut-off valves will be installed at the Black Tickle, Hopedale, Postville, Nain, North Plant, Norman Bay, Port Hope Simpson, St. Lewis, Mary's Harbour, St. Anthony, McCallum, Francois, Grey River and Ramea Diesel Plants.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	56.0	0.0	0.0	56.0
Labour	49.0	0.0	0.0	49.0
Engineering	30.8	0.0	0.0	30.8
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	28.8	0.0	0.0	28.8
Total	**164.6**	**0.0**	**0.0**	**164.6**

Operating Experience:
These plants are not currently equipped with these shut-off valves.

Project Justification:
Section 27(12) of the Provincial Storage and Handling of Gasoline and Associated Products Regulations, Newfoundland and Labrador Regulation 58/03, and the National Fire Code of Canada, Section 4.4.8.2(3), 1995, require that steel shut-off valves be provided on supply piping carrying combustible liquids where it enters buildings or structures.

The environmental compliance audit of the TRO regions identified that these diesel generating stations were deficient in this regard.

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

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Fuel Storage Tanks

Location: Hopedale & Paradise River

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the replacement of the 9,000 ℓ fuel tank at Hopedale with a 22,700 ℓ Tank; and replacement of the two 45,400 ℓ tanks at Paradise River with one 45,400 ℓ tank.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	65.0	0.0	0.0	65.0
Labour	37.0	0.0	0.0	37.0
Engineering	5.5	0.0	0.0	5.5
Project Management	5.5	0.0	0.0	5.5
Inspection & Commissioning	12.0	0.0	0.0	12.0
Corp O/H, AFUDC, Esc. & Contingency	27.3	0.0	0.0	27.3
Total	**152.3**	**0.0**	**0.0**	**152.3**

Operating Experience:

At both sites, the existing dykes fill with snow and ice and are not able to fulfill the secondary containment function as required by the Provincial Storage and Handling of Gasoline and Associated Products Regulations. At Hopedale, deficiencies in the tank's construction result in malfunctions of the fuel depth measuring apparatus and the floating suction causing the engines to be deprived of fuel.

At Paradise River, the tanks are an older design consisting of cylinderical tanks mounted in open dykes. The mounting saddles have failed and damaged the dyke shells beyond repair. The situation has been stabilized until a new tank can be installed.

Project Justification:

At both sites, the existing tanks and dykes do not comply with the Provincial Storage and Handling of Gasoline and Associated Products Regulations, and hence must be replaced. At Paradise River, the tank farm is located close to the seashore and any significant spill would most likely reach the water.

Project Title: Replace Fuel Storage Tanks **(cont'd.)**

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Justification: (cont'd.)

Only one tank at Paradise River will be required because the construction of the new highway allows for fuel truck deliveries from Cartwright, thus eliminating the need for a nine month fuel storage supply.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Circuit Breakers

Location: Hawkes Bay Diesel

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of two 5 kV, 1200 A vacuum breakers to replace the existing air breakers on the diesel generators.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	85.0	0.0	0.0	85.0
Labour	4.0	0.0	0.0	4.0
Engineering	2.0	0.0	0.0	2.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	19.6	0.0	0.0	19.6
Total	**110.6**	**0.0**	**0.0**	**110.6**

Operating Experience:

The existing Allis-Chalmers air circuit breakers were manufactured in 1970 and are in need of replacement because of age and wear on the breaker components. This type of air circuit breaker has been out of production for some time, thus original certified replacement parts are not available.

Project Justification:

The two 2.5 MW diesel units at the Hawkes Bay Terminal Station provide standby power for the Hawkes Bay, Port Saunders and Port au Choix distribution systems, voltage support for the Great Northern Peninsula transmission and generation capacity to add to overall system reserve. In order to maintain the integrity and availability of these diesel units in future, the replacement of these two unit breakers is essential.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Cooling System

Location: Black Tickle

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the removal of an existing horizontal radiator and all associated piping and valves, and the purchase and installation of a new radiator, system piping, radiator supports, engine venting system and engine fill system.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	25.0	0.0	0.0	25.0
Labour	42.0	0.0	0.0	42.0
Engineering	9.0	0.0	0.0	9.0
Project Management	6.5	0.0	0.0	6.5
Inspection & Commissioning	5.7	0.0	0.0	5.7
Corp O/H, AFUDC, Esc. & Contingency	18.4	0.0	0.0	18.4
Total	**106.6**	**0.0**	**0.0**	**106.6**

Operating Experience:

The existing system is approximately thirty years old, and has a number of operating problems. The piping is poorly laid out and this results in air locking problems that result in engine overheating and plant outages. The existing horizontal radiator is in poor condition, the cowling is corroded, the cooling fins are damaged, and the core is leaking. The radiator is elevated for snow loading but does not have a proper maintenance platform or access ladder.

Project Justification:

The system has a number of inherent flaws which cause operating and maintenance problems and generally degrade reliability. A complete replacement of this system is the most practical solution to the problem.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Day Tank & Fuel Meter

Location: Ramea

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of a 2,500 ℓ fuel day tank system and fuel meter in the Ramea Diesel Plant.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	43.3	0.0	0.0	43.3
Labour	23.6	0.0	0.0	23.6
Engineering	9.3	0.0	0.0	9.3
Project Management	5.0	0.0	0.0	5.0
Inspection & Commissioning	5.7	0.0	0.0	5.7
Corp O/H, AFUDC, Esc. & Contingency	18.7	0.0	0.0	18.7
Total	**105.6**	**0.0**	**0.0**	**105.6**

Operating Experience:

This plant does not have a fuel day tank to facilitate dipping the bulk storage tank for reconciliation purposes.

Project Justification:

Section 18(2)(b) of the Provincial Storage and Handling of Gasoline and Associated Products Regulations, Newfoundland and Labrador Regulation 58/03 requires aboveground storage tanks (other than a storage tank system connected to a heating appliance or a waste oil collection tank) to have dip or gauge readings reconciled with receipt and withdrawal records at least weekly. The environmental compliance audit of the TRO Central Region identified that the Ramea Diesel Plant did not have a means to reconcile fuel in the storage tank with the amount consumed, and thus did not meet the requirements of the regulations.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Building Systems- North Plant

Location: Goose Bay

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of removal of asbestos skirting, roof reconstruction and siding installation on the G5 generator and switchgear building and repainting of the access tunnel.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	58.0	0.0	0.0	58.0
Engineering	6.0	0.0	0.0	6.0
Project Management	5.0	0.0	0.0	5.0
Inspection & Commissioning	13.0	0.0	0.0	13.0
Corp O/H, AFUDC, Esc. & Contingency	16.6	0.0	0.0	16.6
Total	**98.6**	**0.0**	**0.0**	**98.6**

Operating Experience:

The asbestos skirting on the G5 generator module and the asbestos siding on the GM Switch Gear Building is cracked and frayed. It is no longer effective for its intended use and poses a health hazard. The G5 module roof is leaking and rain and snow is entering the unit. The access enclosure to the module is in poor condition and needs to be replaced. The metal access tunnel is leaking and corroded. (Please see pictures on the following pages.)

Project Justification:

Implementing these repairs will eliminate the health hazard caused by the asbestos, and secure the generation equipment from damage caused by the ingress of rain and moisture.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Raise Exhaust Stack Heights

Location: St. Brendan's, Black Tickle & Little Bay Islands

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of all materials necessary to raise the exhaust stack heights at these plants to be compliant with Good Engineering Practice (GEP) stack height guidelines.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	17.1	0.0	0.0	17.1
Labour	51.5	0.0	0.0	51.5
Engineering	9.8	0.0	0.0	9.8
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	17.3	0.0	0.0	17.3
Total	**95.7**	**0.0**	**0.0**	**95.7**

Operating Experience:

Currently, these sites have stack heights which are insufficient to be compliant under the Air Pollution Control Regulations.

Project Justification:

Based on air dispersion modeling, existing stack heights are not sufficient to provide adequate dispersion of emissions to be compliant with the Air Pollution Control Regulations under the Environmental Protection Act. Raising the stack heights will achieve compliance at these sites.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase & Install Digital Metering

Location: Various Sites

Division: Transmission & Rural Operations

Classification: Generation

Project Description:
This project consists of the purchase and installation of digital metering equipment for the seven diesel generating units at the diesel plants in Francois, McCallum, Grey River and Little Bay Islands.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	35.0	0.0	0.0	35.0
Labour	30.0	0.0	0.0	30.0
Engineering	5.0	0.0	0.0	5.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	4.0	0.0	0.0	4.0
Corp O/H, AFUDC, Esc. & Contingency	15.8	0.0	0.0	15.8
Total	**89.8**	**0.0**	**0.0**	**89.8**

Operating Experience:
The seven diesel generating units at these four plants do not have the necessary accessories to collect operating data, required for effective production supervision.

Project Justification:
Digital metering equipment will be used for continuous remote access monitoring of each diesel unit and will be configured to automatically trip the unit(s) off-line for abnormal frequency, voltage and load unbalance conditions. Power calculations within the metering unit will be interfaced with electronic fuel metering to provide accurate unit efficiency calculations. Hydro has standardized on this digital metering equipment for all new generating units. This project will bring the remaining seven diesel generating units on the system up to that standard and provide enhanced data trending and event recording.

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

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Diesel Plant

Location: Black Tickle

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of materials for the upgrading of plant building, fuel line and chain link fence and repairs to the transformer storage ramp. The building upgrade includes new plywood sheeting, new asphalt roof shingles and metal siding. The existing fuel transfer shed and its associated fuel line will be removed.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	50.0	0.0	0.0	50.0
Engineering	8.0	0.0	0.0	8.0
Project Management	3.0	0.0	0.0	3.0
Inspection & Commissioning	8.0	0.0	0.0	8.0
Corp O/H, AFUDC, Esc. & Contingency	15.5	0.0	0.0	15.5
Total	**84.5**	**0.0**	**0.0**	**84.5**

Operating Experience:

The existing roof is leaking and needs to be structurally upgraded to accommodate heavy snow loading. The siding and girts are corroded, due to the marine environment and are damaged due to heavy snow loading. The girts need to be replaced and new ones added to give additional structural strength. The storage ramp has been damaged by heavy equipment loads and snow loads, in one section. The fence has been damaged extensively by heavy snow and ice loading on the top rails and the fence fabric. (Please see pictures on following pages.)

Project Justification:

The plant siding and roof repairs are required to protect and secure the generation equipment and provide reliable customer service. The fence repairs are required to provide security for the equipment and materials that must be stored outside.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Diesel Plant **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Data Acquisition Software

Location: Various Diesel Plants

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of data acquisition software to enable interrogation of all digital power metering devices at the isolated diesel plants.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	50.0	0.0	0.0	50.0
Labour	5.0	0.0	0.0	5.0
Engineering	7.0	0.0	0.0	7.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	8.0	0.0	0.0	8.0
Total	**70.0**	**0.0**	**0.0**	**70.0**

Operating Experience:

The existing data acquisition software is a DOS based for the Labrador plants and Win 95 based for plants on the Island. These software packages are used to retrieve metering data from the remote diesel plants.

Project Justification:

The existing software packages are not compatible with the latest Windows platforms in use throughout Hydro's operations. The new software will provide network communications accessibility, which will enable up-to-date data acquisition from the remote sites to be used for planning and production management.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Intermediate Fuel Storage Tank

Location: Charlottetown

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of an intermediate fuel storage tank between the bulk storage and the plant day tank.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	22.0	0.0	0.0	22.0
Labour	17.2	0.0	0.0	17.2
Engineering	8.8	0.0	0.0	8.8
Project Management	1.5	0.0	0.0	1.5
Inspection & Commissioning	5.7	0.0	0.0	5.7
Corp O/H, AFUDC, Esc. & Contingency	11.2	0.0	0.0	11.2
Total	**66.4**	**0.0**	**0.0**	**66.4**

Operating Experience:

The plant day tank is undersized and the piping is configured in such a way that the bulk storage tank deliveries must be interrupted to refill the day tank. This arrangement makes it impossible to perform fuel reconciliation as required by the regulations.

Project Justification:

Section 18(2)(b) of the Provincial Storage and Handling of Gasoline and Associated Products Regulations, Newfoundland and Labrador Regulation 58/03 requires aboveground storage tanks (other than a storage tank system connected to a heating appliance or a waste oil collection tank) to have dip or gauge readings reconciled with receipt and withdrawal records at least weekly. In order to be compliant, the system must have a means to reconcile fuel in the storage tank with the amount consumed. This deficiency was identified at this site in an environmental compliance audit of the regional operations. The existing plant day tank is too small to allow fuel reconciliation and there is insufficient space inside the plant for a larger day tank. Therefore, the intermediate fuel tank will be installed outside to correct this deficiency.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Intermediate Fuel Storage Tank **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Modify Heating System

Location: Hopedale

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of materials required to modify the plant hydronic heating system to capture sufficient heat from the generating units to heat the diesel plant.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	14.0	0.0	0.0	14.0
Labour	18.2	0.0	0.0	18.2
Engineering	4.0	0.0	0.0	4.0
Project Management	2.5	0.0	0.0	2.5
Inspection & Commissioning	5.7	0.0	0.0	5.7
Corp O/H, AFUDC, Esc. & Contingency	9.7	0.0	0.0	9.7
Total	**54.1**	**0.0**	**0.0**	**54.1**

Operating Experience:

The existing system configuration cannot extract sufficient heat from the generators to heat the plant. Electric heating is being used to supplement the current hydronic heating system on an interim basis.

Project Justification:

This project will displace approximately 38,000 litres of fuel annually with an estimated average annual savings of $18,200.00. Based on this estimate the capital cost of this project will be recovered within four years.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Meters & Equipment - TRO System

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: General

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	148.0	0.0	0.0	148.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	10.6	0.0	0.0	10.6
Total	**158.6**	**0.0**	**0.0**	**158.6**

Operating Experience:

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

Project Justification:

Demand/Energy meters are expected to last a minimum of twenty years. Each meter is evaluated after that time for condition and either retired from service or refurbished and returned to service. Failure to supply metering equipment as required could result in customer connection delays.

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Central Air Conditioning

Location: Whitbourne & Stephenville

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of the purchase and installation of central air conditioning equipment at the Whitbourne and Stephenville offices.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	180.0	0.0	0.0	180.0
Engineering	45.0	0.0	0.0	45.0
Project Management	4.5	0.0	0.0	4.5
Inspection & Commissioning	7.5	0.0	0.0	7.5
Corp O/H, AFUDC, Esc. & Contingency	52.1	0.0	0.0	52.1
Total	**289.1**	**0.0**	**0.0**	**289.1**

Operating Experience:

The Whitbourne and Stephenville offices were constructed in 1974 and do not have central air conditioning systems.

Project Justification:

There have been numerous complaints from employees that temperatures in the offices and other areas of the facilities are excessive during the summer months. Installation of central air conditioning equipment will alleviate these employee concerns.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Warehouse Renovations

Location: St. Anthony

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of renovations to the existing warehouse space at St. Anthony to provide: four fixed offices, two modular offices, a conference room, interior finishing and all associated work. No changes are required in existing water supply and septic facilities. The warehouse overhead door will be removed and new windows will be installed.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	100.0	0.0	0.0	100.0
Engineering	8.0	0.0	0.0	8.0
Project Management	3.0	0.0	0.0	3.0
Inspection & Commissioning	9.0	0.0	0.0	9.0
Corp O/H, AFUDC, Esc. & Contingency	26.5	0.0	0.0	26.5
Total	**146.5**	**0.0**	**0.0**	**146.5**

Operating Experience:

Business Improvement Initiatives in Customer Services and Materials Management have resulted in staff reductions and a reduction in warehouse space requirements. This provides the opportunity to accommodate all St. Anthony employees at one location in the proposed renovated warehouse, and eliminate the need for the rental facilities presently in use.

Project Justification:

The present agreement for the rental facilities at St. Anthony is $44,720.00 per year and the expiration date of this agreement is September 30, 2005. With these renovations, all Hydro operations in St. Anthony will be conducted from Hydro owned facilities and the capital cost for the renovations will be offset by savings in rental charges. This project has a payback of less than four years.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Line Depot/Storage Sheds

Location: Baie Verte, Sop's Arm & Bay d'Espoir

Division: Transmission & Rural Operations

Classification: General

Project Description:

This project consists of roofing and siding repairs to the line depots at Baie Verte and Sops Arm and construction of storage sheds at both sites. At Bay d'Espoir, the project involves an extension to the existing line depot.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	7.0	0.0	0.0	7.0
Labour	82.0	0.0	0.0	82.0
Engineering	17.0	0.0	0.0	17.0
Project Management	7.0	0.0	0.0	7.0
Inspection & Commissioning	12.0	0.0	0.0	12.0
Corp O/H, AFUDC, Esc. & Contingency	26.0	0.0	0.0	26.0
Total	**151.0**	**0.0**	**0.0**	**151.0**

Operating Experience:
At Baie Verte and Sops Arm, the line depots are in excess of twenty-years old and have deteriorated to the point where the roofs, doors and windows leak and the siding is beyond repair. As well, there is insufficient and unsuitable storage space for the line maintenance equipment. At Bay d'Espoir, the line depot is insufficiently sized for the number of line maintenance staff operating from this location.

Project Justification:
At Baie Verte and Sops Arm, the condition of the depots require repairs in order to protect the integrity of the structures and provide a safe and dry environment for workers and maintenance equipment.

The operational re-alignments implemented in 2001, resulted in a relocation of lineworkers from LaScie and Springdale to Baie Verte and from Bishop Falls to Bay d'Espoir. The increased numbers of lineworkers at these two sites necessitate the expansion of the depot to accommodate additional staff and the addition of a storage shed to accommodate the additional tools and equipment.

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

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Line Depot Building

Location: Mary's Harbour

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of the removal and disposal of the existing line depot building and the erection of a new building. The new building will be wood framed measuring 6 m x 9 m with exterior metal siding and a shingled roof.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	47.0	0.0	0.0	47.0
Engineering	7.0	0.0	0.0	7.0
Project Management	2.0	0.0	0.0	2.0
Inspection & Commissioning	5.0	0.0	0.0	5.0
Corp O/H, AFUDC, Esc. & Contingency	12.9	0.0	0.0	12.9
Total	**73.9**	**0.0**	**0.0**	**73.9**

Operating Experience:

The existing building was constructed in 1970 and is located in a poorly drained, depressed area and is subjected to problems associated with frost heave and with flooding during periods of heavy runoff. The building's structure is twisted and not level. This prevents doors from closing and building movement has cracked window glass. The foundation timbers and exterior plywood sheathing are in a stage of advanced rot, the roof shingles have reached the end of their life and the building is poorly insulated.

Project Justification:

The condition of the existing building is deteriorating and it would be more cost effective to erect a new building on a solid, well-drained site, rather than attempt to upgrade the existing building and drain the existing site. The building will serve the two lineworkers, an apprentice and a mechanic stationed at Mary's Harbour with a suitable structure to accommodate staff and equipment.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Global Positioning System

Location: St. John's

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of the purchase of a survey grade Real Time Kinetic Global Positioning System.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	50.0	0.0	0.0	50.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	6.6	0.0	0.0	6.6
Total	**56.6**	**0.0**	**0.0**	**56.6**

Operating Experience:

The equipment currently in use is ten years old, and costs an average of $4,000 per year to service and repair. This annual repair cost is expected to continue and increase. While the equipment is being repaired, the costs for rental replacements average $5,000 per year.

Project Justification:

This project will eliminate average annual repair and rental costs of approximately $9,000.00. Based on this analysis, the cost of this project will be recovered in approximately six years.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Fence

Location: Daniel's Harbour Terminal Station

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of the replacement of the existing fence at the Daniel's Harbour Terminal Station and widening the station on the north and south sides.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	3.0	0.0	0.0	3.0
Labour	25.0	0.0	0.0	25.0
Engineering	6.0	0.0	0.0	6.0
Project Management	3.0	0.0	0.0	3.0
Inspection & Commissioning	6.0	0.0	0.0	6.0
Corp O/H, AFUDC, Esc. & Contingency	8.8	0.0	0.0	8.8
Total	**51.8**	**0.0**	**0.0**	**51.8**

Operating Experience:

The existing fence is approximately 1.5 m high whereas Hydro's standard fence height for terminal stations is 2.5 m. There is congestion in the station due to the proximity of the fencing to the structures which prohibits the effective use of maintenance equipment in the station.

Project Justification:

This station is located inside the community of Daniel's Harbour. Its accessibility to the public creates a safety hazard for anyone who can gain access to the station particularly during winter when the snow depths allow walking in over the fence. Snow often completely covers part of the fence requiring it to be cleared away immediately to make the station inaccessible to the public. Extending the station and increasing the fence height will create the required room for the operation of maintenance equipment inside the station and eliminate the hazard to public safety.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Construct PCB Storage Building

Location: Wabush

Division: Transmission & Rural Operations

Classification: Property

Project Description:

This project consists of the construction of a 3 m x 7 m PCB storage building at the Wabush Line Depot. A chain link fence with gates which can be locked will be constructed around the building.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	24.0	0.0	0.0	24.0
Labour	6.0	0.0	0.0	6.0
Engineering	9.4	0.0	0.0	9.4
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	3.0	0.0	0.0	3.0
Corp O/H, AFUDC, Esc. & Contingency	9.1	0.0	0.0	9.1
Total	**51.5**	**0.0**	**0.0**	**51.5**

Operating Experience:

There are approximately 1,800 distribution transformers in the Labrador City/Wabush system. Approximately 50% remain to be tested for PCB contamination and typically 3 – 5% of the transformers will test positive for PCB contamination.

Project Justification:

Hydro takes PCB contaminated distribution transformers out of service when they are found and they are stored in a designated area at the line depots to await shipping to an approved storage site. The Environmental Regulations stipulate that an approved storage facility be used to store non-serviceable PCB equipment until it can be transshipped for disposal.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Legal Survey of Distribution Line Right-of-Ways

Location: Various Sites

Division: Transmission & Rural Operations

Classification: Properties

Project Description:

This project consists of the completion of legal surveys and the preparation of documentation to acquire Crown Lands easement rights for approximately 600 km of distribution line right-of-ways across Hydro's system.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	0.0	0.0	0.0	0.0
Engineering	40.0	0.0	0.0	40.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	9.6	0.0	0.0	9.6
Total	**49.6**	**0.0**	**0.0**	**49.6**

Operating Experience:

Prior to 1985, it was Hydro's practice to construct and operate transmission and distribution lines without obtaining easement rights over Crown Land as Hydro was an agent of the Crown. In 1985, it was decided to obtain easement rights for all property underlying newly constructed lines and to obtain easement rights for property for the pre-1985 lines. To-date, the easement rights to all property associated with transmission lines have been obtained and there is approximately 2,400 km of distribution lines left without easement rights.

Project Justification:

The project justification is based on: 1) the right-of-ways for the distribution lines occupy Crown Land contrary to the Crown Lands Act; 2) lack of easement rights presents a significant risk to Hydro operations should competing requirements for the land arise; and 3) appropriate rights are required for proper maintenance and upgrading of the lines.

Future Plans:

This is an annual program which began in 2004 and easement rights for the whole distribution system are planned to be in place by the end of 2008.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Nodwell V7600 & Boom V6067

Location: Stephenville

Division: Transmission & Rural Operations

Classification: Tools & Equipment

Project Description:

This project consists of replacing the 1973 model off-road track vehicle (No. V7600) and the 1977 model boom (No. V6067) with a similar unit and a 100 ft. reach boom/work platform.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	700.0	0.0	0.0	700.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	97.6	0.0	0.0	97.6
Total	**797.6**	**0.0**	**0.0**	**797.6**

Operating Experience:

The unit being replaced is a 31-year old Nodwell with a 26-year old boom with a 57 ft. reach. Average maintenance costs have been $25,000/year over the past three years.

Project Justification:

Both units have reached the end of their useful life. Transmission maintenance staff require a heavy-duty off-road vehicle equipped with a 100 ft. reach boom and work platform in order to access portions of the transmission line structures during icing conditions or when failed hardware makes a structure unsafe to climb. The replacement criteria for this type of heavy-duty off-road tracked vehicle is 20-25 years of age, condition, extent of repairs needed, and level of compliance with current safety standards. The current equipment is required to be replaced for reasons of employee safety and to permit effective repair and maintenance of the transmission system.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Mobile Oil Reclamation Unit

Location: TRO Central

Division: Transmission & Rural Operations

Classification: Tools & Equipment

Project Description:

This project consists of the purchase of a self-contained mobile oil regeneration unit for refurbishing oil from power transformers. This includes a 48 ft. aluminum transport trailer with two parallel regenerative clay towers and computerized control. The unit is capable of providing 24 hour continuous processing of transformer oil until the required level of oil regeneration has been achieved.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	420.0	0.0	0.0	420.0
Labour	6.0	0.0	0.0	6.0
Engineering	6.0	0.0	0.0	6.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	98.9	0.0	0.0	98.9
Total	**530.9**	**0.0**	**0.0**	**530.9**

Operating Experience:

There are 161 power transformers on Hydro's bulk electrical system with 67 showing parameters outside the guideline limits as specified under the ASTM D3487 standard. Of the 67 units outside the acceptable range, 17 are considered high priority and will need to undergo an oil regeneration process within the next five years. A recent service contract for an oil regeneration process performed on three transformers at Bay d'Espoir cost approximately $150,000, giving an average cost of $50,000 per transformer.

Project Justification:

With 67 transformers testing outside the ASTM guidelines and 17 units considered high priority, Hydro intends to conduct an annual oil regeneration program on all its power transformers. With a regeneration program of 4 – 5 units per year, it is more cost effective to purchase a regeneration unit, than to use outside service contractors.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Mobile Oil Reclamation Unit **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Doble F2000 Relay Test Equipment

Location: Bishop's Falls, Whitbourne, Stephenville & Bay d'Espoir

Division: Transmission & Rural Operations

Classification: Tools & Equipment

Project Description:

This project consists of the replacement of three sets of Doble computerized relay test sets, for Transmission Operations and purchase of one set for Generation Operations at Bay d'Espoir.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	342.6	0.0	0.0	342.6
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	19.6	0.0	0.0	19.6
Total	**362.2**	**0.0**	**0.0**	**362.2**

Operating Experience:

The present computerized relay test equipment was purchased from Doble Engineering from 1986 to 1989, and since then have received regular hardware and software updates.

Project Justification:

In 1998, Doble Engineering started manufacturing a new generation of computerized test equipment, and announced that they would not support the present equipment (spare parts, repairs and updates to software) beyond 2004. Without the proper manufacturer's support, the present equipment is inadequate for maintaining the relaying and protection of the bulk electrical transmission system. In addition, the newer technology test equipment is more compatible with the new computerized relays and metering units that are being used by Hydro and will allow more comprehensive and efficient testing of new relaying.

With more sophisticated electronic equipment being installed in existing and new generating plants, there is a requirement for accurate and up to date test equipment to support the maintenance of this

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Doble F2000 Relay Test Equipment **(cont'd.)**

Project Justification: (cont'd.)
equipment. A modern 3-phase test supply capable of signal processing and simulation is required for testing: digital protection and control relays; digital fault recorders; new exciters; and electronic governors. As well, it can aid in testing and calibration of existing equipment such as 3-phase metering, synchronizing controls and auxiliary equipment

Future Plans:
None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Energy Management System - Energy Control Centre

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

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

The cashflow for the EMS has changed from that submitted in the 2003 Capital Budget proposal. The 2003 Capital Budget proposal was prepared based on the report by KEMA with an anticipated contract signing in December 2003 and an in-service date of February 2006. Due to slower progress than anticipated in the KEMA report to address the rather complex nature of the contract, it was not signed until June 2004 and therefore the scheduled project completion milestone has changed to June 2006. As a result the estimated costs for 2004 and 2005 are forecasted down and estimated costs for 2006 are forecasted up. The total cost for the project has not changed.

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**2005**	**Beyond**	**Total**
Material Supply	7.7	1,321.3	3,204.8	1,461.3	5,995.1
Labour	0.0	45.0	68.0	118.2	231.2
Engineering	297.2	948.9	1,355.2	611.4	3,212.7
Project Management	49.4	158.7	190.6	48.4	447.1
Inspection & Commissioning	0.0	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	32.8	248.6	703.8	1,406.8	2,392.0
Total	**387.1**	**2,722.5**	**5,522.4**	**3,646.1**	**12,278.1**

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Operating Experience:

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

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

Project Justification:

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

Future Plans:

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

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Applications Enhancements

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

The application enhancement project provides for:

(1) unforeseen modifications, enhancements and additions to software to address the required changes to business processes initiated by customers, stakeholders and regulators or to provide efficiencies to existing processes;

(2) the continuing design, and implementation of enhancements to Hydro's Corporate Intranet;

(3) enhancements to the Key Performance Indicator application to reflect business initiatives; and

(4) the addition of a Hydro facilities risk based analysis-modeling tool to predict the impact of failures.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	123.6	0.0	0.0	123.6
Labour	130.8	0.0	0.0	130.8
Engineering	0.0	0.0	0.0	0.0
Project Management	20.4	0.0	0.0	20.4
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	35.9	0.0	0.0	35.9
Total	**310.7**	**0.0**	**0.0**	**310.7**

Operating Experience:

N/A

Project Justification:

This project involves:

a) Various Minor Enhancements:

Hydro must be able to react to requests to provide enhancements to software applications in response to unforeseen requirements, such as legislative and compliance changes; vendor driven changes, and enhancements designed to improve customer service or staff productivity. Previous changes have included changes initiated by Canada Post, changes to income tax

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification (cont'd.)

calculations, providing equal billing to customers, and other enhancements to provide environmental and operational processes.

b) Intranet

This involves the continuing design, and implementation of enhancements to Hydro's Intranet to improve access to information to our employees. This will help to improve information flow, eliminate redundant processes, reduce the manual effort associated with distributing information and provide an enhanced level of customer service.

c) Key Performance Indicator

This is required to support enhancements to the Key Performance Indicator initiative which is directed at reporting on performance activities. This involves the continuing design, build and implementation of Hydro's KPI application.

d) Facilities Failure Model

This tool allows Engineering to develop realistic life-cycle asset management programs. Based on risk-based analysis, different modes of failures of Hydro facilities can be modeled and the impacts on life cycles and extent of destruction predicted. It can assist with identifying least cost intervention strategies and the timing for executing the intervention.

Future Plans:

Application enhancements are a continuing requirement.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program - Secure Remote Access

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project for 2005 is the continuation of a project for which the Board approved funds for 2004. The project will focus on the evaluation, design and implementation of a product(s) that will ensure a secure method of accessing corporate information technology resources from multiple locations. The product chosen will have to meet industry standards, address the inter-operability of existing and future applications, and incorporate existing in-house technology where possible. It must address both internal (employees accessing the company network) and external (vendors connecting to the Hydro Group's network for different transactions) concerns.

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

Operating Experience:

N/A

Project Justification:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Corporate Applications Environment

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project includes all costs to apply modifications and test applications affected by a vendor upgrade. Software requiring upgrades are:

a) Metaframe Server operating system;
b) Network Management tools,
c) Helpdesk Management tools.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	183.7	0.0	0.0	183.7
Labour	36.6	0.0	0.0	36.6
Engineering	0.0	0.0	0.0	0.0
Project Management	20.2	0.0	0.0	20.2
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	33.8	0.0	0.0	33.8
Sub-Total	**274.3**	**0.0**	**0.0**	**274.3**
Less: Cost Recovery - CF(L)Co	**(52.1)**	**0.0**	**0.0**	**(52.1)**
NLH Cost	**222.2**	**0.0**	**0.0**	**222.2**

Operating Experience:

These software applications were installed in 2000/2001 and have not been updated.

Project Justification:

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

Future Plans:

Software vendor maintenance and upgrades is an on-going activity. Vendors will usually release a software upgrade each year. Hydro's plan is to implement the latest software version every second year, thereby insuring that our operating version of software is, at most, one version behind the current release level.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: iSeries Replacement

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

Project Description:

This project consists of the replacement of an existing AS400 Server which supports the Corporate integrated financial applications (JDE), and the Showcase Strategy Report Writer. The server will be replaced by an iSeries server which will be capable of connecting to and using the storage installed on Hydro's Storage Area Network (SAN) in 2003.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	983.0	0.0	0.0	983.0
Labour	0.0	0.0	0.0	0.0
Engineering	120.0	0.0	0.0	120.0
Project Management	16.0	0.0	0.0	16.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	278.4	0.0	0.0	278.4
Sub-Total	**1,397.4**	**0.0**	**0.0**	**1,397.4**
Less: Cost Recovery - CF(L)Co	**(265.5)**	**0.0**	**0.0**	**(265.5)**
NLH Cost	**1,131.9**	**0.0**	**0.0**	**1,131.9**

Operating Experience:

The current AS400 server was installed in 1997 and upgraded twice over the past seven years. In 2002 after being leased for five years, the AS400 computer was purchased and additional disk storage was added to meet corporate requirements. The current disk storage capacity is at a capacity level of 70 - 75% which is the maximum level recommended by IBM in order to ensure optimal performance of applications. This Project was included in the 2004 Corporate Budget Application as part of the End User & Server Evergreen Program but was not approved. It was not resubmitted as other components of that project were, as it was felt that if we could keep disk space growth at a minimum, we could continue to use the existing server for an additional year.

Project Justification:

This project will ensure the future of Hydro's core financial applications on a supported hardware and operating system platform.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: iSeries Replacement **(cont'd.)**

Project Justification: (cont'd.)

The workload from the AS400 system can be handled by the new iSeries Server. This new system can be attached to the shared disk system to provide less expensive and better managed disk storage. This proposed replacement for the AS400, has a projected life of five to seven years and will ensure continued and reliable service.

Future Plans:

None.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User Evergreen Program
Location: St. John's
Division: Production
Classification: Information Systems & Telecommunications

Project Description:

This is the third year of the end-user workstation evergreen program and will replace 211 desktop and laptop computers used by Hydro employees and continues with the implementation of thin client technology strategy. The proposed end user workstations are planned to be refreshed based on industry standard lifecycles (3 years-Laptop, 4 years-Desktop and 5 years-Thin Client) and the device (thin client, desktop, laptop) will be determined by an analysis of the work needs of each user.

The project will also upgrade the operating system that runs these computers to the 2005 standard. The project comprises the third year of Hydro's strategy to reduce the total cost of acquiring and supporting the computers used by employees. The thin client technology strategy is the least cost option and was approved by the Board for 2003 and 2004.

The computers to be replaced through the End User Evergreen Project are leased and must be returned to the vendor or purchased starting in the first quarter of 2005. Hydro plans to return the leased computers to the vendor and purchase new desktop, laptop and thin client computers. A thin client is a network computer without a hard disk drive and accesses and runs applications located on a shared server. In order to reduce ongoing support costs, Hydro also plans to install the current operating system on the new computers that is consistent with other computers at Hydro and which is supported by the vendor.

The planned distribution of the hardware, licenses and related purchase cost follow:

Device	Number	Cost ($)	Total ($)
Laptops	71	2,900	205,900
Desktops	40	1,650	66,000
Thin Clients	100	1,225	122,500
Servers	4	10,100	40,400
Thin Client Licenses	211	325	68,575
		Total	503,375

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Description: (cont'd.)

The third party installation cost of all equipment is $98,000 and includes travel expenses, return of leased equipment and cost to install software which is not part of the corporate standard (specialized limited applications).

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	503.4	0.0	0.0	503.4
Labour	98.0	0.0	0.0	98.0
Engineering	0.0	0.0	0.0	0.0
Project Management	24.0	0.0	0.0	24.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	85.1	0.0	0.0	85.1
Total	**710.5**	**0.0**	**0.0**	**710.5**

Operating Experience:

The End User Evergreen Program for 2005 is the third year of the program presented to the Board as part of the 2003 Capital Budget proposal. Through this program, Hydro plans to reduce the cost of acquiring and supporting the computers used by employees by using "thin client technology" and standard types of computers, operating systems and collections of applications.

This strategy is the least cost option and was approved by the Board for 2003 and 2004.

The anticipated efficiencies gained through standardizing computer hardware and software allowed Hydro to eliminate three Client Support Analyst positions in the IS&T department.

Project Justification:

The End User Evergreen Program for 2005 continues as Hydro's strategy to reduce the total lifecycle cost of acquiring and supporting the computers used by its employees. Hydro plans to return the 211 computers with leases that expire in 2005 to the vendor and purchase new desktop, laptop and thin client computers. Further, Hydro plans to install an operating system on the new units that is consistent with other computers at Hydro and which is supported by the vendor.

In setting the direction outlined for 2005, Hydro did consider the option of returning leased equipment and not replacing it. This option is not acceptable to the Corporation. The decision to not replace one-third of the computers used by employees would have a significant negative impact on Hydro's

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User Evergreen Program 2004 **(cont'd.)**

Project Justification: (cont'd.)
business. Computers are required for a range of tasks including monitoring and troubleshooting the power system, financial analysis, and communication. Without computers Hydro employees would not be able to perform the functions required to deliver services to our customers and manage our business.

Hydro also reviewed the options outlined in its 2003 capital budget submission. These options include:

1. Continue with the evergreen program with thin client technology;

2. Purchase the computers as leases expire off lease and upgrade the operating system (no thin client computers); and

3. Extend the lease and upgrade the operating system (no thin client computers).

The approach recommended by Hydro in 2003 and 2004, and accepted by the Board, was to move forward with the implementation of thin client technology. This approach is the least cost alternative of the 3 options and supports Hydro's strategy to reduce the total cost of ownership (TCO) for employee computers.

It should be noted that for each of the options outlined, the operating system would be upgraded to a version supported by the vendor. Not upgrading the operating system in one-third of the Corporation's computers will place the Corporation at risk because users will not have vendor support and security patches will no longer be available to defend against virus attacks.

In evaluating its options for 2005, Hydro again focused on identifying the direction that would provide the lowest total cost over the life of its computers. Continuing to use thin client technology will result in the least cost capital replacement alternative. Further, in order to achieve the projected financial benefits of the thin client technology, it is necessary to complete the remaining elements and years of the program. By maximizing the deployment of thin client devices, Hydro can achieve a lower total cost of ownership over the lifecycle of these devices and improved efficiency through standardization

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User Evergreen Program 2004 **(cont'd.)**

Project Justification: (cont'd.)

and reduced support requirements. This continued implementation of the thin client environment is fundamental in order for Hydro to continue to reduce the total cost of its IT infrastructure. A change in this strategy now will increase demands for additional computer support and would therefore increase Hydro's operating costs.

Future Plans:

This will be an on-going refresh program. The cycle will be over 3-5 years based on the device.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Peripheral Infrastructure Replacement

Location: Hydro System

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of peripherals**.** In 2005 two multi-function devices (MFDs) and several smaller laser printers and projectors are scheduled to be installed.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	90.0	0.0	0.0	90.0
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	4.0	0.0	0.0	4.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	13.6	0.0	0.0	13.6
Total	**117.6**	**0.0**	**0.0**	**117.6**

Operating Experience:

As the age of the peripherals increase and usage accumulates so does the operating and maintenance expenses. Typical life for peripheral devices is five years.

Project Justification:

This is the continuation of the evergreen program to replace the peripheral devices as they reach the end of their useful life. This refresh will address printers, MFDs, scanners and projectors. It is estimated that two MFD's and several smaller laser printers and projectors will be replaced, however this is subject to change depending on failures and a reprioritization of the needs.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Strategy Deployment

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

The purpose of this project is to develop, implement, test, and maintain a disaster recovery plan (DRP) and site for the data center, and tie this into the overall corporate business continuity initiative. This project will develop the DRP for Hydro's enterprise servers using basic business recovery concepts - risk management, requirements identification, evaluation, plan development, plan testing, and maintenance. The project will include the development of an actual DRP site capable of accommodating our enterprise servers.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	18.0	0.0	0.0	18.0
Labour	45.0	0.0	0.0	45.0
Engineering	0.0	0.0	0.0	0.0
Project Management	25.0	0.0	0.0	25.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	11.4	0.0	0.0	11.4
Sub-Total	**99.4**	**0.0**	**0.0**	**99.4**
Less Cost Recoveries CF(L)Co	**(18.9)**	**0.0**	**0.0**	**(18.9)**
Total	**80.5**	**0.0**	**0.0**	**80.5**

Operating Experience:

Hydro currently has a contract with SunGard to provide a standby site to recover our production enterprise server. This agreement expires in July of 2005. This presents Hydro with the opportunity to re-assess our DRP strategy and direction.

Project Justification:

Disaster recovery planning is a necessity in today's automated world mainly due to the ever-growing dependency upon technology. There are a growing number of technology-related threats (viruses, worms, etc.) in addition to the number of threats from natural disasters (fire, water, power interruption, etc.). Finally, there are ever-increasing legal and regulatory requirements governing the protection of historical and personal information. Based on the renewal date of our agreement with SunGard, it is prudent to plan, develop, test and maintain a DRP and offsite facility, and integrate this

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Justification: (cont'd.)

with the corporate business continuity initiative. This site would allow the recovery of critical business applications.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Server & Operating Systems Evergreen Program - 2005

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project is a part of the Corporation'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 the reliable, secure infrastructure environment required to support efficient operations.

The Board has previously approved the evergreening approach in 2003 and 2004; 2005 will be the third year of the program. The scope of the proposed Server and Operating System Evergreen Program includes:

- Replacing six obsolete servers at Hydro Place data center and continuing to consolidate servers in a limited number of locations.

- Replacing four obsolete servers in four regional offices with print management devices.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	132.5	0.0	0.0	132.5
Labour	42.0	0.0	0.0	42.0
Engineering	0.0	0.0	0.0	0.0
Project Management	12.0	0.0	0.0	12.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	25.4	0.0	0.0	25.4
Total	**211.9**	**0.0**	**0.0**	**211.9**

Operating Experience:

The Server and Operating System and Evergreen Program addresses the purchase and implementation of the hardware and software required to effectively operate the Corporation's shared servers. These servers are the computers that house the applications that have multiple users throughout the organization.

Hydro uses its existing servers for: office productivity tools (e.g. Word, Excel); e-mail; internet, intranet, various database systems as well as the software tools required to monitor and manage the

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Server & Operating Systems Evergreen Program – 2005 **(cont'd.)**

Operating Experience: (cont'd.)

servers, end user devices and the related security. Ten of Hydro's current servers are technically obsolete and cannot maintain the server operating system software supported by the vendor.

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 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.

The factors that are driving Hydro's proposal to replace/upgrade its server environment include:

- Addressing obsolescence/maintaining vendor support;
- Providing security/managing the Infrastructure;
- Supporting current versions of applications; and,
- Exploiting 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 five years and beyond that timeframe, reliability and continued support become issues. While Hydro has extended the life of many of its servers, 25% of the shared servers are five years of age or older and at this time ten servers are proposed for replacement. The disc storage capacity of these servers cannot be upgraded due to technical obsolescence. As well, the server infrastructure cannot be integrated with the disk storage in the storage area network (SAN) because of physical and technical obsolescence. Of the ten servers proposed for replacement, none can support the version of the operating system that will be current in 2005.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Server & Operating Systems Evergreen Program – 2005 **(cont'd.)**

Project Justification: (cont'd)

Summary

The replacement, addition and upgrade of hardware components and software related to the Corporation's shared server infrastructure will allow Hydro to operate in a supported environment to the 2008-2009 time frame and allow Hydro to take advantage of the functionally and enhancements included within the new release. There will however be ongoing investment required in the server environment to ensure the ongoing reliability of the applications required to conduct our business efficiently.

Servers - Hydro is proposing that ten existing servers be replaced. These servers meet or exceed the life expectancy of five years and are not capable of supporting current server operating system. This replacement effort will also involve the continued consolidation of servers in St. John's.

Operating System - Hydro is proposing that the operating system on all servers be upgraded to the current release that will be supported by the vendor until 2008-2009.

Future Plans:

This will be an on-going refresh program. The cycle will be over five years. Costs will vary slightly from year to year as servers reach the end of their life cycle. On going efforts will look to further the consolidation process both at the location and hardware levels.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace VHF Mobile Radio System

Location: Various

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project involves the replacement of the Corporation's existing VHF mobile radio system with a new system that will meet the coverage and access requirements of the user group. The scope of work will include the replacement of a central switch located in Gander, equipment at 29 repeater sites, approximately 300 mobile and base station radios, and approximately 100 portable radios. The proposed system will expand to 39 sites in order to provide the additional coverage as identified by the user group.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	2,194.9	3,342.3	0.0	5,537.2
Labour	152.0	307.5	0.0	459.5
Engineering	216.6	160.1	0.0	376.7
Project Management	79.9	78.5	0.0	158.4
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	271.4	1,585.2	0.0	1,856.6
Total	**2,914.8**	**5,473.6**	**0.0**	**8,388.4**

Operating Experience:

The existing system was purchased in 1989. The components of the current system are manufacturer discontinued and spare parts are no longer available for many critical subsystems. The system has experienced an increasing rate of failure in recent years, resulting in reduced availability. Trained resources, knowledgeable about the system are no longer present at Aliant, who maintain a substantial portion of the system under contract, which puts the system at risk.

Project Justification:

The increased failures over the last few years, the manufacturer discontinued equipment, the unavailability of spare parts, the lack of trained resources, and operational issues with the existing coverage as identified by the user group justifies the replacement of the existing VHF mobile radio system. The intent is to replace the existing system with a standards-based mobile radio system, which will protect the Corporation's investment in the long term since the system would not be tied to a single manufacturer.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace VHF Mobile Radio System **(cont'd.)**

Project Justification: (cont'd.)

The required documentation addressing the Board's Order No. P.U. 29 (2003) is attached in Section G, Appendix 4.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery System - Multiple Sites

Location: Cat Arm, Godaleich Hill, Plum Point & Bear Cove

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the supply and installation of five 48 VDC battery systems at the Cat Arm Intake, Cat Arm Plant, Godaleich Hill Microwave Site, Plum Point Terminal Station and Bear Cove Terminal Station. This includes 48 VDC rectifiers, battery banks, battery racks and associated cabling. For small sites, the rectifier rack replacement also includes replacement of the 48 VDC distribution.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	183.2	0.0	0.0	183.2
Labour	66.8	0.0	0.0	66.8
Engineering	25.0	0.0	0.0	25.0
Project Management	11.4	0.0	0.0	11.4
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	77.6	0.0	0.0	77.6
Total	**364.0**	**0.0**	**0.0**	**364.0**

Operating Experience:

The flooded cell battery banks being proposed for replacement are all at least twenty years old. The non-flood cell battery banks being proposed for replacement are ten years old. Yearly capacity and conductive tests confirm the natural, expected degradation with time for these types of batteries.

Project Justification:

This replacement is necessary to provide emergency power to equipment required for the remote control and monitoring of Hydro's transmission and generation system and is justified on reliability considerations. Failure to replace this equipment is likely to result in a battery bank failure or reduced reliability which could extend or cause customer outages. The flooded batteries have been in operation for at least twenty years and have exceeded the twenty-year design life which is the industry standard life expectancy of large stationary batteries of the flooded cell type. In some sites, cell plates are warping and showing signs of deterioration or there is significant corrosion of battery terminals. As well, the capacitors in some older types of rectifiers are deteriorating as expected with equipment of this age. A failure is likely after the battery design life is exceeded.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

The non-flooded batteries at Plum Point and Bear Cove will be ten years old in 2005. Non-flooded batteries have demonstrated service life in the range of seven - eight years depending on the conditions in which the battery operates.

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Microwave Site Refurbishing

Location: Mary March Hill

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project involves the refurbishing of the West Coast microwave site at Mary March Hill. In particular the work includes:

1. the tower painting;
2. anchor heads field galvanized;
3. guys at level 4 will be replaced; and
4. a detailed electrical system assessment.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	224.4	0.0	0.0	224.4
Labour	0.0	0.0	0.0	0.0
Engineering	1.6	0.0	0.0	1.6
Project Management	5.3	0.0	0.0	5.3
Inspection & Commissioning	6.8	0.0	0.0	6.8
Corp O/H, AFUDC, Esc. & Contingency	55.7	0.0	0.0	55.7
Total	**293.8**	**0.0**	**0.0**	**293.8**

Operating Experience:

The tower and building at Mary March Hill were installed in 1980. The Mary March Hill site has not been refurbished since being constructed twenty-five years ago.

Project Justification:

The Mary March Hill Microwave site requires some upgrading to ensure that the site's infrastructure condition does not further deteriorate. The microwave sites are a major part of the critical infrastructure that supports the operation and control of the Provincial electrical grid. In order to maximize the useful life of its microwave infrastructure, Hydro periodically evaluates the condition of its towers and associated infrastructure. Included in this evaluation are tower and anchor foundations, guy wires, paint, radomes, wave-guides, light and electrical systems, air conditioners, structure integrity of building and building foundations plus any miscellaneous components that may need repair or replacement. To ensure that this project will be completed at the lowest possible cost, Hydro will solicit competitive bids for all materials and external labour.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Microwave Site Refurbishing **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

This project is part of an IS&T program to refurbish and extend the life of the microwave sites infrastructure. Other locations will be proposed for refurbishment once identified through inspection.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Remote Terminal Units for Hydro - Phase 6

Location: Bay d'Espoir Plant and Bay d'Espoir Terminal Station

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of two Quindar Remote Terminal Units (RTUs) used for remote monitoring and control of plants and terminal stations from the Energy Control Center. The sites are the Bay d'Espoir Plant and the Bay d'Espoir Terminal Station. This is phase 6 of a 9-phase plan to replace all obsolete RTUs.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	75.2	0.0	0.0	75.2
Labour	30.2	0.0	0.0	30.2
Engineering	12.5	0.0	0.0	12.5
Project Management	4.2	0.0	0.0	4.2
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	27.4	0.0	0.0	27.4
Total	**149.5**	**0.0**	**0.0**	**149.5**

Operating Experience:

The plant RTU was installed in 1980. The Terminal Station RTU was installed in 1990. Third party spares and repair services are not available for the RTUs.

Project Justification:

This replacement is necessary to ensure control and monitoring capabilities of Hydro's transmission and generation facilities as the equipment is no longer supported by the equipment manufacturer and spares are no longer available for these systems. Failure to replace this equipment will result in reduced reliability and extend or cause customer outages. Failures of RTUs can prevent the Energy Control Center from being able to dispatch generation at those particular sites or not being able to control the water at the various structures at the Bay d'Espoir facility. The RTUs permit the operation of these systems without having people present twenty-four hours a day. The Bay d'Espoir RTUs are located at one of the most critical system sites with the largest generation capacity.

Future Plans:

None in this phase.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Air Conditioners

Location: Stoney Brook & Deer Lake

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of the air conditioning systems in the communications rooms at Stoney Brook Terminal Station and the Deer Lake Office.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	34.5	0.0	0.0	34.5
Labour	1.7	0.0	0.0	1.7
Engineering	7.2	0.0	0.0	7.2
Project Management	0.7	0.0	0.0	0.7
Inspection & Commissioning	0.3	0.0	0.0	0.3
Corp O/H, AFUDC, Esc. & Contingency	10.9	0.0	0.0	10.9
Total	**55.3**	**0.0**	**0.0**	**55.3**

Operating Experience:

The air conditioner at Stoney Brook is an original unit installed and is approximately fifteen years old. Heating and humidification are not functioning and cannot be repaired because the required parts are not available.

The air conditioning at Deer Lake Office is inadequate and does not meet the requirement of indoor Air Quality Assessment.

Project Justification:

These units will need to be replaced because they have reached the end of their serviceable life and are required to maintain an environment that is suitable for the operation of communications and control equipment used to support Hydro's transmission and generation facilities. These units are obsolete and parts are no longer available.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This proposal is a continuation of a project for which the Board has approved funds for 2004. This project is a two-year program to plan, design and install a wide area network (WAN) communications infrastructure to replace the existing operational data (SCADA) and operational voice network. This will provide an architecture that can support the operational data, administrative data and voice traffic over a standard network infrastructure.

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

Operating Experience:

The existing operational data network was installed in 1988, and is now fifteen year-old technology. The equipment was designed to carry the operational data between the RTUs and the Energy Management System (Harris) at Hydro Place, and operational voice traffic between the sub-stations & plants and the Energy Control Centre (ECC).

The equipment is at the end of its useful life and the manufacturer no longer supports the software.

Project Justification:

The Telecommunications Plan (Table 5, page 19), which was submitted to the Board as part of Hydro's 2003 Capital Budget Application (Section H), indicates that the equipment Hydro has installed over the past fifteen years is no longer under development and many components have been manufacturer discontinued for a number of years.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification (cont'd):

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

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

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

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

Future Plans:

There are no further plans under consideration at this time.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - 2004

Location: System Wide

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

This project for 2005 is the continuation of a project for which the Board approved funds for 2004. The project involves replacing twenty-six light vehicles (cars, pick-ups and vans) and seven medium/heavy vehicles (line trucks and boom trucks).

Project Cost: *($ x1,000)*	**2004**	**2005**	**Beyond**	**Total**
Material Supply	1,020.0	300.0	0.0	1,320.0
Labour	0.0	0.0	0.0	0.0
Engineering	10.0	10.0	0.0	20.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	51.2	140.0	0.0	191.2
Total	**1,081.2**	**450.0**	**0.0**	**1,531.2**

Operating Experience:

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

REPLACEMENT CRITERIA

VEHICLES

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

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

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

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

The budget allocations for each class of vehicle is shown below.

Vehicle Class	**Budget Amount**
1000 (Cars/Mini-vans)	$ 300,000
2000 (Pick-up/ Service Vans)	711,200
3000 (Light Trucks)	80,000
4000 (Medium/Heavy Trucks)	300,000
Contingency	140,000
Total	**$ 1,531,200**

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

Future Plans:

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

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - 2005

Location: System Wide

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

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

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	771.0	0.0	0.0	771.0
Labour	0.0	0.0	0.0	0.0
Engineering	10.0	0.0	0.0	10.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	96.6	0.0	0.0	96.6
Total	**877.6**	**0.0**	**0.0**	**877.6**

Operating Experience:

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

REPLACEMENT CRITERIA

VEHICLES

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

Category 1000 and 2000 vehicles being replaced will generally have an average age of seven years and 165,000 km and the category 4000 item will have an average age of ten years and 200,000 km.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles - Hydro System - 2005 **(cont'd.)**

Project Justification:

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

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

The budget allocations for each class of vehicle is shown below.

Vehicle Class	**Budget Amount**
1000 (Cars/Mini-vans)	$ 275,000
2000 (Pick-up/ Service Vans)	465,500
3000 (Light Trucks)	0
4000 (Medium/Heavy Trucks)	60,000
Contingency	77,100
Total	**877,600**

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

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Electronic Metering Reading

Location: Hydro Place

Division: Finance

Classification: Administrative

Project Description:

This project for 2005 is the continuation of a project for which the Board approved funds for 2004. This project consists of a study to provide recommendations on a replacement system for the currently used meter-reading units (the Radix FW200) in 2004 and to purchase equipment and install the system in 2005.

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

Operating Experience:

A total of twenty-eight metering-reading software were purchased in 1998 and since that time, five have been repaired, three in 2002 and two in 2003.

Project Justification:

The handheld meter-reading units facilitate meter reading and billing processes. Hydro has been notified by the Radix Corporation that the FW200 handheld meter-reading unit presently being used by Hydro was phased out in 2003, however, they will support Hydro's system through 2005. The equipment estimate used for this budget is based on prices provided by the Radix Corporation to upgrade to the FW300 handheld model but other suppliers will be evaluated. As well, Hydro is currently evaluating an automatic meter-reading option using power line carrier technology.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Chiller

Location: Hydro Place

Division: Human Resources & Legal

Classification: Administrative

Project Description:

This project involves the disposal of existing Trane HVAC chiller at Hydro Place and replacement with a chiller unit which complies with revised government regulations for refrigerants.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	200.0	0.0	0.0	200.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	13.3	0.0	0.0	13.3
Total	**213.3**	**0.0**	**0.0**	**213.3**

Operating Experience:

The existing Trane chiller is original equipment installed in 1989 and is normally operational from May through September each year. The HVAC chiller is under an annual service agreement with Johnson Controls Ltd and has been periodically upgraded to meet changes in regulations governing its operation.

Project Justification:

The installed Trane chiller uses R-11 refrigerant, a chlorofluorocarbon (CFC), the production of which was banned in Canada as of December 1995 and its use and refill in existing chillers is prohibited after January 2005. The normal life expectancy of a chiller is between 20 - 25 years and the existing unit is 15 years old. The cost to retrofit the existing chiller from R-11 is estimated at between $120 to - $150 thousand. Johnson Controls Ltd. recommend a replacement rather than retrofit the fifteen-year old Trane HVAC chiller unit in light of the concern with respect to the refrigerant and future availability of replacement parts. A cost benefit analysis indicates it is more cost effective to replace the unit.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Assessment of System Operations

Location: Hydro Place

Division: Finance

Classification: Administrative

Project Description

This project consists of having a consultant perform a security risk assessment of critical facilities on the interconnected and isolated systems.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	100.0	0.0	0.0	100.0
Engineering	0.0	0.0	0.0	0.0
Project Management	10.0	0.0	0.0	10.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	0.0	0.0	0.0	0.0
Total	**110.0**	**0.0**	**0.0**	**110.0**

Operating Experience

The interconnected and isolated systems have been operating for approximately forty years. Hydro has had several major outages, mainly due to weather-related causes on the Avalon and Great Northern peninsulas. In addition, there have been three isolated system outages that were fire-related. Finally, our terminal stations and microwave sites have been subjected to theft and vandalism on many occasions. The theft incidents besides endangering the public and Hydro's ability to provide service also is an added risk to our employees, as the focus of these thefts is the copper grounding systems.

Project Justification

This project will be the first risk assessment of their facilities. This information will assist in developing risk management techniques to eliminate or reduce the potential exposures and increase security at critical facility locations.

Future Plans

Future costs for security improvements will be determined by this project. By completing the risk assessment, it will permit an orderly planning of the work necessary to eliminate or reduce the exposures to our facilities. It is expected this will increase operational reliability and employee safety.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Standby Diesel Fuel System

Location: Hydro Place

Division: Human Resources & Legal

Classification: Administrative

Project Description:

The project involves upgrading the existing fuel system for the Hydro Place standby diesel generator to meet provincial regulations for Storage and Handling of Gasoline and Associated Products. The project consists of:

- obtaining necessary permits;
- performing site environmental testing (site remediation, if required, is not covered under this proposal;
- replacing primary storage tanks, day tanks, and fuel transfer piping with approved equipment; and,
- Installing compliant fuel metering system and approved automatic fuel transfer system and controls.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	25.7	0.0	0.0	25.7
Engineering	6.0	0.0	0.0	6.0
Project Management	1.5	0.0	0.0	1.5
Inspection & Commissioning	0.3	0.0	0.0	0.3
Corp O/H, AFUDC, Esc. & Contingency	17.3	0.0	0.0	17.3
Total	**90.8**	**0.0**	**0.0**	**90.8**

Operating Experience:

The existing diesel fuel storage system is designed with sufficient capacity to provide fuel to power the Energy Control Center for seven days. Due to the system configuration, fuel usage cannot be reconciled.

Project Justification:

A 2002 environmental audit, highlighted that the existing fuel storage system does not comply with provincial regulations with regards to fuel reconciliation requirements. As well, the existing day tanks are not ULC certified and there is no secondary containment designed into the day tank system.

Future Plans:

None.

2005 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Reconstruct Storage Ramps

Location: Bishop's Falls

Division: Human Resources & Legal

Classification: Administrative

Project Description:

This project consists of the re-construction of two outside storage ramps, 3 m by 60 m at the Bishop's Falls Central Stores facility. The ramps are to be constructed of steel posts supporting steel beams with treated timber decking.

Project Cost: *($ x1,000)*	**2005**	**2006**	**Beyond**	**Total**
Material Supply	35.0	0.0	0.0	35.0
Labour	35.0	0.0	0.0	35.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	2.8	0.0	0.0	2.8
Total	**72.8**	**0.0**	**0.0**	**72.8**

Operating Experience:

The existing all wood ramps in the Central Stores yard are twenty-five years old and are in a deteriorated condition.

Project Justification:

Equipment and materials stored on these ramps are both heavy and costly. Given the deteriorated condition, there are concerns regarding personnel safety and protection of the stored assets.

Future Plans:

None.

2005 LEASING COSTS

HYDRO

2005 LEASING COSTS

ITEM	***2005 COST***
Office Space – Happy Valley/Goose Bay	63,581
It is anticipated that this lease will be renewed in 2005	