SECTION A

NEWFOUNDLAND & LABRADOR HYDRO

2003 CAPITAL BUDGET - OVERVIEW

($,000)

	Exp To 2002	2003	Future Years	Total	Explanation Page Ref.
GENERATION	37	4,961	1,386	6,384	
TRANSMISSION & RURAL OPERATIONS	15	10,033	2,836	12,884	
GENERAL PROPERTIES	269	17,076	12,717	30,062	
ALLOWANCE FOR UNFORSEEN EVENTS	0	1,000	0	1,000	
TOTAL CAPITAL BUDGET	321	33,070	16,939	50,330	
PROJECTS CARRIED FROM 2002 to 2003					
Install Fault Recorder - Upper Salmon Generating Statior	71	56		127	A-11
Purchase and Install Continuous Emission Monitoring	249	552		801	A-11
Replace Vehicles - 2002	1,400	497		1,897	A-11
Purchase Additional Corporate Applications	442	75		517	A-11
TOTAL PROJECTS CARRIED FROM 2002 to 2003	2,162	1,180	0	3,342	
REVISED TOTAL CAPITAL BUDGET	2,483	34,250	16,939	53,672	

NEWFOUNDLAND & LABRADOR HYDRO

2003 CAPITAL BUDGET - SUMMARY BY CATEGORY

($,000)

	Exp To 2002	2003	Future Years	Total
GENERATION				
HYDRO PLANTS				
Construction Projects	0	710	1,265	1,975
Property Additions	0	327	0	327
Tools & Equipment	0	117	121	238
THERMAL PLANT				
Construction Projects	37	1,743	0	1,780
Property Additions	0	1,991	0	1,991
Tools & Equipment	0	73	0	73
TOTAL GENERATION	37	4,961	1,386	6,384
TRANSMISSION & RURAL OPERATIONS				
TRANSMISSION	15	539	2,836	3,390
SYSTEM PERFORMANCE & PROTECTION	0	546	0	546
TERMINALS	0	581	0	581
DISTRIBUTION	0	6,685	0	6,685
GENERATION	0	681	0	681
GENERAL				
Metering	0	102	0	102
Properties	0	49	0	49
Tools & Equipment	0	850	0	850
TOTAL TRANSMISSION & RURAL OPERATIONS	15	10,033	2,836	12,884

NEWFOUNDLAND & LABRADOR HYDRO

2003 CAPITAL BUDGET - SUMMARY BY CATEGORY

($,000)

	Exp To 2002	2003	Future Years	Total
GENERAL PROPERTIES				
INFORMATION SYSTEMS & TELECOMMUNICATIONS	269	15,241	11,575	27,085
ADMINISTRATIVE	0	1,835	1,142	2,977
TOTAL GENERAL PROPERTIES	269	17,076	12,717	30,062
ALLOWANCE FOR UNFORSEEN EVENTS	0	1,000		1,000
TOTAL CAPITAL BUDGET	321	33,070	16,939	50,330

NEWFOUNDLAND & LABRADOR HYDRO
GENERATION
2003 CAPITAL BUDGET - DETAIL

($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
HYDRO PLANTS						
CONSTRUCTION PROJECTS						
Upgrade Controls Spherical Valve No. 1 - Bay d'Espoir		223		223	Aug. 03	B-5
Replace Vibration/Data System - Bay d'Espoir		153		153	Nov. 03	B-7
Replacement of Draft Tube Stoplogs at Paradise River		156		156	Aug. 03	B-9
Replace Fuel Storage Tanks at Burnt Spillway - Bay D' Espoir		97		97	Aug. 03	B-11
Install Early Warning System - Victoria Dam		40		40	Oct. 03	
Frazil Ice Monitoring - Granite Canal		21		21	Oct. 03	
Replace Gate Hoist No. 2 - Ebbegunbaeg Control Structure		7	508	515	Sep. 04	B-13
Replace Unit No. 7 Exciter - Bay d'Espoir		13	757	770	Oct. 04	B-15
TOTAL CONSTRUCTION PROJECTS	0	710	1,265	1,975		
PROPERTY ADDITIONS						
Replace Site fencing - Bay d'Espoir		250		250	Dec. 03	B-18
Purchase and Install Security Locks at Hydro Plants		77		77	Oct. 03	B-19
TOTAL PROPERTY ADDITIONS	0	327	0	327		
TOOLS & EQUIPMENT						
Replace Loader/Backhoe - Bay d'Espoir		3	121	124	Nov. 03	B-20
Purchase & Replace T & E Less than $ 50,000		114		114		
TOTAL TOOLS & EQUIPMENT	0	117	121	238		

NEWFOUNDLAND & LABRADOR HYDRO
GENERATION
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
THERMAL PLANT						
CONSTRUCTION PROJECTS						
Replace Turbine Electrohydraulic Control System - Unit No. 1 - Holyrood	37	954		991	Aug. 03	B-21
Purchase and Installation of a Neutralization Pit - Holyrood		343		343	Aug. 03	B-24
Purchase Mobile Ambient Monitoring System - Holyrood		184		184	Jun. 03	B-26
Flue Gas Particulate Removal Study - Holyrood		150		150	Mar. 03	B-28
Purch/Inst Partial Discharge Analysis Equip - Unit No. 1 - Holyrood		112		112	Jul. 03	B-30
TOTAL CONSTRUCTION PROJECTS	37	1,743	0	1,780		
PROPERTY ADDITIONS						
Upgrade Civil Structures - Holyrood		1,991		1,991	Oct. 03	B-32
TOTAL PROPERTY ADDITIONS	0	1,991	0	1,991		
TOOLS & EQUIPMENT						
Purchase & Replace Tools & Equipment Less than $ 50,000	0	73	0	73		
TOTAL TOOLS & EQUIPMENT	0	73	0	73		
TOTAL GENERATION	37	4,961	1,386	6,384		

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
TRANSMISSION						
Uprate of TL203- (230kv Sunnyside - Western Avalon)	15	192		207	Oct. 03	C-2
Replace Insulators TL209 - (230kV Stephenville - Bottom Brook)		236		236	Oct. 03	B-35
Upgrade TL214 - (138kV Bottom Brook - Doyles)		111	2,836	2,947	Sep. 04	B-38
TOTAL TRANSMISSION	15	539	2,836	3,390		
SYSTEM PERFORMANCE & PROTECTION						
Upgrade Circuit Switcher South Brook Terminal Station		355		355	Jun. 03	B-40
Purchase and Install 138kV Breaker Fail Protection		82		82	Dec. 03	B-42
Upgrade Breaker Controls - SunnysideTerminal Station		33		33	Aug. 03	
Replace Digital Fault Recorder - Holyrood Terminal Station		76		76	Aug. 03	B-43
TOTAL SYSTEM PERFORMANCE & PROTECTION	0	546	0	546		
TERMINALS						
Replace Fence - Holyrood Terminal Station		32		32	Aug. 03	
Upgrade Access Road - Farewell Head Terminal Station		22		22	Jul. 03	
Replace 125v Battery Banks		83		83	Jul. 03	B-44
Upgrade Station Services - Long Harbour Terminal Station		83		83	Jul. 03	B-46
Install Motor Drive Mechanisms on Disconnect Switches - Sunnyside T.S.		217		217	Oct. 03	B-48
Replace Surge Arrestors		69		69	Dec. 03	B-50
Replace Instrument Transformers		75		75	Dec. 03	B-52
TOTAL TERMINALS	0	581	0	581		

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
DISTRIBUTION						
Service Extensions		1,448		1,448	Dec. 03	B-54
Distribution Upgrades		1,476		1,476	Dec. 03	B-56
Upgrade Line - Little Bay Distribution System		317		317	Dec. 03	B-58
Upgrade Line - St. Anthony Distribution Systems		557		557	Dec. 03	B-59
Insulator Replacements		795		795	Dec. 03	B-61
Pole Replacements		852		852	Dec. 03	B-64
Protection Upgrades - Isolated Systems		720		720	Oct. 03	B-66
Replace Corroded Transformers - Northern		172		172	Dec. 03	B-68
Replace Voltage Regulators		176		176	Oct. 03	B-70
Protection Upgrade North Diesel Plant - Goose Bay		172		172	Nov. 03	B-74
TOTAL DISTRIBUTION	0	6,685	0	6,685		
GENERATION						
Install Nox Emission Monitor - McCallum		103		103	Aug. 03	B-75
Fire Alarm Systems		98		98	Sep. 03	B-76
Upgrade Service Cables		60		60	Apr. 03	B-78
Increase Generation - Mary's Harbour		212		212	Dec. 03	B-82
Fuel Storage Upgrades		208		208	Oct. 03	B-85
TOTAL GENERATION	0	681	0	681		
GENERAL						
METERING						
Purchase Meters & Equipment - Rural System		96		96	Dec. 03	B-90
Purchase Metering Spares - Bulk Electrical System		6		6	Dec. 03	
TOTAL METERING	0	102	0	102		
PROPERTIES						
Construct Storage Shed - Harbour Breton		19		19	Mar. 03	
Purchase Land - Mud Lake		30		30	Mar. 03	
TOTAL PROPERTIES	0	49	0	49		
TOOLS & EQUIPMENT						
Purchase & Replace Tools & Equipment Less than $ 50,000		306		306		
Replace Light Duty Mobile Equipment Less than $ 50,000		544		544		
TOTAL TOOLS & EQUIPMENT	0	850	0	850		
TOTAL GENERAL	0	1,001	0	1,001		
TOTAL TRANSMISSION & RURAL OPERATIONS	15	10,033	2,836	12,884		

NEWFOUNDLAND & LABRADOR HYDRO
GENERAL PROPERTIES
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
INFORMATION SYSTEMS & TELECOMMUNICATIONS						
SOFTWARE APPLICATIONS						
Infrastructure Replacement						
Replace Energy Management System - Energy Control Centre		1,214	11,073	12,287	Oct. 05	B-91
New Infrastructure						
Security Program Centralized Log Monitoring & Analysis System		57	83	140	Dec. 04	B-97
TOTAL SOFTWARE APPLICATIONS	0	1,271	11,156	12,427		
COMPUTER OPERATIONS						
Infrastructure Replacement						
Enterprise Storage Management Infrastructure		2,049		2,049	Dec. 03	B-99
End User & Server Evergreen Program		893		893	Dec. 03	B-101
New Infrastructure						
Peripheral Infrastructure Replacement		99		99	Dec. 03	B-105
TOTAL COMPUTER OPERATIONS	0	3,041	0	3,041		

NEWFOUNDLAND & LABRADOR HYDRO
GENERAL PROPERTIES
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
INFORMATION SYSTEMS & TELECOMMUNICATIONS						
NETWORK SERVICES						
Infrastructure Replacement						
Install New Microwave System Interconnection Between East/West Coast	269	8,673		8,942	Dec. 03	B-106
Replace UHF Radio Link - Abitibi - Stephenville		89		89	Oct. 03	B-108
Replace Powerline Carrier Equipment West Coast Transmission System		1,009	419	1,428	Dec. 04	B-109
Replace Voice, Data & Teleprotection Equip - Upper Salmon Intake		88		88	Oct. 03	B-111
Upgrade Site Grounding at Telecontrol Site - Phase 4		48		48	Jun. 03	
Replace Battery System - Multiple Sites		224		224	Oct. 03	B-113
Replace Remote Terminal Unit for Hydro - Phase 4		285		285	Oct. 03	B-115
Network Infrastructure						
Purchase Equipment for Physical Facilities Upgrade		71		71	Jun. 03	B-118
Deer Lake Building Improvements		103		103	Dec. 03	B-119
Upgrade Local Area Networks (LANs) - Multiple Sites		47		47	Oct. 03	
Upgrade of Technology						
Replacement of Operational Data & Voice Network - Phase I		292		292	Oct. 03	B-120
TOTAL NETWORK SERVICES	269	10,929	419	11,617		
TOTAL INFORMATION SYSTEMS & TELECOMMUNICATIONS	269	15,241	11,575	27,085		

NEWFOUNDLAND & LABRADOR HYDRO
GENERAL PROPERTIES
2003 CAPITAL BUDGET - DETAIL
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
ADMINISTRATIVE						
Vehicles						
Replace Vehicles - Hydro System		1,584	1,142	2,726	Jun. 04	B-122
ADMINISTRATION						
Replace Engineering Wide Format Printing System		62		62	Jun. 03	B-124
Automatic Meter Reading (AMR) - Pilot Project		52		52	Dec. 03	B-125
Purchase & Replace Admin Office Equip less than $50,000	0	137	0	137		
TOTAL ADMINISTRATIVE	0	1,835	1,142	2,977		
TOTAL GENERAL PROPERTIES	269	17,076	12,717	30,062		

2003 CAPITAL BUDGET
VARIANCE EXPLANATIONS
(2002 Carryover Projects)

1. Install Fault Recorder - Upper Salmon Generating Station

The delay in receiving the approval of this Capital budget item by the Board of Commissioners Public Utilities (the Board) combined with expected delivery times for materials results in a 2003 project completion date.

2. Purchase and Install Continuous Emission Monitoring

The delay in receiving the approval of this Capital budget item by the Board combined with expected delivery times for materials will result in missing the maintenance window for the Holyrood units and thus a 2003 project completion date.

3. Replace Vehicles - 2002

The delay in receiving the approval of this Capital budget item by the Board combined with expected delivery times for materials results in a 2003 project completion date.

4. Purchase Additional Corporate Applications

The delay in receiving the approval of this Capital budget item by the Board combined with expected development and installation times for the application results in a 2003 project completion date.

SECTION B

NEWFOUNDLAND & LABRADOR HYDRO

2003 CAPITAL BUDGET

PROJECTS OVER $50,000 - OVERVIEW

($,000)

	Exp To 2002	2003	Future Years	Total
GENERATION	37	4,713	1,386	6,136
TRANSMISSION & RURAL OPERATIONS	0	8,849	2,836	11,685
GENERAL PROPERTIES	269	16,844	12,717	29,830
ALLOWANCE FOR UNFORSEEN EVENTS		1,000	0	1,000
TOTAL CAPITAL BUDGET	306	31,406	16,939	48,651

NEWFOUNDLAND & LABRADOR HYDRO
GENERATION
2003 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
Upgrade Controls Spherical Valve No. 1 - Bay d'Espoir		223		223	Aug. 03	B-5
Replace Vibration/Data System - Bay d'Espoir		153		153	Nov. 03	B-7
Replacement of Draft Tube Stoplogs at Paradise River		156		156	Aug. 03	B-9
Replace Fuel Storage Tanks at Ebby & Burnt Spillway - Bay d'Espoir		97		97	Aug. 03	B-11
Replace Gate Hoist No. 2 - Ebbegunbaeg Control Structure		7	508	515	Sep. 04	B-13
Replace Unit No. 7 Exciter - Bay d'Espoir		13	757	770	Oct. 04	B-15
Replace Site fencing - Bay d'Espoir		250		250	Dec. 03	B-18
Purchase and Install Security Locks at Hydro Plants		77		77	Oct. 03	B-19
Replace Loader/Backhoe - Bay d'Espoir		3	121	124	Nov. 04	B-20
Replace Turbine Electrohydraulic Control System - Unit No. 1 - Holyrood	37	954		991	Aug. 03	B-21
Purchase and Installation of a Neutralization Pit - Holyrood		343		343	Aug. 03	B-24
Purchase Mobile Ambient Monitoring System - Holyrood		184		184	Jun. 03	B-26
Flue Gas Particulate Removal Study - Holyrood		150		150	Mar. 03	B-28
Purch/Inst Partial Discharge Analysis Equip - Unit No. 1 - Holyrood		112		112	Jul. 03	B-30
Upgrade Civil Structures - Holyrood		1,991		1,991	Oct. 03	B-32
TOTAL GENERATION	37	4,713	1,386	6,136		

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2003 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
Replace Insulators TL209 - (230kV Stephenville - Bottom Brook)		236		236	Oct. 03	B-35
Upgrade TL214 - (138kV Bottom Brook - Doyles)		111	2,836	2,947	Sep. 04	B-38
Upgrade Circuit Switcher South Brook Terminal Station		355		355	Jun. 03	B-40
Purchase and Install 138kV Breaker Fail Protection		82		82	Dec. 03	B-42
Replace Digital Fault Recorder - Holyrood Terminal Station		76		76	Aug. 03	B-43
Replace 125v Battery Banks		83		83	Jul. 03	B-44
Upgrade Station Services - Long Harbour Terminal Station		83		83	Jul. 03	B-46
Install Motor Drive Mechanisms on Disconnect Switches - Sunnyside T.S.		217		217	Oct. 03	B-48
Replace Surge Arrestors		69		69	Dec. 03	B-50
Replace Instrument Transformers		75		75	Dec. 03	B-52
Service Extensions		1,448		1,448	Dec. 03	B-54
Distribution Upgrades		1,476		1,476	Dec. 03	B-56
Upgrade Line - Little Bay Distribution System		317		317	Dec. 03	B-58
Upgrade Line - St. Anthony Distribution Systems		557		557	Dec. 03	B-59
Insulator Replacements		795		795	Dec. 03	B-61
Pole Replacements		852		852	Dec. 03	B-64
Protection Upgrades - Isolated Systems		720		720	Oct. 03	B-66
Replace Corroded Transformers - Northern		172		172	Dec. 03	B-68
Replace Voltage Regulators		176		176	Oct. 03	B-70
Protection Upgrade North Diesel Plant - Goose Bay		172		172	Nov. 03	B-74
Install Nox Emission Monitor - McCallum		103		103	Aug. 03	B-75
Fire Alarm Systems		98		98	Sep. 03	B-76
Upgrade Service Cables		60		60	Apr. 03	B-78
Increase Generation - Mary's Harbour		212		212	Dec. 03	B-82
Fuel Storage Upgrades		208		208	Oct. 03	B-85
Purchase Meters & Equipment - Rural System		96		96	Dec. 03	B-90
TOTAL TRANSMISSION & RURAL OPERATIONS	**0**	**8,849**	**2,836**	**11,685**		

NEWFOUNDLAND & LABRADOR HYDRO
GENERAL PROPERTIES
2003 CAPITAL BUDGET - PROJECTS OVER $50,000 BY CATEGORY
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
Replace Energy Management System - Energy Control Centre		1,214	11,073	12,287	Oct. 05	B-91
Security Program Centralized Log Monitoring & Analysis System		57	83	140	Dec. 04	B-97
Enterprise Storage Management Infrastructure		2,049		2,049	Dec. 03	B-99
End User & Server Evergreen Program		893		893	Dec. 03	B-101
Peripheral Infrastructure Replacement - 2003		99		99	Dec. 03	B-105
Install New Microwave System Interconnection Between East/West Coast	269	8,673		8,942	Dec. 03	B-106
Replace UHF Radio Link - Abitibi - Stephenville		89		89	Oct. 03	B-108
Replace Powerline Carrier Equipment West Coast Transmission System		1,009	419	1,428	Dec. 04	B-109
Replace Voice, Data & Teleprotection Equip - Upper Salmon Intake		88		88	Oct. 03	B-111
Replace Battery System - Multiple Sites		224		224	Oct. 03	B-113
Replace Remote Terminal Unit for Hydro - Phase 4		285		285	Oct. 03	B-115
Purchase Equipment for Physical Facilities Upgrade		71		71	Jun. 03	B-118
Deer Lake Building Improvements		103		103	Dec. 03	B-119
Replacement of Operational Data & Voice Network - Phase I		292		292	Oct. 03	B-120
Replace Vehicles - Hydro System		1,584	1,142	2,726	Jun. 04	B-122
Replace Engineering Wide Format Printing System		62		62	Jun. 03	B-124
Automatic Meter Reading (AMR) - Pilot Project		52		52	Dec. 03	B-125
TOTAL GENERAL PROPERTIES	**269**	**16,844**	**12,717**	**29,830**		

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Controls Spherical Valve No. 1

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project involves the upgrading of the control system for spherical valve No. 1 by replacing components with new equipment, including control valves, piping, tubing, and control panel. The spherical valve is the main valve for controlling the flow of water to the turbine and also functions as an emergency shut off device. The new controls will have stainless steel mechanical components for corrosion protection and a programmable logic controller with manual overrides.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	138.0	0.0	0.0	138.0
Labour	39.0	0.0	0.0	39.0
Engineering	6.0	0.0	0.0	6.0
Project Management	7.0	0.0	0.0	7.0
Inspection & Commissioning	2.0	0.0	0.0	2.0
Corp O/H, AFUDC, Esc. & Contingency	31.2	0.0	0.0	31.2
Total	**223.2**	**0.0**	**0.0**	**223.2**

Operating Experience:

Bay d'Espoir unit #1, along with the spherical valve and control system became, operational in August 1967. This generating unit typically operates for 5500 hours each year. In the last five years, there have been 36 maintenance events for this control system, which is much higher than expected. This project is part of a multi year program for upgrading control systems. Unit # 5 controls were upgraded in 2001 and Unit # 2 will be completed during 2002.

Project Justification:

The control system for spherical valve No. 1 is obsolete and unreliable. Replacement parts have to be reversed engineered and custom made. The failure of the existing control system can result in the following events:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Controls Spherical Valve No. 1 – Bay d'Espoir **(cont'd.)**

Project Justification: (cont'd.)

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

c) Loss of all six units (450 MW) in powerhouse #1 if the spherical valve or seals fail while the unit is "opened" for maintenance resulting in the flooding of powerhouse #1, with the potential for loss of life.

Depending on the time of year when an outage occurs, replacement capacity and energy, if available, would have to be obtained through increased thermal production at Holyrood or gas turbine sites at significantly higher costs. As well, a lengthy outage would increase the risk of spill during high inflow periods. The cost of replacement energy from Holyrood arising from an outage of two units (150 MW) is approximately $164,000/day assuming fuel at $28/bbl. Given the significance of the generating capacity to the overall system, it would be unacceptable to maintain the status quo and risk the loss of capability.

This budget includes the provision for a set of spare parts which will be suitable for use on any of the six units once all are modified.

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vibration/Data System - Bay d'Espoir

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the replacement of both the Data Acquisition and the Vibration Monitoring Systems in Bay d'Espoir Powerhouse #1 Control Room with one system capable of performing both functions.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	125.0	0.0	0.0	125.0
Labour	10.0	0.0	0.0	10.0
Engineering	4.0	0.0	0.0	4.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	1.0	0.0	0.0	1.0
Corp O/H, AFUDC, Esc. & Contingency	13.0	0.0	0.0	13.0
Total	**153.0**	**0.0**	**0.0**	**153.0**

Operating Experience:

The current Data Acquisition System (DAS) was installed in 1991 and the Vibration Monitoring System was installed in the mid 1980's. The (DAS) system was used for continuous monitoring of plant parameters but has been out of service since 2000 without parts to complete repair.

Project Justification:

Both existing systems are obsolete. IRD (the manufacturer) have stopped manufacturing parts for the current vibration monitoring system and parts availability is becoming problematic. The existing vibration monitoring system does not have the capacity to obtain orbit plots, or compare vibration differences on separate axes. With the technological advancements available in a new system, a better determination of a vibration condition can be obtained which will result in more efficient troubleshooting. The new vibration monitoring equipment will serve as a data acquisition and a condition monitoring system capable of reading process points such as

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vibration/Data System – Bay d'Espoir **(cont'd.)**

Project Justification: (cont'd.)

temperatures, flow rates, etc. This will aid in trend monitoring unit parameters, providing advance notice of possible problem areas, and has the potential to decrease the number of forced outages on these units.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Draft Tube Stoplogs at Paradise River

Location: Paradise River

Division: Production

Classification: Hydro Plants

Project Description:

This proposal includes the design and construction of stoplogs for the draft tube at the Paradise River Generating Station. The work will include the fabrication of two (2) - 2.8 m x 5.4 m steel stoplogs complete with J-seals, a hoist support frame, a monorail and an electric hoist and trolley. The logs will be stored in place in the stoplog slots and will be placed, when required, by the electric hoist and trolley system.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	93.0	0.0	0.0	93.0
Engineering	30.0	0.0	0.0	30.0
Project Management	6.0	0.0	0.0	6.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	27.0	0.0	0.0	27.0
Total	**156.0**	**0.0**	**0.0**	**156.0**

Operating Experience:

The existing wooden stoplogs were fabricated in 1989 and, despite being modified on a number of occasions, they have proven to be extremely unreliable. They were originally bolted together and later steel was added to the front for extra weight to help them sink. Finally, J-seals were added to the face of the timber stoplogs but they continue to leak as the timbers bend. As a result, a diving contractor has to mobilize to the site to plug leaks each time the stoplogs are put in place. This results in additional cost as well as delays in getting work done.

Project Justification:

The provision of draft tube stoplogs is required to provide access to the turbine and other underwater parts for carrying out inspections and maintenance. This ensures that operating equipment can be maintained in proper working condition and permits a safe repair environment when problems arise.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Draft Tube Stoplogs at Paradise River **(cont'd.)**

Project Justification: (cont'd.)

The draft tube has to be unwatered to perform work on the turbine runner and associated components. When the timber stoplogs are used to de-water the draft tube area, there is significant leakage around the stoplogs and occasionally they float out of place. This causes a significant safety concern for employees and contractors working in the area.

The existing timber stop logs have deteriorated and must be replaced.

Each time the stoplogs are put in place, divers have to be brought in to stop the leakage resulting in a delay in performing maintenance thereby extending plant outages and risking spill of water from the reservoir. Attempts that have been made to modify the current stoplogs, have not been successful in preventing leakage. The only option remaining to provide a safe maintenance environment is to replace them.

Steel stoplogs have proven to be very reliable at other Hydro facilities. They will provide a safe working environment for maintenance crews, decrease plant outage time and eliminate the requirement for divers and eliminate safety issues associated with the existing 23 year old wooded stoplogs.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Fuel Storage Tanks at Ebbegunbaeg Control Structure & Burnt Spillway - Bay d'Espoir

Location: Ebbegunbaeg and Burnt Spillway

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the removal and disposal of two existing 22,730 litre fuel tanks at Burnt Spillway and the relocation of an existing 45,460 litre, self-dyking fuel tank from Ebbegunbaeg (Ebby) to Burnt Spillway. It includes the design, supply, and installation of one 9,092 litre double wall fuel tank and one 909 litre self-dyking day tank at Ebby. Activities at both locations will include site work, concrete foundations, and fuel piping modifications. Approvals will be required from the Department of Environment for this work under the Provincial Gasoline and Associated Products (GAP) regulations.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	25.0	0.0	0.0	25.0
Labour	36.0	0.0	0.0	36.0
Engineering	14.0	0.0	0.0	14.0
Project Management	6.0	0.0	0.0	6.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	16.4	0.0	0.0	16.4
Total	**97.4**	**0.0**	**0.0**	**97.4**

Operating Experience:

The 45,460 litre fuel storage tank at Ebby and the two 22,730 litre fuel tanks at Burnt Spillway were fabricated and installed in 1995 and 1985, respectively. All tanks have been in constant operation since then.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Fuel Storage Tanks at Ebbegunbaeg Control Structure & Burnt Spillway - Bay d'Espoir **(cont'd.)**

Project Justification:

The existing fuel system at the Burnt Spillway does not meet Provincial Gasoline and Associated Products regulations. The interconnection in 2002 of Ebbegunbaeg to the Upper Salmon Generating Station via a distribution line will result in a decreased fuel capacity requirement at Ebbegunbaeg. This permits the existing GAP compliant 45,460 litre tank at Ebbegunbaeg to be relocated to Burnt Spillway and its replacement by a new 9,092 litre self-dyking tank and associated day tank. The two existing 22,730 litre, single-walled fuel tanks at Burnt Spillway are installed in an earth dyke. The earth dyke, which acts as the secondary containment for this system, does not meet the permeability requirements. As well, during the winter, snow and rain accumulate inside the dyke and forms a slush and ice build-up, which causes problems with the tank drains and piping. The relocation of the 45,460 litre self-dyking tank to Burnt Spillway and the installation of a smaller new tank at Ebbegunbaeg is less costly than the purchase and installation of a larger new tank at Burnt Spillway. Failure to correct the situation could lead to environmental damage and significant remediation costs. This project is consistent with Hydro maintaining a proactive approach on environmental responsibility and stewardship as well as continuous improvement of its environmental performance.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: Ebbegunbaeg Control Structure

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the replacement of the existing screw stem hoist mechanism on gate no. 2 at the Ebbegunbaeg Control Structure with a wire rope type hoist.

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

Operating Experience:

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

Project Justification:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

the gate is actually in the open position. Were such an event to occur when the unit at Upper Salmon is not available, water would have to be spilled around the Upper Salmon facility. The value of this lost production is equivalent to approximately 3,600 barrels of oil per day at Holyrood. At $28/barrel, this would represent a loss of $100,000 per day.

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

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This project consists of the purchase, installation and commissioning of a replacement static exciter for Unit 7 at Bay d'Espoir. The exciter will be an ABB Unitrol P similar to that used on Units 1 to 6 at Bay d'Espoir. The installation will be done during the planned maintenance outage for Unit 7 in 2004. This project is part of an ongoing replacement program started in 1995. By the end of 2002, exciters will have been replaced on 6 units at Bay d'Espoir and 2 units at Holyrood.

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

Operating Experience:

The existing exciter is part of the original equipment installed in 1977. It has been in service for 91856 hours. The most recent repair on the exciter is a fan failure in September 2000 which resulted in a unit trip.

Project Justification:

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

A report titled "A Condition Assessment of Exciters within the Bay d'Espoir Powerhouse No.2, Hind's Lake, Upper Salmon, Cat Arm and Holyrood Generating Stations" was prepared by Generation Engineering dated March 28, 2000 and is contained in Section G, Appendix 1.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

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

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

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

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

(150MW) is approximately $164,000/day assuming fuel at $28/bbl. As well, a lengthy outage would increase the risk of spill during high inflow periods.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Site Fencing – Bay d'Espoir

Location: Bay d'Espoir

Division: Production

Classification: Hydro Plants

Project Description:

This Project involves the supply and installation of approximately 2.2 km of chain-link fencing at the Bay d'Espoir site. The specific areas which require fencing are: around Powerhouses 1 and 2; along the site entrance; around the Surge Tanks; and, around Intake #4.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	114.0	0.0	0.0	114.0
Labour	79.0	0.0	0.0	79.0
Engineering	12.0	0.0	0.0	12.0
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	45.2	0.0	0.0	45.2
Total	**250.2**	**0.0**	**0.0**	**250.2**

Operating Experience:

Security access to these areas is currently not restricted by fencing. In recent years there has been a significant increase in the number of people gaining or attempting to gain access to the Bay d'Espoir Hydro site, primarily for fishing. This has been aggravated by the escape of fish from the aquaculture facility in the area.

Project Justification:

Unlike other hydro sites, the Bay d'Espoir facility does not have complete enclosure by chain-link fence, which would deter public access to operations areas. A review of site security was undertaken and it is proposed to fence the designated areas to further control/restrict public access to the site. This is a security and a public safety concern.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Install Security Locks at Hydro Plants
Location: Bay d'Espoir, Upper Salmon, Hind's Lake, Cat Arm, Paradise River & Granite Canal
Division: Production
Classification: Hydro Plants

Project Description:

This project consists of the extension of an electronic security system to control access to all Hydro plants and their associated support buildings and structures. The system will be compatible with the security system installed at Corporate Headquarters in St. John's. The plan is to install the system at Granite Canal; Hinds Lake; Cat Arm; Upper Salmon; Paradise River; and, Bay d'Espoir.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	37.0	0.0	0.0	37.0
Labour	15.0	0.0	0.0	15.0
Engineering	10.5	0.0	0.0	10.5
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	14.1	0.0	0.0	14.1
Total	**76.6**	**0.0**	**0.0**	**76.6**

Operating Experience:

Currently, access to hydro plants is controlled by a conventional key access system with a common key for all buildings.

Project Justification:

The installation of this system will provide complete control of access to Hydro plants and the ability to monitor traffic year round. Employees will be issued a photo ID access card which will allow access to specified areas only. This will eliminate the current necessity for issuing keys that allow unlimited access with no means of monitoring when, or by whom the key is being used or when facilities are being entered. All ID cards can be upgraded or rejected at any time by the system controller. The controller to be utilized will be the one now used for control at Hydro Place. Lost cards can be immediately disabled with replacements issued appropriately.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Loader/Backhoe
Location: Bay d'Espoir
Division: Production
Classification: Hydro Plants

Project Description:

This project consists of the replacement of loader/backhoe - V9770 at Bay d'Espoir.

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

Operating Experience:

The current machine is a 1990 JCB Model 1400 Loader with an attached Backhoe. It is used extensively for maintenance on dams, dykes, roads and grounds at Bay d'Espoir, Upper Salmon, Hinds Lake, Cat Arm and Paradise River. It is also used for winter road maintenance such as clearing snow and handling salt and sand. Corrective maintenance costs on this machine for the past three years have been $27,000 excluding Preventative Maintenance and routine maintenance costs.

Project Justification:

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

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Turbine Electrohydraulic Control System - Unit No. 1 - Holyrood

Location: Holyrood

Division: Production

Classification: Thermal Plant

Project Description:

This project consists of the replacement of the control section of the turbine Electrohydraulic Control (EHC) system for Unit 1 with a GE Mark V turbine controller. The new controls will allow full control of the governor for loads less than 30 MW during a black start condition. This will include a new GE Mark V system, a DC/AC inverter, changes to the front standard, the replacement of switches with transmitters and the supply of recommended spare parts. As well, bearing metal thermocouples will be installed in 5 bearings to provide direct readings of the bearing temperatures.

Project Cost: *($ x1,000)*	**2002**	**2003**	**Beyond**	**Total**
Material Supply	0.0	605.0	0.0	605.0
Labour	0.0	175.0	0.0	175.0
Engineering	34.0	43.0	0.0	77.0
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	2.9	130.5	0.0	133.4
Total	**36.9**	**953.5**	**0.0**	**990.4**

Operating Experience:

The EHC system is used whenever the unit is generating and unit No. 1 has 130,465 operating hours. The most recent failure on the EHC system was in November 2001.

Project Justification:

The existing GE Mark II controls for the EHC system are the original equipment installed in 1969. The electronic cards in the system are obsolete and spare parts are no longer available from the manufacturer, General Electric have not stocked cards for the Mark II since 1996 and they do not provide any guarantee that they will be able to exchange or repair a failed card.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Turbine Electrohydraulic Control System - Unit No. 1 – Holyrood **(cont'd)**

Project Justification: (cont'd.)

A study was completed in 1997 to investigate the need and feasibility of upgrading or replacement of the electrical section of the EHC. A report titled " Holyrood Generating Station, Units 1 & 2 EHC Study" contained in Section G, Appendix 2, was prepared in December 1997. This report recommended the replacement of the EHC control systems on both units in 1999. It was later decided to replace the EHC controls on Unit 2 during its major maintenance outage in 1999 and to use the retired system as spares for the EHC system on Unit 1 until it could be replaced in 2003 during a planned major maintenance outage.

With the existing Mark II EHC controls, Unit 1 is not capable of black starting a de-energized system such as occurs during a major system blackout. There is no automatic governor control available at loads less than 30 MW. This makes it difficult to get Unit 1 on line and pick up load during a major blackout condition assuming that no other Holyrood unit is available. The proposed Mark V EHC controls for Unit 1will be similar to that installed on Unit 2 in 1999 and will allow full governor control and the unit can be used to black start a de-energized system.

It will also be useful during major system disturbances such as that experienced on February 13, 2002, when a system fault caused the loss of 225 MW from the system, 115 MW of which was dropped at Holyrood and 70% of that was shed from Unit 2, without loss of the unit, due to the fast response of the Mark V governor. This would not have been possible with the existing Mark II governor (Unit 1 only shed 20 MW) and the result could have been a major system collapse and possible Island blackout.

Replacement of the EHC controls in 2003 will result in the controls on both Units 1 & 2 being the same. This has benefits in lessening the parts to be stocked and the training required for maintenance and engineering personnel. A delay in replacing the controls in 2003 could result in a different model being used on Unit 1 due to new products being provided by the manufacturer.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Turbine Electrohydraulic Control System - Unit No. 1 – Holyrood **(cont'd)**

Project Justification: (cont'd.)

This proposal also includes the supply and installation of thermocouples in five turbine bearings. The existing method of monitoring bearing temperature is to measure the oil temperature. This is inaccurate in that it does not directly measure the bearing metal temperature. The installation of these thermocouples was recommended by the turbine manufacturer, General Electric.

Future Plans:

Funds of $34,000 were budgeted in 2002 for preliminary engineering. No funds are needed beyond the $954,000 in 2003.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Installation of a Neutralization Pit - Holyrood

Location: Holyrood Thermal Generating Station

Division: Production

Classification: Thermal Plant

Project Description:

This project consists of the installation of a fiberglass tank outside the west wall of the plant to permit chemical wastes to self neutralize before being discharged to Conception Bay. Project Design will require consultation with the Newfoundland Department of Environment and Lands.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	179.0	0.0	0.0	179.0
Labour	79.0	0.0	0.0	79.0
Engineering	21.0	0.0	0.0	21.0
Project Management	6.0	0.0	0.0	6.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	58.0	0.0	0.0	58.0
Total	**343.0**	**0.0**	**0.0**	**343.0**

Operating Experience:

The generating plant has been in operation since 1969.

Project Justification:

A neutralization tank is a standard component in a thermal power plant. The installation of the fiberglass tank replaces a concrete neutralizing tank (as per the original plant design) which was worn out and removed from service some years ago. The new tank will permit the acidic and basic waste streams to mix and self neutralize before being discharged to the environment. At present, acids and bases used in the preparation of boiler feed water are discharged directly to Conception Bay. This contravenes the Environmental Control (Water and Sewage) Regulations which prohibit the discharge from a control point into a body of water of any effluent having a pH value less than 5.5 or greater than 9.0. While the regulator has been tolerant of this, the proposed project is consistent with Hydro maintaining a proactive approach on Environmental responsibility and stewardship as well as continuous improvement of its environmental performance. This is one of the last uncontrolled releases of material from the Holyrood Generating Station.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Installation of a Neutralization Pit - Holyrood **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Mobile Ambient Monitoring System - Holyrood

Location: Holyrood Thermal Generating Station

Division: Production

Classification: Thermal Plant

Project Description:

This project involves the procurement of a mobile ambient monitoring station to continuously monitor fine particulates, NOx (nitrogen oxides) and SOx (sulphur oxides). The mobile station will be used to monitor air quality in the vicinity of the Holyrood Thermal Generating Station. The cost includes installation on leased land with minor site preparation but excludes the cost of leasing the land.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	135.0	0.0	0.0	135.0
Labour	11.0	0.0	0.0	11.0
Engineering	5.0	0.0	0.0	5.0
Project Management	1.0	0.0	0.0	1.0
Inspection & Commissioning	2.0	0.0	0.0	2.0
Corp O/H, AFUDC, Esc. & Contingency	30.2	0.0	0.0	30.2
Total	**184.2**	**0.0**	**0.0**	**184.2**

Operating Experience:

The Holyrood Thermal Generating Station (HTGS) has been in operation since 1969. Permanent ambient monitoring stations were placed in service in 1997 but anecdotal evidence indicates that there are air quality events occurring in areas not predicted by computer dispersion models and not in the vicinity of the existing monitoring sites.

Project Justification:

Air emissions from HTGS includes particulates, NOx, SOx and acid aerosols. Although the emissions are below the statutory limits, the Health Risk Assessment report prepared by CANTOX in 1999 concluded that further quantification of emissions is required. This report was submitted to the Board as part of a response to a request for information (NP-104) at Hydro's 2001 Rate Application. The expansion of ambient air monitoring site capabilities will enable us to gather data which can be used to support dispersion modeling. As well, the Department of Environment (DOE) recommends monitoring fine particulate fallout. The mobile station will permit the investigation of air quality at a variety of locations.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Mobile Ambient Monitoring System - Holyrood **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

None expected.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Flue Gas Particulate Removal Study - Holyrood

Location: Holyrood Thermal Generating Station

Division: Production

Classification: Thermal Plant

Project Description:

This project consists of a study to investigate technologies to reduce air emissions, including particulates, from the Holyrood Thermal Generating Station (HTGS). A report will be prepared presenting the effectiveness, history of application, capital, maintenance and operating costs of all proven technologies. Candidate technologies include duct screens, cold end additives, cyclones, fabric filters, precipitators and scrubbers.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	0.0	0.0	0.0	0.0
Engineering	141.0	0.0	0.0	141.0
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	9.0	0.0	0.0	9.0
Total	**150.0**	**0.0**	**0.0**	**150.0**

Operating Experience:

The HTGS has been in operation since 1969. Regulations existing at the time did not require that the plant be fitted with any sort of flue gas pollution control equipment, so none was installed. Current regulations require that a similar plant built today would incorporate flue gas emission control equipment.

Project Justification:

Air emissions from HTGS include particulates, NOx, SOx and acid aerosols. Although emissions control equipment is not required because due to its age, (this facility has been grandfathered), Hydro proposes to investigate the effectiveness, feasibility and costs associated with various emissions control technologies. This project is consistent with Hydro maintaining a proactive approach on environmental responsibility and stewardship as well as continuous improvement of its environmental performance.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Flue Gas Particulate Removal Study - Holyrood **(cont'd.)**

Project Justification:

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

Future Plans:

Any future plans will be dependant on the outcome of the study.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Installation of Partial Discharge Analysis Equipment for Unit No. 1 - Holyrood

Location: Holyrood

Division: Production

Classification: Thermal Plant

Project Description:

This project will complete the purchase, installation and commissioning of partial discharge analysis (PDA) couplers on all Holyrood thermal units. The couplers will provide information on the condition of the winding insulation on the Holyrood generator stator windings.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	30.0	0.0	0.0	30.0
Labour	65.0	0.0	0.0	65.0
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	14.5	0.0	0.0	14.5
Total	**111.5**	**0.0**	**0.0**	**111.5**

Operating Experience:

Unit 1 has been in service since 1969 and it has 130,465 operating hours.

Project Justification:

PDA couplers are used to monitor the condition of the stator winding insulation system. The information collected through the couplers will assist in taking timely corrective action to prevent forced outages and extend the stator winding life. It is an on-line predictive maintenance tool widely used by the utility industry and is a proven means of monitoring the condition of the stator winding insulation system. Hydro has installed PDA couplers on the other two units at Holyrood (Unit 2 in 1999 and Unit 3 in 2001) and on all major hydro units. The partial discharge activity of the winding is recorded at set periods and the data is analyzed for any trends that would indicate deterioration in the insulation system. If concerns are found, an outage can be scheduled to do further testing and to take corrective action to prevent forced outages. Often forced outages due to in-service winding failures are catastrophic and very costly events with

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Installation of Partial Discharge Analysis Equipment for Unit No. 1 – Holyrood **(cont'd)**

Project Justification (cont'd):

lengthy outage times. PDA is an industry standard approach used to alert generating plant personnel to impending problems so that timely repair options can be implemented or increased monitoring done. The software and interface equipment needed to access the couplers was purchased in 1999 for Unit 2 and will be used for Unit 1. The installation of the PDA couplers is planned to occur during a planned major maintenance outage as the rotor has to be removed to allow access to the stator winding.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Civil Structures - Holyrood
Location: Holyrood Generating Station
Division: Production
Classification: Thermal Plant

Project Description:

1. Boiler Stack:

Stack #1 at Holyrood consists of concrete shell, steel liner, stack breeching and associated utilities. This project involves the replacement of the interior steel liner due to reduced reliability, increased cost of maintenance and risk of failure. The liner consists of ¼" thick steel shell with a diameter of 13.5 ft. and height of 302 ft. It is supported at the base by a 35 ft. high steel framing.

2. Circulating Water (CW) Screen Structures

The CW screen structures are located in pumphouse #1 and their function is to screen the salt water required for plant cooling. The work involves the replacement of the steel structure that supports the traveling screens. Two structures are to be replaced because of deteriorated condition, reduced reliability and risk of failure. Each structure is 32 ft. high and fabricated from 3/8" thick angle iron and covers an area of 5 ft. x 7 ft.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	1,355.0	0.0	0.0	1,355.0
Engineering	170.0	0.0	0.0	170.0
Project Management	140.0	0.0	0.0	140.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	326.0	0.0	0.0	326.0
Total	**1,991.0**	**0.0**	**0.0**	**1,991.0**

Operating Experience:

1. Boiler Stack

The stack and steel liner are 34 years old and are in use whenever the unit is operating. The cost to provide inspection and emergency maintenance for the steel liner during the last 6 years was $266,000 including $76,000 in 2002.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Operating Experience:

2. Circulating Water (CW) Screen Structures

The CW screen structures are 34 years old and are located in 20 ft. of salt water. They are in use whenever the units are operating. In 1998/1999 the traveling screens and rollers were replaced because of operating problems and increased maintenance costs.

Project Justification:

1. Boiler Stack

Regular annual inspection revealed the need for major upgrade work for Stack #1. The stack inspection in 2001 and 2002 identified increased metal loss & "thin" spots on the steel liner. The probability of liner buckling & failure is increasing with time. Emergency repairs have been undertaken during the last several years involving covering holes with steel patches or rings. This approach is believed to be no longer sufficient to prevent buckling and 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 Unit #1 major maintenance outage in 2003 and thus it will have minimal impact on its availability for generation.

The 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.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

2. Circulating Water (CW) Screen

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

The failure to replace the structures 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 customers.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators TL209 (230kV Stephenville - Bottom Brook)

Location: Stephenville and Bottom Brook

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

TL209 is a 230kV transmission line that runs from Stephenville to Bottom Brook, a distance of 21 km. It is an H-Frame wooden pole line constructed in 1971. The project is to replace approximately 2,600 of the Canadian Ohio Brass (COB) suspension insulators on the line. The total number of insulators on this line is approximately 5,500.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	80.0	0.0	0.0	80.0
Labour	66.0	0.0	0.0	66.0
Engineering	30.0	0.0	0.0	30.0
Project Management	12.0	0.0	0.0	12.0
Inspection & Commissioning	8.0	0.0	0.0	8.0
Corp O/H, AFUDC, Esc. & Contingency	39.7	0.0	0.0	39.7
Total	**235.7**	**0.0**	**0.0**	**235.7**

Operating Experience:

Approximately 2,600 or 48% of the insulators on this line are COB type. The remaining 2,900 have been replaced due to failures, primarily on dead end structures. Experience has shown that, for this type/vintage of COB insulator, initial failures typically show up on the dead end structures first, followed by the tangent structures.

During the 2000 Preventative Maintenance (PM) Program, a total of 1,176 insulators or 20% were tested, with 78 insulators or 7% being found defective. During the 2001 PM Program, another 20% section of line had insulators tested, with 32 insulators or 3% being found defective. This lower failure rate was due to a higher number of dead end structures on this line section which have already had COB insulators replaced.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators TL209 (230kV Stephenville - Bottom Brook) **(cont'd.)**

Project Justification:

In the 1980's, Hydro, through its PM inspections detected an insulator problem similar to that being experienced by other utilities. It was determined that some COB suspension insulators were prematurely failing due to a cement problem. The design of the insulation system for transmission lines consists of multiple suspension insulators in a string which allows for adverse environmental conditions. Therefore, having an individual insulator fail does not cause an immediate reliability problem. One of the purposes of Hydro's ongoing preventative maintenance program is to detect and replace individual insulators as they fail before reliability is affected.

The failure rate on the suspect COB insulators and timing of these failures were dependent on a number of factors which included the number of freeze-thaw cycles and other environmental conditions. A normal life expectancy for an insulator is approximately 40 years, however for these COB insulators, the life has been between 10-30 years.

To address this insulator problem, an intensive testing program on transmission lines was implemented by Hydro. Due to the high number of defective insulators found in the central and eastern areas of the Island, a proactive approach was taken in these areas for the bulk replacement of COB insulators which began in 1992 and was completed in 1997. On the transmission lines in the western area of the Island, the testing did not reveal a high percentage of defective insulators. Thus, it was decided to continue to change out individual defective insulators as they were discovered during regular inspections and delay the bulk replacement until testing found a higher number of defective insulators.

As a result of the recent results of the ongoing PM in the western area, it is expected that as each year passes, the percentage of defective pre-1974 COB insulators on TL209 will rise. The defective insulator units are currently showing up in strings that have had previous defective insulators replaced therefore requiring additional travel by a crew to the structure to make further replacements.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Insulators TL209 (230kV Stephenville - Bottom Brook) **(cont'd.)**

Project Justification: (cont'd.)

As this is a single radial 230kV supply to this area, it will significantly improve services to customers.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: Bottom Brook and Doyles

Division: Transmission & Rural Operations

Classification: Transmission

Project Description:

This project involves the addition of structures, installation of counterweights and replacement of insulators, over the whole line. The proposal includes costs to provide temporary generation to serve customers during outages required to complete the upgrade.

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

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

Operating Experience:

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

Project Justification:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

A condition assessment review was conducted to confirm the condition of the line and to recommend corrective action. The full report titled "TL214 Condition Assessment and Recommendations for Upgrading" is contained in Section G, Appendix 3.

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Circuit Switcher South Brook Terminal Station

Location: South Brook Terminal Station

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase, installation and commissioning of a Power Circuit Switcher for transformer T1 at the South Brook Terminal Station. It includes the addition of controls, transformer protection, a battery bank, communications equipment and a small control building. A mobile substation will be installed to allow construction and installation of the circuit switcher without interruption to customers.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	171.0	0.0	0.0	171.0
Labour	78.9	0.0	0.0	78.9
Engineering	0.0	0.0	0.0	0.0
Project Management	37.4	0.0	0.0	37.4
Inspection & Commissioning	3.8	0.0	0.0	3.8
Corp O/H, AFUDC, Esc. & Contingency	63.5	0.0	0.0	63.5
Total	**354.6**	**0.0**	**0.0**	**354.6**

Operating Experience:

At South Brook the main transformer protection is 138kV power fuses. These power fuses were originally installed with the station in the mid-seventies. The fuses and some of the fuse holders have been replaced over the years because of failures due to age and system disturbances.

Project Justification:

At South Brook when a blown fuse requires replacement it takes four to six hours to restore power to customers. This results from time required to contact maintenance crews and travel time to the station, and time to repair the fuse. There have been seven fuse failures since 1987.

The SAIDI (Distribution Indices) for the South Brook System are 11.3 hours, and the SAIDI (Delivery Point Indices) are 8.2 hours. Installation of a circuit switcher will reduce the

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Circuit Switcher South Brook Terminal Station **(cont'd.)**

Project Justification: (cont'd.)

Distribution Indices to 4.9 hours and the Delivery Point Indices to 0 hours. Therefore replacing the fuses with a circuit switcher will significantly improve service to our 1957 customers on the South Brook system.

A circuit switcher can isolate the fault and restore the service in much less time than fuses. As well, it can be remotely controlled from the Energy Control Centre. This will improve response times and reduce the duration of customer outages.

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

Future Plans:

This is a one year project due for completion in 2003. No future work is planned for this equipment beyond 2003.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase and Install 138kV Breaker Fail Protection

Location: Stoney Brook, Sunnyside and Bottom Brook Terminal Stations

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of upgrading of the protection on 138 KV lines TL210 (Grand Falls - Glenwood), TL222 (Grand Falls - South Brook), TL212 (Sunnyside - Linton Lake) and TL214 (Bottom Brook - Doyles). It includes the purchase of microprocessor based relays and associated equipment, preparation of design modifications and installation/commissioning of the relays in existing panels.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
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	20.0	0.0	0.0	20.0
Corp O/H, AFUDC, Esc. & Contingency	11.6	0.0	0.0	11.6
Total	**81.6**	**0.0**	**0.0**	**81.6**

Operating Experience:

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

Project Justification:

This project will improve the protection on 138 KV lines which currently have electromagnetic distance relays for both zone and ground protection. The new relays will have enhanced capabilities, self-diagnostics and alarm in the event of an internal failure. These relays can be remotely interrogated thus enabling more timely analysis of problems on the lines or with the relays themselves. This is part of ongoing initiative to improve protection systems on the bulk transmission system.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Digital Fault Recorder - Holyrood

Location: Holyrood Terminal Station

Division: Transmission & Rural Operations

Classification: System Performance & Protection

Project Description:

This project consists of the purchase, installation and commissioning of a new 32 channel Digital Fault Recorder at the Holyrood Terminal Station.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	52.0	0.0	0.0	52.0
Labour	6.6	0.0	0.0	6.6
Engineering	4.4	0.0	0.0	4.4
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	12.7	0.0	0.0	12.7
Total	**75.7**	**0.0**	**0.0**	**75.7**

Operating Experience:

The existing recorder is approximately 11 years old. The technology is outdated in that the recording rates are not suitable for the current operating environment. Fault information is not recorded in a manner suitable for effective analysis of system events

Project Justification:

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

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace 125V Battery Banks

Location: Deer Lake and Howley Terminal Stations and Corner Brook Frequency Converter

Division: Transmission & Rural Operations

Classification: Terminal Stations

Project Description:

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	51.0	0.0	0.0	51.0
Labour	12.0	0.0	0.0	12.0
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	13.6	0.0	0.0	13.6
Total	**82.6**	**0.0**	**0.0**	**82.6**

Operating Experience:

The current station batteries were originally installed in 1980 and 1981 and will be in service for more than 21 years by 2003. Regular maintenance work involves voltage, specific gravity and load discharge tests. For the three stations, the DC load requirements have not changed. Therefore, there is no requirement to change the capacity of the battery bank.

Project Justification:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

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

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Station Services

Location: Long Harbour Terminal Station

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project consists of the purchase and installation of transformers and associated equipment necessary to provide station service directly from the 46kV bus in the Long Harbour Terminal Station.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	13.0	0.0	0.0	13.0
Engineering	10.3	0.0	0.0	10.3
Project Management	2.0	0.0	0.0	2.0
Inspection & Commissioning	3.0	0.0	0.0	3.0
Corp O/H, AFUDC, Esc. & Contingency	14.4	0.0	0.0	14.4
Total	**82.7**	**0.0**	**0.0**	**82.7**

Operating Experience:

The existing station service for the Long Harbour Station is fed from the customer's equipment. Hydro personnel must enter the customer's facility when troubleshooting and/or restoring station service.

Project Justification:

This is the only terminal station on Hydro's System which does not have a station service supply integral to the terminal station.

Currently the Long Harbour Terminal Station provides service to one customer and has a capacitor bank which is used to control voltage levels on the Avalon Peninsula. The condition of equipment feeding the station service is deteriorating.

To address reliability and security concerns, a station service supply integral to the Long Harbour Terminal Station is required.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Station Services

Project Justification: (cont'd.)

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Motor Drive Mechanisms on Disconnect Switches - Sunnyside T.S.

Location: Sunnyside Terminal Station

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

This project consists of the installation of motor drive mechanisms on ten 230kV disconnect switches at the Sunnyside Terminal Station. This will allow the disconnects to be motor operated rather than the current manual operation.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	68.0	0.0	0.0	68.0
Labour	58.0	0.0	0.0	58.0
Engineering	18.0	0.0	0.0	18.0
Project Management	12.0	0.0	0.0	12.0
Inspection & Commissioning	22.0	0.0	0.0	22.0
Corp O/H, AFUDC, Esc. & Contingency	38.9	0.0	0.0	38.9
Total	**216.9**	**0.0**	**0.0**	**216.9**

Operating Experience:

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

Project Justification:

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

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install Motor Drive Mechanisms on Disconnect Switches - Sunnyside T.S. **(cont'd.)**

Project Justification: (cont'd.)

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

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

Future Plans:

This is the first year of the program to install motor operators on all manual 230kV disconnects on the system.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Surge Arrestors

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**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	11.8	0.0	0.0	11.8
Total	**68.6**	**0.0**	**0.0**	**68.6**

Operating Experience:

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

Project Justification:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Instrument Transformers

Location: Various Terminal Stations

Division: Transmission & Rural Operations

Classification: Terminals

Project Description:

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**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	11.6	0.0	0.0	11.6
Total	**74.8**	**0.0**	**0.0**	**74.8**

Operating Experience:

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

Project Justification:

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

2003 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. It is normal utility practice to hold a reserve inventory sufficient to replace service units based on maintenance assessments or failure.

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

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Service Extensions

Location: All Service Areas

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	676.0	0.0	0.0	676.0
Labour	635.0	0.0	0.0	635.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	137.0	0.0	0.0	137.0
Total	**1,448.0**	**0.0**	**0.0**	**1,448.0**

Operating Experience:

An analysis of average historical expenditure (i.e. 1997 - 2001) on new customer connection is shown in the following table. All historical dollars were converted to 2001 dollars using the GDP Implicit Price Deflator and a 5-year average calculated.

Region	**Avg. Yearly Material & Labour (1997 - 2001) ($000)**
Central	$ 416
Northern	$ 391
Labrador	$ 504
Total	$ 1,311

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

Based on the 5-year average (in 2001 dollars) the following budget was developed assuming annual escalation to 2003 of 2.5% and normal corporate administrative charges.

Region	2003 Budget (O/H, Esc., etc. incl.) ($000)
Central	$ 459
Northern	$ 432
Labrador	$ 557
Total	$ 1,448

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Distribution Upgrades

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 condition/salt contamination. This summarizes the total budget for all regions.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	770.0	0.0	0.0	770.0
Labour	568.0	0.0	0.0	568.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	138.0	0.0	0.0	138.0
Total	**1,476.0**	**0.0**	**0.0**	**1,476.0**

Operating Experience:

An analysis of historical expenditures (i.e. 1997 - 2001) on distribution upgrades is shown in the following table. All historical dollars (table below) were converted to 2001 dollars using the GDP Implicit Price Deflator and 5-year average calculated.

Region	**Avg. Yearly Material & Labour (1997 - 2001) ($000)**
Central	$ 522
Northern	$ 570
Labrador	$ 246
Total	$ 1,338

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Distribution Upgrades **(cont'd.)**

Project Justification: (cont'd.)

Based on this 5-year average the following budget was developed using an annual escalation of 2.5% and normal corporate administrative charges.

Region	2003 Budget (O/H, Esc., etc. incl.) ($000)
Central	$ 576
Northern	$ 628
Labrador	$ 272
Total	$ 1,476

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Line

Location: Little Bay

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

The project consists of the upgrade of the distribution facilities which serves the Little Bay Distribution System.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	135.0	0.0	0.0	135.0
Labour	86.0	0.0	0.0	86.0
Engineering	14.0	0.0	0.0	14.0
Project Management	7.0	0.0	0.0	7.0
Inspection & Commissioning	32.0	0.0	0.0	32.0
Corp O/H, AFUDC, Esc. & Contingency	43.2	0.0	0.0	43.2
Total	**317.2**	**0.0**	**0.0**	**317.2**

Operating Experience:

For details on operating experience on this line, refer to attached joint report titled "Springdale/Little Bay System Improvement", contained in Section G, Appendix 4.

Project Justification:

Following a review of the condition of its Springdale feeder that supplies Newfoundland and Labrador Hydro's Little Bay system, Newfoundland Power determined that the feeder has deteriorated to the point that it requires substantial upgrading or replacement. A joint planning study by Hydro and Newfoundland Power reviewed a number of alternatives and identified that the least cost solution is to rebuild the feeder along the road to Little Bay. The joint report titled "Springdale/Little Bay System Improvement" is contained in Section G, Appendix 4.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Distribution Line

Location: St. Anthony

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

The project consists of the replacement of selected insulators and poles on Line L1 of the of St. Anthony Distribution System.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	130.0	0.0	0.0	130.0
Labour	227.0	0.0	0.0	227.0
Engineering	35.0	0.0	0.0	35.0
Project Management	15.0	0.0	0.0	15.0
Inspection & Commissioning	50.0	0.0	0.0	50.0
Corp O/H, AFUDC, Esc. & Contingency	100.0	0.0	0.0	100.0
Total	**557.0**	**0.0**	**0.0**	**557.0**

Operating Experience:

The line has been in service for over 30 years. It is subjected to some of the harshest weather conditions in Newfoundland and is prone to frequent failures due to such harsh weather conditions. The regular maintenance inspections confirm insulators with hairline cracks in the porcelain material, on insulators over the whole length of the line.

Project Justification:

Outage statistics for the period 1997 - 2001 for Line 1 are:

5 Year Ave.	SAIFI	SAIDI
Hydro	**6.19**	**10.06**
L1	**18.43**	**28.26**

SAIFI (System Average Interruption Frequency Index) is defined as the average number of interruptions per delivery point.

SAIDI (System Average Interruption Duration Index) is defined as the average duration of time that power was not available to a typical delivery point.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

Records show that outages on this line are primarily caused by insulator and pole failures. As the insulators and poles age, the failure rates and outages will increase. The replacement of insulators and poles will improve the integrity of this line and improve the reliability to customers.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Insulator Replacements

Location: Distribution Lines in Bottom Waters, Barachoix and King's Point

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of suspension insulators and pin-type insulators that were manufactured by Canadian Ohio Brass (COB) and Canadian Porcelain (CP) and installed on the following 25kV distribution lines:

1. Bottom Waters Line 3: which services the communities of Snook's Arm, Round Harbour, Venam's Bight, Tilt Cove, Harbour Round, Brent's Cove, Shoe Cove, La Scie and the Nugget Pond Mine site and was constructed in 1973;

2. Barachoix Line 1: which services the communities of Furby's Cove, Hermitage, Sandyville and Seal Cove and was constructed in 1969; and

3. Kings Point Line 1: which services the communities of Jackson's Cove, King's Point, and Rattling Brook and was constructed in 1966.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	162.0	0.0	0.0	162.0
Labour	339.0	0.0	0.0	339.0
Engineering	50.0	0.0	0.0	50.0
Project Management	32.0	0.0	0.0	32.0
Inspection & Commissioning	113.0	0.0	0.0	113.0
Corp O/H, AFUDC, Esc. & Contingency	99.2	0.0	0.0	99.2
Total	**795.2**	**0.0**	**0.0**	**795.2**

Operating Experience:

Bottom Waters

Line 3 has experienced 11 major outages, due to defective insulators, from February 1996 to October 2001.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Operating Experience: (cont'd.)

Barachoix

Line 1 has experienced 29 major outages, due to defective insulators, from May 1996 to July 2001.

Kings Point

Line 1 has experienced 17 major outages, due to defective insulators, from January 1996 to August 2001.

Project Justification:

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

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

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd)

A weakened insulator has the potential of breaking apart during climbing activities by our lineworkers.

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

Future Plans:

None

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Pole Replacements

Location: Distribution Lines in Bay d'Espoir, South Brook & Kings Point, Farewell Head & St. Anthony

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the replacement of 38 deteriorated poles on the St. Anthony Distribution System; replacement of 45 deteriorated poles on the South Brook and King's Point Distribution Systems; replacement of 35 deteriorated poles on the Farewell Head Distribution System; and, replacement of 50 deteriorated poles in the Bay D'Espoir Distribution System.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	185.0	0.0	0.0	185.0
Labour	326.5	0.0	0.0	326.5
Engineering	77.0	0.0	0.0	77.0
Project Management	31.0	0.0	0.0	31.0
Inspection & Commissioning	95.0	0.0	0.0	95.0
Corp O/H, AFUDC, Esc. & Contingency	137.5	0.0	0.0	137.5
Total	**852.0**	**0.0**	**0.0**	**852.0**

Operating Experience:

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

Project Justification:

The Preventative Maintenance Program, identified selected poles on each system which were rated "B" condition (replace within 5 years). It is determined that a certain number of these poles must be replaced in 2003 in order to maintain service reliability. The remainder of the poles are regularly inspected to determine their deterioration rate and these will be replaced as required. A deteriorated pole represents a safety hazard to lineworkers in the event the pole has to be climbed for planned or emergency maintenance. Failure of a pole also has a significant impact on the performance for the system. This is due to the higher probability of failure under adverse

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

weather conditions, and the length of time it takes to replace a pole, especially in the case of a remote location. Often, failures of deteriorated poles causes a domino affect resulting in more failures of consecutive poles, which might not be deteriorated.

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

Future Plans:

There are no future commitments associated with this capital budget proposal.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Protection Upgrades - Isolated Systems

Location: Grey River, Francois, Petites, McCallum, Little Bay Islands, Black Tickle, Paradise River, Postville, Norman Bay, St. Lewis, William's Harbour and St. Brendan's

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the purchase and installation of electronic reclosers on the distribution lines at the Little Bay Islands, Black Tickle, Postville, St. Lewis and St. Brendan's and protective relays for the main breakers at the Francois, Grey River, McCallum, Petites, Paradise River, Norman Bay and William's Harbour diesel plants.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	310.0	0.0	0.0	310.0
Labour	195.0	0.0	0.0	195.0
Engineering	58.0	0.0	0.0	58.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	12.0	0.0	0.0	12.0
Corp O/H, AFUDC, Esc. & Contingency	145.0	0.0	0.0	145.0
Total	**720.0**	**0.0**	**0.0**	**720.0**

Operating Experience:

There is no operating experience as this is new equipment to be installed.

Project Justification:

It is a utility industry standard to provide automatic line-to-ground protection for distribution lines. The distribution lines from these diesel generating plants presently do not have automatic line-to-ground protection. This can result in a safety hazard for the general public when a line breaks and the energized conductor contacts the ground. Completing this upgrade will provide adequate protection to the plant personnel and the public and improve the service reliability of the diesel plants.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Protection Upgrades - Isolated Systems (cont'd.)

Project Justification: (cont'd.)

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Corroded Transformers - Northern

Location: Northern Region

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the Replacement of 65 corroded transformers on various distributions systems in the Northern Region.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	97.5	0.0	0.0	97.5
Labour	42.7	0.0	0.0	42.7
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	31.6	0.0	0.0	31.6
Total	**171.8**	**0.0**	**0.0**	**171.8**

Operating Experience:

Some transformers, currently in operation have tanks constructed of mild steel, without the benefit of corrosive protection. In some operating areas, near the salt water, this design has not withstood the corrosive effects of the environment. In these areas, the units last as little as 4 years in service whereas in less exposed areas, the service life could be as much as 12 - 15 years. On average over the region (Great Northern Peninsula and Southern Labrador) the average service life of a distribution transformer is about 7 -9 years.

In 2000 a survey of all transformers in the region confirmed that 203 units were corroded beyond repair. This corrosion increases the likelihood of unit failures and oil leaks which would create safety and environment hazards. During 2001, 29 of the most seriously corroded units were replaced. In 2002, 109 are being replaced and in 2003 the remaining 65 units are scheduled to be replaced.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Corroded Transformers - Northern **(cont'd.)**

Project Justification:

The corrosion of the transformer tanks cause oil leaks which result in shorting of the electrical components of the transformers. These oil spills create a hazard to the environment and the shorting of electrical components results in interruptions in the reliability and continuity of service.

One of the specific applications for stainless steel design is for use in areas where high salt contamination is a problem. In these applications, stainless steel has proven to be significantly more resistant to corrosion and has become common utility industry practice in these applications. The only practical solution to the problem is to replace the corroded units with ones of a stainless steel design.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voltage Regulators

Location: Plum Point & Rocky Harbour Terminal Stations

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project involves the purchase and installation of three single phase, 400A voltage regulators at both the Plum Point Terminal Station and the Rocky Harbour Terminal Station to replace existing 200A voltage regulator banks.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	128.0	0.0	0.0	128.0
Labour	20.0	0.0	0.0	20.0
Engineering	2.0	0.0	0.0	2.0
Project Management	2.0	0.0	0.0	2.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	24.0	0.0	0.0	24.0
Total	**176.0**	**0.0**	**0.0**	**176.0**

Operating Experience:

The existing 200A voltage regulator bank in the Plum Point Terminal Station has been in service since 1983 and the one in the Rocky Harbour Terminal Station has been in service since 1985. They will both be removed and returned to inventory.

Project Justification:

Plum Point

Continuing load growth will result in the existing 200A voltage regulator bank becoming overloaded at time of peak demand.

To prevent possible damage to the existing voltage regulator bank and interruption of service, it is necessary to increase the rating of the bank. Installing a 400A bank will prevent overloading for the foreseeable future.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voltage Regulators **(cont'd)**

Project Justification: (cont'd.)

The following is based on Hydro's latest load projections:

	2002	2003	2004	2005	2006
Peak Demand (kW)	3,837	4,191	4,197	4,204	4,210
Peak Demand (Amps @ 0.95 pf)	187	204	205	205	205
% Overload	-	2%	3%	3%	3%

Rocky Harbour

An increase in peak demand, mainly due to the opening of the Bonne Bay Medical Centre in Norris Point, has caused the existing 200A voltage regulator bank to become overloaded at time of peak demand.

To prevent possible damage to the existing voltage regulator bank and interruption of service, it is necessary to increase the rating of the bank. Installing a 400A bank will prevent overloading for the foreseeable future.

The following is based on Hydro's latest load projections:

	2002	2003	2004	2005	2006
Peak Demand (kW)	4,443	4,466	4,496	4,526	4,555
Peak Demand (Amps @ 0.95 pf)	217	218	219	221	222
% Overload	9%	9%	10%	11%	11%

Another option reviewed for both projects was the opportunity for a Demand Side Management (DSM) based capital deferral. It was determined that DSM was not a viable alternative in either of these particular circumstances. See the following two pages for analysis.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voltage Regulators **(cont'd)**

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Rocky Harbour - Replace Voltage Regulators**

Description: Replace 200 A voltage bank with 400 A voltage bank

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

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

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

	2003	2004	2005	2006	2007
Load Forecast (HR OPLF Nov 2001)					
Peak Demand Forecast - kW	4466	4496	4526	4555	na
Domestic Customers - #	888	893	898	903	na
Existing Amp Rating	200	Amps			
Capital Budget Proposal	$87,800				

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral (kW)	362	392	422	451	na
(Difference of forecast peak demand and demand for existing amp rating)					
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% rural debt cost as per 2002 COS)					
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	na
Total DSM Deferral Budget	$3,951	$7,726	$11,326	$14,750	na
DSM Budget Per Required Demand Savings kW	$11	$20	$27	$33	na

* Percentage of capital cost that can be incurred to defer project for 1 to 4 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW Achieved	$/kW*
Domestic Hot Water (DHW) Load Control	$346

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
(Max kW reduction at lowest DSM supply cost and full DSM deferral budget)					
DHW Load Control - kW	11	22	33	43	na
Achievable DSM Less Required DSM Savings-kW	(351)	(370)	(389)	(408)	na

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voltage Regulators **(cont'd)**

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Plum Point - Replace Voltage Regulators**

Description: Replace 200 A voltage bank with 400 A voltage bank

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

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

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

	2003	2004	2005	2006	2007
Load Forecast (HR OPLF Nov 2001)					
Peak Demand Forecast - kW	4191	4197	4204	4210	na
Domestic Customers - #	841	843	845	847	na
Existing Amp Rating	200	Amps			
Capital Budget Proposal	$87,800				

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral (kW)	87	93	100	106	na
(Difference of forecast peak demand and demand for existing amp rating)					
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% rural debt cost as per 2002 COS)					
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	na
Total DSM Deferral Budget	$3,951	$7,726	$11,326	$14,750	na
DSM Budget Per Required Demand Savings kW	$45	$83	$113	$139	na

* Percentage of capital cost that can be incurred to defer project for 1 to 4 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW Achieved	$/kW*
Domestic Hot Water (DHW) Load Control	$360

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
(Max kW reduction at lowest DSM supply cost and full DSM deferral budget)					
DHW Load Control - kW	11	21	31	41	na
Achievable DSM Less Required DSM Savings-kW	(76)	(72)	(69)	(65)	na

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Protection Upgrade North Diesel Plant - Goose Bay

Location: Goose Bay North Side Diesel Plant

Division: Transmission & Rural Operations

Classification: Distribution

Project Description:

This project consists of the upgrading of protection equipment at North Diesel Plant in Goose Bay. This includes the supply and installation of a new 25kV breaker, two new 25kV potential transformers; a new 125 VDC battery bank; a new feeder protection relay and associated breaker controls; and modifications to the 25kV bus to accommodate the breaker installation.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	101.0	0.0	0.0	101.0
Labour	25.0	0.0	0.0	25.0
Engineering	15.0	0.0	0.0	15.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	31.1	0.0	0.0	31.1
Total	**172.1**	**0.0**	**0.0**	**172.1**

Operating Experience:

There is no operating experience as this is new equipment to be installed.

Project Justification:

It is a utility industry standard to have automatic line to ground protection for distribution lines. The distribution lines from the North Plant do not have automatic line-to-ground protection. This can result in a safety hazard for the general public when a line breaks and the energized conductor contacts the ground. Completing this upgrade will provide adequate protection to the plant, personnel and the public and improve the service reliability of the diesel plant.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install NOx Emission Monitor - McCallum

Location: McCallum

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project involves the purchase and installation of an ambient NOx monitor for the diesel plant in McCallum.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	60.0	0.0	0.0	60.0
Labour	6.0	0.0	0.0	6.0
Engineering	10.7	0.0	0.0	10.7
Project Management	3.0	0.0	0.0	3.0
Inspection & Commissioning	4.0	0.0	0.0	4.0
Corp O/H, AFUDC, Esc. & Contingency	19.7	0.0	0.0	19.7
Total	**103.4**	**0.0**	**0.0**	**103.4**

Operating Experience:

This is a new equipment installation.

Project Justification:

This project is being completed in consultation with the Provincial Department of Environment to validate the model being used to predict ground level NOx concentrations in isolated diesel communities. McCallum was selected as a test site. Ground level NOx concentrations are regulated by the Provincial Air Pollution Control Regulations.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Fire Alarm Systems

Location: Rigolet and Postville Diesel Plants

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the design, purchase and installation of a fire alarm system for the Rigolet and Postville Diesel Plants. The fire alarm system will sound an audible alarm, shut down the generators and ventilation system, close the plant fuel supply valve, and auto-dial the diesel system representative to respond.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	52.0	0.0	0.0	52.0
Labour	6.6	0.0	0.0	6.6
Engineering	20.0	0.0	0.0	20.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	19.3	0.0	0.0	19.3
Total	**97.9**	**0.0**	**0.0**	**97.9**

Operating Experience:

This is a new installation, so there is no operating experience.

Project Justification:

Hydro owns and operates 26 isolated diesel plants. These plants are semi-attended, so the operator is not on site all the time. To minimize the effects of a fire in an unattended plant, Hydro initiated a program to install Fire Alarm systems in all its isolated diesel plants. These two plants are the last two plants to be upgraded in the program.

Over the past ten years there have been three major fires in Hydro diesel plants (Mary's Harbour, Hopedale and Rencontre East). Each fire resulted in considerable expense to the Corporation and significant power outages to customers. These expenses and outages will be minimized by installation of a Fire Alarm system.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Fire Alarm Systems **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

Once this fire alarm system is installed in 2003, there are no plans for any other major replacements, upgrades, or repairs to the fire alarm system to be undertaken within the next three years.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Service Cables

Location: Hopedale and Little Bay Islands Diesel Plants

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This proposal involves the purchase and installation of additional main generator cables and conduit at both the Hopedale and the Little Bay Islands Diesel Plants.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	10.0	0.0	0.0	10.0
Labour	28.0	0.0	0.0	28.0
Engineering	6.0	0.0	0.0	6.0
Project Management	6.0	0.0	0.0	6.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	10.0	0.0	0.0	10.0
Total	**60.0**	**0.0**	**0.0**	**60.0**

Operating Experience:

These are both new installations.

Project Justification:

Hopedale

Continuing load growth will result in the overloading of the diesel plant service conductors (2 runs of 500 MCM per phase: rating 810A) during peak demand periods. See below.

As the load is forecast to continue growing, it is necessary to add another run of cable per phase to prevent possible damage to the existing cables.

Adding a third run of 500 MCM will bring the rating of the service cables up to the rating of the main bus approximately 1200A and prevent overloading for the foreseeable future.

The following is based on Hydro's latest load projections:

	2002	2003	2004	2005	2006
Peak Demand (kW)	741	764	779	790	795
Peak Demand (Amps @ 0.9 pf)	792	817	833	845	850
% Overload	-	1%	3%	4%	5%

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Service Cables **(cont'd)**

Project Justification (cont'd)

Little Bay Islands

The fish plant in Little Bay Islands has added new load in 2001. This will result in the overloading of the diesel plant service conductors (2 runs of 500 MCM per phase: rating 810A) during peak demand periods if the 450 kW mobile (the system's largest unit) is out of service. Hydro's firm generation criteria requires that peak demand should be met with the largest unit out of service.

As this condition is expected to continue, it is necessary to add another run of cable per phase to prevent damage to the existing cables.

Adding a third run of 500 MCM will bring the rating of the service cables up to the rating of the main breaker approximately 1200 A and prevent overloading for the foreseeable future.

The following is based on Hydro's latest load projections:

	2000 (Act.)	2001 (Act.)	2002	2003	2004	2005	2006
Peak Demand (kW)	581	809	809	808	807	806	805
Peak Demand (Amps @ 0.9 pf)	621	865	865	864	863	862	861
% Overload (450kW unit out of Service)	-	7%	7%	7%	7%	6%	6%

Another option reviewed with these proposals for Hopedale and Little Bay Islands was the opportunity for a Demand Side Management (DSM) based capital deferral. It was determined that DSM was not a viable alternative resource in either case. See the following two pages for analysis.

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

Future Plans:

The work is proposed for completion in 2003. There are no future commitments.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Service Cables **(cont'd)**

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Hopedale - Upgrade Service Cables**
Description: Increase Rating of Service Cables for Peak Demand

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

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

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

	2003	2004	2005	2006	2007
Load Forecast (HR OPLF Nov 2001)					
Peak Demand Forecast (Net kW)	764	779	790	795	na
Domestic Customers - #	186	187	188	189	na
Existing Amp Rating	810	Amps			
Capital Budget Proposal	$31,800				

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral (kW)	6	21	32	37	na
(Difference of forecast peak demand and demand for existing amp rating)					
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% isolated debt cost as per 2002 COS)					
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	na
Total DSM Deferral Budget	$1,431	$2,798	$4,102	$5,342	na
DSM Budget Per Required Demand Savings kW	$239	$133	$128	$144	na

* Percentage of capital cost that can be incurred to defer project for 1 to 4 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW Achieved	$/kW*
Domestic Hot Water (DHW) Load Control	$345

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
(Max kW reduction at lowest DSM supply cost and full DSM deferral budget)					
DHW Load Control - kW	4	8	12	15	na
Achievable DSM Less Required DSM Savings-kW	(2)	(13)	(20)	(22)	na

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Upgrade Service Cables **(cont'd)**

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Little Bay Islands - Upgrade Service Cables**
Description: Increase Rating of Service Cables for Peak Demand

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

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

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

	2003	2004	2005	2006	2007
Load Forecast (HR OPLF Nov 2001)					
Peak Demand Forecast (kW)	808	807	806	805	na
Domestic Customers - #	116	115	115	114	na
Existing Amp Rating	810	Amps			
Capital Budget Proposal	$28,300				

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral (kW)	50	49	48	47	na
(Difference of forecast peak demand and demand for existing amp rating)					
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% isolated debt cost as per 2002 COS)					
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	na
Total DSM Deferral Budget	$1,274	$2,490	$3,651	$4,754	na
DSM Budget Per Required Demand Savings kW	$25	$51	$76	$101	na

* Percentage of capital cost that can be incurred to defer project for 1 to 4 years, and still be indifferent in economic terms.

DSM Supply Cost - $ per kW Achieved	$/kW*
Domestic Hot Water (DHW) Load Control	$357

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
(Max kW reduction at lowest DSM supply cost and full DSM deferral budget)					
DHW Load Control - kW	4	7	10	13	na
Achievable DSM Less Required DSM Savings-kW	(46)	(42)	(38)	(34)	na

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Increase Generation – Mary's Harbour

Location: Mary's Harbour Diesel Plant

Division: Transmission & Rural Operations

Classification: Generation

Project Description:

This project consists of the transfer of diesel Unit 2048 complete with switchgear and radiator, from Nain to Mary's Harbour. The unit is to be installed in the vacant fourth bay in the Mary's Harbour Diesel Plant.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	40.0	0.0	0.0	40.0
Labour	70.0	0.0	0.0	70.0
Engineering	22.5	0.0	0.0	22.5
Project Management	8.0	0.0	0.0	8.0
Inspection & Commissioning	27.0	0.0	0.0	27.0
Corp O/H, AFUDC, Esc. & Contingency	44.2	0.0	0.0	44.2
Total	**211.7**	**0.0**	**0.0**	**211.7**

Operating Experience:

Unit 2048 is an 800 kW Caterpillar 3508 engine which was installed in Nain in 1997. The original Nain Plant will be decommissioned in 2002. The unit has operated for approximately 18,000 hours with no major overhaul. The first major overhaul is planned prior to its installation in Mary's Harbour in 2003.

Project Justification:

Based on the April 2002 load forecast for Mary's Harbour, peak load will exceed firm capacity in 2003 (firm capacity is defined as the installed capacity of the plant less the largest unit). The installation of the 800 kW unit from Nain will insure that the firm capacity criteria is met beyond the forecast period. The existing 365 kW unit may be relocated to another plant if necessary.

Currently Installed:
545 kW, 545 kW and 365 kW yielding a plant firm capacity of 910 kW.

Proposed Installed:
800 kW, 545 kW and 545 kW yielding a plant firm capacity of 1,090 kW.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Increase Generation – Mary's Harbour **(cont'd.)**

Project Justification (cont'd):

Forecast peak load for Mary's Harbour:

The following is based on Hydro's latest load projections.

Peak	2002	2003	2004	2005	2006	2007
KW	929	996	1,010	1,023	1,037	1,050

Other options considered include:

1. Purchase and install a new 455 kW generator set, switchgear and radiator for Mary's Harbour. The estimated cost for this alternative is $394,400 which is almost twice the recommended plan. This option was not considered further.
2. The opportunity for a Demand Side Management (DSM) based capital deferral was reviewed and it was determined that DSM was not a viable alternative resource in this particular circumstance. See analysis on next page.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Increase Generation – Mary's Harbour **(cont'd.)**

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Mary's Harbour - Increase Generation**
Description: Transfer 800 kW unit from Nain

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

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

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

Load Forecast (HR OPLF Nov 2001)*	2003	2004	2005	2006	2007
Peak Demand Forecast (kW)	996	1010	1023	1037	1050
Domestic Customers - #	225	230	235	240	245

*revised Mary's Harbour forecast April 2002

Existing Plant Firm Capacity	910	kW
Capital Budget Proposal for Increased Generation	$211,700	

	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
Required Demand Savings for Capital Deferral (kW)	95	109	122	136	149

(Difference of forecast peak demand and peak demand target of 1% below firm capacity)

DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% isolated debt cost as per 2002 COS)

Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	16.8%	20.5%
Total DSM Deferral Budget	$9,527	$18,630	$27,309	$35,566	$43,399
DSM Budget Per Required Demand Savings kW	$100	$171	$224	$261	$291

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

DSM Supply Cost - $ per kW Achieved	$/kW*
Domestic Hot Water (DHW) Load Control	$354

* includes provision for distribution losses.

Maximum Achievable Winter Peak Demand Reduction	1 Yr	2 Yr	3 Yr	4 Yr	5 Yr
(Max kW reduction at lowest DSM supply cost and full DSM deferral budget)					
DHW Load Control - kW	27	53	77	101	123
Achievable DSM Less Required DSM Savings-kW	(68)	(56)	(45)	(36)	(26)

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Fuel Storage Upgrades

Location: Postville, Lanse Au Loup and Makkovik Diesel Plants

Division: Transmission and Rural Operations

Classification: Generation

Project Description:

This project consists of the purchase and installation of a 45,400ℓ self-dyking fuel storage tank at the diesel plant site in Postville; replacement of the two 22,700ℓ tanks at the diesel plant in Lanse Au Loup; and, replacement of the exterior fuel line from the bulk fuel transfer pump house to the diesel plant, at the diesel plant in Makkovik.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	126.0	0.0	0.0	126.0
Labour	28.0	0.0	0.0	28.0
Engineering	10.0	0.0	0.0	10.0
Project Management	9.0	0.0	0.0	9.0
Inspection & Commissioning	12.0	0.0	0.0	12.0
Corp O/H, AFUDC, Esc. & Contingency	23.0	0.0	0.0	23.0
Total	**208.0**	**0.0**	**0.0**	**208.0**

Operating Experience:

Postville & Lanse Au Loup

The operating experience on the bulk storage tanks at these two sites has been acceptable. Tanks are cleaned and painted regularly and function according to design.

Makkovik

The existing 50 mm dia. fuel line has been in operation for the past twenty three (23) years. This fuel line is used for transferring of diesel fuel from the bulk storage to the Diesel Plant. It has performed reasonably well but has suffered damage from ice and snow loads and other external damage

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

Postville

Based on the fuel storage forecast for Postville, there is an anticipated shortfall in fuel storage capacity in the 2002/2003 nine month winter period of approximately 8,700 litres. This shortfall is forecasted to increase to approximately 46,000 litres by the year 2005/2006. Due to the marginal violation of the nine-month storage capacity criteria in 2002, it is therefore recommended that a 45,460 litre self-dyked fuel storage tank be installed in 2003 to meet the near term fuel storage requirements for the community. There is insufficient space within the existing earth dyke to install additional tanks. Therefore the self-dyked option is proposed.

The scope of this project may change if the relocation of the community of Davis Inlet to Natuashish proceeds in 2002. Hydro has a number of self-dyked fuel storage tanks in Davis Inlet that could be used in Postville if they become available by 2003. The scope of this project would change from a purchase and install to a relocate and install, thereby reducing the overall capital cost.

Other options considered:

1. Remove existing horizontal tanks to make space to install vertical storage tanks. This alternative was not considered due to a high capital cost estimated to be on the order of $450,000.

2. Guarantee of storage capacity from local supplier. Hydro was unable to obtain such a guarantee.

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Demand Side Management Analysis for Capital Budget Proposal

Project Title: **Postville - Increase Fuel Storage Capacity**

Description: Install 45,400 liter fuel tank

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

The most economic energy DSM options, namely, domestic hot water (DWH) retrofit and compact fluorescent lighting (CFL) are evaluated against the required energy savings with the calculated DSM budget.

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

	2003/04	2004/05	2005/06	2006/07
Load Forecast (HR OPLF Nov 2001)				
9-Mth System Energy Forecast (MWh)	1,167	1,178	1,188	na
Domestic Customers - #	84	86	87	na
9-Month Fuel Storage Capacity*	1055	MWh		
Capital Budget Proposal for Increased Fuel Storage	$77,700			
(* MWh based on gross fuel efficiency of 2.9 kWh/Liter)				

	1 Yr	2 Yr	3 Yr	4 Yr
Required Energy Savings for Capital Deferral (MWh)	123	133	144	na
(Difference of forecast energy and energy target of 1% below capacity)				
DSM Budget Calculation (Calculated assuming 2% inflation and 6.8% isolated debt cost as per 2002 COS)				
Capital Budget Deferral Factors*	4.5%	8.8%	12.9%	na
Total DSM Deferral Budget	$3,497	$6,838	$10,023	na
* Percentage of capital cost that can be incurred to defer project for 1 to 3 years, and still be indifferent in economic terms.				
DSM Supply Cost	Unit Cost			
Domestic Hot Water (DHW) Retrofit	$30			
Compact Fluorescent Lighting (CFL)	$20			

Maximum Achievable Energy Reduction*	1 Yr	2 Yr	3 Yr	4 Yr
(Max MWh reduction at DSM supply cost and full DSM deferral budget)				
CFL	13.1	25.8	36.3	na
DHW Retrofit	0.0	0.0	2.0	na
Program Total - mWh	13.1	25.8	38.3	na
* includes provision for distribution losses.				
Achievable DSM Less Required DSM Savings-mWh	(109)	(108)	(106)	na

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

Postville Fuel Storage Forecast

Year	9-month Fuel Usage (Litres) (A)	Existing Storage Capacity (Litres) (B)	Additional Storage Req'd (Litres) (A) - (B)
2002/3	372,418	363,680	8,738
2003/4	402,286	363,680	38,606
2004/5	406,054	363,680	42,374
2005/6	409,821	363,680	46,141

Existing Storage:	2 x	68,190	Litres
	4 x	45,460	Litres
	2 x	22,730	Litres
	Total	363,680	Litres

Lanse Au Loup

The existing tanks do not meet the GAP Regulations and need to be recertified. To get this recertification extensive work is required to upgrade the tanks. The tanks are twenty-four (24) years old and the cost to upgrade is greater than the replacement cost.

Makkovik

The existing fuel line is subject to excessive snow loads and ice rafting near the side of the access road to the plant. This fuel line has been bent drastically, putting high stresses on the welded joints and fittings. To avoid any risk of further damage or an environmental incident, due to a pipe breakage, this up-grade is required. The upgrade consists of installing a heavier gauge pipe with additional supports and protection against damage.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Meters & Equipment - Rural 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)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	94.0	0.0	0.0	94.0
Labour	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	2.1	0.0	0.0	2.1
Total	**96.1**	**0.0**	**0.0**	**96.1**

Operating Experience:

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

Project Justification:

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

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

Future Plans:

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

2003 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 consists of the replacement of the existing Energy Management System (EMS) computer software and hardware infrastructure with state of the art hardware and software which provides greater flexibility for future technology changes and integration with Hydro's IT Infrastructure. The existing EMS is used by Hydro's Energy Control Centre to monitor, control and manage the power system and related water resources across the Province. The EMS is critical to the continued efficient and reliable operation of the electric power system and generation facilities owned by Hydro. The EMS is reaching the end of its projected life of 15 years with manufacturer supplied spare parts discontinued and technical support severely limited. Project costs are based on a joint procurement with Churchill Falls (Labrador) Corporation.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	544.5	2,238.0	2722.5	5,505.0
Labour	0.0	18.0	64.0	82.0
Engineering	453.8	1,315.2	1,441.4	3,210.4
Project Management	97.2	103.2	165.1	365.5
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	118.0	618.3	2,388.0	3,124.3
Total	**1,213.5**	**4,292.7**	**6,781.0**	**12,287.2**

Operating Experience:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Operating Experience: (cont'd.)

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

Project Justification:

Please refer to the attached documents EMS Replacement Project Justification (starting on the next page) and a report by KEMA titled "Newfoundland and Labrador Hydro Energy Management System Assessment" contained in Section G, Appendix 5.

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

Future Plans:

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 an the frequency of vendor software upgrades. KEMA are suggesting this will amount to be approximately $700,000 every 3 years following project in service.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

ENERGY MANAGEMENT SYSTEM REPLACEMENT

PROJECT JUSTIFICATION

August, 2002

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EXPLANATIONS

Introduction

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

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

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

Cost of EMS Failure

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

The EMS provides a mission critical function for Hydro and the operation of the Interconnected Power System. If this system failed for an extended period of time while a replacement was procured the reliability of the power system and electrical service to all of Hydro's customer would fall to unacceptable levels. Remote control of any station would be impossible and therefore all major stations would have to be staffed. There are eight stations that would have to be staffed 24 hours per day with 16 others having to be staffed for varying durations depending on the system condition. The eight stations alone would cost, provided staff are available, approximately $41,000 per week in overtime. As well, this will result in a

significant reduction in maintenance activity, as the staff performing monitor and control functions normally perform maintenance. In order to continue with routine maintenance additional staff would have to be hired and trained to replace those assigned to operating duties. This could add an additional $32,000 per week, while repairs or replacement are being done. If the failure was catastrophic and full replacement was the only option the cost could be as high as $3.8M per year.

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

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

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

The alternatives mentioned above are highlighted in the KEMA report. The report clearly identifies the least cost option is alternative 3 which is to procure the system at the

same time as CF(L)Co. In addition to the savings in system procurement costs identified by KEMA there are internal engineering and project management cost savings of $560,000 and corporate overhead, AFUDC, Escalation and Contingency savings of $390,000. Therefore the total savings for a joint procurement are approximately $1,500,000. Hydro has obtained a commitment by CF(L)Co for joint procurement and therefore the cost estimate has been prepared on that basis.

Operator Training Simulator

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

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

Safety Issues

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Security Program Centralized Log Monitoring & Analysis System

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

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

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

Operating Experience:

N/A

Project Justification:

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

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Enterprise Storage Management Infrastructure

Location: Hydro Place

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project involves the implementation of an Enterprise Storage Management infrastructure that includes a centralized repository for information that provides common data management and protection, as well as data sharing functions, through connections to numerous (and possibly dissimilar) computer systems.

This project involves two components: the installation and configuration of a storage area network (SAN) that will allow for the consolidation of all disk storage requirements for all of Hydro's server platforms deployed at Hydro Place; and the installation of a single tape storage system to replace the four tape storage systems currently in use.

Disk space is now attached to each computer server platform namely AS400, Windows NT, Risc 6000 and Harris on an individual computer platform basis. The consolidation of disk space within a storage area network will allow for control of disk space allocation between servers, high availability, recovery, and less administration. The tape storage system will backup the disc storage from the SAN providing a single point of backup. When the Energy Management system is replaced, it will also be used to backup the disc storage associated with the EMS.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	1,699.0	0.0	0.0	1,669.0
Labour	0.0	0.0	0.0	0.0
Engineering	60.0	0.0	0.0	60.0
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	319.5	0.0	0.0	319.5
Total	**2,048.5**	**0.0**	**0.0**	**2,048.5**

Operating Experience:

On average over the last 6 years Hydro has spent $220,000 on disk upgrades for NT servers and the AS400. The current disk has been installed from 1997 to present .

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Enterprise Storage Management Infrastructure **(cont'd.)**

Operating Experience: (cont'd.)

Over the last 5 years the disk space has been increased on four different occasions. Disc requirements for the NT and AS400 servers has increased at about 28% per year, which is consistent with industry benchmarks.

The existing four different tape storage systems were installed from 1994 to 1997 and are used to backup the disk storage on the different server platforms that are in use. With the 28% a year increase in disk storage, the backup time for the existing tape storage technology is impacting the availability of various applications such as JDE enterprise resource planning suite.

Project Justification:

The SAN technology provides for a cost effective deployment of disk storage accessible by all servers rather than adding the disk storage on an individual server basis . The disk storage assigned to a SAN has a life cycle of 8 years whereas for individual servers it is 5 years. The 28% per year growth in storage as seen over the past 5 years combined with the movement of personal storage on PC's to the network will further increase the demand for disk space.

The tape storage replacement system will:

- reduce the backup time and extend the availability of applications to the business.
- allow automation of the tape backup system in the data centre with a resulting reduction of 1 FTE.
- accommodate the tape backup requirements of the EMS with no increase in cost.

The tape component can be implemented separate from the SAN and these benefits will still apply.

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

Future Plans:

Future plans are for the addition of disk space as space is required to support business applications.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User & Server Evergreen Program

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This evergreen program will refresh the end user workstation infrastructure and the server & operating systems. End User hardware will be refreshed on a 3-5 year life cycle and Servers will be refreshed on a 5 year life cycle.

Users will be classified into three categories.

Category 1 will include users that do not require much local processing power or specialized applications. A thin client architecture will be used and the applications will be accessed through an appliance device.

Category 2 will include users that require significant processing power for specialized applications. Financial analyst, CAD operators and GIS users are typical users. The thin client would be available on a standard desktop PC. The user would use the thin client to access core (JDE) applications and the local processing power for their specialized applications.

Category 3 will include users that are mobile. This is the same setup as category 2 but the configuration will be on a laptop computer.

Based on industry standards and the age of existing servers, each year an appropriate number of servers will be refreshed and the latest version of the Microsoft's server operating system will be applied. This first year will allow for the planning and migration to Microsoft's new operating system (Windows 2000.NET) with the active directory feature.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	766.5	0.0	0.0	766.5
Labour	0.0	0.0	0.0	0.0
Engineering	103.0	0.0	0.0	103.0
Project Management	3.6	0.0	0.0	3.6
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	20.0	0.0	0.0	20.0
Total	**893.1**	**0.0**	**0.0**	**893.1**

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User & Server Evergreen Program 2003 **(cont'd.)**

Operating Experience:

Industry standards indicate that end user devices have a useful life of between 3-5 years. Beyond this timeframe reliability and support become issues. Hardware vendors offer new models about twice a year. Newer models offer more functionality and performance. The useful life cycle for these devices is based on the type of device. Thin client devices can be expected to provide effective service for up to 5 years. Desktops are now expected to last 4 years, while laptops have a life expectancy of 3 years. This refresh cycle is based on industry standards and the equipment has little value at the end of their useful life. The operating system for these devices follows a similar life cycle. As well as offering new functionality, operating systems will take advantage of the improved features in the newer hardware devices. Tying the end user hardware and operating systems together in a planned upgrade program, allows Hydro to exploit the enhancements of both.

Project Justification:

This evergreen program will allow Hydro to take advantage of new functionality offered in new end user and server hardware models and in new releases of the operating system. This keeps the end user component of the infrastructure in line with the technologies in the server infrastructure being deployed. The rationale for moving to a thin client environment and server refresh is supported by the IT Technical Architecture Strategy report filed with the Board on February 28, 2002 as #U - Hydro - 37. By maximizing the deployment of thin client devices and consolidating servers, Hydro can achieve lower total cost of ownership over the life cycle of these devices with reduced costs over the long term and improve efficiency through standardization and reduced support needs.

For the end user infrastructure, three options were considered. First, to remain with the current program of desktops & laptops refreshed over a 3-4 year life. Second, to deploy thin clients as the standards device and use desktops & laptops for the unique user. Third, to buy out the present lease and operate the existing units until they break and then fix or replace.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User & Server Evergreen Program 2003 **(cont'd.)**

Project Justification: (cont'd.)

The results of this analysis is to proceed with Option 2 which is contained in the Table below. For the server hardware, two options were considered. First, to remain with the current program of servers refreshed over a 3-4 year life. Second, to deploy servers in key office locations and use the WAN to allow other offices to access the applications & data.

		2003 ($)	2004 ($)	2005 ($)	2006 ($)	2007 ($)	Total
Option 1:	1						
Continue current refresh program		$685,100	$682,800	$577,500	$685,100	$682,800	$3,313,300
Option 2:	2						
Move to Thin Client deployment		$774,300	$855,500	$670,700	$354,300	$463,700	$3,118,500
Option 3:							
Buy out lease & fix/replace as equipment	3	$253,806	$785,075	$743,722	$799,531	$670,875	$3,233,009

Note 1: This option is the existing program of desktops and laptops rolled out over a 3 - 4 year cycle. Costs include equipment, operating system, and install resources.

Note 2: This option is the deployment of thin clients and related servers in combination with desktops and laptops. Refresh cycle is over 3 - 5 years. Costs include equipment, operating system, and install resources.

Note 3: This option is the buy out of existing lease, extend the life cycle by 1 year, and add maintenance cost for extended year. Refresh cycle is over 4 years. Costs include buyout, equipment, operating system and install resources.

There is no opportunity to share this infrastructure with NP or any other organization.

The intent of the refresh program is to prevent excessive maintenance to end user and server hardware. As reliability and performance become issues, the cost to maintain these devices becomes extremely high. Thus, as per industry standards, it becomes cheaper to replace than to maintain.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: End User & Server Evergreen Program 2003 **(cont'd.)**

Project Justification: (cont'd.)

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

Future Plans:

This will be an on-going refresh program with budgets prepared for each future year. For end user hardware, the cycle will be over 3-5 years based on the device. Startup costs will be slightly higher than the current program, but as more thin client devices are deployed, Hydro will start to realize the savings from this program. On the server side, efforts will look at further consolidation both at the location and hardware levels.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Peripheral Infrastructure Replacement

Location: Hydro System

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

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

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	73.0	0.0	0.0	73.0
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	15.5	0.0	0.0	15.5
Total	**98.5**	**0.0**	**0.0**	**98.5**

Operating Experience:

As peripherals increase in age, the operating expenses increase as equipment breaks down. This equipment includes projectors, scanners and printers.

Project Justification:

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

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install New Microwave System Interconnection Between East/West Coast

Location: Various

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This Project for 2003 is the continuation of a project given approval by the Board in 2002. The scope of work consists of the installation of a new digital microwave radio system between the West Coast Microwave System at Sandy Brook Hill Repeater and the East Coast Microwave System at Bull Arm Hill Repeater. It will include five (5) hops of high-capacity digital microwave radio with repeaters located at Clarenville, Glovertown, Gander (Jonathan's Pond) and Lewisporte (Southwest Brook). Each site would include a communications tower, buildings, dc power system, stand-by diesel generator and telecommunications equipment. In addition, the system will provide high-speed power system teleprotection for TL202/TL206 between Sunnyside and Bay D'Espoir, a high-capacity link to transport voice and data from the generating and terminal stations on the western side of the Island to the Energy Control Centre (ECC) in the east, and a decrease in both the cost of and reliance on third-party leased facilities.

Project Cost: *($ x1,000)*	**2002**	**2003**	**Beyond**	**Total**
Material Supply	0.0	300.0	0.0	300.0
Labour	0.0	6,721.0	0.0	6,721.0
Engineering	248.3	246.5	0.0	494.8
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	20.2	1,405.5	0.0	1,425.7
Total	**268.5**	**8,673.0**	**0.0**	**8,941.5**

Operating Experience:

The existing Powerline Carriers currently in operation on TL202/TL206 are not capable of supporting the telecommunication bandwidth requirements of the enhanced protection and control relaying system features installed on these lines.

The telecommunications requirements for administrative and operation data are currently being met utilizing third-party leased facilities that in the past have provided unreliable service at a high leasing cost.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Install New Microwave System Interconnection Between East/West Coast **(cont'd.)**

Project Justification:

The new digital microwave radio system will provide a reliable and secure teleprotection infrastructure between the Bay D'Espoir Generating Station and the main load centres on the Avalon Peninsula. This project will also complete the upgrade of the teleprotection communications infrastructure on the bulk 230kV transmission system from the West Coast to the East Coast. The new infrastructure will allow for one third of the Corporation's VHF mobile radio infrastructure to be moved to Hydro's facilities. The system would also meet the long term bandwidth requirements of the Corporation's Wide Area Network requirements.

In response to a request for information #NP-180 filed August 3, 2001, during the General Rate Hearing for Newfoundland and Labrador Hydro indicated a willingness to investigate providing power system teleprotection services to Newfoundland Power in the Clarenville area as requested in a meeting with Newfoundland Power. Also in a telephone conversation with Newfoundland Power on June 21, 2002, Newfoundland Power indicated an interest in Hydro carrying their SCADA data bandwidth in central Newfoundland. The area of interest is in the Sandy Brook and Rattling Brook location where Newfoundland Power has a budget to install a private radio link to support these sites. Both Newfoundland Power and Hydro agreed to meet this Fall to review these items and to investigate possible ways to reduce costs and improve customer service for both companies. Collaboration with NP will not reduce the costs of this project. Please refer to the "Telecommunications Plan", section 3.4 and the corresponding Appendix E of the Plan for further details of the project justification. Alcatel was the successful tenderer for the East Coast and West Coast Microwave projects. Hydro will be sole sourcing the Interconnection Microwave project to Alcatel in order to standardize on Alcatel radio and support infrastructure components across its complete microwave radio infrastructure. This will allow Hydro to minimize its spares inventory and standardize on training, documentation and maintenance practices thus reducing costs.

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace UHF Radio Link - Abitibi - Stephenville
Location: Abitibi & Stephenville
Division: Production
Classification: Information Systems & Telecommunications

Project Description:

This proposal consists of the replacement of the UHF radios and multiplexers that comprise the point-to-point radio link between Abitibi Stephenville Paper Mill and Stephenville Gas Turbine plant. The existing UHF antennas will be reused.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	57.4	0.0	0.0	57.4
Labour	10.2	0.0	0.0	10.2
Engineering	6.6	0.0	0.0	6.6
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	14.8	0.0	0.0	14.8
Total	**89.0**	**0.0**	**0.0**	**89.0**

Operating Experience:

The existing radio is used equipment, removed from the Hinds Lake system and installed in Abitibi / Stephenville in 2000. There have been two failures in the last two years resulting in repair costs of $13,100. This pattern is expected to continue. There is one spare radio available.

Project Justification:

The existing radio will be 23 years old by 2003 and is at the end of its useful life. This link carries critical teleprotection circuits for TL234 and requires a high degree of reliability. Spare equipment is no longer available for purchase and when failures, and subsequently loss of service, occur, it requires a long time before repairs can be implemented. Failure to replace this equipment in the time frame indicated will result in an unacceptable level of security and reliability which can result in an increase in the duration of an outage to the mill.

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

Future Plans:

There are no future commitments.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Location: Various

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This proposal is a continuation of a program to replace obsolete powerline carrier systems on the West Coast. This Project consists of the purchase, installation and commissioning of a new ABB Power Line Carrier (PLC); Alcatel Digital Microwave Radio and T1 Multiplexer equipment to replace the existing PLC's on TL243, TL245, TL234 and TL247. Associated PLC equipment, including wavetraps, line matching units, teleprotection and high voltage coupling equipment will be replaced in a phase-to-phase arrangement. In addition, a single digital microwave radio hop will replace two PLC links providing increased bandwidth and high-speed teleprotection.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	9.0	269.0	0.0	278.0
Labour	781.7	39.2	0.0	820.9
Engineering	28.2	22.0	0.0	50.2
Project Management	6.3	5.0	0.0	11.3
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	183.8	83.8	0.0	267.6
Total	**1,009.0**	**419.0**	**0.0**	**1,428.0**

Operating Experience:

The equipment proposed for replacement was installed during the power system generation additions in the early 1980's at Hinds Lake, Upper Salmon and Cat Arm. During the 20 year operating life of this equipment, there have been many requirements for corrective maintenance and upgrades.

Project Justification:

Most of the equipment slated for replacement has been in service for over 20 years and is now obsolete. The manufacturer no longer supports the product, and has discontinued the manufacture and sale of replacement components. In addition, there is no known third party that provides repair services for defective modules. With the removal of the East Coast PLC

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

system due to the installation of a new digital microwave system in 2001, there will be an increase in the availability of spares. These spares however would come from equipment that has also been in service for over 20 years and would have limited additional life expectancy. As such continued utilization of this equipment poses the risk of failure and hence loss of communications required for the protection and control of the power system. Please see the Telecommunications Plan revised August 20, 2002, Section 3.2 and Appendix F of this plan for further details of the Project Justification. The revised Telecomnunication Plan is contained in Section H of this document.

Hydro has standardized on ABB PLC radio equipment and Alcatel microwave radio infrastructure to provide voice, data and teleprotection. As such, Hydro will sole source this equipment to the manufacturers. This allows Hydro to minimize its spares inventory and standardize on training, documentation and maintenance practices thus reducing costs.

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voice, Data & Teleprotection Equip - Upper Salmon Intake

Location: Upper Salmon

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This estimate covers the replacement of the voice, data, teleprotection equipment and fiber optic cable used for the remote monitoring and communications of the Upper Salmon Intake from the Upper Salmon Plant.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	47.6	0.0	0.0	47.6
Labour	11.3	0.0	0.0	11.3
Engineering	13.8	0.0	0.0	13.8
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	15.6	0.0	0.0	15.6
Total	**88.3**	**0.0**	**0.0**	**88.3**

Operating Experience:

The redundant equipment configuration has been reduced to a non-redundant configuration due to equipment failure in July 2002. There were no other reported failures of this equipment over is operating life.

Project Justification:

This equipment is 20 years old and will have reached the end of its' useful life by 2003. Parts and support are no longer available from the manufacturer. The redundant configuration placed in service 20 years ago presently has been reduced to a non-redundant state because modules can no longer be repaired. There are no known third party sources for parts or repairs. Special repair tools, components, mock-ups and specialized repair training is not available in-house and not practical to support for a single system. Sourcing components to repair failures has not been successful. The new equipment will incorporate the use of teleprotection equipment to improve reliability and provide better isolation capabilities. The remote control and monitoring of the Intake is a critical component of the operation the plant. Failure to replace this equipment in the recommended time frame will result in increased probability of equipment failure which can extend or cause a plant outage.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Voice, Data & Teleprotection Equip - Upper Salmon Intake

Project Justification: (cont'd.)

Hydro has standardized on the RFL IMUX technology to provide voice, data and teleprotection services. As such, Hydro will sole source this equipment to the manufacturer, RFL. This allows Hydro to minimize its spares inventory and standardize on training, documentation and maintenance practices thus reducing costs.

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

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Battery System - Multiple Sites

Location: Ebbegunbaeg, North Salmon Dam, Upper Salmon (2) & Springdale

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of the replacement of five (5) 48 VDC battery systems at the Ebbegunbaeg Control Structure, North Salmon Dam Control Structure, Upper Salmon Intake, Upper Salmon Plant and the Springdale Terminal Station. This includes all 240 VAC to 48 VDC rectifiers, rectifier control panels, battery banks and associated cabling.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	125.7	0.0	0.0	125.7
Labour	36.4	0.0	0.0	36.4
Engineering	22.1	0.0	0.0	22.1
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	39.7	0.0	0.0	39.7
Total	**223.9**	**0.0**	**0.0**	**223.9**

Operating Experience:

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

Project Justification:

The equipment has been in operation for over 20 years which has exceeded the 20 year design life and 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, while in others there is significant corrosion of battery terminals. As well, the capacitors in some older types of rectifiers are deteriorating. This replacement is necessary to maintain reliability of equipment necessary for providing emergency power for the remote control and monitoring of Hydro's transmission

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification: (cont'd.)

and generation system. Failure to replace this equipment could result in a battery bank failure or reduced reliability which has the potential to extend or cause customer outages.

Hydro has standardized on Argus rectifiers and control panels for the telecommunications battery system. Newfoundland and Labrador Hydro will solicit competitive bids for the battery systems and associated materials.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Remote Terminal Unit for Hydro - Phase 4
Location: Buchans, Doyles, Howley & Upper Salmon
Division: Production
Classification: Information Systems & Telecommunications

Project Description:

Four (4) Quindar Remote Terminal Units (RTUs) used for remote monitoring and control of Plants and Terminal Stations from the Energy Control Center will be replaced. The sites are: Buchans Terminal Station, Doyles Terminal Station, Howley Terminal Station and Upper Salmon Plant. This is phase four of a nine phase plan to replace all obsolete RTUs. The de-commissioned equipment has no value and will be scrapped.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	145.9	0.0	0.0	145.9
Labour	60.3	0.0	0.0	60.3
Engineering	28.1	0.0	0.0	28.1
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	50.9	0.0	0.0	50.9
Total	**285.2**	**0.0**	**0.0**	**285.2**

Operating Experience:

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

Project Justification:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Remote Terminal Unit for Hydro - Phase 4 **(cont'd.)**

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

Future Plans:
None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Equipment for Physical Facilities Upgrade
Location: Bishops Falls and Port Saunders
Division: Production
Classification: Information Systems & Telecommunications

Project Description:

This project consists of the construction of a secure room in each regional office designed to accommodate the various types of IT and telecommunications equipment. The facilities will include:

- A secure room sized to house the equipment based on class of office
- Equipment racks to support the networking, communications and server equipment
- Adequate electrical power and sufficient backup power to allow normal shutdown of equipment
- Adequate air conditioning to dissipate the heat generated by the equipment
- Normal building fire suppression system
- Communications and data wiring to service the office

A classification scheme has been used to set the standards for each equipment room facility based on the type and quantity of equipment needed to support the user community in each office.

Regional offices identified as central hubs will require a main equipment room and several satellite rooms. The makeup of the rooms is as follows:

- Core server room (Class 1), secure area · Distribution closet (Class 2), secure area Satellite location (Class 3), free standing cabinet
- LAN extension (Class 4), wall mount area

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Purchase Equipment for Physical Facilities Upgrade **(cont'd.)**

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	52.0	0.0	0.0	52.0
Labour	0.0	0.0	0.0	0.0
Engineering	6.0	0.0	0.0	6.0
Project Management	2.0	0.0	0.0	2.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	11.0	0.0	0.0	11.0
Total	**71.0**	**0.0**	**0.0**	**71.0**

Operating Experience:

Equipment is located in unsecured areas or areas with inadequate climate control. Some of these areas are shared by other groups for storing supplies and other items.

Equipment has been unplugged or turned off by persons not knowing the use or impact on staff. Overheating has occurred due to improper ventilation or air conditioning.

Project Justification:

The IT technical architecture strategy identified the need for a consistent and secure facility in which to house the equipment needed to support the IT and Communications services. This is necessary to ensure that access is available only to authorized staff. To provide the required reliability, the equipment must have the proper environment in which to operate. There is a significant investment in equipment in each area office which allows staff to access applications and information as they perform their jobs. There is the expectation that this equipment and services will be available whenever it is needed. Providing the proper operating environment will ensure that the equipment will not be interrupted due to overheating, power failures or access by unauthorized staff.

A separate room will allow for controlled access. The battery based UPS will allow for adequate time to perform a controlled shutdown of equipment in the event of a prolonged power outage. All equipment in these rooms consume power and thus generate heat. Air conditioning is needed to dissipate the heat which will prolong the life of the equipment and eliminate interruptions due to overheating.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Deer Lake Building Improvements

Location: Deer Lake

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of a 7.62 m x 7.62 m building extension and an air handling system at an existing pre-engineered building at Deer Lake Office to provide a meeting room, equipment control room, kitchen and two additional office spaces.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	57.0	0.0	0.0	57.0
Labour	25.0	0.0	0.0	25.0
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	16.9	0.0	0.0	16.9
Total	**102.9**	**0.0**	**0.0**	**102.9**

Operating Experience:

This building was constructed in 1981 and was intended to house four employees and equipment storage. Since that time the number of employees have grown to eight and this site is now used as a backup to the Network Management Centre at Hydro Place and as such houses equipment that must be properly secured.

Project Justification:

The present office arrangements does not provide space or security required for its current use. An air quality analysis recommended an upgrade to the air handling system for the building.

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

Future Plans:

There are no future commitments.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Operational Data & Voice Network - Phase 1

Location: St. John's

Division: Production

Classification: Information Systems & Telecommunications

Project Description:

This project consists of a migration assessment study to develop the design and implementation plan of a wide area network (WAN) communications infrastructure to replace the existing operational data (SCADA) and operational voice network currently using General DataComm (GDC) infrastructure. This will provide an architecture that can support the operational data, administrative data and voice traffic over a single network.

This proposal addresses the design and verification of a replacement infrastructure as well as implementation, plan and detailed costing information to support the installation.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	34.0	0.0	0.0	34.0
Labour	18.0	0.0	0.0	18.0
Engineering	189.0	0.0	0.0	189.0
Project Management	13.8	0.0	0.0	13.8
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	37.0	0.0	0.0	37.0
Total	**291.8**	**0.0**	**0.0**	**291.8**

Operating Experience:

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

The GDC equipment is at the end of its useful life.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replacement of Operational Data & Voice Network - Phase 1 **(cont'd.)**

Operating Experience: (cont'd.)

The following Table gives the number of problems recorded for the past 7 years and this year to date.

Incident Summary by Year

	1995	1996	1997	1998	1999	2000	2001	2002
Incident Reported	**4**	**11**	**5**	**23**	**12**	**15**	**11**	**6**

Project Justification:

GDC are no longer in the transport market segment but have focused their strategic direction elsewhere. Table 5, page 19 of the Telecommunications Plan, contained in Section H (General Data Network Transport Equipment) indicates that the General Datacom equipment that Hydro has installed over the past 15 years is no longer under development by GDC and many components have been manufacturer discontinued for a number of years. A migration assessment and plan needs to be put in place to minimize the risk and impact on Hydro's core business. The operational, administrative and voice traffic currently run on separate communications equipment each having its own 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 and to support different communications protocols and equipment resulting in lower TCO.

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.

This study will investigate the options and alternatives for this communications network.

There is little or no opportunity to share this infrastructure with NP. The areas served by both utilities cover different locations within the province and are not suited to a shared operation.

Future Plans:

This project will consist of a study, followed by a two-year implementation phase beginning in 2004 which is now estimated at $2.2 million.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Vehicles

Location: System Wide

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

This project involves replacing 28 light vehicles (cars, pick-ups and vans) and 17 medium/heavy vehicles (line trucks and boom trucks).

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

Operating Experience:

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

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

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

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

Project Justification:

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

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

The budget for each class of vehicle is shown below.

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

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

Future Plans:

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

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Replace Engineering Wide Format Printing System

Location: Hydro Place

Division: Transmission & Rural Operations

Classification: Administrative

Project Description:

Supply and install a digital wide-format Engineering Printing System to replace the existing Regma 9100 copier.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	62.0	0.0	0.0	62.0
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	0.0	0.0	0.0	0.0
Total	**62.0**	**0.0**	**0.0**	**62.0**

Operating Experience:

This copier produces approximately 300,000 lineal meters of output per year. The copy quality is deteriorating, and the equipment is experiencing increasing frequency of breakdowns.

Project Justification:

The existing copier bought in May 1993 with an expected life span of 7 years. The Manufacturer has terminated the supply of all spare parts and consumables effective Nov. 30th 2001

The annual cost to lease a copier is $36,000, and to purchase copying services is $150,000 per year. Therefore, the most cost effective option is to purchase a replacement unit. The replacement copier has an expected life of 8 - 10 years.

Future Plans:

None.

2003 CAPITAL PROJECTS OVER $50,000
EXPLANATIONS

Project Title: Automatic Meter Reading (AMR) - Pilot Project

Location: Hydro Place

Division: Finance

Classification: Administrative

Project Description:

To conduct a pilot project to determine the feasibility of using Automatic Meter Reading in Hydro's Rural Service Areas. Cost is based on conducting the pilot in an isolated diesel community of approximately 200 customers.

Project Cost: *($ x1,000)*	**2003**	**2004**	**Beyond**	**Total**
Material Supply	41.0	0.0	0.0	41.0
Labour	10.0	0.0	0.0	10.0
Engineering	0.0	0.0	0.0	0.0
Project Management	0.0	0.0	0.0	0.0
Inspection & Commissioning	0.0	0.0	0.0	0.0
Corp O/H, AFUDC, Esc. & Contingency	0.9	0.0	0.0	0.9
Total	**51.9**	**0.0**	**0.0**	**51.9**

Operating Experience:

None

Project Justification:

Hydro currently has 18 full time meter readers, 15 part-time meter readers and 20 DSR's that read approximately 35,000 meters monthly. Customer Services is currently conducting a Meter Route Optimization Study to determine if cost savings can be realized. An Automatic Meter Reading (AMR) Study will be a continuation of this process to determine if further savings can be realized by automating some of the reading routes.

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

Future Plans:

To implement AMR where cost savings can be identified.

SECTION C

NEWFOUNDLAND & LABRADOR HYDRO
TRANSMISSION & RURAL OPERATIONS
2003 CAPITAL BUDGET
PROJECTS SUBJECT TO MINIMUM FILING REQUIREMENTS - OVERVIEW
($,000)

PROJECT DESCRIPTION	Exp To 2002	2003	Future Years	Total	In-Ser Date	Explanation Page Ref.
Uprate of TL203- (230kv Sunnyside - Western Avalon)	15	192		207	Oct. 03	C-2
TOTAL TRANSMISSION & RURAL OPERATIONS	**15**	**192**	**0**	**207**		

Uprate of TL203 (230kV Sunnyside – Western Avalon)

1. Project Name

This project involves all engineering and construction work associated with the thermal uprating of TL203. TL203 is designed to operate at a maximum conductor temperature of 50^0C. This project will modify TL203 to operate at a 75^0C conductor temperature thus increasing its load transfer capability.

2. Project Scope

A review of the Plan & Profile for TL203 has determined that with the exception of a few critical locations the line is already capable of operating at 75^0C. It is being proposed that at these critical locations mid-span structures be added to limit the line sag to acceptable standards when operated at the higher temperature.

3. Project Timetable/Cash Flow

The preliminary design work for this project will commence in the fall of 2002 which will include a field verification of the line plan and profile, with the actual construction of the mid-span structures taking place during the summer of 2003.

Year	Project Cost
2002	15,200.00
2003	191,800.00
Total	207,000.00

4. Customer Impact

The thermal uprating of TL203 will increase the transfer capability of the east cost transmission grid. This increased capability will be of most benefit during periods when the Holyrood thermal plant is offline or when the system is experiencing a 230kV transmission line outage. The thermal uprating will improve the reliability of service to customers on the Avalon Peninsula during the above periods and in addition the increased transfer capability will permit Hydro to more effectively utilize the existing Island hydroelectric facilities.

Uprate of TL203 (230kV Sunnyside - Western Avalon) (cont'd.)

5. Statement of Need

The 1995 Hydro report "East Cost Voltage Study" which has been reviewed by the Board at the hearing for Hydro's 1997 Capital budget identified a number of deficiencies in the east coast transmission system and recommended a plan to mitigate these deficiencies which included:

- The addition of capacitors at Hardwoods and Oxen Pond terminal stations;
- The thermal uprating and/or reconductoring of TL207, TL237 and TL203.

The capacitors at Hardwoods and Oxen Pond have been added and the thermal uprating and reconductoring of TL207 and TL237 has been incorporated as part of the Avalon Lines Upgrade Program (Phase I Steel Lines). Had Phase II of the program (the wood pole lines) proceeded, the uprating and reconductoring of TL203 would also have been completed.

The requirement for the thermal uprating of TL203 still exists and once the steel line upgrade program is complete TL203 will be the limiting capacity link of the east coast transmission system. The East Coast Voltage Study indicates that it would be desirable to be able to deliver 365 MW to the Avalon Peninsula during periods when Holyrood is off. To attain this goal and to be able to achieve maximum flexibility in the scheduling of the Island generating resources TL203 will require thermal uprating and reconductoring.

6. Description of Corrective Options

The East Coast Voltage Study investigated the following corrective measures for the ampacity limitation on 230kV transmission lines TL203, TL207 and TL237.

i) Thermal Uprating: which involved modifying the lines to allow them to operate at temperatures up to 75^0C utilizing existing conductors.

ii) Thermal Uprating & Reconductoring: which includes replacement of all conductor with 795 MCM ACSR (or electrical equivalent) operating at 75^0C as opposed to 50^0C.

The latter was the preferred alternative, as thermal uprating alone did not achieve the 365 MW transfer requirement for certain line out contingencies.

Uprate of TL203 (230kV Sunnyside - Western Avalon) (cont'd.)

7. Documentation of Decision Rationale

Concurrent with the East Coast Voltage Study, studies were also completed which assessed the mechanical strength of these lines and their ability to withstand ice and wind loads. The lines were determined to be deficient in these areas as well and a resultant work plan, known as the Avalon Lines Upgrade Program, was developed to upgrade and reconductor the 230kV lines on the Avalon Peninsula including TL203, TL207 and TL237. As part of the Avalon Lines Upgrade Program the capacity deficiencies identified in the East Coast Voltage Study would be rectified.

As mentioned previously, TL207 and TL237 have been upgraded as part of Phase I of the Avalon Lines Upgrade Program. In the year 2000, Hydro made a decision not to proceed with Phase II (the wood pole lines) of the upgrade program. This decision was based on knowledge gained from an evaluation of the residual strength of the 230kV wood pole transmission lines on the Avalon Peninsula. This evaluation indicated that while the existing poles have sufficient strength to withstand original design ice loads an upgrade to the proposed new ice loads using existing structures was not practical.

This proposal for the thermal uprate of TL203 is being submitted as a result of the cancellation of the wood pole upgrade program. The limited transfer capacity of TL203 has caused difficulty in the past and will continue to do so in the future until the problem is corrected. The optimum solution as identified in the East Coast Voltage Study would be the thermal uprating combined with reconductoring, however given the uncertainties regarding the residual strength and remaining life of the existing wood pole structures, the decision to proceed with only the thermal uprating is deemed more prudent. The thermal uprating alone will greatly enhance the operating flexibility of this system and increase the capacity of this line by approximately 80 MVA. This combined with the fact that TL207 and TL237 have been thermally uprated and reconductored goes a long way in alleviating the deficiencies identified in the East Coast Voltage Study.

SECTION D

NEWFOUNDLAND & LABRADOR HYDRO

2003 LEASING COSTS

ITEM	***2003 COST***
Living Accommodations - Recontre East	$7,200.00

It is anticipated that this lease will be renewed in 2003.