PROJECT DESCRIPTION	Expended to 2014	2015	Future Years	Total	Page Ref
		($000)			
GENERATION					
Upgrade Gas Turbine Plant Life Extension - Stephenville		2,655.2	2,525.4	5,180.6	C - 3
Replace Interior Coating on Surge Tank 3 - Bay d'Espoir		1,629.3		1,629.3	C - 5
Overhaul Turbine Valves Unit 1 - Holyrood		1,577.5		1,577.5	C - 7
Upgrade Burnt Dam Spillway Structure - Bay d'Espoir	110.2	1,201.9		1,312.1	
Rehabilitate Salmon River Spillway - Bay d'Espoir		745.6	556.8	1,302.4	C - 9
Upgrade Powerhouse Roofing - Holyrood		1,047.8		1,047.8	C - 11
Replace Station Service Breakers - Cat Arm		644.9	363.4	1,008.3	C - 13
Refurbish Access Road - Cat Arm		990.0		990.0	C - 15
Replace ABB Exciter Unit 2 - Cat Arm		845.9		845.9	C - 17
Upgrade Generator Bearings Units 1 and 3 - Bay d'Espoir		14.7	633.3	648.0	C - 19
Automate Generator Deluge Systems - Bay d'Espoir		645.2		645.2	C - 21
Replace Pump House and Associated Equipment - Bay d'Espoir		22.7	522.5	545.2	C - 23
Replace Economizer Inlet Valves Units 1 and 2 - Holyrood	192.0	329.1		521.1	
Install Cold-Reheat Condensate Drains and High Pressure Heater Trip Level Unit 3 - Holyrood	49.8	467.4		517.2	
( )					
TOTAL GENERATION	352.0	12,817.2	4,601.4	17,770.6	
TRANSMISSION AND RURAL OPERATIONS					
Upgrade Circuit Breakers - Various Sites (2015-2016)		6,189.1	6,873.8	13,062.9	C - 27
Upgrade Power Transformers - Various Sites		4,440.4	7,002.3	11,442.7	C - 29
Provide Service Extensions - All Service Areas		6,080.0		6,080.0	C - 31
Upgrade Circuit Breakers - Various Sites (2014-2015)	3,695.4	1,642.5		5,337.9	
Upgrade Distribution System - Various Sites (2014-2015)	370.2	4,850.1		5,220.3	
Upgrade Distribution Systems - All Service Areas		3,340.0		3,340.0	C - 33
Perform Wood Pole Line Management Program - Various Sites		2,830.6		2,830.6	C - 37
Refurbish Anchors and Footings TL202 and TL206 - Bay d'Espoir to Sunnyside	1,191.7	988.2		2,179.9	
Perform Arc Flash Remediation - Various Sites	1,602.6	413.1		2,015.7	
Upgrade Distribution System - Various Sites (2015-2016)		1,136.1	818.8	1,954.9	C - 39
Inspect Fuel Storage Tanks - Various Sites		1,761.1		1,761.1	C - 41
Replace Instrument Transformers - Various Sites	1,146.0	538.4		1,684.4	
Increase Fuel Storage - Rigolet		1,666.8		1,666.8	C - 44
Perform Grounding Upgrades - Various Sites	1,311.3	345.4		1,656.7	
Replace Disconnect Switches - Various Sites (2015-2016)		963.7	642.9	1,606.6	C - 46
Replace Accommodations and Septic System - Ebbegunbaeg		489.4	1,061.4	1,550.8	C - 48
Install Fire Protection - L'Anse Au Loup		220.6	1,126.2	1,346.8	C - 50
Replace Unit 2038 - Mary's Harbour		103.5	1,241.5	1,345.0	C - 53
Overhaul Diesel Units - Various Sites		1,199.2		1,199.2	C - 55
Install Transformer On line Gas Monitoring - Various Sites		700.5	975.7	1,676.2	C - 57
Construct Second Distribution Feeder - Nain		1,050.3		1,050.3	C - 59
Replace Disconnect Switches - Various Sites (2014-2015)	815.9	189.5		1,005.4	
Install Fire Protection System - Nain	107.1	892.2		999.3	
Install Automated Meter Reading - Various Sites (2015-2016)		559.9	401.8	961.7	C - 61
Replace Programmable Logic Controllers - Various Sites		366.9	591.1	958.0	C - 63
Upgrade Line Depots - Various Sites		953.3		953.3	C - 65
Upgrade Diesel Plant Production Data Collection Equipment - Various Sites	268.9	269.8	280.7	819.4	
Install Automated Meter Reading - Various Sites (2014-2015)	356.9	340.2		697.1	
TOTAL TRANSMISSION AND RURAL OPERATIONS	10,866.0	44,520.8	21,016.2	76,403.0	

PROJECT DESCRIPTION	Expended to 2014	2015	Future Years	Total	Page Ref
		($000)			
GENERAL PROPERTIES					
Replace Vehicles and Aerial Devices - Various Sites (2014-2015)	1,809.1	1,091.0		2,900.1	
Replace Vehicles and Aerial Devices - Various Sites (2015-2016)		2,377.1	225.3	2,602.4	C - 67
Upgrade Microsoft Office Products - Hydro Place	711.6	297.7		1,009.3	
Replace Roof - Hydro Place		671.9		671.9	C - 69
Replace Battery Banks and Chargers - Various Sites	267.0	398.0		665.0	
Replace Personal Computers - Various Sites		573.3		573.3	C - 71
TOTAL GENERAL PROPERTIES	2,787.7	5,409.0	225.3	8,422.0	
TOTAL PROJECTS $500,000 AND OVER	14,005.7	62,747.0	25,842.9	102,595.6	

[1] Project is over $500,000 before cost recoveries. Shown net of cost recoveries in this schedule.

Project Title: Upgrade Gas Turbine Plant Life Extension

Location: Stephenville

Category: Generation - Gas Turbines

Definition: Other

Classification: Normal

Project Description:

This project is to refurbish equipment and systems at the Stephenville Gas Turbine Plant (Stephenville). It is the second and third years of a three year program to complete upgrades at Stephenville. A project proposal was approved by Order No. P.U. 42(2014) for the first year (2014) of the three-year upgrade program for $2,995,000.

The scope of work for the upgrade program was developed giving consideration to two sources of information as follows.

- A report prepared in 2007 by engineering firm, Stantec Inc. (Stantec), titled *Condition Assessment and Life Cycle Cost Analysis – Hardwoods and Stephenville Gas Turbine Facilities*.

- Stephenville's operating history and equipment failures since 2007 and Hydro's experience gained from a similar upgrade program that took place at Hardwoods Gas Turbine Plant (Hardwoods) between 2009 and 2013.

The budget estimate for this project is shown in Table 1 below.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	605.7	40.0	0.0	645.7
Labour	295.0	408.8	0.0	703.8
Consultant	264.2	0.0	0.0	264.2
Contract Work	944.4	1,339.5	0.0	2,283.9
Other Direct Costs	9.0	21.6	0.0	30.6
Interest and Escalation	113.3	353.5	0.0	466.8
Contingency	423.6	362.0	0.0	785.6
TOTAL	**2,655.2**	**2,525.4**	**0.0**	**5,180.6**

Operating Experience:

The Stephenville gas turbine has been in service for over 39 years providing synchronous condensing and generation capability in supporting the Island Interconnected System. Major component deterioration and failures in recent years has led to disruption in service, most notably the alternator failure in December 2011. The unit was released for service in June 2013. This forced outage affected both synchronous condensing and generation capability, negatively affecting the reliability performance of the gas turbine.

Project Justification:

The gas turbine plant at Stephenville is over 39 years old and has reached the end of its service life as a reliable facility. In recent years it has experienced sudden failures to major pieces of equipment and one failure resulted in a long forced outage. The condition assessment and life cycle cost analysis study on Stephenville completed by engineering firm, Stantec in 2007, provided recommendations to extend the life of the plant as a reliable facility for at least another 15 years. It is important that this upgrade program take place in order for the unit to continue to support the voltage on the Island Interconnected System and to reliably provide peak and emergency power generation when required.

Attachments:

See report entitled “Upgrade Gas Turbine Plant Life Extension ” located in Volume I, Tab 1, for further project details.

Project Title: Replace Interior Coating on Surge Tank 3

Location: Bay d'Espoir

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

This project includes the cleaning of the tank and riser, repair of welds and application of new coating for the Surge Tank 3 interior. The interior coating on the riser is in a deteriorated condition as a result of corrosion. The interior coating of the surge tank has failed, resulting in the metal being exposed and corroded. To ensure the integrity of the tank and riser, this project includes cleaning of the tank and riser, welding repairs and recoating of the tank and the riser with a suitable epoxy or moisture cure product.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	146.7	0.0	0.0	146.7
Consultant	0.0	0.0	0.0	0.0
Contract Work	1,096.0	0.0	0.0	1,096.0
Other Direct Costs	24.7	0.0	0.0	24.7
Interest and Escalation	108.4	0.0	0.0	108.4
Contingency	253.5	0.0	0.0	253.5
TOTAL	**1,629.3**	**0.0**	**0.0**	**1,629.3**

Operating Experience:

The overall height of the surge tank is 112 meters and it was installed in 1970 during Stage II construction of the Bay d'Espoir Hydroelectric Generating Station powerhouse. The surge tank is an integral part of the hydraulic system of the plant with their primary use being for water pressure protection of the penstock. During a sudden change in water pressure in the penstock, the water in the surge tank rises quickly to release the water pressure in the penstock line and prevent water hammer damage to the penstock. As a result of this function, the interior surface of the surge tank is subject to frequently changing wet and dry conditions which causes corrosion. A corrosion protection system (Cathodic Protection system) is located within the tank. The system is not functioning properly and as a result, the interior of the tank is corroding. Outages to Bay d'Espoir Units 5 and 6 are required to

complete work on the tank and riser interior.

Project Justification:

This project is justified on the requirement to replace failing or deteriorated infrastructure in order for Hydro to provide safe and reliable operation of Surge Tank 3 and generating Units 5 and 6 at the Bay d'Espoir Hydroelectric Generating Station.

A condition assessment of the tank and riser interior was completed by an engineering consultant in 2012. The consultant identified significant deterioration of the surge tank and recommended welding repairs, corrosion removal and recoating of the interior of the surge tank and riser.

Corrosion in the surge tank and/or riser section can ultimately result in leaks, and if sever enough, structural failure of the metal. A significant leak in this structure would require immediate repair from the inside, requiring the tank to be fully drained and resulting in an unscheduled outage which, depending on the magnitude of the problem, could be four to eight weeks in duration. Removing the corrosion, completing welding repairs and recoating the tank and riser will extend the life and reliability of the structure. As this surge tank is located on the penstock supplying water to generating Units 5 and 6, a failure of the tank and the resulting outage would affect both Units 5 and 6 with a combined maximum generation capacity of 150 MW.

The coating system is 15 years beyond the manufacturer's recommended useful life and given the degradation of the structure, this work is high priority and needs to be completed in the next construction season.

Future Plans:

Surge tanks 1 and 2 are planned for condition assessments in 2014 and 2015 with refurbishment in 2016 and 2017 respectively.

Attachments:

See report entitled "Replace Interior Coating on Surge Tank 3" located in Volume 1, Tab 2 for further project details.

Project Title: Overhaul Turbine Valves Unit 1

Location: Holyrood

Category: Generation - Thermal

Definition: Other

Classification: Normal

Project Description:

This project is required to perform a scheduled major overhaul of Unit 1 Turbine valves located at the Holyrood Thermal Generating Station.

This major overhaul consists of:

- Total dismantling of all turbine valves;
- Inspection of the valves;
- Blue checks;
- Lapping of the valve seats;
- Adjustment of valve clearances;
- Repairs/replacements as required; and
- Re-assembly of all turbine valves.

The steam seal regulator will be removed and overhauled as well.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	130.0	0.0	0.0	130.0
Labour	75.0	0.0	0.0	75.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	1,075.0	0.0	0.0	1,075.0
Other Direct Costs	0.0	0.0	0.0	0.0
Interest and Escalation	41.5	0.0	0.0	41.5
Contingency	256.0	0.0	0.0	256.0
TOTAL	**1,577.5**	**0.0**	**0.0**	**1,577.5**

Operating Experience:

The Unit 1 operating hours up to March 2014 is 185,244. Assuming the generator operates for approximately 5,000 hours per year until 2015, it is expected to attain approximately 190,000 hours

before the next valve overhaul in 2015. Unit 1 has undergone scheduled valve overhauls on a three year basis from 1970 to 2012.

Project Justification:

The valves of a turbine control the steam flow to the steam turbine generator and hence the electricity production. An improperly functioning valve can cause an over speed of the turbine and result in damage to the steam turbine, and potentially to other property and result in potentially life threatening staff injuries. It is important for continued operation as well as safety to maintain the valves in proper condition. Hence, the turbine valves need to be overhauled and the three year frequency is supported by industry practice as well as consultants and original equipment manufacturers.

Future Plans:

A Turbine valve overhaul for Unit 2 is scheduled to be completed in 2017.

Attachments:

See report entitled “Overhaul Turbine Valves - Unit 1” located in Volume I, Tab 3, for further project details.

Project Title: Rehabilitate Salmon River Spillway

Location: Bay d'Espoir

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

This project is the first two years of an estimated five year program to rehabilitate the Salmon River Spillway Structure. Equipment at the spillway is at or near the end of its useful life or is in a deteriorated condition. After this rehabilitation program is completed, the Salmon River Spillway will be in a condition to operate safely and reliably for another 25 years. This project involves condition assessment, replacement, refurbishment and upgrade of various components at Salmon River Spillway.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	120.0	44.0	0.0	164.0
Labour	263.0	76.1	0.0	339.1
Consultant	36.0	0.0	0.0	36.0
Contract Work	229.2	130.0	0.0	359.2
Other Direct Costs	55.8	39.0	0.0	94.8
Interest and Escalation	41.6	69.1	0.0	110.7
Contingency	0.0	198.6	0.0	198.6
TOTAL	**745.6**	**556.8**	**0.0**	**1,302.4**

Operating Experience:

Although one or more of these gates have only been used for spilling five times in the last thirty years, they have always operated successfully when required. There have been problems with water in the oil in each of the six gear boxes for the gate screws and the stop log tandem hoist is presently out of service due to the deterioration of the bus bars, power supply and tandem hoists. The heating system for spillway gate 2, which is the only heated gate out of three gates, has been out of service for approximately 15 years. An upweller system which circulates water in front of the gate has been used upstream of each gate to keep ice off the face of each gate but ice can still collect on the gate rollers where the gate is presently not being heated. Two of the six gain heaters are also presently out of service and require replacement.

Project Justification:

This work is required to ensure the continued safe and reliable operation of the Salmon River Spillway. This project is justified on the requirement to rehabilitate failing or deteriorated infrastructure in order for Hydro to provide safe, reliable flood management control for the Bay d'Espoir Reservoir system. A condition assessment study performed by a professional engineering firm, Hatch, in 2008 identified Salmon River Spillway as having significant deficiencies that need to be addressed. Hydro's ability to continue to manage flood waters is contingent upon the successful rehabilitation of Salmon River Spillway. When the estimated five year rehabilitation program for Salmon River Spillway is complete, this hydraulic structure will be in a condition to operate safely and reliably for at least another 25 years.

Critical component failure in a major piece of drive equipment at Salmon River Spillway would result in the inability to open or close a gate. If the reservoir water elevations are rising and a gate is unable to be opened it will diminish spill capacity and increase the potential of overtopping and breaching of a dam. However if reservoir elevations are decreasing and a spillway gate is stuck in the open position it results in a potential spill of up to 660 cubic meters of water per second at maximum flood level. Spilled water is lost and cannot be used for power generation anywhere on the system.

Seized gate rollers can overload the gate hoists resulting in damage to hoist equipment or tripping of the gate overloads. Worn embedded parts and gate seals can cause leakage, unnecessary spillage, and excessive icing of the gates and gains. Failure of limit and load safety devices can result in major equipment damages as well as unsafe working conditions. To ensure reliable operation of the gates at all times all electrical and mechanical components and systems must be safe, reliable and in good condition.

Reliability and safe operation of the stop log monorail tandem hoists is also critical in order to perform annual preventative and corrective maintenance on each gate.

Future Plans:

Further refurbishment for the Salmon River Spillway will be proposed in future capital budget applications.

Attachments:

See report entitled "Rehabilitate Salmon River Spillway" located in Volume I, Tab 4, for further project details.

Project Title: Upgrade Powerhouse Roofing

Location: Holyrood

Category: Generation - Thermal

Definition: Other

Classification: Normal

Project Description:

This project comprises the first year of a three year program for the completion of roof upgrades at the Holyrood Thermal Generating Station (Holyrood). Upgrades consist of the replacement of all Holyrood Powerhouse roofing areas deemed to have a remaining service life of less than five years. The scope of the project includes the replacement of deteriorated wood blocking, reinforcement of all perimeters, projections, and roof/wall junctions, supply and installation of new projection sleeves and insert drains, supply and installation of new vapour barrier and composite insulation, the supply and installation of a new cold-applied roofing system and the installation of new flashing.

The budget estimate for this project is provided in Table 1.

Table 1: Project Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	106.2	0.0	0.0	106.2
Consultant	14.4	0.0	0.0	14.4
Contract Work	702.1	0.0	0.0	702.1
Other Direct Costs	8.7	0.0	0.0	8.7
Interest and Escalation	50.3	0.0	0.0	50.3
Contingency	166.2	0.0	0.0	166.2
TOTAL	**1,047.8**	**0.0**	**0.0**	**1,047.8**

Operating Experience:

The Holyrood Thermal Generating Station is one of the primary contributors to the generation supply on the Island Interconnected System. These generation units, housed within the powerhouse, will be required to continue generating electricity until the 2020/2021 time frame. Beyond 2020/2021, the powerhouse will remain in operation as a synchronous condenser facility until the year 2041.

The majority of the powerhouse roofing areas are at the end of their service life and have started to show signs of deterioration, typical of their age and exposure.

Project Justification:

The Holyrood powerhouse contains the three oil-fired generating units and their associated controls equipment. This equipment is vital to the generation supply on the Island Interconnected System and the continued performance of the powerhouse roof is essential to ensure that the equipment is protected from the elements, thus, enabling it to be operated in a safe and reliable manner.

A Level 2 condition assessment completed by AMEC in 2013 found that the majority of the powerhouse's 23 roofing areas are nearing the end of their service life and replacement is recommended within the next five years. Given the roofing systems' age and noted condition, the occurrence of leaks is imminent. If left unaddressed, the roof will form leaks which may impact the use of the building, result in deterioration and mould growth, or damage sensitive equipment. A proactive approach is required to ensure that the roof replacement can be completed prior to the failure of the roofing membrane system.

Future Plans:

Additional roof upgrade projects will be proposed in future capital budget applications as part of a three year roof replacement program.

Attachments:

See report entitled "Upgrade Powerhouse Roofing" located in Volume I, Tab 5, for further project details.

Project Title: Replace Station Service Breakers

Location: Cat Arm

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

The scope of work for this project is to replace each of the 600 volt, 1600 amp station service breakers with new low voltage power circuit breakers. The new breakers will be installed within the existing enclosures (the station service switchboard and the standby diesel generator control panel). New protective relays and current transformers will also be installed.

The scope also includes the replacement of the existing station service programmable logic controllers (PLC). Wiring adapters will be used to limit the amount of wiring changes.

The project will address the obsolescence of the PLC and station breakers and will provide a modern and reliable source of electrical power for the essential systems within the Cat Arm facility.

The budget estimate for this project is shown in Table 1.

Table 1: Budget estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	46.7	13.0	0.0	59.7
Labour	248.2	122.6	0.0	370.8
Consultant	0.0	0.0	0.0	0.0
Contract Work	300.0	0.0	0.0	300.0
Other Direct Costs	13.6	6.0	0.0	19.6
Interest and Escalation	36.5	71.8	0.0	108.3
Contingency	0.0	150.0	0.0	150.0
TOTAL	**644.9**	**363.4**	**0.0**	**1,008.3**

Operating Experience:

The existing station service breakers are part of the original equipment installed prior to the initial operation of the Cat Arm plant in 1985. The station service PLC was installed in 1986. These components have been in continuous service since that time. There have been no major upgrades since their installation.

Project Justification:

There have been instances of operational failures and issues over the last five years as demonstrated below.

- In January 2013, the Cat Arm plant was left without station service power due to a failure of the station service to transfer to the emergency diesel supply. The diesel unit breaker (52SSD) failed to close after tripping;
- In January 2013, the breaker NESB3 failed to stay closed upon issue of a close command;
- In December 2012, the open/close indication on breaker 52SSL was incorrect; and
- Some breakers would not operate by remote and had to be manually closed by an operator.

Investigations have attributed most failures to internal mechanical linkage problems within the breakers. The breakers have been serviced but this has not been able to address the issues. Additionally, parts for the breakers are no longer available.

Future Plans:

None.

Attachments:

See report entitled “Replace Station Service Breakers” located in Volume I, Tab 6, for further project details.

Project Title: Refurbish Access Road

Location: Cat Arm

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

The 127 MW Cat Arm Hydroelectric Generating Station, situated on the east side of the Great Northern Peninsula, was completed in 1984. Access to the plant is via a 24 km long gravel road off route 420 near Jackson's Arm.

The project consists of replacing culverts at various locations, processing, supplying, placing and compacting 100 mm of Class 'A' road topping over the entire surface of the 24 km long access road. Permitting will be required for culvert placement, borrow pits and quarries. The work will be performed under contract with inspection by Hydro personnel.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	99.0	0.0	0.0	99.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	720.0	0.0	0.0	720.0
Other Direct Costs	31.5	0.0	0.0	31.5
Interest and Escalation	54.4	0.0	0.0	54.4
Contingency	85.1	0.0	0.0	85.1
TOTAL	**990.0**	**0.0**	**0.0**	**990.0**

Operating Experience:

The Cat Arm access road was constructed in 1982/83 and is approximately 24 km long and 6 m wide. Maintenance work such as cleaning out culverts, removing roadside blockages, cleaning and redefining ditches, repairing guide rails, erosion repairs and grading the road surface is performed regularly. The road is normally graded twice per year but no road topping has been placed on the road since original construction.

Project Justification:

The Cat Arm Hydroelectric Generating Station access road is the only access available to the powerhouse. The road is used on a daily basis by Hydro's operating staff and at regular intervals by maintenance personnel as well as the general public. Vehicles transporting personnel and maintenance material must travel this access road. The road is essential for operation and maintenance of the plant. The road must be kept in a safe and passable condition to ensure both employee and public safety. After 30 years of continuous use and regular maintenance, the road now requires upgrading to extend its service life and to provide safe and reliable access to the Cat Arm Hydroelectric Generating Station.

Many of the culverts have deteriorated since they were first installed. Repairs such as cutting off the ends due to unravelling and flattening have been carried out over the last number of years. The culverts also contain large amounts of sediment which restrict management of water run off from rain and snow melt and could lead to road wash outs. By 2015 the culverts will be more than 30 years old and need to be replaced.

Except for what is required for minor erosion repair, no significant amounts of road topping have been placed on this road since it was constructed. The road has been maintained and graded regularly. Much of the original topping has now eroded from continued use leaving the road in need of rehabilitation in order to avoid accelerated degradation. These problems are more pronounced in certain areas but are evident throughout the entire access road.

A permanent safe access road is required for the long term reliable operation of the Cat Arm Hydroelectric Generating Station.

Future Plans:

Additional access road upgrades will be proposed in future capital budget applications.

Attachments:

See report entitled "Upgrade Access Road" located in Volume II, Tab 7, for further project details.

Project Title: Replace ABB Exciter Unit 2

Location: Cat Arm

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

The scope of this project is to replace the existing BBC Type A 16030 exciter on Unit 2 at the Cat Arm Generating Station with a modern exciter, fully supported by the manufacturer. A Human Machine Interface (HMI) will be installed in the control room for the operator's use. New control cables from existing circuits and a communication cable from the exciter to the HMI will be installed.
The exciter will be purchased and installed in 2015.

The budget estimate for this project is provided in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	5.0	0.0	0.0	5.0
Labour	274.4	0.0	0.0	274.4
Consultant	0.0	0.0	0.0	0.0
Contract Work	344.4	0.0	0.0	344.4
Other Direct Costs	43.3	0.0	0.0	43.3
Interest and Escalation	45.4	0.0	0.0	45.4
Contingency	133.4	0.0	0.0	133.4
TOTAL	**845.9**	**0.0**	**0.0**	**845.9**

Operating Experience:

The exciter has been in service since February, 1985 and it has operated well. It has experienced from 6757 to 8469 annual operating hours from 2008 to 2013.

Project Justification:

The BBC Type A 16030 exciter is in the Obsolete Phase of its Life Cycle Management Plan. In this phase the supplier is not able to provide spare parts or technical support. A condition assessment was completed by Kestrel Power Engineering and the report recommended replacement of the exciter in 2015.

Future Plans:

None.

Attachments:

See report entitled “Replace ABB Exciter Unit 2” located in Volume II, Tab 8, for further project details.

Project Title: Upgrade Generator Bearings Units 1 and 3

Location: Bay d'Espoir

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

Hydro is seeking approval for this two year project starting in 2015 for the upgrades of the generator bearings on Units 1 and 3 at Bay d'Espoir. It is the third project in a multi-year program to perform guide bearing and sealing upgrades to generating Units 1 to 6 at Bay d'Espoir. The program began in 2013 with approval under Board Order No. P.U. 4(2013) to perform the upgrades to Unit 4 followed by the approval of Unit 2 in 2014, and is proposed to continue until 2019 when all six units are planned to be upgraded. Upgrades to the guide bearings and maintenance access hatches will eliminate oil loss from the generator bearing housing caused by emissions of vaporized oil and leaks from seals, gaskets and fittings.

The budget estimate for this project is provided in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	10.0	0.0	10.0
Labour	12.0	260.2	0.0	272.2
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	185.0	0.0	185.0
Other Direct Costs	1.9	27.5	0.0	29.4
Interest and Escalation	0.8	51.3	0.0	52.1
Contingency	0.0	99.3	0.0	99.3
TOTAL	**14.7**	**633.3**	**0.0**	**648.0**

Operating Experience:

Generating Units 1 to 6 at Bay d'Espoir have generator guide bearings that leak oil and contaminate each unit which creates a reliability concern, an open fuel supply in the event of a fire, safety and environmental hazards. Periodic cleaning of components, walls and walking surfaces take place, primarily during the annual unit maintenance shut-down period. Cleaning of the rotor and stator is normally done during major generator overhauls which take place approximately every six years. Alarms due to low bearing oil levels are also occasionally experienced which can require unplanned maintenance outages to correct. When significant leaks of one liter or more per day occur, the units are normally removed from service when loading permits. Repairs are normally completed during planned

or unplanned maintenance outages. Many of the significant leaks occur around the joints between the bearing housing and the maintenance hatch seals. The oil vapors are usually emitted through the clearances between the top of the generator bearing housing and the generator shaft.

Project Justification:

Generating Units 1 to 6 at Bay d'Espoir were commissioned from 1967 to 1970 and due to the bearing design have always had oil emission problems arising from vaporized lubricating oil escaping from the guide bearing seals and between the maintenance access hatches. Shortly after commissioning, modifications to the bearing housings were undertaken to help contain and collect oil emissions resulting from the vaporization of oil. These modifications were only partially successful and did not eliminate the problem. Hydro has also tested alternative O-rings and seals on the existing design without success. Leaks through the maintenance hatch seals are a recurring problem and cannot be corrected without modifying the original design of the hatches. These oil emissions and leaks contaminate the entire unit and of particular concern is the generator's rotor and stator. Contamination has an accelerated deterioration effect on these major electrical components and has the potential of contributing to a major fault. It also creates safety, fire, and environmental hazards which result in the need for frequent unit cleaning. An inspection of Unit 2 in May 2012, by Voith Hydro found the unit heavily contaminated with a mixture of oil and carbon dust. Voith Hydro, who rewound the stator in June/July 2010, stated in its inspection report that the bottom of the unit looks like it has been in service for ten years rather than just two years. This buildup of oil and carbon dust also clogs the ventilation ducts of the stator core over time, increasing the temperature rise in the stator and could reduce its operational life if allowed to persist.

A major stator failure with significant damage to the windings could put a unit out of service for one to two months or up to a year if the number of windings damaged is significant (greater than 10%).

Future Plans:

Additional projects to complete the bearing modifications on Units 5 and 6 will be proposed in future capital budget applications.

Attachments:

See report entitled "Upgrade Generator Bearings Units 1 and 3" located in Volume II, Tab 9, for further project details.

Project Title: Automate Generator Deluge Systems

Location: Bay d'Espoir

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

As part of the 2014 Capital Budget Application, a project entitled Automate Generator Deluge Systems Units 3 and 6 was approved by Order No. P.U. 42 (2013). However, due to unforeseen changes in generating outage schedules, Hydro is unable to perform that work on Units 3 and 6 and the planned installations will be completed in 2014 on Units 1 and 2 instead.

The scope of work for this project is to install automatic deluge systems to enhance fire protection on the generators of Units 3, 5 and 6 in 2015 at Bay d'Espoir. It will replace the existing manually operated generator deluge systems with a modern fully automatic system. A new control cabinet will be installed along with a new deluge valve and the existing sprinkler distribution ring will be reused. The distribution ring is a system of pipes that surround the generator and deliver water to spray nozzles in the event of a fire. When the system is activated water flows immediately through all nozzles at once. An outage on each generating unit will be required to complete the new installations. The outages will take place during the annual maintenance period and will be two to three weeks in duration.

The budget estimate for this project is shown in Table 1.

Table 1: Project Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	4.5	0.0	0.0	4.5
Labour	97.1	0.0	0.0	97.1
Consultant	0.0	0.0	0.0	0.0
Contract Work	398.0	0.0	0.0	398.0
Other Direct Costs	10.1	0.0	0.0	10.1
Interest and Escalation	33.5	0.0	0.0	33.5
Contingency	101.9	0.0	0.0	101.9
TOTAL	**645.2**	**0.0**	**0.0**	**645.2**

Operating Experience:

The current generator fire protection system in Bay d'Espoir is a manual system that remains in a stand-by state until it can be activated by operations personnel. The system is tested every year to ensure

there is water flow to the deluge valve. However, since it is not practical to wet the generator windings with water, the actual spray rings inside the generating unit are not flow tested. Applying water to a generator in a non-fire condition is not practical because it can cause damage to the unit.
In the time taken for an operator to respond to a fire alarm on a generating unit a potentially small fire could turn into something much larger thus leading to more equipment damage and increased replacement costs. An automatic system is more effective because there is no delay in responding to an alarm thereby ensuring a greater potential for extinguishing a fire before major equipment damage occurs. This project was identified by FM Global in 2007 and Hydro believes the risk from a fire should be mitigated.

Project Justification:

This project is justified on the need for Hydro to upgrade the existing equipment to reduce exposure to harm by operations personnel and reduce the potential for damage to equipment in the event of a fire on a generator.

The FM Global Risk Report for Bay d'Espoir indicates the hazard associated with a manual system is the ability of a generator fire to spread rapidly during the time it takes an operator to respond to the initial alarm. A longer response time to a fire could result in more extensive damage to the equipment and increased cost of repairs. A large fire could also prevent access to the manual valves altogether leading to greater damage with potential loss of 450 MW of generating capacity to the Island Interconnected System for a period of time ranging in duration from several months to over a year.

Hydro has not experienced a fire on any of its seven generating units at Bay d'Espoir. However, the existing manual system poses a significant risk if there is a fire. It is required that the deluge systems for each generating unit be upgraded to a fully automatic system to limit employee exposure to harm and reduce potential equipment damage in the event of a fire.

Future Plans:

None.

Attachments:

See report entitled "Automate Generator Deluge Systems" located in Volume II, Tab 10, for further project details.

Project Title: Replace Pump House and Associated Equipment

Location: Bay d'Espoir

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

Hydro is seeking approval for this two year project starting in 2015 for the replacement of the pump house which supplies domestic and fire water for the site facilities at Bay d'Espoir. Work will include engineering design of a new pump house and water supply system that will tie into the existing piping system. The new pump house will be constructed with a concrete sump and foundation. The water supply system will be equipped with two pumps, a filtration and a chlorination system. In addition, each of the site facilities will be equipped with ultraviolet water sterilizers to ensure sterilization of the potable water.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	103.0	0.0	103.0
Labour	12.9	186.1	0.0	199.0
Consultant	6.0	30.0	0.0	36.0
Contract Work	0.0	60.0	0.0	60.0
Other Direct Costs	2.8	19.6	0.0	22.4
Interest and Escalation	1.0	39.7	0.0	40.7
Contingency	0.0	84.1	0.0	84.1
TOTAL	**22.7**	**522.5**	**0.0**	**545.2**

Operating Experience:

Where the distribution system was originally designed for a large construction camp, the distribution system is now oversized which often leads to insufficient chlorine residuals for the potable water when tested at each facility. There have also been a number of occasions when the water pressure is low due to line breaks and pump failures. The lagoon, which is fed from Bear Brook, has been enlarged and dredged over the years to ensure a sufficient water supply to the pump house especially during low runoff periods.

Project Justification:

The pump house which supplies potable and fire water to the site facilities in Bay d'Espoir is approximately 50 years old and is in a deteriorated condition. A condition assessment by Meridian Engineering in 2013 has recommended replacement. The wooden structure with rock filled gabions for a partial foundation and culverts for the pump wells have all exceeded their service lives. As noted in the Meridian Engineering report, many of the wooden materials are rotted. The roof and floor require replacement. The piping is also in need of replacement. The rock filled gabions supporting the lagoon side of the building are bulging and falling apart.

Due to the size of the system and low usage, the required chlorine residuals at each facility are normally too low for the supply of safe potable water. To address this individual ultraviolet sterilizers are required in each of the facilities to sterilize the potable water.

Future Plans:

None.

Attachments:

See report entitled "Replace Pump House and Associated Equipment" located in Volume II, Tab 11, for further project details.

Project Title: Purchase Spare Transformer

Location: Paradise River

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

The purchase of a 6/8/10 MVA, 25 kV Wye grounded to 4.16 kV delta transformer will provide a spare unit to the existing transformer installed at the Paradise River Hydroelectric Generating Station. The spare unit would be stored at the Bishop Falls Warehouse on a new concrete pad. Upon arrival of the transformer to the Bishop Falls Warehouse, the transformer will be dressed, filled with oil, appropriately tested and set up for long term storage.

The budget estimate for this project is shown below in Table 1.

Table 1: Project Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	83.7	199.5	0.0	283.2
Labour	42.2	26.6	0.0	68.8
Consultant	0.0	7.2	0.0	7.2
Contract Work	0.0	19.0	0.0	19.0
Other Direct Costs	0.0	13.1	0.0	13.1
Interest and Escalation	8.9	30.1	0.0	39.0
Contingency	25.2	53.1	0.0	78.3
TOTAL	**160.0**	**348.5**	**0.0**	**508.5**

Operating Experience:

When a transformer ages it typically involves the degradation of its insulation system. This aging process reduces both the mechanical and dielectric strength of the transformer and in turn, its reliability. For comparison, if the same electrical fault was placed on both an aged transformer and a new transformer, the impact of these electrical forces would create a situation where the survival of the older transformer is reduced, in relation to the newer unit. From recent furans analysis, it is found that for this T1 transformer, 2FAL value has reached 205 which is high enough to raise concern about possible paper deterioration. Estimated degree of polymerization (DP) is 628. A new transformer would have a DP value of around 1000 and would reach its end of life at around a DP of 200. The Paradise River T1 transformer has a DP of 628 meaning it is 46% of the way to end of life.

Project Justification:

This project is justified on the requirements to maintain reliable generation supply by having a spare 6/8/10 MVA 25 kV – 4.16 kV transformer in the event there is a failure of the existing transformer at the Paradise River Hydroelectric Generating Station. Failure to have a spare transformer available would extend the loss of supply period for Paradise River's Hydroelectric Generating Station from two months to fourteen months in the event of a transformer failure. Lead times for small power transformers can range between twelve and sixteen months.

Hydro's condition assessment tool (which evaluates oil quality parameters such as acidity, interfacial tension, power factor, and criticality) provides a ranking of all transformer units. From this table it can be seen that the Paradise River transformer T1 shows signs of deterioration and is being monitored closely.

The system planning criteria for single transformer stations is to have a back-up plan in place which utilizes NLH's and/or Newfoundland Power's mobile equipment to restore service. Given there is currently no mobile or spare transformers available to replace the Paradise River T1 transformer, there is risk that if the T1 transformer were to fail, there would be an extended outage to the Paradise River Hydroelectric Generating Station.

Future Plans:

This is a two year project due to the delivery time associated with the purchase of the transformer.

Attachments:

See report entitled "Purchase Spare Transformer" located in Volume II, Tab 12, for further project details.

Project Title: Upgrade Circuit Breakers

Location: Various Sites

Category: Transmission and Rural Operations - Terminal Stations

Definition: Pooled

Classification: Normal

Project Description:

This project is to refurbish air blast and SF_6 breakers, replace air blast circuit breakers on an accelerated schedule, and to replace oil circuit breakers throughout Hydro's Island Interconnected System. Hydro has many circuit breakers which have been in service for more than 30 years and are approaching the end of their service life. The refurbishment and replacement of all the circuit breakers are given a priority ranking; this priority is represented as a year for the refurbishment or replacement to be completed. These priorities are determined by the criteria or plan for each circuit breaker type.

The budget estimate for this project is shown in Table 1 below.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	1,577.5	1,222.5	0.0	2,800.0
Labour	1,638.8	1,557.1	0.0	3,195.9
Consultant	6.0	8.4	0.0	14.4
Contract Work	2,455.6	990.8	0.0	3,446.4
Other Direct Costs	148.0	169.7	0.0	317.7
Interest and Escalation	363.2	970.4	0.0	1,333.6
Contingency	0.0	1,954.9	0.0	1,954.9
TOTAL	**6,189.1**	**6,873.8**	**0.0**	**13,062.9**

Operating Experience:

The average age of the overall fleet of circuit breakers is well past a utility estimated circuit breaker's midlife of 20 years and is approaching the manufacturers' specified design end-of-life of 40 years. At present, approximately 60 circuit breakers have a service life greater than 40 years.

Hydro has experienced increased maintenance problems and the unavailability of circuit breakers which include:

- air blast circuit breakers with air leaks and sticking valves; and
- SF_6 circuit breakers with SF_6 gas leaks and problems with the operating mechanism.

These problems experienced by Hydro are common in the utility industry and owners of these circuit breakers have addressed such problems though similar upgrading programs.

In the past ten years there have been refurbishments completed on air blast circuit breakers and the operating mechanism associated with selected SF_6 circuit breakers. Up to the events of January 2014 refurbishments of air blast circuit breakers have proven to maintain the reliability of the equipment and extend the service life of the circuit breakers by 10 to 15 years.

There has been no major refurbishment work associated with oil circuit breakers. The plan is to replace all oil circuit breakers by 2025 to ensure Hydro is compliant with the latest PCB regulations.

Project Justification:

This project is justified on the requirement to replace failing or deteriorated circuit breakers in order for Hydro to provide safe, reliable electrical service, and to comply with PCB regulations.

To maintain the reliability of in-service circuit breakers, Hydro has implemented a plan to address the aging circuit breaker fleet. Hydro has developed a long term asset management plan for circuit breaker replacement and refurbishment.

Following the events of January 2014, Hydro has accelerated the replacement of air blast circuit breakers starting in 2015. The plan will see all the current in-service air blast circuit breakers replaced by 2020, all current in-service SF_6 circuit breakers overhauled at mid-life and replaced at or near age 40, and all oil circuit breakers replaced by 2025.

Future Plans:

Circuit breaker replacements will be proposed in future capital budget applications.

Attachments:

A report entitled “Upgrade Circuit Breakers” will be filed by the end of August 2014 (To be placed in Volume II, Tab 13).

Project Title: Upgrade Power Transformers

Location: Various Sites

Category: Transmission and Rural Operations - Terminal Stations

Definition: Other

Classification: Normal

Project Description:

This proposal is for the upgrading of power transformers which includes a refurbishment or a replacement based upon a number of condition assessment techniques and criteria. The replacement of a transformer is based on the degree of degradation of the cellulose insulation and the amount of dissolved gas present in the transformer oil. There are two transformers planned for replacement in 2016, Bay d'Espoir T7 and Cat Arm T1, with engineering design and procurement starting in 2015.

The budget estimate for this project is shown below in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	557.0	784.0	0.0	1,341.0
Labour	1,060.0	1,367.5	0.0	4,427.5
Consultant	14.4	35.8	0.0	50.2
Contract Work	1,676.9	2,927.8	0.0	4,604.7
Other Direct Costs	189.4	237.3	0.0	426.7
Interest and Escalation	243.3	579.5	0.0	822.8
Contingency	699.5	1,070.5	0.0	1,770.0
TOTAL	**4,440.4**	**7,002.3**	**0.0**	**11,442.7**

Operating Experience:

Approximately 67 percent of all Hydro's 230 kV, 138 kV and 66 kV power transformers are at an age of 30 years or greater. Recent experience has shown the need to upgrade the transformers as concerns with oil quality, tap changers, gasket systems, bushings, radiators and protective devices can lead to failure during operation.

Project Justification:

Power transformers are critical components of the transmission system. To maintain reliable operation of the transformer fleet Hydro uses condition assessment techniques to selectively target weak units or problem areas within a unit for upgrading. The recommended upgrades and replacements will serve to extend the service lives of the transformers and decrease the probability of an unplanned outage. The

targeted transformers are based on condition as per Hydro's evaluation program.

Future Plans:

Future power transformer upgrades will be proposed in future capital budget applications.

Attachments:

See report entitled "Upgrade Power Transformers" located in Volume II, Tab 14, for further project details.

Project Title: Provide Service Extensions

Location: All Service Areas

Category: Transmission and Rural Operations – Distribution

Definition: Pooled

Classification: Normal

Project Description:

This project is an annual allotment based on past expenditures to provide for service connections including street lights to new customers.

Table 1 identifies the total budget for the Central, Northern and Labrador operating regions

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	2,772.0	0.0	0.0	2,772.0
Labour	2,351.0	0.0	0.0	2,351.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	200.0	0.0	0.0	200.0
Other Direct Costs	160.0	0.0	0.0	160.0
Interest and Escalation	265.0	0.0	0.0	265.0
Contingency	542.0	0.0	0.0	542.0
Sub-Total	6,290.0	0.0	0.0	6,290.0
Cost Recoveries	(210.0)	0.0	0.0	(210.0)
TOTAL	**6,080.0**	**0.0**	**0.0**	**6,080.0**

Operating Experience:

An analysis of average historical expenditures on new customer connections by region was developed. All historical dollars were converted to 2013 dollars using the Statistics Canada Utility Distribution Line Construction index.

The five year actual expenditures for service extensions by region are shown in Table 2.

Table 2: Five Year Expenditures

Expenditures ($000)										
	2009		2010		2011		2012		2013	
Region	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Central	1,028	1,133	1,001	1,448	1,045	1,086	1,200	1,231	1,437	1,751
Northern	758	1,432	768	1,356	1,092	1,040	1,267	1,728	1,371	1,216
Labrador	653	1,446	659	2,051	1,248	2,665	1,705	3,073	2,196	2,722
Total	2,439	4,011	2,428	4,855	3,385	5,591	4,172	6,032	5,006	5,689

Project Justification:

In recent years, rural areas of the province have experienced increased expenditures for service extensions due to higher customer growth and economic activity. Because of this, for 2015, a two year historical average was used to determine the service extension budget for the Labrador region. These expenditures are forecast to decline across the next three to four years. A five year historical average was used for the Central and Northern regions. The 2015 budget was developed assuming distribution line costs escalation of approximately two percent over 2014. The budget by region is shown in Table 3 below.

Table 3: Budget for Distribution System

Region	2015 Budget ($000)
Central	1,600
Northern	1,460
Labrador	3,020
Total	**6,080**

Future Plans:

This is an annual allotment which is adjusted from year to year depending on historical expenditures. Please see the five-year capital plan (2015 Capital Plan Tab, Appendix A).

Project Title: Upgrade Distribution Systems

Location: All Service Areas

Category: Transmission and Rural Operations - Distribution

Definition: Pooled

Classification: Normal

Project Description:

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

The budget estimate for this project is shown in Table 1 below.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	1,817.0	0.0	0.0	1,817.0
Labour	1,052.0	0.0	0.0	1,052.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	132.0	0.0	0.0	132.0
Other Direct Costs	2.0	0.0	0.0	2.0
Interest and Escalation	145.0	0.0	0.0	145.0
Contingency	292.0	0.0	0.0	292.0
Sub-Total	3,440.0	0.0	0.0	3,440.0
Cost Recoveries	(100.0)	0.0	0.0	(100.0)
TOTAL	**3,340.0**	**0.0**	**0.0**	**3,340.0**

Operating Experience:

An analysis of average historical expenditures on distribution upgrades by region was performed. All historical dollars were converted to 2013 dollars using the Statistics Canada Utility Distribution Line Construction index.

The five-year expenditures for distribution upgrades by region are shown in Table 2.

Table 2: Five Year Expenditures

Expenditures ($000)										
	2009		2010		2011		2012		2013	
Region	**Budget**	**Actual**	**Budget**	**Actual**	**Budget**	**Actual**	**Budget**	**Actual**	**Budget**	**Actual**
Central	1,050	1,028	1,032	1,037	998	1,365	993	1,854	1,095	1,692
Northern	1,026	1,148	1,072	1,071	1,051	1,489	1,089	1,010	1,237	678
Labrador	450	484	468	191	450	548	426	270	458	604
Total	2,526	2,660	2,572	2,299	2,499	3,402	2,508	3,134	2,790	2,974

Other specifically approved projects for 2009 – 2013B are listed in Table 4.

Project Justification:

Based on the five-year average for distribution system upgrades for the period 2008 – 2012 the budget shown in Table 3 was developed for Northern and Labrador regions. The budget for the Central area was developed using a three year average. The 2015 budget was developed assuming distribution line cost escalation in 2015 of approximately two percent over 2014.

Table 3: Budget for Distribution System

Region	2015 Budget ($000)
Central	1,720
Northern	1,170
Labrador	450
Total	**3,340**

Future Plans:

This is an annual allotment which is adjusted from year to year depending on historical expenditures. See the five-year capital plan (2015 Capital Plan Tab, Appendix A).

Table 4 shows the history of other specific distribution system upgrades that have been completed over the past five years as well as the budget for 2014.

Table 4: Historical Information

Year	Project Description	Budget ($000)	Actuals ($000)
2014B	Upgrade Distribution Feeder - Line 1 Nain (Year 1 of 2)	43.0	
	Upgrade Distribution Feeder - Line 7 Happy Valley (Year 1 of 2)	64.3	
	Upgrade Distribution Feeder - Line 1 Daniel's Hr. (Year 1 of 2)	69.7	
	Upgrade Distribution Feeder - Line 1 and 2 Main Brook (Year 1 of 2)	64.3	
	Upgrade Distribution Feeder - Line 1 Plum Point (Year 1 of 2)	75.3	
	Upgrade Distribution Feeder - Line 1 Hampden (Year 1 of 2)	53.6	
	Upgrade Distribution Feeder - Line 1 McCallum	359.1	
	Upgrade Distribution Feeder - Line 1, 2, 4 and 5 Barachoix	583.7	
	Upgrade Distribution Feeder - Line 1 Bay d'Espoir	692.6	
	Upgrade Distribution Feeder - Line 1 Conne River	494.2	
	Upgrade Distribution Feeder - Line 1 St. Lewis (Year 2 of 2)	908.1	
	Upgrade Distribution Feeder - Line 1 and 3 Roddickton (Year 2 of 2)	1,259.5	
	Upgrade Distribution System - Charlottetown (Year 2 of 2)	365.0	
	Upgrade Distribution System - South Brook (Year 2 of 2)	975.8	
	Upgrade Distribution Feeder - Line 1 Grey River (Year 2 of 2)	487.1	
2013	Upgrade Distribution Feeder - Line 1 St. Lewis (Year 1 of 2)	76.9	23.3
	Upgrade Distribution Feeder - Line 1 and 3 Roddickton (Year 1 of 2)	98.4	106.5
	Upgrade Distribution System - Charlottetown (Year 1 of 2)	27.8	22.8
	Upgrade Distribution System - South Brook (Year 1 of 2)	76.3	108.5
	Upgrade Distribution Feeder - Line 1 Grey River (Year 1 of 2)	32.5	111.9
	Upgrade Distribution Feeder - Line 1 Cow Head	665.6	658.4
	Upgrade Distribution Feeder - Line 1 St. Brendan's	330.2	310.7
	Upgrade Distribution Feeder - Line 1 Holyrood	632.4	372.1
	Upgrade Distribution Feeder - Line 11 Wabush	400.8	513.2
	Upgrade Distribution Voltage - Line 6 St. Anthony	641.9	648.6
	Upgrade Distribution Feeder - Line 6 Farewell Head	961.9	980.0
	Upgrade Distribution Feeder - Line 5 Farewell Head	1,110.1	1,184.9
	Upgrade Distribution Feeder - Line 2 Plum Point (Year 2 of 2)	1,110.5	1,276.2
2012	Upgrade Distribution Feeder - Line 1 Bay d'Espoir	856.6	896.9
	Upgrade Distribution Feeder - Line 2 Bay d'Espoir	952.9	811.2
	Upgrade Distribution Feeder - Line 1 Francois	440.9	650.4
	Upgrade Distribution Feeder - Line 1 Parson's Pond	381.9	344.7
	Upgrade Distribution Feeder - Line 2 Plum Point (Year 1 of 2)	50.4	33.2
	Upgrade Distribution Feeder - Line 7 Happy Valley	1,260.1	1,163.6
	Upgrade Distribution Feeder - Line 2 Glenburnie (Year 3 of 4)	2,114.6	1,895.0
	Reconfigure Feeders – Wabush	55.4	55.4
	Upgrade Distribution Feeder - Line 1 Rigolet (Year 2 of 2)	725.7	658.5
	Upgrade Distribution Feeder - Line 1 Makkovik (Year 2 of 2) - (Materials ordered in 2011)	799.5	612.6

Year	Project Description	Budget ($000)	Actuals ($000)
2011	Replace Poles – Westport	256.4	279.3
	Replace Poles - Grandy Brook	286.4	312.4
	Replace Poles - Farewell Head	339.6	393.9
	Upgrade Distribution Feeder - Line 1 Rigolet (Year 1of 2)	72.0	10.5
	Upgrade Distribution Feeder - Line 1 Francois	440.9	116.0
	Upgrade Distribution Feeder - Line 8 Happy Valley	553.5	488.2
	Upgrade Distribution Feeder - Line 4 Roddickton (Year 2 of 2)	902.6	1,106.2
	Upgrade Distribution Feeder - Line 1 Makkovik (Year 2 of 2)	742.4	137.3
	Upgrade Distribution Feeder - Line 2 Glenburnie (Year 2 of 4)	578.2	527.8
2010	Replace Poles - English Harbour West	274.8	249.8
	Replace Poles - Line 1 Fleur De Lys	269.2	246.9
	Replace Poles – Barachoix	273.3	256.1
	Upgrade Distribution System - Line 1 Makkovik (Year 1 of 2)	57.1	25.1
	Upgrade Distribution System - Line 4 Roddickton (Year 1 of 2)	160.6	98.4
	Upgrade Distribution System - Line 2 Glenburnie (Year 1 of 4)	267.3	134.8
	Upgrade Distribution System - Line 4 Happy Valley	265.3	251.6
2009	Upgrade Distribution System - Line 7 St. Anthony	689.3	503.6
	Replace Insulators - Line 1 and Line 2 Jackson's Arm, Hampden	691.5	590.6
	Replace Insulators - Line 2 Little Bay Islands	182.7	120.8
	Replace Poles - Line 1 and Line 2 Jackson's Arm	433.7	416.1
	Replace Poles - Line 1 Hampden	263.1	243.6
	Upgrade Distribution Feeder - Line 36 Wabush	498.0	466.1

Project Title: Perform Wood Pole Line Management Program

Location: Various Sites

Category: Transmission and Rural Operations - Transmission

Definition: Pooled

Classification: Normal

Project Description:

The objective of this program is to maintain a comprehensive pole inspection and testing program using the conventional sound and bore methods supplemented by Non Destructive Evaluation (NDE), periodic full scale tests of poles removed from service, and remedial treatment application. Structural analysis to assess the line reliability, taking into account the system concept, is applied against all inspection information. Any replacement and/or refurbishment will be based on the assessment of quantitative risk with respect to in-service pole strength.

The budget estimate for the project is shown in Table 1 below.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	454.5	0.0	0.0	454.5
Labour	1,568.7	0.0	0.0	1,568.7
Consultant	100.0	0.0	0.0	100.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	76.0	0.0	0.0	76.0
Interest and Escalation	191.6	0.0	0.0	191.6
Contingency	439.8	0.0	0.0	439.8
TOTAL	**2,830.6**	**0.0**	**0.0**	**2,830.6**

Operating Experience:

Hydro operates approximately 2,400 kilometers of wood pole transmission lines, including approximately 26,000 poles. Hydro inspects 20 percent of a line each year using visual inspections and a rule-of-thumb approach to identify the health of a typical pole. Previous intensive inspections that targeted lines for specific issues on the Avalon Peninsula showed that decay and preservative retention were becoming an issue, showed extremely low preservative levels which are below minimum acceptable levels, and indicated that rot is becoming more prevalent in the 30-40 year old poles.

Project Justification:

Previous pole inspections indicate that almost half of the poles sampled did not meet the minimum

preservative retention levels and full scale pole tests of selected poles completed at Memorial University since 1999 indicate a 25 percent reduction of average pole strength over a 35 year period. When combined, these facts justify the strong need for a well managed wood pole inspection and treatment program that detects and corrects any dangerous poles in the system which will ensure safety as well as reliability.

Future Plans:

Future wood pole line management projects will be proposed in future capital budget applications.

Attachments:

See report entitled " Wood Pole Line Management" located in Volume II, Tab 15, for further project details.

Project Title: Upgrade Distribution Systems

Location: Various Sites

Category: Transmission and Rural Operations - Distribution

Definition: Other

Classification: Normal

Project Description:

Hydro provides service to residents in select rural communities within the province through the use of existing distribution systems. The distribution systems typically consist of a substation coupled with a wood pole distribution line that supplies power from the station to service drops throughout the community. This project proposal includes distribution lines located in the distribution systems of Bottom Waters, Farewell Head, Charlottetown, and Labrador City that have been identified as requiring upgrades to the existing infrastructure.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	190.0	165.0	0.0	355.0
Labour	267.5	100.0	0.0	367.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	478.0	350.0	0.0	820.0
Other Direct Costs	0.0	0.0	0.0	0.0
Interest and Escalation	72.0	72.8	0.0	155.0
Contingency	128.6	131.0	0.0	257.9
TOTAL	**1,136.1**	**818.8**	**0.0**	**1,954.9**

Operating Experience:

The distribution lines were originally constructed over 40 years ago. Most of the line components were installed at the time of original construction and have exceeded their expected service life. In addition, standardized condition inspection and testing procedures indicate line components are deteriorated and have remaining life spans of only one to five years.

Project Justification:

This project is justified based on the inspected condition of the equipment. The conditions of the components could result in system failures and have a negative effect on the safety and reliability performance of the line. The failure of a line may also result in unplanned power outages to customers

at a time when required repairs may be hampered by severe weather conditions.

Future Plans:

Future distribution line upgrades will be proposed in future capital budget applications.

Attachments:

See report entitled “Distribution Upgrades 2015” located in Volume II, Tab 16, for further project details.

Project Title: Inspect Fuel Storage Tanks

Location: Various Sites

Category: Transmission and Rural Operations - Generation

Definition: Pooled

Classification: Normal

Project Description:

The purpose of this project is to complete detailed inspections of the above ground fuel storage tanks and associated fuel supply systems. The inspections will serve to identify corrective and preventive maintenance items. Identifying and completing the necessary maintenance will maximize the service life, ensuring that these assets are in reliable operating condition. The scope of work involves the completion of the ten-year internal tank inspection as outlined in the American Petroleum Institute (API) Standard 653. The tanks to be inspected under this proposal include:

- One 2,273,000 Liter, vertical fuel storage tank, located at the Hardwoods Gas Turbine plant;
- One 90,800 Liter, vertical fuel storage tank, located at the McCallum diesel plant;
- Two 22,730 Liter, horizontal fuel storage tanks, located at the Port Hope Simpson diesel plant; and
- Two 22,730 Liter, horizontal fuel storage tanks, located at the L'Anse Au Loup diesel plant.

While the inspection findings are not yet known, anticipated refurbishment costs have been included for the Hardwoods and McCallum sites. As both locations have only a single tank, the tanks are critical to the operation of the respective facilities. Consequently, any required refurbishments must be completed immediately to ensure that the tanks can be recertified and returned to service, thus, enabling the facility to resume normal operation. Hydro will complete the minimum work necessary to enable the tank to be returned to service.

The budget estimate for this project is shown in Table 1.

Table 1: Project Budget Estimate

Project Cost: *($ x1,000)*	2015	2016	Beyond	Total
Material Supply	0.0	0.0	0.0	0.0
Labour	250.9	0.0	0.0	250.9
Consultant	0.0	0.0	0.0	0.0
Contract Work	1,093.8	0.0	0.0	1,093.8
Other Direct Costs	37.5	0.0	0.0	37.5
Interest and Escalation	102.5	0.0	0.0	102.5
Contingency	276.4	0.0	0.0	276.4
TOTAL	**1,761.1**	**0.0**	**0.0**	**1,761.1**

Operating Experience:

75% of Hydro's aboveground fuel storage tanks provide fuel storage for its isolated diesel generation plants. These tanks are critical to ensuring the continued supply of reliable power to the communities in which they are located. Fuel storage tanks containing diesel fuel are located in isolated communities from Nain, on the north coast of Labrador, to Ramea, located on the south coast of Newfoundland. Historically tank inspections have been performed but the frequency of inspection was not in accordance with the API 653 Standard.

Project Justification:

In the interest of maximizing the service life of its assets and adhering to Hydro's Environmental Policy and Guiding Principles, Hydro has completed routine inspections of its above ground fuel storage tanks in the past, however, these inspections were not conducted in a systematic fashion. In order to implement a standardized approach for the completion of all future tank inspections TRO has adopted the tank inspection procedures outlined by The American Petroleum Institute[1] (API).

The American Petroleum Institute (API) recommends that above ground fuel storage tanks undergo an internal inspection every ten years after its initial service date. The required inspection procedures are outlined in *API Standard 653, Tank Inspection, Repair, Alteration, and Reconstruction*, *section 6*. The majority of TRO's fuel storage tanks are due, or soon to be due, for inspection. This project will ensure that the tanks are inspected in accordance with the requirements identified in the API 653 standard.

Hydro must ensure that its fuel storage tanks are maintained in a safe, reliable operating condition. Tank inspections serve to identify maintenance and repair items, enabling the work to be completed in a timely fashion. This proactive maintenance approach will enable the tanks to continue to perform as designed, ensuring that they are structurally sound, suitable for operation, and not at risk of releasing

[1] The American Petroleum Institute has been the leader in developing equipment and operating standards for the oil and natural gas industry since 1924.

fuel into the environment.

Future Plans:

Future plans will see the continuation of the multi-year tank inspection program.

Attachments:

See report entitled “Inspect Fuel Storage tanks” located in Volume II, Tab 17, for further project details.

Project Title: Increase Fuel Storage

Location: Rigolet

Category: Transmission and Rural Operations - Generation

Definition: Other

Classification: Normal

Project Description:

This project will require one year to complete and will involve the replacement of two 90,000 litre fuel tanks (12A and 12B) with one new 400,000 litre tank. The new vertical fuel storage tank will reside inside the existing dyke and be constructed on site in accordance with the American Petroleum Institute (API) Standard 650: Welded Steel Tanks for Oil Storage. The tank will also be applied with a protective coating to resist corrosion and ensure a long service life. Modifications will be required to the existing fuel header system to accommodate the new tank. The modifications will include the installation of new piping, pipe supports and painting. Pressure testing of the new piping system will also be a requirement. Minor alterations will be required to the existing containment dyke to satisfy regulatory fuel containment capacity requirements.

The budget estimate for the total project is shown inTable 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	65.0	0.0	0.0	65.0
Labour	213.9	0.0	0.0	213.9
Consultant	100.0	0.0	0.0	100.0
Contract Work	865.0	0.0	0.0	865.0
Other Direct Costs	67.9	0.0	0.0	67.9
Interest and Escalation	92.6	0.0	0.0	92.6
Contingency	262.4	0.0	0.0	262.4
TOTAL	**1,666.8**	**0.0**	**0.0**	**1,666.8**

Operating Experience:

The increase in fuel storage at the Rigolet Diesel Generating Station is required by the fall of 2014 as it is projected that the existing fuel storage capacity cannot support the nine-month fuel requirement. The increase in forecasted load can mainly be attributed to the construction of a new community center in Rigolet

Each Labrador diesel plant must have sufficient fuel storage capacity to operate the plant for a minimum

of nine-months. This criterion ensures the plant will continue to support the load during the winter months when fuel delivery is not possible or impractical. However, this nine-month criterion is considered conservative for some diesel plants, which allows for some flexibility. Typically, from last fill up in early November to ice breaking up in mid-June, the winter season, in which Rigolet is inaccessible by ocean, lasts 7 - 7.5 months. However, occasionally the ice breaking up can be up to a month later.

As well, the fuel required can vary due to changing engine efficiencies. This change in plant efficiency could be the result of the most efficient diesel unit breaking down, an extra cold winter, or an unexpected load increase. Therefore, the nine-month criterion is used to account for the possibility of these variances. However, the installation of the temporary 90,800 litre self-dyking will meet the 8 and 9-month requirements and reduce any risk in the event that the winter of 2014/2015 is abnormally long and cold.

Project Justification:

This project is justified on the requirement to accommodate load growth in Rigolet. The existing fuel storage facility in Rigolet is not adequate to meet the growing load of the community. Hydro's latest Operating Load Forecast, shows energy consumption increasing by approximately 21 percent over the period of 2014 to 2020. Consequently, this will increase the requirement for fuel in Rigolet and therefore the need for more storage to ensure that fuel is available through the winter period when ocean access is blocked by ice.

Attachments:

See report entitled "Increase Fuel Storage" located in Volume II, Tab 18, for further project details.

Project Title: Replace Disconnect Switches

Location: Various Sites

Category: Transmission and Rural Operations - Terminal Stations

Definition: Pooled

Classification: Normal

Project Description:

This project is part of an ongoing program to replace aging 69 kV, 138 kV and 230 kV disconnect switches in Hydro's terminal stations on the Island Interconnected System. This project proposal is for the purchase and replacement of disconnect switches targeted for replacement in 2015 and for the purchase only of disconnects targeted for replacement in 2016. The schedule for this work will be planned over a two year period and will involve engineering and material procurement in the first year and construction and commissioning in the second year.

The budget estimate for this work is shown in the Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	201.0	122.0	0.0	323.0
Labour	554.4	156.7	0.0	711.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	7.0	1.4	0.0	8.4
Other Direct Costs	147.8	6.1	0.0	154.0
Interest and Escalation	53.5	117.4	0.0	170.9
Contingency	0.0	239.3	0.0	239.3
TOTAL	**963.7**	**642.9**	**0.0**	**1,606.6**

Operating Experience:

The disconnect switches included in the replacement plan no longer perform their intended function. Faulty or damaged disconnect switches may be tagged inoperative, which means the switch cannot be opened or closed. As a result, equipment cannot be isolated by the inoperative disconnect switch and adjacent disconnect switches must be operated in order to isolate the equipment. This decreases system reliability and performance since additional equipment and customers will be included in the outage/isolation for a longer duration of time. This scenario also increases the safety risk to personnel who have to execute a more complicated switching order, involving a remote disconnect switch not typically included in the isolation of the equipment.

Project Justification:

Disconnect switches are used to isolate equipment either for maintenance activities or system operation and control. Proper operation of these switches is essential for a safe work environment and for reliable and secure system operation. Faulty and/or malfunctioning disconnect switches that do not operate properly prevent reliable and secure system operation and create a safety hazard. The switches scheduled for replacement have problems such as inoperable mechanical linkages, misalignment of switch blades, broken insulators, and seizing of moving parts. Additionally, the switches have reached the end of their service life and replacement parts are not available.

Future Plans:

Future disconnect switch replacements will be proposed in future capital budget applications.

Attachments:

See report entitled "Replace Disconnect Switches" located in Volume II, Tab 19, for further project details.

Project Title: Replace Accommodations and Septic System

Location: Ebbegunbaeg

Category: Generation - Hydraulic

Definition: Other

Classification: Normal

Project Description:

This project comprises the replacement of the existing site accommodations and septic system, located at Hydro's Ebbegunbaeg control structure. The scope of work includes:

- The completion of rudimentary access road upgrades, as required, to permit the transport of construction materials to the work site;
- The supply and installation of a temporary bridge at Noel Paul's Brook to allow vehicle passage and the transport of material, to and from the site, for the duration of construction;
- The completion of required site preparation work and pressure treated timber cribbing installation;
- Supply and installation of a new six person, double module accommodations complex. The new accommodations will contain: six bedrooms, each with a dedicated washroom; a common washroom; a kitchen/dining area; laundry facilities; and a common/recreational area; and
- The installation of a new septic system.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	158.0	181.5	0.0	339.5
Labour	178.8	178.8	0.0	357.6
Consultant	7.2	0.0	0.0	7.2
Contract Work	100.0	310.0	0.0	410.0
Other Direct Costs	16.0	43.7	0.0	59.7
Interest and Escalation	29.4	112.6	0.0	142.0
Contingency	0.0	234.8	0.0	234.8
TOTAL	**489.4**	**1,061.4**	**0.0**	**1,550.8**

Operating Experience:

Hydro employees working at Ebbegunbaeg have typically stayed at the existing site accommodations facility until 2013, when the condition of the facility was deemed unsatisfactory, as a result of concerns regarding the deteriorating building structure and mould growth. Employees no longer stay at the

facility but rather are transported to and from the site via helicopter daily.

To ensure that the site maintenance requirements are met, work completed at Ebbegunbaeg currently must be planned and scheduled to take place during periods in which adverse weather condition do not impact the helicopter's ability to fly. This is not a long term option as operational issues can occur during severe weather conditions, at which time travel to and from site is not possible by helicopter. While Hydro has been able to implement a short term solution, through the strategic planning of scheduled maintenance work, the transport of personnel in this manner poses numerous logistical issues and cannot be accepted as the long term solution.

Project Justification:

The existing site accommodations facility was constructed in 1966. It is old, deteriorated and has exceeded its service life. The six bedroom, three washroom facility does not meet current industry standards for camp facilities. Modern day standards for such facilities provide adequate levels of comfort and privacy through the allocation of single room occupancy, with individual washroom facilities; the availability of separate male and female accommodations; and the provision of modern communication systems, including internet access.

The existing septic system, will also require replacement, as it does not have registered provincial approval. In accordance with Hydro's Environmental Management System, the replacement septic system would comply with all provincial requirements and the required registered approval obtained.

In order to meet current site accommodation standards and provide the expected level of employee safety and comfort, the existing facility requires replacement. The construction of a newer, more modernized facility will satisfy employee lodging requirements at Ebbegunbaeg for the next 20 or more years. The need for this facility is magnified due to the remote location and logistical issues, associated with site access, which makes it impractical to transport employees to and from the site on a daily basis.

Future Plans:

None.

Attachments:

See report entitled "Replace Accommodations and Septic System" located in Volume II, Tab 20, for further project details.

Project Title: Install Fire Protection

Location: L'Anse au Loup

Category: Transmission and Rural Operations – Generation

Definition: Other

Classification: Normal

Project Description:

This is a two year project to install fire protection systems at L'Anse au Loup diesel plant. It will be the third plant in a multi-year program to equip diesel plants with fire protection systems.

The project will provide the following:

- Automatic fire protection systems in the diesel generator main hall area and other interior spaces of the plant including the supervisory control room, battery room and storage room;
- Fire separation barriers between the transformers;
- Fire-rated construction for the fuel pumping; and
- Fire-rated cut off room equipped with drainage for the fuel 750-gallon fuel day tank.

The budget estimate for this project is provided in Table 1.

Table 1: Project Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	15.0	0.0	15.0
Labour	57.0	178.4	0.0	235.4
Consultant	108.0	0.0	0.0	108.0
Contract Work	0.0	640.3	0.0	640.3
Other Direct Costs	3.1	30.9	0.0	34.0
Interest and Escalation	11.2	96.4	0.0	107.6
Contingency	41.3	165.2	0.0	206.5
TOTAL	**220.6**	**1,126.2**	**0.0**	**1,346.8**

Operating Experience:

Hydro's diesel plants are not equipped with automatic fire protection systems; therefore, there is no operating experience with these systems in that application.

Project Justification:

This project is justified by protecting critical assets at L'Anse au Loup diesel plant from potential catastrophic consequences in the event of a fire. As the plant is not attended 24 hours per day seven

days a week and has no automatic fire protection system, catastrophic consequences would result if a fire broke out and was left unchecked.

Although plant personnel are trained to extinguish small fires, they are unable to extinguish major fires and must depend on local volunteer fire departments.

Hydro has experienced a number of fires in the past at its diesel generating stations that have caused major damages in excess of $5,000,000. A list of reported incidents involving fire within Hydro Diesel Plants is provided in an engineering report prepared by Hatch.

After the 2008 incident at Nain, Hydro decided to engage an engineering firm, Hatch, to complete a study and recommend measures that could be taken to reduce the risk of fire and minimize fire damages to diesel generating stations. In addition Hydro's insurance agent, FM Global, has recommended in its risk evaluation report for L'Anse au Loup diesel plant that different areas of the powerhouse to be equipped with automatic fire protection systems.

Also, it was recommended in the FM Global risk evaluation report to construct two hour fire-rated masonry barriers between each of the three main transformers (one 5 MVA and the other two at 2.5 MVA) and between the nearest transformer and the main power plant building.

To mitigate hazards associated with the diesel fuel supply system in the powerhouse, safeguards, fire-rated construction, containment and drainage to the outside are required for the diesel pumping as recommended by FM Global. A fire-rated cut off room equipped with containment and drainage for the 750-gallon fuel day tank is also recommended by FM Global. A leak in the diesel fuel lines may release the entire contents of the 750-gallon day tank and the outdoor tank which may be ignited resulting in a fire.

Future Plans:

Hydro owns and operates 25 diesel plants. L'Anse au Loup is the third plant that Hydro is proposing to have fitted with new fire protection systems. It is anticipated that Hydro will submit other proposals to the Board in subsequent years to have fire protection systems installed at other remote diesel generation stations.

Attachments:

See report entitled “Install Fire Protection” located in Volume II, Tab 21, for further project details.

Project Title: Replace Unit 2038

Location: Mary's Harbour

Category: Transmission and Rural Operations - Generation

Definition: Other

Classification: Normal

Project Description:

This project is for the planned replacement of one of the four gensets at the Mary's Harbour Diesel Plant, Unit 2038. The budget includes all costs associated with the engineering, procurement and installation of a 545 kW diesel genset, upgrade of the associated switch gear and controls, and modification of the unit auxiliary systems to accommodate the new genset.

The new genset will be installed where the existing Unit 2038 is located. It will come equipped with a new remote radiator and after cooler system that will require piping modifications to the existing cooling system to accommodate the new unit. The existing exhaust system including the muffler and stack will also be replaced. At least two of the other units are required to be available to meet load during the construction phase of the project.

The work is estimated to take approximately 14 to 16 months to complete. The estimated cost of the project is $1,345,000 as shown in Table 1. The work will be performed by Hydro personnel with some technical support from a diesel consultant and the equipment supplier.

The budget estimate is show in the table below.

Table 1: Project Budget Estimate

Project Cost: ($ x1,000)	2015	2016	Beyond	Total
Material Supply	50.0	365.0	0.0	415.0
Labour	34.0	385.4	0.0	419.4
Consultant	6.0	51.6	0.0	57.6
Contract Work	0.0	25.0	0.0	25.0
Other Direct Costs	9.2	117.0	0.0	126.2
Interest and Escalation	4.3	88.9	0.0	93.2
Contingency	0.0	208.6	0.0	208.6
TOTAL	**103.5**	**1,241.5**	**0.0**	**1,345.0**

Operating Experience:

Unit 2038 was installed in 1993 and has been in service for approximately 21 years. During its service life the unit has been overhauled four times. All overhauls have been scheduled based on running hours of the unit. The last overhaul was completed in September 2012. By 2016 the unit is forecast to have incurred over 100,000 hours of operation. To continue operating Unit 2038 beyond 2016 could potentially jeopardize the reliability of the Mary's Harbour Diesel Plant.

Project Justification:

This project is justified based on Hydro's current asset management strategy to replace gensets when they approach 100,000 operating hours. Unit 2038 at the Mary's Harbour Diesel Plant is forecast to incur 100,000 hours of operation by the time it will be replaced in 2016.

Future Plans:

None.

Attachments:

See report entitled "Replace Unit 2038" located in Volume II, Tab 22, for further project details.

Project Title: Overhaul Diesel Units

Location: Various Sites

Category: Transmission and Rural Operations - Generation

Definition: Pooled

Classification: Normal

Project Description:

This project is required to overhaul the diesel engines at various prime power diesel generating plants. The project consists of the 7 overhauls that are projected to become due in 2015. This projection is based on the engines being overhauled every 20,000 hours of operation (with the exception of the 100,000 hours milestone at which point the engine is replaced instead of being overhauled).

The budget estimate is shown in the table below.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	642.0	0.0	0.0	642.0
Labour	258.0	0.0	0.0	258.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	72.0	0.0	0.0	72.0
Interest and Escalation	32.8	0.0	0.0	32.8
Contingency	194.4	0.0	0.0	194.4
TOTAL	**1,199.2**	**0.0**	**0.0**	**1,199.2**

Operating Experience:

Isolated diesel generation plants operate continuously since they provide the primary source of electricity to communities isolated from the province's electrical grid. A given unit is not in service continually since the number of units in service varies based on the demand. In automated plants the engine mix is automatically controlled by a control system to maximize fuel efficiency while in a manual plant this control is completed by the operator. In all plants the operator has the flexibility to shut down engines for planned maintenance provided there is another engine available to supply the load for that time. As a result, planned outages to engines can occur without customer outages.

Project Justification:

Hydro's current maintenance philosophy is to complete an engine overhaul on all diesel engines every 20,000 hrs. This philosophy was established as a result of a 2003 review of the maintenance tactics and failure history. Performing overhauls too frequently results in additional expenditure for negligible improvement in reliability. An overhaul interval of 20,000 hours is considered to be the optimum interval for providing least-cost, reliable electrical service.

Future Plans:

The overhaul of diesel engines is a continuous program that will need to continue as long as there are prime power diesel generating plants. The long term plan for diesel engine overhauls projects that there will be 49 overhauls over the next 5 years (i.e. 2015 - 2019) which is an average of 9.8 overhauls annually and is based on an overhaul interval of 20,000 operating hours. The long term plan is based on the present-day operating conditions which are subject to change as the loading on a plant or other factors may change with time. Changes to the operating conditions can change the average number of annual overhauls.

Attachments:

See report entitled "Overhaul Diesel Engines" located in Volume II, Tab 23, for further project details.

Project Title: Install Transformer On Line Gas Monitoring

Location: Various Sites

Category: Transmission and Rural Operations - Terminal Stations

Definition: Other

Classification: Normal

Project Description:

This project consists of the purchase and installation of transformer on line gas monitoring on generator step up transformers (GSUs) and terminal station transformers at various Hydro terminal stations on the Island Interconnected System. The scope of the program will include installations on all 230 kV and 138 kV GSUs with the priority in this project being on the transformers rated 80 MVA and above.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	30.0	39.7	0.0	69.7
Labour	194.8	212.0	0.0	406.8
Consultant	0.0	0.0	0.0	0.0
Contract Work	300.0	456.0	0.0	756.0
Other Direct Costs	29.5	45.8	0.0	75.3
Interest and Escalation	35.3	71.5	0.0	106.8
Contingency	110.9	150.7	0.0	261.6
TOTAL	**700.5**	**975.7**	**0.0**	**1,676.2**

Operating Experience:

The existing generator unit transformers are approximately 35 years old and have annual oil samples taken to measure oil quality and dissolved gases analysis (DGA). Oil quality test results have shown the oil in these transformers to be deteriorating, to the point where the condition of the oil is causing concern. Oil regeneration has been performed on many of our GSUs to improve oil quality and help extend the life of these transformers. With the age, criticality of unit transformers, and the fact that annual dissolved gas samples only give a snap shot in time of the condition of the transformer, continuous on-line monitoring is required to further aid in the life extension process for power transformers.

Project Justification:

Electrical and thermal stresses lead to the breakdown of transformer dielectric oil and the development of a variety of gases. These gases indicate the presence of developing faults. Online gas in oil monitoring

will provide early fault detection which will minimize repair cost, downtime, and transportation expenses and increase equipment availability. Data would also be available as a tool for personnel to use to trend gases to help schedule repairs prior to in-service failures.

Continuous monitoring will enable Hydro to keep aging equipment in service and repair as required. If continuous monitoring is not initiated there will be a higher probability of transformer in-service failures resulting in the requirement for significant capital investment.

Future Plans:

Future transformer on line gas monitoring installation will be proposed in future capital budget applications.

Attachments:

See report entitled “Install Transformer On Line Gas Monitoring” located in Volume II, Tab 24, for further project details.

Project Title: Construct Second Distribution Feeder

Location: Nain

Category: Transmission and Rural Operations – Distribution

Definition: Other

Classification: Normal

Project Description:

This project will require less than one year to complete and will involve the creation of a new second feeder to serve the community of Nain. This will be accomplished by building a section of new line that will be connected to existing feeder in such a manner to split the load. A portion of the new feeder will utilize an existing single-phase section of L1 that will be converted to three-phases. The new feeder will service the western region of Nain that is experiencing low voltages.

The budget estimate for the total project is shown in the Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	190.0	0.0	0.0	190.0
Labour	230.0	0.0	0.0	230.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	400.0	0.0	0.0	400.0
Other Direct Costs	0.0	0.0	0.0	0.0
Interest and Escalation	66.3	0.0	0.0	66.3
Contingency	164.0	0.0	0.0	164.0
TOTAL	**1,050.3**	**0.0**	**0.0**	**1,050.3**

Operating Experience:

According to load flow analysis, it was determined that under peak conditions there are currently low voltage conditions downstream of pole structure 34 on the Nain distribution system. This section of line is just before the new three-phase tap to the Trouser Lake pump house located on the west side of Nain. These existing low voltage conditions are manageable in the short term, but with future load growth the voltage levels will reduce to an unacceptable level.

Project Justification:

This project is justified on the requirement to meet the growing electricity needs of Hydro's customers on the Nain distribution system. If the status quo is maintained, some customers in Nain will eventually experience low voltage conditions well below the standard. In certain areas of the Nain distribution

system, recent load growth in Nain has reduced the voltage level below the acceptable voltage range defined by CSA standards during peak demand periods. According to Hydro's 2013 Operating Load Forecast, this condition will only worsen as time progresses since the load growth in Nain is expected to continue for the foreseeable future.

The construction of a second feeder will also provide additional redundancy to the distribution system and allow for more flexibility during planned and unplanned outages. The new proposed configuration for the Nain distribution system will better accommodate cold load pick-ups. A second feeder would allow a Diesel Site Representative (DSR) to sectionalize the system directly from the diesel plant and avoid any switching on the distribution system. The DSR would have the capability of restoring one feeder at a time in the event of an outage. This would lessen the strain on the diesel units when picking up the load after an extended outage and avoid the need for a line crew.

Future Plans:

None.

Attachments:

See report entitled "Construct Second Distribution Feeder" located in Volume II, Tab 25, for further project details.

Project Title: Install Automated Meter Reading

Location: Various Sites

Category: Transmission and Rural Operations - Metering

Definition: Other

Classification: Normal

Project Description:

This project is required to implement Automatic Meter Reading (AMR) in Hydro customer service areas of English Harbour West and Barachoix. The AMR functionality is proposed for all customers in these service areas. The work includes (i) the replacement of existing customer meters with AMR equipped meters; (ii) the installation of data collectors in the substations in these service areas; (iii) communications to the AMR server located in St. John's; and (iv) configuring the AMR central server to include customers in these service areas.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	495.0	25.1	0.0	520.1
Labour	35.0	82.1	0.0	117.1
Consultant	0.0	63.4	0.0	63.4
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	4.0	18.8	0.0	22.8
Interest and Escalation	25.9	67.8	0.0	93.7
Contingency	0.0	144.7	0.0	144.7
TOTAL	**559.9**	**401.8**	**0.0**	**961.7**

Operating Experience:

The AMR system will replace (i) manual handheld devices used to collect meter readings at each customer's site; (ii) supporting infrastructure (computers and modems) used to retrieve the data; and, (iii) a requirement for personnel to travel to each customer location to read meters. Previous AMR projects have been completed by Hydro in a number of other the service areas. The AMR system being implemented has proven to be reliable and accurate.

Project Justification:

This project is primarily justified on the results of a cost-benefit analysis which shows that the new AMR system has economic benefit over the existing system through a reduction in controllable costs. The

new system also provides benefits in customer service through improvements in accuracy, frequency and detail of reporting. Implementation of AMR will also enhance safety by reducing employee risk exposure and will provide a benefit to the environment as a result of less vehicle usage.

Future Plans:

Future installations of automated meter reading will be proposed in future capital budget applications.

Attachments:

See report entitled "Install Automated Reading 2015-2016" located in Volume II, Tab 26, for further project details.

Project Title: Replace Programmable Logic Controllers

Location: Various Sites

Category: Transmission and Rural Operations - Generation

Definition: Other

Classification: Normal

Project Description:

This project is to replace 25 obsolete programmable logic controllers (PLCs) at five diesel plants from 2015 through 2017. Replacements are planned at L'Anse au Loup and St. Anthony in 2015, Hawke's Bay and Ramea in 2016, and Port Hope Simpson in 2017.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**2017**	**Total**
Material Supply	85.0	70.0	38.0	193.0
Labour	166.0	151.0	119.0	436.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	33.0	39.0	22.0	94.0
Interest and Escalation	26.1	34.0	30.3	90.4
Contingency	56.8	52.0	35.8	144.6
TOTAL	**366.9**	**346.0**	**245.1**	**958.0**

Operating Experience:

PLCs are used to automate diesel units and subsystem controls. They also serve as a point of collection for alarms and equipment status to be sent to the operator consoles.

Project Justification:

The existing PLCs used in five diesel plants are Compact 984 models manufactured by Schneider Electric. This model is now obsolete as the commercialization period ceased as of 2006 and the service period will cease at the end of 2014. Each Compact 984 system needs to be updated to a newer model. The PLCs in all diesel plants need to be of recent technology and of active sale and support status to ensure their continued reliable operation.

Future Plans:

PLCs are to be upgraded as required, subject to declaration of obsolescence from the manufacturer.

Attachments:

See report entitled “Replace Programmable Logic Controllers”, located in Volume II, Tab 27, for further project details.

Project Title: Upgrade Line Depots

Location: Various Sites

Category: Transmission and Rural Operations - Distribution

Definition: Pooled

Classification: Normal

Project Description:

This strategy report outlines a plan to refurbish Hydro's aging line depot infrastructure over the next nine years. This program includes continuing detailed assessment, engineering and construction of line depot upgrades and replacements as well as replacements of specific line depot storage ramps and storage sheds which have been identified previously as needing replacement.

Line Depot Upgrades:

Condition assessments were completed for the Cow Head, Rocky Harbour and Springdale line depots. Recommendations from these conditions assessments include civil, mechanical and electrical replacements and /or upgrades. The work includes replacement of windows, doors, ramp decks and heating units, the installation of second washrooms as per the OHS regulations, upgrades to lighting for energy efficiency gains, life safety code additions and upgrades, as well as upgrades relating to electrical code deficiencies.

Line Depot Storage Ramps and Storage Shed Upgrades:

Included in 2015 is the engineering design only of replacement storage sheds at the Change Islands, St. Anthony and Hopedale line depots as well as storage ramps at the Bay d'Espoir, Wabush and Hopedale Line Depots.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	264.9	0.0	0.0	264.9
Consultant	0.0	0.0	0.0	0.0
Contract Work	427.5	0.0	0.0	427.5
Other Direct Costs	51.7	0.0	0.0	51.7
Interest and Escalation	60.3	0.0	0.0	60.3
Contingency	148.9	0.0	0.0	148.9
TOTAL	**953.3**	**0.0**	**0.0**	**953.3**

Operating Experience:

The purpose of these buildings and ramps is to provide line workers with a safe and protected area to store, load and prepare materials and equipment used to maintain the integrity of Hydro's transmission lines. During emergency repairs in winter, under adverse weather conditions, working with frozen transmission line materials is difficult for the workers and many times, the weather conditions can be too adverse to assemble materials on site. As such, the line depots provide a sheltered location to repair equipment and keep materials protected from the weather so they don't freeze together. These depots also provide a safe reprieve from the adverse weather that workers are required to be in during emergencies, sometimes for exceptionally long hours.

Project Justification:

These depot buildings are in the range of 25-40 years old. Many of the windows and doors, as well as heating and cooling units are at the end of their expected life cycle and need replacement. The Heat Recovery Ventilation (HRV) system does not meet code requirements for ventilation and requires a new HRV system installed at each depot office. There have been a number of items identified as safety issues relating to the electrical system such as incorrectly wired exterior plugs, code deficient panel barriers, overloaded circuits for identified use and lack of Ground fault circuits in wet areas. There have also been a number of fire safety deficiencies identified including missing fire detectors, illuminated exits signs and emergency light wall packs. These condition assessments have also identified the replacement of a storage shed and storage ramp at Springdale since both are dilapidated and unsafe for workers to use.

Future Plans:

A list has been developed prioritizing line depot detailed assessments and upgrades. It is anticipated this program will continue to 2024 where the detailed assessments will be completed in the first year of the identified schedule, detailed engineering will be completed in the second year and construction will be completed in the third year.

Attachments:

See report entitled “Line Depot Condition Assessment and Refurbishment” located in Volume II, Tab 28, for further project details.

Project Title: Replace Vehicles and Aerial Devices

Location: Various Sites

Category: General Properties - Transportation

Definition: Other

Classification: Normal

Project Description:

This project proposes the replacement of thirty-nine light-duty vehicles and six heavy-duty vehicles in accordance with the established replacement criteria for vehicle age and kilometers (km) as follows in Table 1.

Table 1: Replacement Criteria - Hydro

Hydro	
Light-duty vehicles	5-7 years or > 150,000 km and Condition/Maintenance Cost
Heavy-duty vehicles:	
- Class 4, 5 and 6	6-8 years or > 200,000 km and Condition/Maintenance Cost
- Class 7 and 8	7-9 years or > 200,000 km and Condition/Maintenance Cost

All vehicles that meet the criteria are being replaced. In addition, one light duty vehicle was added to the list because it met the replacement criteria. Two additional light duty vehicles are added to the list to fulfill requirements as a result of additional staff positions.

The budget estimate for this project is shown in Table 2

Table 2: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	2,277	92.0	0.0	2,369.0
Labour	6.5	1.0	0.0	7.5
Consultant	0.0	0.0	0.0	0.0
Contract Work	0.0	0.0	0.0	0.0
Other Direct Costs	3.0	2.0	0.0	5.0
Interest and Escalation	90.6	11.2	0.0	101.8
Contingency	0.0	119.1	0.0	119.1
TOTAL	**2,377.1**	**225.3**	**0.0**	**2,602.4**

Operating Experience:

Hydro's transportation section maintains a close liaison with other utilities across Canada and has established the replacement criteria based on industry standards and Hydro's operating experience.

Extension of the service life of a vehicle beyond the replacement criteria result in increased operating and maintenance costs.

Project Justification:

This project provides for the normal replacement of on-road fleet vehicles based on projected age and kilometers at disposal. The transportation vehicles are subjected to a lease, or purchase cost/benefit analysis during the tender process, to determine the least cost alternative.

The cost benefit analysis is best done in the year of replacement to ensure consideration of current year fleet incentives offered by the manufacturers. This proposal provides the funding required to purchase the projected replacements and will be adjusted to reflect the outcome of the lease or purchase cost/benefit analysis.

The light duty vehicles are an average of six years old with 173,000 km and the heavy duty vehicles average eleven years old with 138,000 km.

Future Plans:

Future replacement of vehicles and aerial devices will be proposed in future capital budget applications.

Attachments:

See report entitled “Replace Vehicles and Aerial Devices” located in Volume II, Tab 29 for further project details.

Project Title: Replace Roof

Location: Hydro Place

Category: General Properties - Administrative

Definition: Other

Classification: Normal

Project Description:

This project comprises the first year of a three year program for the completion of roof upgrades at Hydro Place. Upgrades include: supply and installation of a new, mechanically fastened roofing system; and the completion of interior repairs to various areas damaged as a result of water infiltration. The roof areas to receive upgrades in 2015 include those over levels 5 and 6, as well as the ECC Control Room.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	0.0	0.0	0.0	0.0
Labour	68.3	0.0	0.0	68.3
Consultant	10.0	0.0	0.0	10.0
Contract Work	451.5	0.0	0.0	451.5
Other Direct Costs	1.6	0.0	0.0	1.6
Interest and Escalation	34.3	0.0	0.0	34.3
Contingency	106.3	0.0	0.0	106.3
TOTAL	**671.9**	**0.0**	**0.0**	**671.9**

Operating Experience:

Hydro Place serves as the main headquarters for the Hydro group of Companies. It provides office space for approximately 460 full time employees, and houses Hydro's Energy Control Center, which allows System Operators to monitor the amount of power being generated throughout the system, voltage conditions across the system and the status of virtually all equipment on the Island power grid.

Project Justification:

A condition assessment completed by BAE-Newplan Group Limited in 2009, noted that the existing roofing system was nearing the end of its service life and its replacement was recommended. In an effort to prolong the requirement for a complete roof replacement, Hydro has closely monitored the condition of the roof, particularly during the spring thaw when snow melt and rainfall combine to

generate an influx of water. Numerous repairs have been enacted to remedy noted leaks, however, the repairs are often short lived ; in some instances the leaks have reoccurred and/or new leaks have formed at different locations.

Given the roofing system's age, the formation of leaks will continue to pose a problem to building maintenance personnel and occupants alike. If left unaddressed these leaks may impact the use of the building, result in deterioration and mold growth.

The replacement of the roof must be completed to mitigate this risk and to provide a new roofing system capable of providing maintenance free protection for the next 20 years.

Future Plans:

Additional roof upgrade projects will be proposed in future capital budget applications as part of a three year roof replacement program.

Attachments:

See report entitled "Replace Roof " located in Volume II, Tab 30, for further project details.

Project Title: Replace Personal Computers

Location: Various Sites

Category: General Properties - Information Systems

Definition: Other

Classification: Normal

Project Description:

The Personal Computer (PC) Replacement program is an on-going program required to enhance the efficiency of Hydro's employees by replacing the PCs used for their day to day requirements.

This project will enable Hydro to replace 335 computers that were deployed in 2009, 2010 and 2011. There are 213 Thin Clients, 92 Laptops, 19 Desktops, and 11 Workstations to be replaced. A workstation is a more powerful desktop that is used for specialized applications that require more power and resources, such as Auto Cad for drafting.

The budget estimate for this project is shown in Table 1.

Table 1: Budget Estimate

Project Cost: *($ x1,000)*	**2015**	**2016**	**Beyond**	**Total**
Material Supply	422.3	0.0	0.0	422.3
Labour	32.0	0.0	0.0	32.0
Consultant	0.0	0.0	0.0	0.0
Contract Work	101.2	0.0	0.0	101.2
Other Direct Costs	0.0	0.0	0.0	0.0
Interest and Escalation	17.8	0.0	0.0	17.8
Contingency	0.0	0.0	0.0	0.0
TOTAL	**573.3**	**0.0**	**0.0**	**573.3**

Operating Experience:

Hydro has approximately 900 end-user personal computers in service. It is important to refresh this equipment on a regular cycle to keep the technology current to maintain a reliable, efficient and productive workforce. Refreshing is the replacement of end user equipment, such as desktops, laptops and thin clients, on a life cycle depending on the type of device.

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

for the current year. The annual review continues the replacement life cycle for laptops of every four years and desktops every five years.

Project Justification:

Hydro must keep computers current in order to adequately support and protect the Information Technology applications and information required to operate its business. The replacement and addition of PC components to achieve this goal requires investment over the life cycle of the computers.

Future Plans:

This is an ongoing refresh program to maintain the personal computers of employees.

Attachments:

See report entitled “Replace Personal Computers” located in Volume II, Tab 31, for further project details.