Q. Page 5 of the report states *"The overall budget increase requested for approval is $2,046,800".* Please reconcile this number considering the original budget approval of $9,400,300 and the revised project cost of $11,477,100.

A. The correct 2015 additional cost is $1,238,200 and not $1,268,200. This number has been corrected in the attached report (PUB-NLH-1 Attachment 1) for the Board's convenience. The corrected number yields a revised project forecast of $11,447,100 instead of $11,477,100.

With these corrections, the requested budget increase of $2,046,800 reconciles to a revised project cost of $11,447,100 from original budget of $9,400,300. The amount of $2,046,800 is comprised of $199,700 increase over original budget from actual costs incurred 2010 to 2013, plus the additional costs for 2014 ($608,900) and 2015 ($1,238,200).

A REPORT TO

THE BOARD OF COMMISSIONERS OF THE BOARD

| | |
|---|---|
| | Electrical |
| | Mechanical |
| | Civil |
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| | Transmission & Distribution<br>John Noble |
| | Telecontrol |
| | System Planning |

# 2014/2015 Labrador City Voltage Conversion

Newfoundland and Labrador Hydro

September 2014

newfoundland labrador hydro
a nalcor energy company

## Table of Contents

# 1.0 Introduction

This report details a proposed revision to the 2010 Capital Budget Proposal, "Labrador City Voltage Conversion" (see Volume II, Tab 9, 2010 CBA). The Labrador City Voltage Conversion was approved as a multi-year expenditure of $9.4 million to be completed over the period 2010 to 2013. However, further review of the Board is required as the project will require an additional two years to complete as well as approximately $2 million in additional capital expenditures.

# 2.0 2014/2015 Labrador City Voltage Conversion ($608,900/$1,238,200)

## 2.1 Background

Hydro's Labrador City Upgrading Project was developed to ensure that continued, least-cost, reliable service is provided to customers in Labrador City, and to provide the required capacity to meet load growth. The present system was designed to supply approximately 52 MW of customer load. Hydro carried out a study of the distribution system in the fall of 2007. It was found that beyond 52 MW, the existing system would be subject to poor voltage regulation, low voltages, and more frequent component failures due to excessive heating. The distribution system study determined that in order to serve additional load growth, it would be necessary to convert the system to a higher distribution voltage. Converting the distribution lines to 25 kV will increase the power transfer capability, improve voltage regulation, and improve the overall reliability of the system.

## 2.2 Project Execution

The Labrador City Voltage Conversion has encountered challenges which have resulted in escalated costs and schedule delays. The material quantities have increased from the original proposal, and weather conditions and overall contractor availability have resulted in shorter than anticipated construction seasons. When combined with the restrictions in obtaining outages in Labrador City, the pace of construction has been slow.

In an effort to improve the pace, a larger portion of work has been required from Hydro's local operations forces to support to project. This not only includes direct work on the voltage

conversion but switching, securing work permits, and outage planning. The project will require an additional two years to complete.

## 2.3 Work Completed

Since the start of the project, a large amount of work has been completed. This includes the following:

- Install 246 Poles
- Frame/Transfer 402 Structures
- Re-Insulate 227 Structures
- Install 354 Distribution Transformers
- Install 303 Polymer Cutouts
- Install 44.36km of Primary and Neutral Conductor
- Install 4.7km of Secondary Conductor
- Install/Transfer 98 Service Drops
- Install 205 Anchors
- Install 403 Downguys
- Install/Transfer 6 Overhead Guys
- Clear 5.84ha of brush
- Transfer 3 Street Lights
- Install 20 Crossarms
- Install 61 Neutral Brackets

The completed work has resulted in the following system improvements:

- Harrie Lake Trailer Court upgrade work has been completed and is currently operating at 25 kV
- New line to College of the North Atlantic ("CNA") installed
- CNA and new hospital are currently operating at 25 kV
- Labrador City Industrial Park upgrade work has been completed and is currently operating at 25 kV

The lines which have been converted, as outlined in the system improvements above, and are

currently operating at 25 kV are as follows:

- Quartzite Line 6, Line 7, Line 8, and Line 14
- Harrie Lake Line 19 and Line 20
- Vanier Line 21
- A section of Hudson Line 18, around the Labrador City Industrial Park, has been converted and is currently operating at 25 kV

### 2.4 Remaining Work

The following lines are currently operating at 4.16 kV and are scheduled to be converted to 25 kV as a part of this project:

- Bartlett Line 1, Line 2, Line 3, Line 4, and Line 5
- Quartzite Line 12 and Line 13
- Hudson Line 15, Line 16, Line 17, and remainder of Line 18
- Vanier Line 22

## 3.0 Revised Budget

The revised budget for project completion is $11,447,100. The main areas contributing to the increased budget are:

*Material Procurement Costs*

The scope of the project and continued load growth was underestimated and contributed to increased costs due to a requirement for higher quantity of materials than budgeted. In addition, the overall cost of materials and shipping to the area has increased significantly from what was included in the original estimate.

*Cost of Construction*

Contract costs have increased significantly in comparison to the original budget. Labour costs represent approximately 50% of the contract value. The extent of the involvement of Hydro's operations forces required to complete the work was unforeseen and not included in the original estimate. This not only includes work directly associated with converting from 4.16 kV to 25 kV,

but also includes costs required from an outage planning and preparation perspective.

*Weather Conditions and Contractor Availability*

The original budget allowed for a construction schedule of June to October every year, 5 months per year, for a total of 20 months of construction. To date, this level of activity has only been achieved in one year and on average, only 3.5 months of actual work has been completed each year. It is anticipated that the project will require another six to eight months of construction to complete. This will require a project schedule extension of two years.

*Outage Restrictions*

The upgrading of existing line components must be done under a customer outage. Due to the increased development in the Labrador City area, it has been difficult to obtain the volume of outages required to complete the upgrade work in a timely manner. This is especially true in the fall season when temperatures are dropping and customer outages are more difficult to obtain. The outage restrictions have also contributed to the requirement for a schedule extension.

## 3.1 Improved Budgeting Process

A comprehensive review of the project was undertaken in 2013. The result of this review was to finalize the remaining work to be completed and to ensure that all outstanding material was available. As part of the review, a construction work plan was developed and approved by both Projection Execution and Hydro Operations in Labrador.

A number of project planning and project management enhancements currently in place should avoid future problems similar to that which occurred in the Labrador City Voltage Conversion project. These include the use of increased front end engineering/scope development for better estimate accuracy and increased engagement of key team members earlier in the budget development process (e.g., operations/commissioning).

The budget was also revised to reflect the increased involvement of Hydro Operations personnel in direct outage work as well as outage preparation.

# 4.0 Project Cost

Table 1 indicates the revised project costs.

**Table 1 - Revised Project Cost**

**($000s)**

| | ***Budget Original*** | **Actual** | **Additional Costs** | | **Revised Project Cost** |
|---|---|---|---|---|---|
| **Project Cost: ($ x 1,000)** | **2010 to 2013** | **2010 to 2013** | **2014** | **2015** | **Total** |
| Material Supply | 3,050.0 | 5,161.2 | 100.0 | 83.0 | 5,344.2 |
| Labour | 930.0 | 636.7 | 200.0 | 294.2 | 1,130.9 |
| Consultant | 0.0 | 0.3 | 0.0 | 0.0 | 0.30 |
| Contract Work | 3,700.0 | 2,133.4 | 250.0 | 370.0 | 2,753.4 |
| Other Direct Costs | 0.0 | 692.2 | 0.0 | 27.3 | 719.5 |
| O/H, AFUDC & Escln. | 952.3 | 976.2 | 58.9 | 158.5 | 1,193.6 |
| Contingency | 768.0 | 0.0 | 0.0 | 335.2 | 335.2 |
| TOTAL | 9,400.3 | 9,600.0 | 608.9 | 1,238.2 | 11,447.1 |

# 5.0 Conclusion

The approval of additional expenditures is required to complete the Labrador City Voltage Conversion project. Completion of the Labrador City Voltage Conversion will ensure that a reliable energy supply is available to customers and to meet future load growth. As demonstrated in the 2010 capital budget proposal, voltage conversion is the most efficient and economical way to obtain these desired results.

The overall budget increase requested for approval is $2,046,800.