Q. Labrador City Terminal Stations: Please: (a) describe the estimating methods used for estimating the hours and pricing of each element of this project, (b) describe how Hydro validated the labor and pricing estimates for P.U. 36 (2008) and the 2009 Capital Budget, (c) describe whether and how Hydro factored in anticipated increases in equipment prices and labor costs, (d) state whether Hydro has modified its project estimating method since 2009, and (e) describe any project estimation practices "lessons learned" actions taken after this project.

A. (a) At the time the project budgets were created, projects were estimated by having each discipline involved (e.g., Civil, Electrical, Protection and Control, and Telecontrol) develop individual budgets. The individual budgets were then combined.

(b) Please see Hydro's response to PR-PUB-NLH-039. Given Hydro's limited experience at the time in construction of new terminal stations, labour and pricing where not specifically validated at the time of the 2009 Capital Budget Application. See also paragraph (a).

(c) Other than standard escalation indices, the project budget did not have specific factors for equipment and labour increases. Hydro factored overall increases in the project budget through the use of a contingency fund, which was incorporated in the 2011 revision to the project budget at $242,600.

(d) Hydro's estimating process has evolved since 2009 in the following ways:

- The Engineering Services division is now divided into two groups. The Technical Services group is responsible for the development of estimates for project

proposals. The Project Execution group is responsible for the execution of the projects, after they have been approved. This organizational change fosters consistency and the development of expertise in the creation of estimates within the Technical Service team;

- As noted in Hydro's response to PR-PUB-NLH-040, there is a greater alignment within the Project Execution and Technical Services groups with project management guidelines and standards such as the *Project Management Body of Knowledge* (PMBOK). The Project Execution and Technical Service group are continually improving their project management and execution practices and processes by bench marking against PMBOK practices and processes;
- Any prospective project proposals are first vetted through a screening process to ensure they are justified and have a well-defined scope of work. Estimators are now developing estimates from more detailed project scope definitions. Estimators detail the scope of work and apply this to a work breakdown structure. Estimates are built using a bottom up approach (a breakdown of smaller project work tasks) which feed up into the larger project scope objective;
- The estimating process involves project managers who provide feedback on lessons learned (i.e., scope, time, cost, risk, etc.) from other similar ongoing or completed projects;
- Estimates are developed using a multi-disciplinary team, including field operations, as appropriate;
- "Constructability review" is now part of the scope definition and estimation process. The project team walks through the construction steps of the project to gain a better understanding of the impacts on existing infrastructure and associated costs;

- Quotes with projected delivery times are now secured for major pieces of equipment as well as budgetary prices for installation contracts;
- Estimates now include an allowance of 15% for Project Management, 15% for Engineering, and 20% for Contingency; and
- Project proposals are now signed off by applicable disciplines and Operations groups affected before being submitted for final approval.

(e) Project estimation "lessons learned" actions taken after this project are as follows:

- It is recognized that a constructability review is an essential component of the project budgeting process, especially for large-scale multi-disciplinary projects;
- It is also recognized that insufficient front-end engineering during the development of a project's budget increases the risks of issues during the execution phase of a project; and
- See generally (d) above.