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May 6, 2015

VIA RESS, E-MAIL, and COURIER

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Re: Enbridge Gas Distribution Inc. ("Enbridge")
Ontario Energy Board ("Board") Docket No.: EB-2012-0099
Ottawa Reinforcement Project
Conditions of Approval – Financial Report

In the Board's Decision issued on November 29, 2012, the Conditions of Approval required Enbridge to file a financial report for the project 15 months after the in-service date. The final in-service date for the project was February 6, 2014 and requires Enbridge to file the report by May 6, 2015.

Enclosed please find the financial report for Enbridge's Ottawa Reinforcement project.

If you have any questions, please contact the undersigned.

Yours truly,

(Original Signed)

Bonnie Jean Adams
Regulatory Coordinator

cc: Zora Crnojacki, OPCC Chair
Pascale Duguay, Manager, Natural Gas Applications, Ontario Energy Board

EB-2012-0099

Ottawa Reinforcement Project

Post-Construction Financial Report on Costs and Variances

May 6, 2015

Introduction

Enbridge Gas Distribution Inc. ("Enbridge") applied to the Ontario Energy Board (the "Board") on June 28, 2012, under section 90 of the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Schedule B, for an Order granting Leave to Construct ("LTC") approximately 18.8 kilometers ("km") of Nominal Pipe Size 24 ("NPS 24") Extra High Pressure ("XHP") steel pipeline to reinforce the existing natural gas delivery system in the Ottawa area.

The Board assigned file number EB-2012-0099 to this application and issued a favourable decision on November 29, 2012.

This Post-Construction Financial Report summarizes the actual capital costs of the project and provides an explanation of variances from the original estimate.

Project Summary

Pipeline construction activities commenced in March 2013. The pipe was tested in November 2013 and energized in February 2014. Many of the potential environmental impacts for the pipeline were avoided during the routing selection process. This was accomplished by locating a majority of the pipeline within previously disturbed road allowances. The route was also chosen to minimize impact to National Capital Commission ("NCC") lands. Potential adverse effects during construction of the pipeline were further reduced by ensuring appropriate measures were implemented to mitigate environmental impacts. Details can be found in the Interim Environmental Report (August 5, 2014) and Final Environmental Report (May 6, 2015).

Most of the restoration activities were completed in 2014. Final restoration activities may be required in the spring / summer of 2015 as communicated in the Interim Monitoring Report. In addition, there are gate station insulation requirements resulting from correspondence with local residents and environmental reporting to be completed in 2015. The actual costs described within this report assume additional expenses amounting to approximately $270,000 still to be incurred in 2015.

Cost and Variance Reporting

The original cost estimate was $51.2 million as reported in EB-2012-0099, Exhibit C, Tab 2, Schedule 1. The actual project cost is $70.1 million[1]. Enbridge has kept the Board updated on the cost escalation throughout the project. Please refer to EB-2012-0099 Enbridge's September 23, 2013 letter to Pascale Duguay and EB-2012-0459 Undertaking Response Exhibit J6.3.

A detailed comparison of actual versus estimated project costs is shown in Table 1 below.

Table 1 – Total Project Costs

Ottawa Reinforcement Project

Item No.	Breakdown	Budgeted Costs	Actual	Variance
1.0	Material Cost	$8,678,000	$11,106,251	$2,428,251
2.0	Labour Cost	$30,775,000	$51,773,241	$20,998,241
3.0	External Cost	$3,364,000	$5,756,103	$2,392,103
4.0	Land Cost	$677,000	$350,010	($326,990)
5.0	Overhead Cost	$2,175,000	$1,076,557	($1,098,443)
6.0	Contingency	$5,567,000	$0	($5,567,000)
7.0	Total Costs	$51,236,000	$70,062,162	$18,826,162

[1] This includes the estimate additional spend in 2015. Life to date costs incurred as of April 30, 2015 is $69,795, 430.

Reasons for the cost variances are set out below:

1. The final material costs were $11,106,251, approximately $2.4 million more than estimated at the time of the LTC filing. The difference between the budgeted and actual material costs can be attributed to three primary reasons: pipe coating changes (variance of $1.5M), pipe shipping delays (variance of $0.25M), and additional materials required (variance of $0.25M) to construct the pipeline.

   At the time of LTC filing, the pipeline coating cost was estimated for single fusion bonded epoxy coating, which is the coating recommended for XHP pipelines. Double fusion bonded epoxy is used for boring applications and for other locations that require abrasion protection. Following the filing with the Board, an additional geotechnical investigation was conducted to further examine and expand upon the initial findings. Enhanced coating was determined to be appropriate upon discovery of additional rock and in anticipation of the pipeline being installed at the bottom of municipal ditch lines in rural corridors. For these reasons, the coating design was changed to double fusion bonded epoxy coating for the entire route to protect the integrity of the pipeline.

   Pipe shipping rates increased largely due to timing of pipe delivery. The NPS 24 pipe shipping estimates were provided based on pipe movement from Saskatchewan to Ottawa in January. Project mobilization shifted to March 2013 due to steel mill production schedules, resulting in increased trucking costs due to the seasonal road weight restrictions imposed by the City of Ottawa (the “City”).

   Finally, there was an increase in material costs associated with the final engineering design and procurement of fittings and valves in comparison to those established at the time of the LTC filing.

2. The final cost for construction labor was $51,773,241, approximately $21 million more than estimated at the time of filing. The difference between the budgeted and actual labour costs can be attributed to three primary reasons: project definition ($5M), loss of anticipated productivity rates due to the inability to secure planned working easements from the NCC and the impact of inclement weather along these sections (variance of $12.5M), and unplanned rock excavation (variance of $3.2M).

   2.1 A Request for Quotation (“RFQ”) was conducted prior to filing the LTC application to gauge accuracy of Enbridge’s cost estimating tool and to assess the impact of market forces. The RFQ results supported the estimating tool.

However, additional scope definition prior to construction increased the cost estimate by $5M.

2.2 Productivity Losses From Reduced Working Easement and Weather Impacts

The inability to secure planned working easements along the National Capital Commission ("NCC") lands, about 7km along the 19km project route, forced a change to the method of construction in order to accommodate greatly restricted work areas. This change resulted in slower production than anticipated, more extensive and complex traffic control management and additional hauling of materials. (Please see Section 2.2.1). Inclement weather further impacted labour and hampered productivity throughout the project schedule (Please see Section 2.2.2). Approximately $12.5M of the pipeline labour cost increase is due to such productivity related factors.

2.2.1 NCC Temporary Working Easement

At the time of the LTC application, the NCC did not anticipate any issues relating to the Federal Land Access permit request given the limited amount of space required and the nature of the construction activities that would take place. (EB-2012-0099, Exhibit G, Tab 1, Schedule 2).

The Environmental Assessment ("EA") study took many factors into consideration during the identification and evaluation of the route selection process. The NCC endorsed the proposed preferred route due to minimal impact to NCC lands compared to the direct impact of the alternate route as identified within the EA.

Enbridge worked with the NCC on obtaining temporary working easements along the project route starting in early 2011 and continuously up to June 2013. The negotiation process with the NCC was deemed to be progressing well up until March 2013. However, the NCC did not anticipate that the removal of trees adjacent to existing municipal road allowance would be required to facilitate pipeline construction. In addition to the Company's Neutral Footprint Policy which replaces trees to minimize the environmental impact of the number of trees to be removed, Enbridge revised the request from an original 10 metre temporary working easement to a 7 metre temporary working easement to a 3 metre temporary working easement. The 3 metre width was determined to be the minimum amount of working room required to ensure safe construction. Enbridge continued to negotiate with the NCC and was not in a position to apply for expropriation as the proposed easement is federal

land. By June 2013, Enbridge had to develop and implement a new construction execution plan which did not include the temporary use of NCC Federal Lands in order to maintain the project schedule.

The change resulted in restricted work zones which forced work onto arterial roadways. This led to the engagement of traffic management professionals to design a traffic plan, the construction, maintenance and removal of additional lanes, and full time traffic management resources on site. This also resulted in additional temporary and permanent hard surface restoration, spoil removal, hauling and storage.

2.2.2 Weather Conditions

Productivity was negatively impacted due to weather events, especially rain, throughout the construction period. Resources and equipment were diverted to pumping water. A lack of natural drainage along West Hunt Club Road and Richmond Road combined with an inability to discharge through NCC lands had significant impacts on productivity.

Ground water over a 4 km section of the east portion of Flewellyn Road required ongoing dewatering. Rain events in this portion made restoration efforts difficult and increased costs. Crews returned to washed out working sections several times and were required to rebuild ditches to ensure public and worker safety. Early snow in November and December and consistently cold temperatures challenged tasks during hydrostatic testing, dewatering and drying of the pipeline. Weather-related shut-downs significantly impacted crew productivity, resulting in increased labour costs.

2.3 Productivity Loss Due To Rock Excavation

The 1.7 km segment along Flewellyn Road was located on private land and rock conditions were not fully determined until after the LTC application and upon agreement with the landowner on access rights. The additional rock excavation and rock haulage resulted in an additional $3.2M along these sections. Multiple factors such as severe subsurface water, above average precipitation levels, unexpected boulders not suitable as backfill material, and digging in constrained work zones also contributed to the increased costs.

The increased cost of extra rock is not a result of the extra depth required along Hopeside Road, Richmond Road, and West Hunt Club Road in accommodating

the City's Road Widening Program. (It should be noted that the City has yet to complete its Corridor EA study for its Road Widening Program.)
In summary, the absence of NCC easements directly contributed to additional construction costs. It also exacerbated the costs impacts from weather events and rock conditions.

3. The final external costs were $5,756,103, approximately $2.4 million more than estimated at the time of filing. The difference between the budgeted and actual external costs can be attributed to two primary reasons: increase in inspection and permitting resources (variance of $1.9M) and increase in external consultation instead of utilizing internal resources (variance of $0.5M).

   As a result of restricted work areas, additional inspection resources were required who had the expertise to adequately oversee additional complex work zones along the route. This was diligent in order to maintain worker and public safety, reduce complaints and ease traffic congestion. Further external expert resources were required to obtain special permits such as the permit to take water from the Ministry of Environment for filling and discharge of Hydrostatic test water from quarries.

   Some of this increase in external cost is offset by decrease in overhead cost. (Please see Section 5.)

4. The final land costs were $350,010, approximately half of the original estimate. This is due to the inability to secure a number of temporary working easements as originally forecast.

5. Final overhead costs were $1,076,557, approximately half of the original estimate. Engineering, project planning and inspection services were completed externally rather than internally resulting in increased external costs and decreased internal overhead costs. In the future, it may be beneficial to report on external and internal costs together rather than separately, as the circumstances for resourcing will depend on project complexity and the depth of internal subject matter expertise.

6. Contingency has been used for this project.

Lessons Learned for Future Projects

The contingency for Ottawa Reinforcement Project was underestimated at the time of project cost development. Risk assessment sessions were held to review systemic and project specific risks to determine this contingency. However, the certainty of the inputs into the risk register varied; for example, the input into the risk register for working

easements was based on the current status of negotiations. In the case of rock evaluation, the sufficiency of the input data was influenced by the extent of sampling along the route.

Large scale projects require front end resource commitments earlier in the project development life cycle to progress scope definition and class[2] of estimate prior to LTC submission. For example, advancing geotechnical studies along entire project routes will increase information on subsurface conditions and therefore, more cost certainty. In the absence of detailed information at the early stages of a project, sufficient contingency needs to be built in to account for exclusions in the estimate and possible scope variations. It is also essential to distinguish between the different levels of estimating classes and associated contingencies in order to improve cost predictability. After each project completion, actual costs need to be reviewed against estimates to iteratively improve the cost estimating methodology.

The following changes have been made to Enbridge to ensure better cost estimates:

- Pipe coating will continue to be selected on a case by case basis. The cost estimating tool will be updated to include scenarios where double fusion bonded epoxy coating may be prudent based on geotechnical information and other project circumstances.
- The extent of geotechnical studies will be increased at the time of cost estimation. Additional training has been initiated to better understand the geotechnical data collected. Project contingency will reflect the appropriate level of project definition at the time of filing.
- Negotiations of permanent and working easements will begin earlier in the project planning phases. Letters of intent will be sought during early easement discussions if possible. The level of risk associated with not being able to attain required easements and their alternatives will be explored and highlighted. This is particularly important when the easements cannot be expropriated.

[2] AACE - Association for the Advancement of Cost Engineering