

Project Change Notice

PCN-0531 Geotechnical Field Investigation for HVdc Line

Section 1: Request for Proposed Change

CM X-Ref. **DAN-1770, DAN-1595, PCN-0591, PCN-0580**

Date Originated **7 Oct 2015**

Originator **Maria Veitch**

Package Leader / Engineer **Maria Veitch**

Area Manager **Keenan Healey**

Scope / Project Manager **Kumar Kandaswamy**

Current Status **Created**

Revision **1**

TL 267 Project

Origin

- Internal PMT
- Contractor/Supplier
- Other Nalcor
- Construction Site Event
- SNC-Lavalin
- Other External

Agreement No.	Description
CT0327-001	350 kV HVdc Transmission Line Construction

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Description

Rev 01

As described below in Rev 00, addition funds were acquired for the completion of an advanced geotechnical program at approximately 26 locations in Segment 1 along the HVdc Transmission Line. As this geotechnical program has progressed additional locations beyond the initial 26 were identified and investigated. Also, due to site conditions the production was less than originally estimated.

As a result the cost incurred as of 31-Dec is \$518,866 (see attached) for 27 boreholes at 24 structure locations. As of 22-Jan-2016 the program has progressed to S1-499 and identified a total of 43 locations requiring borehole. The estimate in Rev 00 was \$253,485. It is projected that an additional \$ 746,515 will be required to complete the program.

Rev 00

This PCN is seeking the release of LIL Contingency required to fund the completion of an advanced geotechnical program at approximately 26 locations in Segment 1 along the HVdc Transmission Line.

The advanced geotechnical program is required for two reasons: to check locations at which foundations are already installed to ensure the correct foundation was selected and to check select future foundation sites before installation to ensure the correct foundation is selected.

There have been issues during construction on the HVdc transmission line with settlement of grillage foundations in the zone of S1 -1 to 200(reference LTRs CT0327001-0044 and 0052). The underlying reason for settlement is under debate, however one reason is incorrectly choosing a grillage foundation based on limited geotechnical data when a pile foundation would be a more fitting solution due to the soil type (note that this is Valard's position.) LCMC's position is that settlement is largely due to QC issues during installation.

As a solution to reduce the risk of incorrect foundation selection as well as ensure LITL is well protected to advance re-work claims by Valard, a program for additional geotechnical field investigation has been developed for investigating foundation sites where a grillage foundation will not provide adequate bearing. See attached proposal in LTR-CT0327001-0071 Rev 02 for details.

Both locations with foundation already installed, and location where a foundation is to be installed will be investigated.

Rationale

Further geotechnical analysis is required for some foundation location to verify the correct foundation solution.

Benefits

- 1.) Ensuring the correct foundation for the geotechnical condition is used should resolve issues related to settling or eliminate foundation selection as the cause of foundation settling.
- 2.) Ensure LITP has sufficient information to address any re-work claims presented by Valard.
- 3.) De-risk construction schedule due to re-work causing delays.
- 4.) Help ensure the long term integrity of the asset.

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Section 2: Impact of the Proposed Change to Project

Categorization

- Scope Addition/Deletion
- Scope Modification
- Non-Scope Change

Affected Project Component

- Muskrat Falls Generation
- Labrador Transmission Assets
- Labrador - Island Tx Link
- Maritime Link
- Nalcor PM
- Other

GC **Cost Control Account Summary**

Cost Control Account	Description	Estimated Cost
5.4.500.6224.1030.15.01	LITL Labrador Overland DC Transmission (CT0327 and CT0342)	\$275,000
5.4.990.0000.0699.99.02	LITL Project Contingency	(\$275,000)

rev 5.4.500.6224.1030.15.01 LITL Labrador OL DC Transmission 725,000
 5.4.990.0000.0699.99.02 LITL Project Contingency (725,000)

Direct and Indirect Impact by Change Analysis Team

Basis of Design

Construction
 Currently issues with settlement are causing delays in foundation installation. Confirming foundation selection with further geotechnical analysis should help alleviate these issues or confirm it is a construction method issue.

Contracts/Procurement
 Collection of geotechnical data will strengthen LITP's position wrt any potential warranty claims under CT0327-001.
 Valard will undertake the work under CT0327-001 foundation selection program, thus a Change Order will be issued.

GC **Cost Control** Reviewed By *Lisa Powers* Date Reviewed: *15 Feb 2016*

Rev 01
 Additional funds are required for CT0327-001: \$ 746,515

Rev 00
 Additional funds are required for CT0327-001: \$253,485.32. \$275,000 will be requested from LIL contingency to account for field changes (i.eg the need to expand the current program).

Note that pending the outcome of this program, it may require to be expanded.

Design Philosophy

Environment and Regulatory Comp.

Execution Approach

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The introduction of this advanced geotechnical program, specifically the collection of borehole data, will serve to augment the current approved foundation selection methodology within CT0327-001.

Health & Safety

Operations/Reliability

Collection of geotechnical data will provide further reassurance that for suspect locations, the correct foundation is selected, thus ensuring long term reliability of the line.

Property and Lands

Quality

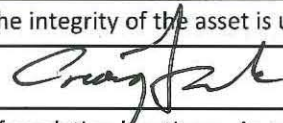
Currently issues with settlement are causing delays in foundation installation. Confirming foundation selection with further geotechnical analysis should help alleviate these issues or confirm it is a construction method issue.

Reputation

The criticality of the LIL requires LCMC to have confidence that the integrity of the asset is uncompromised.

Schedule

Reviewed By



Date Reviewed: 16-Feb-2016

To-date there have settlement observed at a number of grillage foundation locations. As present it is uncertain if this settlement is due to incorrect foundation selection or QC issues related to the installation. In either event, the collection of geotechnical borehole data for suspect locations will serve to protect / de-risk the overall construction schedule.

Other

Transportation/Shipping: No impact

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Section 3: Risk Screening

N/A:

	Low	Medium	High
Risk Pre-Change	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
With Proposed Change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

Change required due to design development - site conditions in order to respond an issue related to tower's foundation settlement through additional Geotechnical Field Investigation for HVdc line.

[Signature]
Risk Coordinator

19-FEB-2016
Date

* Reference Project Risk Management Plan for risk screening guidelines.

Risk Pre-Change

	Capital Cost, \$M	Schedule, Mos	Product Quality	People (HS)	Env	Reputation	< 0.1% Rare (1)	0.1% - 1% Low (2)	1% - 50% Possible (3)	50% - 90% Likely (4)	> 90% Almost Certain (5)
Extreme (5)	> 100	> 12	System & safety requirements are not achieved	Single or multiple fatalities	Massive Effect	International media coverage. Irreparable stakeholder impact	5	10	15	20	25
Major (4)	10 - 100	3 - 12	Substantial effect on performance objectives	Serious personal injury resulting in permanent disability	Major Effect	National media coverage. Substantial stakeholder impact	4	8	12	16	20
Moderate (3)	1 - 10	1 - 3	All design and operating margins eliminated	Injury to personnel not resulting in permanent disability	Localized Effect	Regional media coverage. Moderate stakeholder impact	3	6	9	12	15
Minor (2)	0.1 - 1	0.25 - 1	Minor decrease in system performance	Medical treatment of personnel. Lost time incident	Minor Effect	Local media attention. Minor stakeholder impact	2	4	6	12	15
Slight (1)	< 0.1	< 0.25	Slight degradation of element performance	Minor impact on personnel. First aid only. No lost time	Slight Effect	Slight media attention. Little stakeholder impact	1	2	3	4	5

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With Proposed Change

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Section 4: Implementation Plan

Implementation Strategy

Rev 01

Issue Change Order to Valard for additional cost.

Rev 00

Valard will assume the execution lead for this foundation geotechnical program under the umbrella of its current Foundation Selection Program, with AMEC providing geotechnical engineering services. Valard will contract for a third party drill rig and oversee the operations using AMEC onsite representative. LCMC will monitor results in a similar fashion as we have done to-date for the H-pile geotechnical program under CT0319-001.

Change Request will be approved via execution of Change Order.

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Actions

Action	Actionee	Status
Issue CO against contract / PO for additional costs Rev 01	Rosann Taylor	Incomplete
Define participation program with Valard for geotechnical program	Nazmi Boran	Complete
Issue CO against contract / PO	Rosann Taylor	Complete
Assess requirement for future program and flag DAN accordingly.	Maria Veitch	Incomplete
Update Current Control Budget in PM+	Lisa Powers	Complete

Documents

Name	File Name
Attachment 1	LTR-CT0327001-0071 Rev 02 - Further Geotech Proposal for MFDC.pdf
Attachment 2	Geotechnical Investigation Program.pdf
Completed Action Report #1	PCN0531 SC0572.pdf
Completed Action Report #2	Action Complete - Nazmi Boran.pdf

Process References

CHO-CT0327001-0008

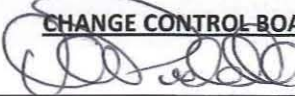
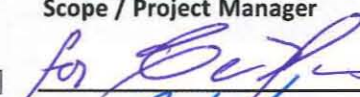
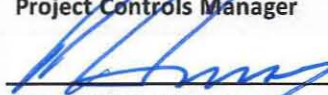
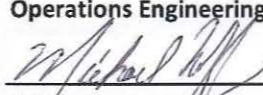
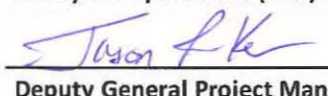


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Section 5: Distribution

- | | |
|---|---|
| <input checked="" type="checkbox"/> Originator | <input checked="" type="checkbox"/> Project Director |
| <input checked="" type="checkbox"/> Package Leader/Engineer | <input type="checkbox"/> System Planning (Nalcor) |
| <input checked="" type="checkbox"/> Area Manager | <input type="checkbox"/> Operations |
| <input type="checkbox"/> PM - Muskrat Falls Generation | <input type="checkbox"/> MF Site Manager |
| <input checked="" type="checkbox"/> PM - HVdc Specialties and Switchyards | <input type="checkbox"/> Construction Manager |
| <input type="checkbox"/> LILCo Manager | <input checked="" type="checkbox"/> Other |
| <input checked="" type="checkbox"/> PM TL Construction / Execution | <input type="checkbox"/> <input type="text" value="Rosann Taylor"/> |
| <input checked="" type="checkbox"/> Project Controls Manager | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> Supply Chain Manager | <input type="checkbox"/> <input type="text"/> |
| <input type="checkbox"/> HSS & ER Manager | <input type="checkbox"/> Other |
| <input type="checkbox"/> Quality Manager | <input type="checkbox"/> <input type="text"/> |
| <input type="checkbox"/> Envir. & Regul. Compliance Manager | |
| <input type="checkbox"/> Business Services Manager | |
| <input type="checkbox"/> Ready for Operations (RFO) Manager | |
| <input checked="" type="checkbox"/> Deputy General Project Manager | |
| <input type="checkbox"/> Project Manager SOBI Crossing | |
| <input checked="" type="checkbox"/> General Project Manager | |
| <input checked="" type="checkbox"/> Finance Manager | <input type="checkbox"/> Vice President |

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Section 6: Acceptance Phase

Decision	
<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Rejected/Cancelled
Decision Date 7 MAR 2016	
CHANGE CONTROL BOARD APPROVAL	
<input checked="" type="checkbox"/>  Scope / Project Manager (Date) <u>17-FEB-2016</u>	<input type="checkbox"/> _____ (Date)
<input checked="" type="checkbox"/>  Project Controls Manager (Date) <u>26-FEB-2016</u>	<input type="checkbox"/> _____ (Date)
<input checked="" type="checkbox"/>  Supply Chain Manager (Date) <u>24 Feb 2016</u>	<input checked="" type="checkbox"/>  Other Approval 1 (Date) <u>18-Feb-2016</u>
<input type="checkbox"/> _____ (Date)	<input type="checkbox"/> _____ (Date)
<input type="checkbox"/> HSS & ER Manager (Date)	<input type="checkbox"/> Other Approval 2 (Date)
<input type="checkbox"/> _____ (Date)	<input type="checkbox"/> _____ (Date)
<input type="checkbox"/> Quality Manager (Date)	<input type="checkbox"/> Other Approval 2 (Date)
<input type="checkbox"/> _____ (Date)	
<input type="checkbox"/> Envir. & Regul. Compliance Manager (Date)	
<input type="checkbox"/> _____ (Date)	
<input type="checkbox"/> Business Services Manager (Date)	
<input type="checkbox"/> _____ (Date)	
<input type="checkbox"/> Ready for Operations (RFO) Manager (Date)	
<input checked="" type="checkbox"/>  Deputy General Project Manager (Date) <u>24-FEB-2016</u>	
<input type="checkbox"/> _____ (Date)	
<input type="checkbox"/> Project Manager SOBI Crossing (Date)	
<input checked="" type="checkbox"/>  General Project Manager (Date) <u>26-FEB-2016</u>	
<input type="checkbox"/> _____ (Date)	
<input type="checkbox"/> General Manager Finance (Date)	<input type="checkbox"/> _____ (Date)
<input checked="" type="checkbox"/>  Project Director (Date) <u>7 MAR 2016</u>	<input type="checkbox"/> V.P. - Lower Churchill Project (Date)
	<input type="checkbox"/> _____ (Date)
	<input type="checkbox"/> CEO & Gatekeeper (Date)

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Section 7: Close-Out

Implementation Status Complete:

Signoff:

Change Management Lead:

Date:

Scope/Project Manager:

Date: