

From: [Nik Argirov](mailto:Nik.Argirov)
To: gregsnyder@lowerchurchillproject.ca
Cc: "[John Young](mailto:John.Young)"; stevepellerin@lowerchurchillproject.ca
Subject: RE: Minutes of Meeting in MOntréal
Date: Friday, February 5, 2016 4:26:53 PM
Attachments: [.png](#)
[2016 01 14 IE Meeting in Montreal Meeting Minutes GS_JY_NA.docx](#)

Greg,

Sorry I have an additional correction under item 3. Please disregard the previous doc.

Regards,

Nik

From: Nik Argirov [mailto:nik@argirovglobal.com]
Sent: Friday, February 5, 2016 11:47 AM
To: 'GregSnyder@lowerchurchillproject.ca'
Cc: 'John Young'; 'StevePellerin@lowerchurchillproject.ca'
Subject: RE: Minutes of Meeting in MOntréal

Greg,

Here are the minutes with our edits.

Regards,

Nik

From: GregSnyder@lowerchurchillproject.ca
[<mailto:GregSnyder@lowerchurchillproject.ca>]

Sent: Monday, January 18, 2016 9:01 AM

To: John Young; Nik Argirov

Subject: Minutes of Meeting in MONTreal

John, Nik:

Here is a draft of the minutes for the meeting, please review and comment (edit) so we can issue officially. I will attach the sketch showing location for the liquifying clay - are there any other attachments you would like to see?

thanks,

Greg

Greg Snyder, FEC, P.Eng.

Engineering Manager, Muskrat Falls

PROJECT DELIVERY TEAM

Lower Churchill Project

t. (709) 733.4476 c. (709) 351.6856

e. GregSnyder@lowerchurchillproject.ca

w. muskratfalls.nalcorenergy.com





Minutes of Meeting

| | | | |
|------------------|---|-----------------------|----------------------------|
| Project: | Lower Churchill Project | Package No.: | CH0008 |
| Purpose: | Review of Question from Independent Engineer. | Package Title: | North Spur |
| Location: | SNC Office – Montreal | Date / Time: | 14 Jan 2016. 11:00 – 15:00 |

| | | | |
|----------------------|--|-----------------------------------|---------------------------|
| Attendees: | Greg Snyder Regis Bouchard Alvaro Ceballos | Michel Tremblay Paolo Catellan | Nik Argirov John Young |
| Distribution: | Scott O'Brien, Karen O'Neill, Gilbert Bennett, Ron Power, Grant Horwood, Mark Turpin | | |
| Recorded by: | Greg Snyder | Signature: | |

| Item | Description | Action | Date |
|------|---|--------|------|
| 1. | The objective of the meeting is to discuss the <u>IE observation made during the Nov'15 site visit and further reflected in the questions raised in the latest IIndependent Engineers Site Visit Report</u> . The meeting is being held face to face so that issues raised can be discussed and project team can present relevant background information and studies. | | |
| 2. | The report stated the following: <u>"An anomalous feature was noted in the excavations above el 27.0 m in the transition between the Upstream and Downstream cutoff walls. As shown on Photo 1.13, the soil layering in the lower slope is tilted into the slope at an angle of about 30 degrees from horizontal. At mid-height the layers are inclined about 15 to 20 degrees in the opposite direction".</u> <u>A possible relict slide block was noted in the excavated slope above el 27 m in the transition area between the upstream and north cutoff walls.</u> <u>"It is not clear if the project engineers have assessed this feature and determined its impact on long term stability in the area.</u> The IE requested <u>clarification discussion commends on the completion of this project engineer's assessment of this feature.</u> " | | |

Formatted: Font: (Default) Calibri, 12 pt, English (Canada)

Formatted: Highlight



Minutes of Meeting

| Item | Description | Action | Date |
|------|--|-------------------------------|---|
| | <ul style="list-style-type: none"> - IE had noted this feature during visit in November when project team members were not present to discuss in the field. - Photos of the area were reviewed and methods of formation of such a feature were discussed. <u>It was noted that the lower block of material had definitely tilted about 30 degrees towards the north. It also appeared that some of the layering on the upslope side had tilted towards the south. The pre-construction topography indicated that some local slumps had occurred in the affected area as a result of shoreline erosion and resultant local slope over-steepening. It is possible that the tilted beds observed by the IE are related to these features. It is also possible that the feature is a glacial kettle which would better explain the northerly and southerly tilting of the beds. IE agreed that the latter explanation is more likely.</u> - CPT tests were done in this area in 2016 to confirm properties in this area and disturbed material (indicative of a landslide) was not detected. - IE agreed that a relict Kettle Lake better explained the presence of cross-bedding. - The design assumed that a slide could be present anywhere on the upstream of the north spur, so the design is not impacted if an undetected slide had been found. | | |
| | <ul style="list-style-type: none"> - This is explained in Design Report, which is not yet completed (to be issued by March 2016). - It was noted that site is inspected every day by geotechnical engineers (both SNC and Contractor). - IE requested that mapping of this feature be mapped and included in a report. Mapping typically done for foundation preparation, but not always at interim stages of construction, such as this. - It was agreed that anomalies, such as this one, would be mapped if found. | | |
| | <p>Actions:</p> <ul style="list-style-type: none"> - Finalize and issue design report. Copy to IE. - Map any anomalous features - IE to modify their report to indicate Kettle Lake as likely explanation and that further analysis not required. | <p>AC</p> <p>AC</p> <p>JY</p> | <p>11 Mar 2016</p> <p>On-going</p> <p>29 Jan 2016</p> |



Minutes of Meeting

| Item | Description | Action | Date |
|------|---|--------|------|
| 3. | <p>In their report, theThe IE has noted that further <u>observed</u> in the November 2015 Gilbert's monthly report (p3 Problems and Mitigations) that they have encountered liquefying clay in several downs stream sections. In the IE September and November site visit reports, they IE reported that no such materials had been encountered to date – is this statement valid?</p> | | |
| | <ul style="list-style-type: none"> - Project team confirmed that liquefying clay was not encountered by Contractor until late November and had not been found prior to IEs previous visits. - Location of liquefying clay was shown on available plans and reviewed with IE. - theThe presence of this material is local and, <u>so far, is</u> limited to two pockets of material. Only one single layer can be identified and the strata is not continuous along the downstream area. | | |
| | <ul style="list-style-type: none"> - The layer was identified at elevations varying between 27 m and 25 to 22 m in the area of station 0+350 and at elevations varying between 33 and 30 to 28 m in the area of station 0+410. - Information from geotechnical investigations in the area were reviewed and discussed. - It was agreed that liquefiable clays were anticipated and design and construction teams well prepared for it. Amount encountered to date is far less than expected but more may be encountered in coming construction season. - <u>IE requested that mapping of this feature be map performed and included in a report. Mapping is typically done for foundation preparation, but not always at interim stages of construction, such as this.</u> | | |
| | <p>Action:</p> <ul style="list-style-type: none"> - No action required. <u>Field staff will carefully document (including mapping) all occurrences of liquefiable clay.</u> | | |



Minutes of Meeting

| Item | Description | Action | Date |
|------|--|--------|------|
| 4 | <p>Progressive Landslide Report. Regis Bouchard gave a presentation on Progress Landslides, based on the report on this subject.</p> <ul style="list-style-type: none"> - IE commented that this presentation is very good and thorough and answered all questions raised by Bernander and Gordon on design of North Spur for potential landslides. | | |
| 5 | <p>Jim Gordon's recent commentary in media questioning the design of the North Spur was discussed.</p> <ul style="list-style-type: none"> - IE recommends that project team invite Jim Gordon to a presentation on the North Spur design and provide him with answers to any questions he may have. - Greg Snyder will discuss this with management team and determine action. | | |
| | | | |

Contract/Supplier hereby agrees that Contract/Supplier has reviewed and agrees with the content and accuracy of these Minutes of Meeting.

Signature: _____
 Name (please print): _____
 Date: _____