



The Yukon Electrical Company Limited
An ATCO Company

April 20, 2007

Yukon Utilities Board
Box 31728
Whitehorse, Yukon
Y1A 6L3

YUKON UTILITIES BOARD		
EXHIBIT		C1-2
DAY	ENTERED BY	DATE
	YEZL	Apr 20/07

Attention: Wendy Shanks, Acting Chair

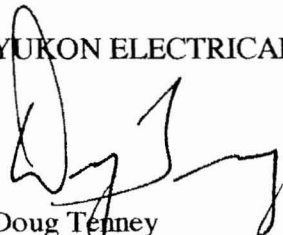
Dear Ms. Shanks

Re: Yukon Electrical Company Limited Information Requests to YEC re Stewart-Carmacks Transmission Project Part 3 Review

Please find enclosed the information requests from Yukon Electrical Company Limited to Yukon Energy with respect to the Stewart-Carmacks Transmission Project Part 3 Review.

Yours truly,

YUKON ELECTRICAL COMPANY LIMITED



Doug Tenney
VP & General Manager

Cc: Yukon Energy Corporation
Registered Intervenors/Interested Parties

WHITEHORSE
2007



— JEUX DU
CANADA
GAMES —

OFFICIAL SUPPLIER -
FOURNISSEUR OFFICIEL



WHITEHORSE 2007
JEUX DU CANADA GAMES



YECL-YEC- 1

Topic: The two proposed stages of the Carmacks-Stewart Transmission Project (CSTP or Project) and confirmation of the scope of the Application for an Energy Project Certificate and an Energy Operation Certificate

Reference: March 13, 2007 letter to the Board from YEC, March 20, 2007 letter from the Minister of Justice to the Board and Page 1 of April 2, 2007 Application for An Energy Project Certificate and an Energy Operation Certificate Regarding the Proposed Carmack-Stewart Transmission Project

Preamble: In the introduction to its Application, YEC applies to the Minister of Justice for an energy project certificate and an energy operation certificate for the proposed CSTP. While it is not entirely clear whether this means both Stage One and Stage Two, Under the heading "Project Summary Description", (Page 3 of the Application) YEC states the CSTP will be located in the Yukon interior region between Carmacks and Stewart Crossing.

In prior correspondence regarding the scope of the impending application YEC writes in Section 2(b)(i)(ii), of its March 13, 2007 letter to the Board:

YEC, as proponent, is required under Section 39 of the Act to submit such application for each certificate and such applications must contain the information prescribed by the Minister.

Stage One application – YEC currently is only seeking a certificate, if needed, to proceed with Stage One of the CS Project. YEC currently therefore plans at this time to submit a Part 3 application only for Stage One.

Stage Two recommended by YUB to require separate later YUB review – The Board's January 15, 2007 Report on the Resource Plan addressed the CS Project by stage, and recommended that Stage Two only proceed after YEC has a firm commitment to connect the Carmacks Copper Mine (which implies a power purchase arrangement as well) and then comes back to the Board



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

for review of specific proposals to develop Stage Two. YEC is currently not in a position to proceed with Stage Two as recommended by the YUB.

In further correspondence regarding the scope of the impending application, the Minister of Justice writes to the Board on March 20, 2007.

“I can advise that on March 16, 2007, the government designated the Carmacks-Stewart Transmission Project as a “regulated project” under Part 3 of the Public Utilities Act...As a result of the designation, I anticipate that the YEC will in the very near future make an application for an energy project certificate and an energy operation certificate under Part 3 for Stage One of the Project.”

- Request:**
- (a) Please confirm whether YEC’s April 2, 2007 Application includes a request for certificates that encompass both Stage One and Stage Two of the CSTP.
 - (b) If the Application does not include a request for certificates that encompass both Stage One and Stage Two, when does YEC anticipate being able to file an Application for Stage Two and under what context?
 - (c) If the Application does include a request for certificates that encompass both Stage One and Stage Two, please explain why YEC is in a position to proceed with both Stage One and Stage Two as of April 2, 2007 given it was not in a position to proceed on March 13, 2007. More specifically, does YEC now have a firm commitment from the Carmacks Copper mine to connect?



YECL-YEC- 2

Topic: Interpretation of April 2, 2007 letter from the Minister of Energy, Mines and Resources to YEC

Reference: Attachment D of YEC's Part 3 Application for an Energy Project Certificate and an Energy Operation Certificate

Preamble: In his April 2, 2007 letter to YEC, the Minister writes:

"I am writing to inform you that the Yukon government will provide YEC with a contribution of up to \$10 million for Stage One of the CSTP. This commitment is subject to YEC securing the YUB approval of the Power Purchase Agreement with Minto Explorations and receiving all necessary permits and approvals, including Energy Certificates obtained under the Public Utilities Act. These funds will be applied to those Stage One capital costs not already committed from Yukon Development Corporation and the Minto.

The Yukon Government will work with YEC and industry to ensure that Stage Two can also be constructed in the future without any direct cost to other ratepayers."

- Request:**
- (a) Please confirm YEC's interpretation of the above statements and, more specifically, what YEC believes the Minister means when he effectively states that Stage One and Stage Two of the CSTP be constructed without any direct cost to other ratepayers.

 - (b) Please confirm YEC's interpretation of the statement the \$10 million for Stage One is subject to YEC securing the YUB approval of the Power Purchase Agreement. More specifically, if the YUB disallows one or more components to the Power Purchase Agreement, is the \$10 million for Stage One still available?



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

- (c) Please describe what evidence YEC has that Stage Two will not have any direct cost to other ratepayers? More specifically, what confirmation does YEC have that the Stage One and Stage Two contributions referred to in the April 2, 2007 letter and YEC's Application will come from the Yukon Territorial Government or industry?

- (d) Regardless of YEC's previously stated intent to not adversely impact ratepayers in the currently submitted PPA between YEC and Minto, if the future unfolds in a way that results in direct costs being allocated to and or incurred by other ratepayers, what would YEC propose to do?

YECL-YEC- 3

Topic: YUB Report to Executive Commissioner and Planning Criteria and Alternatives Available to Meet Insufficient Transmission Capacity

Reference: YUB Report to Executive Commissioner YEC 20-Year Resource Plan

Preamble: On January 15, 2007, the YUB presented its recommendations regarding the hearing into YEC's 20-Year Resource Plan. The Board has concluded, based on the N-1 planning criteria, the WAF system is currently affected by insufficient transmission capacity, and based on the LOLE planning criteria, it would face inadequate generation resources as early as 2008, assuming the base-case load forecast materializes.

Request:



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

Please prepare an economic comparison¹ of the YEC's diesel / Carmacks–Stewart transmission line solution as compared to the Board's alternative of a second Aishihik line as detailed in Table 5.5 of the YUB Report to the Commissioner. The Board's alternative should also include the cost and benefits of constructing a 34.5 kV line to serve both the Minto mine and Pelly Crossing. In order to accurately assess the total cost of each alternative, (i.e. the total societal costs) the only contributions that should be included under either alternative should be "customer contributions". Please provide all supporting details and spreadsheets to complete this economic comparison.

YECL-YEC- 4

Topic: Is it prudent to extend the line from Minto to Pelly Crossing at this time?

Reference: Part III Terms of Reference from the Minister

Preamble: The Minister has asked whether it is prudent to extend the line from Minto to Pelly Crossing at this time

- Request:**
- (a) Please prepare an economic analysis of all costs and benefits to interconnect Pelly Crossing from the Minto spur line using a 34.5 kV power line.
 - (b) Please prepare an economic analysis of all costs and benefits to interconnect Pelly Crossing from the Minto spur line using a 138 kV power line

¹ As detailed by the Board, this economic comparison should include a cash-flow analysis that would include annual production costs, such as fuel requirements and O&M costs, as well as capital costs, properly escalated to the year that each new project is placed in-service under each expansion plan. Then, for each plan, the annual cash-flows would need to be present valued, using appropriate economic parameters, to a reference year for comparison.



YECL-YEC- 5

Topic: Potential provision of grid power to Western Copper

Reference: Page 6 of Part III Application (Footnote 13)

Preamble: YEC notes that an 11 km 138 kV spur would be required from Western Copper's mine site to the CSTP in the McGregor Creek area.

- Request:**
- (a) Please provide the expected distance from the Western Copper min spur interconnection point back to Carmacks.
 - (b) Please provide evidence that supports YEC's conclusion that the Western Copper mine site requires a 138 kV transmission service and what other voltage levels were studied.
 - (c) Please provide evidence that the costs of two separate 34.5 kV lines serving each of the Minto and Western Copper is more expensive than the 138 kV option.

YECL-YEC- 6

Topic: Cost estimates for Stage One and the Spur Mine to Minto

Reference: PWP-1-9 and PWP-1-10 in the Minto PPA proceeding; Board Order 2007-03 Reasons For Decision - Section 1.6

Preamble: In Board Order 2007-03, the Board reviewed the information requests made by Percival and concluded it was not prepared to direct YEC to provide any further information in the proceeding, as it questioned the relevance of this information; however, the Board did consider that this information was likely relevant to the Part 3 review to be directed by the Government of the Yukon.



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

- Request:**
- (a) Please respond to question PWP-1-9 in the Minto PPA proceeding
 - (b) Please respond to question PWP-1-10 in the Minto PPA proceeding.

YECL-YEC-7

Topic: Impact of Minto's Processes on the Grid's Power Quality

Reference: Terms of Reference Section 5(b)

Preamble: YEC has an obligation to the existing customers connected to the grid to ensure new as well as existing customer loads do not negatively impact the power quality of other customers. Minto's processes may cause unacceptable voltage fluctuations on the grid fed system that will be seen by other customers.

Request:

- a) Please provide a copy of International Electro-technical Commission (IEC) standards 1000 3-7 and 1000 4-15.
- b) Does YEC plan and operate its system to ensure IEC standards 1000 3-7 and 1000 4-15 are met? If not, please explain what standards YEC uses.
- c) Based on YEC's proposal to serve Minto via a 138 kV main line and 25 kV spur line, please provide the following information for each of the locations of Minto Landing, Pelly Crossing, Carmacks and the Whitehorse area:
 - i. Will voltage flickers upon motor start up of Minto's equipment cause voltage flickers to be outside of the limits set out by IEC 1000 4-15 and IEC 1000 3-7 and how often? More specifically:
 - 1. What are the largest flicker levels that will be seen by other customers?



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

2. How often does YEC expect flickers over 2% each day for other customers?
 3. How often does YEC expect flickers over 3% each day for other customers?
 4. How often does YEC expect flickers over 4% each day for other customers?
 5. How often does YEC expect flickers over 5% each day for other customers?
- ii. Will Minto's processes be such that loading up of the motors will cause current inrushes (and consequent voltage fluctuations) that are outside the limits set out by IEC 1000 4-15 and IEC 1000 3-7 and how often? More specifically:
1. What are the largest flicker levels that will be seen by other customers?
 2. How often does YEC expect flickers over 2% each day for other customers?
 3. How often does YEC expect flickers over 3% each day for other customers?
 4. How often does YEC expect flickers over 4% each day for other customers?
 5. How often does YEC expect flickers over 5% each day for other customers?
- iii. Please illustrate how your answers in (i) and (ii) compare to the standards as set out in IEC 1000 4-15 and IEC 1000 3-7.
- d) Based on an alternative proposal to serve Minto and Pelly Crossing via a 34.5 kV line, please provide the following information for the locations of Minto Landing, Pelly Crossing, Carmacks and the Whitehorse area:
- i. Will voltage flickers upon motor start up of Minto's equipment cause voltage flickers to be outside of the limits set out by IEC 1000 4-15 and IEC 1000 3-7 and how often? More specifically:
1. What are the largest flicker levels that will be seen by other customers?



**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

2. How often does YEC expect flickers over 2% each day for other customers?
 3. How often does YEC expect flickers over 3% each day for other customers?
 4. How often does YEC expect flickers over 4% each day for other customers?
 5. How often does YEC expect flickers over 5% each day for other customers?
- ii. Will Minto's processes be such that loading up of the motors will cause current inrushes (and consequent voltage fluctuations) that are outside the limits set out by IEC 1000 4-15 and IEC 1000 3-7 and how often? More specifically:
1. What are the largest flicker levels that will be seen by other customers?
 2. How often does YEC expect flickers over 2% each day for other customers?
 3. How often does YEC expect flickers over 3% each day for other customers?
 4. How often does YEC expect flickers over 4% each day for other customers?
 5. How often does YEC expect flickers over 5% each day for other customers?
- iii. Please illustrate how your answers in (i) and (ii) compare to the standards as set out in IEC 1000 4-15 and IEC 1000 3-7.

YECL-YEC-8

Topic: Impact of Extending the Grid to Serve the Minto Mine

Reference: Terms of Reference Section 5(b)

Preamble: YEC has an obligation to ensure existing customers on the electrical system do not have their power quality negatively impacted as a result of the interconnection of new customers. Minto's processes may cause unacceptable power quality concerns.



Request:

- a) When the system is extended to Minto and reactors, capacitor banks and/or synchronous condensers switch in or out, what will be the impact to voltage and frequency when the system is at 100% of peak load, 75% of peak load and 50% of peak load?
- b) Please provide the results any dynamic stability studies done to date to investigate the impact of customers on the grid due to the loss of a generator after the interconnection of Minto to the grid.
- c) As the combination of reactive and capacitive components can create a resonant circuit, especially with very little load, please provide the results of your studies on this issue.
- d) Since the announced hiring of Wardrop Engineering on March 30, 2007, has YEC's engineering staff had any meetings surrounding the work Wardrop Engineering has been tasked to complete? If yes, have any issues been identified that were not previously considered by YEC as part of its 2005 Carmacks – Stewart Project Economics?
- e) Please elaborate on whether costs incurred to mitigate any of the issues identified in d) above are included in the capital cost estimates provided in Schedule 1 of the Application. If not, what are the expected capital cost increases?

YECL-YEC-9

Topic: Impact of Extending the Transmission Grid to tie the “Mayo-Dawson Grid” to the “WAF” grid.

Reference: Terms of Reference Section 5(b)

Preamble: YEC has an obligation to existing customers that new loads and existing loads do not negatively impact the power quality of other customers.



Request:

- a) When the transmission system is extended to Stewart Crossing (and the two grids are tied together) and the reactors or capacitor banks or synchronous condensers switch in or out, what will the impact be to the voltage and frequency when the system is at 100% of peak load, 75% of peak load and 50% of peak load?
- b) What is the forecasted impact to the voltage or frequency when the existing systems separate from one another when the system is at 100% of peak load, 75% of peak load and 50% of peak load?
- c) What is the forecast impact to the voltage or frequency when the existing systems are tied together when the system is at 100% of peak load, 75% of peak load and 50% of peak load?
- d) What is the status of dynamic stability studies done to investigate the loss of a generator on this new system? Have any issues been identified to date?
- e) The combination of reactive and capacitive components can create a resonant circuit, especially with very little load. If this has been studied, what are the results? If this has not been studied, is it part of the terms of reference?

YECL-YEC-10

Topic: Design choices and considerations for the proposed main line to serve Minto and Pelly Crossing.

REFERENCE: TERMS OF REFERENCE SECTION 5(B)

Preamble: There are a wide variety of choices available to YEC regarding the design of the proposed power line. Factors to consider, in part, include current and forecast load, line losses and capital costs.

Request:



The Yukon Electrical Company Limited
An ATCO Company

**Yukon Energy Corporation Application for an
Energy Project Certificate and an Energy
Operation Certificate Regarding the Proposed
Carmacks-Stewart Transmission Project
Information Requests
Dated: April 20, 2007**

Please explain and provide evidence for what YEC has chosen to design and build for the following:

- (1) Right of way width
- (2) Structure design
- (3) Structure composition (materials)
- (4) Conductor size