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December 18, 2017

Mr. Robert Laking, Chair
Yukon Utilities Board
Box 31728
Whitehorse, Yukon Y1A 6L3

Dear Mr. Laking:

Re: Alternative GRA Forecast per Board Order 2017-08

Order 2017-08 of the Yukon Utilities Board ("YUB" or "Board") directed Yukon Energy Corporation ("Yukon Energy" or "YEC") to provide an alternative GRA forecast (the "Alternative GRA Forecast") using a short-term hydro-electric forecast for the test period and any consequential changes to the thermal generation forecast, removing any DCF references in that alternative forecast, and filing the alternative forecast within 60 days of the issuance of Order 2017-08 [i.e., by December 18, 2017].

On December 6, 2017, in its response to Board Order 2017-08, Yukon Energy provided as Appendix 2.2 of the filing the Short-term Hydro Alternative GRA Forecast ("ST Alternative GRA Forecast") as directed in Order 2017-08 so that this alternative could be considered in the ERA Application Part 2 assessments for the period 2017 forward. A copy of Appendix 2.2 is attached to this letter as Attachment 1.

As noted in YEC's December 6, 2017 letter, and in Section 2.2 and 2.5 and Appendix 2.2 of the ERA Application Part 2 Filing, Yukon Energy does not consider the ST Alternative GRA Forecast to be appropriate for rate setting at this time, and YEC is not applying for and does not support the ST Alternative GRA Forecast.

Yukon Energy's December 6, 2017 response to Board Order 2017-08 also noted that Yukon Energy was attempting to address by December 18, 2018 additional directions in Appendix A to Order 2017-08 regarding the ST Alternative GRA Forecast, including directions to:

(a) Provide a copy of the alternative forecast in a clean version and a blacklined version of YEC's entire GRA showing all changes made;

(b) Provide revisions to all information responses and provide similar treatment (clean and blacklined versions) at the time the alternative is filed; and

(c) Explain all variances between the LTA hydro-generation forecast and the short-term hydro-generation forecast (including any changes in the thermal-generation forecasts) as well as a comparison between the LTA and short-term hydro-generation modelling assumptions.

Yukon Energy notes that the ST Alternative GRA Forecast as filed December 6, 2017 (Attachment 1) addresses the basic requirements in "c" above. The following four additional items are provided with this letter to address items "a" and "b" above:

- A clean and blacklined version of YEC's entire GRA showing the changes needed to address the ST Alternative GRA Forecast and to remove any DCF references in the Alternative GRA Forecast for the test years. The following assumptions and guides have been adopted for the Alternative GRA Forecast documents:
    - The document structure and content as filed in June 2017 has been retained, except where inserts are needed to explain the Alternative GRA Forecast document per Order 2017-08, to change text and forecasts to reflect the ST hydro forecast, to remove Appendix 3.4 dealing with DCF Updates, to remove Appendix 4.1 (and other text) dealing with interim refundable Rider J proposals, and to edit ERA comments that are out of date today. No changes were made to Tabs 5, 6, 8, 9 and 10.
    - Reference to LTA and DCF have been removed from the June 2017 document where these addressed test year forecasts in the GRA as filed in June 2017; however, no deletions have been made for LTA and DCF references addressing pre-GRA years (i.e., prior to 2017), past decisions, or current rates and bills.
    - The "Existing Forecasts" for test years have not been changed from the GRA as filed in June 2017, as these address the situation without a new GRA (where past GRA decisions remain including the LTA forecast as last approved and related DCF elements).

- A clean and blacklined version of all YEC's responses to IRs showing where revisions are needed (including deletions) to address Board Order 2017-08 directions regarding the Alternative GRA Forecast. The following assumptions and guides have been adopted for the Alternative GRA Forecast document:
    - Where revisions are needed, the IR response footer is revised to show "Alternative GRA Forecast - December 18, 2017". No change is made to footers on IRs where no revision is needed.
    - IRs dealing with Appendix 3.4 (DCF and LTA Updates) are generally deleted, except where response provided historic information as requested.
    - No changes to IRs dealing with capital project business case references to LTA generation (as these go to business case and not GRA test year hydro forecasts).

- For both of the above noted consolidated documents, where tables have been deleted in the blackline versions, the tracked change edit for the deleted table has been accepted and the revised table has been inserted. This approach was adopted to prevent confusion related to having two separate tables appearing in the document [i.e., the formatting in Adobe makes it difficult to discern which table is revised and which is deleted]. To assist the reader in identifying changes, the revised table has yellow highlights on amended information.

If you have any questions regarding the above please call.

Yours truly,

Ed Mollard
Chief Financial Officer

ATTACHMENT 1:

APPENDIX 2.2: SHORT-TERM HYDRO ALTERNATIVE GRA FORECAST

APPENDIX 2.2: SHORT-TERM HYDRO ALTERNATIVE GRA FORECAST

Introduction

Part 2 of the ERA Application is directed to assess any alternatives to the current LTA approach, with the related DCF and ERA. Board Order 2017-08 also directs YEC "to provide an alternative GRA forecast, using a short-term hydro-electric forecast for the test period in question and any consequential changes to the thermal generation forecast, removing any DCF references in that alternative forecast and filing the alternative forecast within 60 days of the issuance of this order".

This appendix provides an alternative GRA forecast, using a short-term hydro forecast (the "ST Alternative GRA Forecast"), in order that this alternative to the current LTA approach can be assessed in the ERA Application.

Alternative ST Hydro Forecast for Current GRA

The ST Alternative GRA Forecast for 2017 and 2018 generation assuming ST hydro generation modifies what was provided in Table 2.2 of the original GRA filing. This table provides (under "Existing Forecast") a thermal generation forecast, based on ST forecast hydro, of 1,130.0 MW.h for 2017 and 1,084.4 MW.h for 2018, excluding requirements for maintenance and capital projects (each of which is not affected by selection of ST versus LTA forecasts for hydro generation).

In summary, this ST Alternative GRA Forecast for the test years is based on the following as reviewed in Table 2.2 of the GRA:

- **ST Hydro:** The ST hydro forecast for the ST Alternative GRA Forecasts is based on the following assumptions, using YEC's ST hydro generation forecast model:[1]
    - 2017 and 2018 forecast started with actual water levels on November 29, 2016 for all three reservoirs (Aishihik, Marsh and Mayo), and thereafter assumed LTA from 35 years of hydrology for water inflows for each month over the following 24 months, and current constrained Mayo Lake outlet and flow restrictions downstream of Mayo B. The final month of 2018 was forecast based on the ST forecast reservoir levels as at the end of November 2018.
    - The ST Alternative GRA Forecast for 2018 differs from the ST forecast in Table 2.2 of the GRA, which assumed reservoir levels (all three reservoirs) reset as at September 30, 2017 based on latest 5-year average (2012-2016);[2] for GRA revenue requirement forecast

[1] YEC's ST hydro generation forecast model utilizes actual reservoir water levels at a specified date, long-term average assumed water inflows thereafter, current hydro generation capabilities, and forecast grid loads.
[2] This assumption in essence resets reservoirs without reliance on the ST forecast model. ST forecasts apply for up to about 18 months (in terms of reflecting current water conditions). The 5-year average as used for the September 30, 2017 reset for the 2018 ST forecast in Table 2.2 of the GRA reflects a period with water flow conditions higher than LTA. Absent such reservoir reset for the second year, the ST forecast model shows (under current favorable water conditions) materially lower hydro generation for year 2 than for year 1.

purposes it is more reasonable (as was done for the 2012-13 GRA ST forecast filings) to avoid such a reset that relies on recent history.

- **ST Thermal:** As noted in footnote 4 to Table 2.2 in the GRA, forecast ST thermal generation in Table 2.2 of 2,172 MW.h for 2017 and 2,010 MW.h for 2018 reflects ST hydro generation forecasts and the Firm Load Generation forecast at line 6 in this table, and includes forecast capital project requirements at 596 MW.h diesel generation in each test year and forecast maintenance at 446 MW.h in 2017 and 329 MW.h in 2018 (see footnote 3 to Table 2.2).
    - Excluding forecast capital and maintenance (which are unchanged for ST and LTA forecasts), the ST forecast thermal generation in Table 2.2 of the GRA is 1,130.0 MW.h for 2017 and 1,084.4 MW.h for 2018; using the adjusted ST hydro forecast for the ST Alternative GRA Forecast, this ST thermal generation forecast for 2018 is revised to 8,226 MW.h.
    - This ST thermal generation forecast in 2017 is approximately 8% of the "Proposed Forecast" LTA thermal generation (also excluding capital and maintenance) of 14,146 MW.h for 2017, approximately 57% of the "Proposed Forecast" LTA thermal generation of 14,480 MW.h for 2018.

The ST hydro forecasts were not prepared for the purpose of setting GRA revenue requirement forecasts, and there is considerable risk that actual thermal generation will be materially higher at the forecast total Firm Load Generation. Experience since 2012 has shown actual annual thermal generation (excluding capital, but not maintenance) ranging from 0.6 GW.h in 2014 (LTA thermal was 5.3 GW.h) to 5.1 GW.h in 2016 (when LTA thermal was 10.5 GW.h), and averaging 2.45 GW.h/year or 22% of LTA thermal generation over these last five years.[3] Experience in the first six months of 2017 also revealed actual thermal generation (excluding capital, RFID and maintenance) at 6,352 MW.h, well above the ST forecast in the GRA, with diesel generation at 1,968 MW.h and LNG generation at 4,384 MW.h).[4]

Alternative ST Forecast for Diesel and LNG Thermal Generation

The ST Alternative GRA Forecast as developed above does not address the allocation between diesel and LNG generation. This requirement raises new issues.

As reviewed below, the alternative ST thermal forecast as developed for the ERA Application assumes a 40/60 diesel/LNG allocation of forecast ST generation for each test year. There is a considerable risk, absent any change in the forecast total Firm Load Generation, that the diesel/LNG allocation in each test year could be very different than assumed in this alternative ST thermal forecast.

- The above ST and LTA thermal generation forecasts in Table 2.2 are each assumed in that table to be supplied 90% with LNG and 10% with diesel; however, this assumption is entirely derived

[3] See GRA, Appendix 3.5, DCF 2016 Annual Report, Table 1.
[4] See YEC DCF Quarterly Report for Q2, 2017. Response to YUB-YEC-1-39 provided total diesel and LNG generation for the first six months of 2017, including capital, RFID and maintenance (2,696.8 MW.h diesel and 4,543.8 MW.h LNG).

from the GRA assuming the LTA thermal generation forecasts to be supplied on this basis (for reasons reviewed in Appendix 3.4 of the GRA).

- No useful ST forecast is provided in the GRA of the diesel-LNG allocation for the ST forecast thermal generation. The only prior year with full year LNG generation capability showed 5,087 MW.h thermal (excluding capital and RFID, but not excluding maintenance), with 2,293 MW.h diesel (45%) and 2,794 MW.h LNG (55%)[5]; the first 10 months of 2017 showed 8,317 MW.h thermal (excluding capital, RFID and maintenance), with 3,126 MW.h diesel (38%) and 5,190 MW.h LNG (62%).
- This alternative ST thermal forecast for the ERA Application assumes a 60/40 LNG/diesel allocation of forecast ST generation for each test year. This assumption reflects the tendency for diesel generation to dominate smaller and shorter duration thermal generation, and the lack of any useful additional assessments as to a forecast allocation for each test year.
- It is apparent that there is a considerable risk, absent any change in the forecast total Firm Load Generation, that the diesel/LNG allocation in each test year could be very different than assumed in this alternative ST thermal forecast.

The ST Alternative GRA Forecast compared to the GRA LTA forecast reduces forecast fuel costs (Table 3.2) by $2.022 million in 2017 (new total fuel cost of $0.320 million) and $0.703 million in 2018 (new total fuel cost of $1.665 million), as reviewed below:

- 2017 test year - fuel cost reduction of $2.022 million (adjusted total fuel cost of $0.320 million, including $0.102 million for maintenance):
    - Forecast diesel generation is reduced by 963 MW.h (from 1,415 MW.h to 452 MW.h); at $0.2633/kW.h average diesel price, this reduces fuel cost by $253,600.
    - Forecast LNG generation is reduced by 12,053 MW.h (from 12,731 MW.h to 678 MW.h); at $0.1467/kW.h average LNG price, this reduces fuel cost by $1,768,180.
- 2018 test year - fuel cost reduction of $0.703 million (adjusted total fuel cost of $1.665 million, including $0.075 million for maintenance):
    - Forecast diesel generation is increased by 1,842.4 MW.h (from 1,448 MW.h to 3,290.4 MW.h); at $0.2633/kW.h average diesel price, this increases fuel cost by $485,100.
    - Forecast LNG generation is reduced by 8,096.4 MW.h (from 13,032 MW.h to 4,935.6 MW.h); at $0.1467/kW.h average LNG price, this reduces fuel cost by $1,187,740.

Alternative ST Forecast for Other Costs

The ST forecast thermal generation cost reductions will reduce GRA forecast working capital by approximately $0.140 million in 2017 and $0.049 million in 2018 (assumed working capital impact at approximately 6.93% of operating cost change, based on Schedule 2 of the GRA [Tab 7]).

[5] See GRA, Appendix 3.5, DCF 2016 Annual Report, Table 1.

Assuming the proposed average return on rate base of 4.81% in 2017 and 4.92% in 2018 (per Schedule 4B and 4C of the GRA [Tab 7]), forecast return on rate base would be reduced by $0.007 million in 2017 and by $0.002 million in 2018.

No other forecast revenue requirement costs in the GRA would be changed by the ST hydro alternative forecast.

Alternative ST Forecast Revenue Shortfall and Rate Increase Required

Overall, the ST hydro forecast reductions in fuel costs and return result in the following changes to the forecast revenue requirement and revenue shortfall for the GRA test years (compared to the LTA forecast as filed – Table 4.1):

- 2017:
    - Reduction in revenue requirement and revenue shortfall of $2.029 million (adjusted revenue requirement of $46.515 million).
    - Revenue shortfall reduced by 37.9%, to $3.319 million.
- 2018:
    - Reduction in revenue requirement and revenue shortfall of $0.705 million (adjusted revenue requirement of $49.159 million).
    - Revenue shortfall reduced by 10.7%, to $5.880 million.

The resulting ST hydro forecast rate increase requirements (Table 4.2) are as follows:

- 2017:
    - Overall average rate increase required of **4.58%** (vs. 7.38% with LTA GRA forecast).
    - Rider J increase of **5.61%** (vs. 9.04%).
- 2018:
    - Overall cumulative average rate increase required of **8.11%** (vs. 9.08% cumulative with LTA GRA forecast).
    - Cumulative Rider J increase of **9.92%** (vs. 11.11% cumulative with LTA GRA forecast).

Summary ST Alternative GRA Forecast

The overall ST Alternative GRA Forecast impact compared with the LTA hydro GRA forecast as proposed for 2017 and 2018 is summarized as follows:

- Reduction in test year forecast revenue requirement of $2.029 million in 2017 and $0.705 million in 2018, almost all of which relates to reduced forecast fuel costs related to the lower thermal generation with the current ST hydro generation forecast.
- Reduction of the revenue requirement under the ST hydro forecast results in a reduction of the required cumulative rate increase by 2018 by almost 11% (from 9.08% to 8.11%).

- The related Rider J increase by 2018 is reduced from 11.11% to 9.92%.

The ST Alternative GRA Forecast as reviewed above was not prepared as a proposed forecast for the purpose of setting GRA revenue requirement forecasts.[6] The following are noted in regard to considering the ST hydro forecast as a basis for setting the 2017-18 GRA test year revenue requirements:

1. The Board has previously approved LTA hydro forecasts as the basis for setting revenue requirements in order to provide long-term rate stability for ratepayers. ST hydro forecasts for the current test years reflect current very favourable water conditions, and accordingly would move rates well below the LTA revenue requirement levels required for long-term rate stability for ratepayers. The PPA Application related to the Eagle Gold Project also highlights the prospect of materially higher grid loads and the related increase in LTA thermal generation requirements, providing added confirmation of the material rate instability risk in moving today from LTA to ST hydro forecasts for GRA purposes.
2. There is considerable risk that (a) actual thermal generation will be materially higher at the forecast total Firm Load Generation than the above ST hydro forecast indicates (particularly for 2017), and/or (b) that the allocation of LNG and diesel generation will vary materially from the 60/40 allocation assumed in the ST forecast. For this reason alone, YEC would not propose the above ST hydro forecast as the basis for setting revenue requirements in the GRA test years.
3. Regardless of the hydro forecast adopted (e.g., LTA or ST), there will remain a requirement for some form of fuel cost or contingency fund account (so that variances for actual vs forecast hydro generation due to water conditions are to the account of ratepayers and not to the account of YEC, i.e., ratepayers must continue to bear the risk related to water). As directed in Order 2017-08, the ST Alternative GRA Forecast excludes any DCF references; however, as was the case with the LWRF in the early 1990s when ST hydro forecasts were last used for GRA purposes, a ST version of the DCF would be required. Some key features of a ST DCF vs LTA DCF would include:
    a. For both DCF versions, YEC's GRA rates and revenue requirement would be based on the related ST or LTA hydro forecast adopted for each test year.
    b. Under the ST Alternative GRA Forecast, rates will be lower than the LTA GRA Forecast when water conditions are better than LTA (as is the case today) and higher than the LTA GRA Forecast when water conditions are worse than LTA.
    c. For both DCF versions, YEC's final actual thermal generation costs in any fiscal year would be determined after the DCF mechanism implementation determines actual YEC thermal generation cost changes attributable to water variances from the hydro forecast selected for GRA purposes, i.e., YEC thermal generation cost changes due to such water variances from the GRA forecast would be charged to or refunded from the DCF fund.

[6] The ST hydro forecast as reviewed in this appendix also differs from the "Existing Forecasts" in the GRA as filed. The "Existing Forecast" in the GRA address the situation without a new GRA (where past GRA directions remain including the LTA forecast as last approved and related DCF elements), and as such would not change under the ST hydro forecast alternative.

- Both DCF versions today must address the extent to which forecast thermal generation, based on either LTA or ST hydro condition forecasts, varies depending of grid load levels, i.e., forecast thermal generation today under LTA or ST hydro forecasts will tend to increase, as a percent of incremental generation required, as grid load increases.
- The current DCF based on LTA hydro forecasts is able to provide a DCF Term Sheet table for Board approval during the GRA process, setting out the LTA thermal generation expected at different grid loads based on current overall annual load shape (and a revised table can be provided for Board approval in the event that material changes occur in major industrial customer loads). YEC can then apply this DCF Term Sheet table for annual DCF implementation at the end of each fiscal year.
- A ST hydro forecast version of the DCF would need to provide a similar mechanism to enable DCF implementation at the end of each fiscal year, i.e., in this case the DCF Term Sheet table would need to forecast ST thermal generation at varying loads based on the GRA ST forecast hydro conditions.

d. Overall, as noted above, the ST forecast option will tend to provide much poorer rate stabilization over multiple years than the LTA forecast option – and the DCF under the ST forecast option will not tend to develop funds to help offset adverse cost impacts from poor water conditions to the same extent as would be expected under the LTA forecast option.

4. Regardless of the hydro forecast adopted (e.g., LTA or ST), there will remain a requirement pursuant to the Court Order and OIC 1995/90 for some form of ERA mechanism as part of Rate Schedule 42, as needed to ensure that YEC can recover its actual costs of fuel (including any DCF related payments) related to supplying wholesales to AEY (and thereby deal with any variances linked to wholesales varying from the last GRA approved forecast for YEC).