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April 8, 2021
Mr. Richard Buchan, Chair
Yukon Utilities Board
Box 31728
Whitehorse, Yukon Y1A 6L3

Dear Mr. Buchan:

Re: Yukon Utilities Board ("Board") approvals -- Yukon Energy Corporation ("Yukon Energy") Low Water Reserve Fund ("LWRF") Term Sheet and 2019-2020 Annual Filings

In coordination with its 2021 General Rate Application ("GRA"), as referenced in Section 3.6.3 of that filing, Yukon Energy is hereby seeking appropriate Board approvals in relation to:

1. **An Updated LWRF Term Sheet**

   The Board directed in Board Order 2019-08 that issues regarding Yukon Energy's LWRF Term Sheet were to be addressed at the time of the next Yukon Energy GRA. Attachment 1 includes the Updated LWRF Term Sheet applicable for fiscal years after 2018, in conformance with OIC 2021/16; and

2. **Yukon Energy's LWRF Annual Reports and Energy Reconciliation Adjustment ("ERA") Filings for 2019-2020**

   Attachment 2 provides the LWRF and ERA filings for 2019 to 2020, LWRF balances and an update on forecast water conditions for 2021.

Yukon Energy notes that this filing can be addressed independent of any issues in the 2021 GRA Application related to determining 2021 revenue requirement and rates. As described in the GRA Application, Appendix 2.1 provides the updated YECSIM model that is required for establishing the forecast thermal generation for 2021 for rate making purposes based on long term average renewable generation. The LWRF Term Sheet in Attachment 1, Appendix 1-1 to this letter applies only to the subsequent annual report and adjustments to the deferral account that do not affect rates. The Attachment 2 filing also has no impact on revenue requirement or rates for 2021.

Please direct any questions on this communication to the undersigned.

Yours truly,

Ed Mollard
Vice President Finance & CFO

ATTACHMENT 1
UPDATED LWRF TERM SHEET

ATTACHMENT 1: Updated Low Water Reserve Fund (LWRF) Term Sheet

In compliance with Board Order 2019-08, Yukon Energy has updated the LWRF term sheet as required by the approved terms and conditions as previously directed by the YUB and further in accordance with OIC 2021/16. Please see attached in Appendix 1-1.

In this filing, YEC will summarize recent filings and directions related to the LWRF, review the directions from YG's OIC 2021/16 and describe YEC's updates in response to these directions.

LWRF Background

In response to YEC's 2nd GRA 2017-18 Compliance Filing, Board Order 2019-08 included the following directions related to the LWRF:

- Directed that costs for generation for loads above forecast are a utility risk, stating that if YEC wished to provide further views on its risk and ratepayer risks related to this change to the LWRF, the appropriate forum would be YEC's next GRA application. The Board also indicated that YEC should examine whether a drought deferral account could be established to mitigate the effects of any future drought event(s); and

- Directed YEC to address intergenerational equity issues with respect to the LWRF in the next GRA.

Section 3.3.2 of Appendix A to Order 2019-08 accepted the LWRF submitted by YEC for the purpose of the 2017-18 GRA only (para 59), subject to removing from the Term Sheet the Fixed Change Factor references and the reference to "Diesel on the Margin" (para 52 and 54).

In accordance with Order 2019-08, on December 10, 2019 YEC provided the updated LWRF term sheet and Annual Reports for 2017 and 2018 as directed. The Board responded on March 19, 2020 with acknowledgement of the documents and direction that any future issues regarding the LWRF term sheet or the Energy Reconciliation Account ("ERA") are deferred until YEC's next GRA.

The current LWRF filing addresses these outstanding matters.

OIC 2021/ 16

OIC 2021/16 was issued on February 17, 2021. Section 9 includes directions on the approach to forecasting generation for rate making purposes as well as the accounting and reporting for the LWRF. This direction

applies to LWRF Annual Reports for fiscal years after 2018. A copy of OIC 2021/16 is attached as Appendix 1-2.

More specifically, OIC 2021/16 includes the following directives relevant to the LWRF:

- **GRA rate setting (sections 9(2) and 9(3)) -** Forecast fuel costs for GRA rate setting are to be determined based on the forecast amount of thermal generation needed to meet any shortfall between forecast customer requirements and forecast renewable generation "based on long-term average annual renewable source availability".[1]

- **Low water deferral account (sections 9(6) and 9(8))** – YEC must "operate a low water deferral account for the purpose of minimizing the effect on rates for retail customers and major industrial customers that would otherwise be caused by the variation in actual renewable source availability, including the variation caused by drought conditions". The Board "must set the maximum balance and minimum balance for the low water deferral account at amounts sufficient to achieve the purpose described in subsection (6)."

- **Low water deferral account annual financial year operation (sections 9(4) and 9(7))** – YEC is to credit and to charge the low water deferral account for each financial year of YEC by the amount of the difference in fuel costs for (a) "the amount of thermal generation needed to meet actual customer requirements for the financial year as a result of any shortfall between actual renewable generation and actual customer requirements" and (b) "the amount of thermal generation that would have been needed to meet actual customer requirements for the financial year if renewable generation had been consistent with long-term average annual renewable source availability."

Approach Adopted for Current Filings

As described in the Application, Appendix 2.1 provides the updated YECSIM model that is required for establishing the forecast thermal generation for 2021 for rate making purposes based on long term average renewable generation. The LWRF term sheet applies only to the subsequent annual report and adjustments to the deferral account that do not affect rates. For this reason and the reasons outlined below, this filing can be addressed independent of any issues in the Application related to determining 2021 revenue requirement and rates.

[1]

The 2017-18 GRA review experience showed -- absent provision to separate the GRA and LWRF reviews -- that LWRF review matters can materially delay finalizing GRA test year revenue requirement forecasts. This delay can adversely impact customer bills because of the need to true-up rate rider requirements to accommodate delays in finalizing rate changes.

The 2021 GRA is focused on timely adjustments for only one year (2021) that (subject to setting final rates by no later than December 1, 2021) minimize bill impacts to ratepayers, and provide for a subsequent GRA to address ongoing revenue requirement and rate changes.

Therefore, unlike prior GRA proceedings, Yukon Energy's 2021 GRA has separate provisions for the 2021 GRA test year forecast hydro and thermal generation and the LWRF:

- **GRA Test Year Forecasts -** YEC's 2021 GRA filing provides a 2021 long-term average (LTA) generation forecast in Appendix 2.1 of the GRA Tab 2 sales and generation forecasts, separate from any LWRF term sheet considerations.

- **LWRF Term Sheet –** YEC's 2021 GRA includes provision in section 3.6.3 for subsequent filing of an updated LWRF Term Sheet to provide a deferral account stabilization mechanism. The LWRF stabilization mechanism does not affect determination of a GRA forecast revenue requirement; it only pertains to the allocation of thermal generation costs after the year is complete.

Accordingly, because the LWRF deferral account determinations occur after the year end (based on actual outcomes) it can be considered separately from the 2021 GRA's revenue requirement forecasts, and avoid the problems encountered in YEC's last GRA.

The current LWRF filing provides an Updated LWRF Term Sheet (Appendix 1-1) with provisions consistent with OIC 2021/16, as well as an updated LWRF Annual Report and ERA Filing for 2019-2020 (Attachment 2).

Summary: Updated LWRF Term Sheet

The updated LWRF Term Sheet in Appendix 1-1 retains the LWRF Term Sheet filed by YEC on December 10, 2019, except as otherwise noted below:

1. **Background –** The updated LWRF deletes the initial background information provided in the last LWRF filed in December 2019 which noted that the Diesel Contingency Fund ("DCF") Term Sheet as approved in Appendix A to Board Order 2015-01 had been updated and revised in compliance

with Board Order 2018-10, which directed that the Low Water Reserve Fund ("LWRF") replace the then existing DCF. It also noted that the DCF fund amount was last approved for December 31, 2016, and that all funds in the DCF as at January 1, 2017 had been transferred to the LWRF as at that date.

2. **Long-term Average Annual Renewable Source Availability** – The updated LWRF Term Sheet provides for long-term average annual renewable source availability as defined and required by OIC 2021/16 (Sections 9(3) and 9(4)).

3. **Removal of LTA Generation Tables and Details** – The updated LWRF Term Sheet provides for adoption of a LTA Generation Table for a specific actual fiscal year; the LWRF Term Sheet table is no longer used to provide the LTA generation table for the current GRA test year. This change enhances the Term Sheet's flexibility to address changing conditions. The LWRF Term Sheet uses the approved 2018 LTA Hydro Generation simply to provide an example as to how the Term Sheet is to be implemented for a specific fiscal year (this 2018 LTA Hydro Generation was also utilized for LWRF determinations for 2018 and 2019 financial years).

4. **LWRF Applied to Actual Load** – In compliance with OIC 2021/16 (Sections 9(4) and 9(7)), the updated LWRF Term Sheet determines adjustments to the LWRF based on YEC's actual generation load (rather than YEC's last GRA approved forecast load).

5. **Increase in LWRF cap** – In compliance with OIC 2021/16 (Sections 9(6) and 9(8)), the updated LWRF Term Sheet increases the LWRF cap from +/- $8 million to +/- $16 million. This change reflects the material increase in YEC's forecast generation load for the 2021 test year compared to the last GRA 2018 test year forecast. The objective is to reduce Rider E impact frequency and enable the LWRF to be more robust in dealing with severe drought.

Appendix 1-1: LWRF TERM SHEET

PURPOSE & FUNCTION:

The Low Water Reserve Fund ("LWRF", or the "Fund") is a deferral account that operates to smooth customer rate changes from thermal (diesel, LNG and other thermal) generation cost impacts caused by fluctuation of renewable generation due to changes from long-term average annual renewable source availability.[2] Thermal generation costs not related to changes in renewable source availability are not included in LWRF determinations, including thermal generation costs due to equipment failure, force majeure, capital projects, or planned maintenance events.

Yukon Energy Corporation (YEC) manages the LWRF as a ratepayer "trust fund". The Fund is only to be used for variations from long-term average annual renewable source availability as determined in accordance with this Term Sheet.[3]

LONG-TERM AVERAGE (LTA):

Annual thermal generation requirements for each GRA test year are determined for the LWRF based on long-term average ("LTA") annual renewable source availability[4] [including LTA in ATCO Electric Yukon's (AEY's) Fish Lake hydro generation] at the test year forecast firm load on the Yukon Integrated System (YIS). The LWRF determination after the end of each YEC financial year will utilize the LTA annual hydro generation table and the LTA annual generation for other renewable sources for the last approved GRA test year, subject to changes as approved by the Board.

Table 1.1-1 provides an example for 2019 LWRF update where YEC continues to use the final approved 2018 GRA expected LTA hydro and thermal generation.

a. Table 1.1-1 LTA generation was adopted for 2018 load and generation conditions to determine annual expected YEC thermal generation based on long-term average YEC hydro generation at YEC grid loads (net of expected Fish Lake generation) ranging from 400 to 450

[2] Terms as defined in OIC 2021/16: "Long-term average annual renewable source availability" is defined in section 9(1) as "the annual amount of renewable generation that would be available to contribute to meeting forecast or actual customer requirements, based on average annual renewable source availability over the life of a renewable generation facility, as determined using available historical water records respecting long-term average annual hydro generation and available information respecting other renewable generation." "Renewable generation" is defined in section 1 as "generation of electricity from renewable sources, including hydro, wind, solar, geothermal and biomass sources."

[3] Appendix A to Board Order 2015-01, section 2.1.1.4, page 14. The Board directed as follows: "Any application to utilize the fund in some other fashion will require the closing of the fund, the refunding of any balances to customers, and the direction for YEC to use short-term forecasts for its hydro generation in future GRAs."

[4] LTA source availability for YEC hydro generation under any set of assumed grid generation load and grid generation capacity and licence conditions is determined in each GRA based on the then-current YECSIM power benefit model calculations based on available years of water record generation, e.g., see Appendix 2.1 of the 2021 GRA Application. As load grows a portion of the load growth is currently served (on average) by increased YEC hydro output (after use of available IPP and wind generation as well as AEY's Fish Lake hydro generation) and the remainder by increased average thermal generation (diesel or LNG). LTA source availability for Independent Power Production (IPP), YEC wind generation (when applicable) and AEY Fish Lake hydro generation are determined based on available information.

GW.h/year, assuming the mine loads connected as forecast in the GRA approved final Compliance Filing for 2018.

b. An example is provided below the table, using this approved LTA generation table for 2018, of the LWRF determination of YEC thermal generation at the actual 2019 grid load of 437.248 GW.h (net of expected Fish Lake generation).

In preparing an annual LWRF determination after the end of a YEC financial year, YEC will provide the Board, for review and approval, an update to the LTA hydro generation table for the last approved YEC GRA test year when required to address material changes in LTA hydro system capability due to changes in loads, installed capacity, licensing/permits, Independent Power Production (IPP) connections, or other factors.

LWRF THERMAL SAVINGS (COSTS):

YEC thermal generation savings (excess) are calculated on an annual basis for the LWRF based on the variance between actual thermal generation[5] and LTA thermal generation at the actual YIS load. The actual YIS load for this assessment is net of long-term average annual (i.e., expected) availability for all renewable sources other than YEC hydro generation, including Fish Lake hydro, and IPP renewable generation.

Table 1.1-2 provides an example year-end LWRF determination for 2019 based on the last approved LTA hydro generation (as per Table 1.1-1) and actual 2019 results.

Table 1.1-2 shows that costs for YEC thermal generation savings (excess) are calculated so that YEC's final fiscal year expense for the total expected thermal generation (i.e., YEC expense after all transfers) equals the last GRA approved LTA fuel mix (i.e., for the 2017/18 GRA this approved fuel mix was 90% LNG and 10% diesel), subject to the constraints (when setting LWRF based on actual load) noted in Table 1.1-2.[6] Fuel costs for this calculation are based on the last approved average cost of LNG and diesel fuel for YEC per kWh based on the most recent YEC GRA.[7] The LWRF example in Table 1.1-2 reflects these requirements based on fuel prices in the 2017/18 GRA.[8]

[5] Actual thermal generation excludes thermal generation charged to capital projects, RFID, or maintenance. Costs for actual thermal generation are charged separately for diesel and LNG generation based on the last approved average cost of fuel for YEC per kW.h based on the most recent YEC GRA.

[6] The constraints are: (a) when actual thermal > LTA thermal, LNG not exceeding total LTA thermal less estimated diesel (LTA thermal times actual diesel percent of actual thermal); and (b) when actual thermal < LTA thermal, LNG not exceeding total LTA thermal less actual diesel. These constraints reduce LNG share of YEC's final LTA thermal to less than 90% when actual diesel share exceeds 10% (if actual thermal > LTA thermal) or when actual diesel generation exceeds 10% of LTA thermal (if actual thermal < LTA thermal).

[7] YEC's 2017/2018 GRA as approved is applicable for the 2019 example, and includes average LNG fuel cost at 14.668 cents per kW.h and average diesel fuel cost at 26.333 cents/kW.h, and assumes that 90% of LTA thermal is supplied by LNG and 10% by diesel (average blended price of 15.834 cents per kW.h).

[8] Actual diesel as a share of the estimated actual thermal generation for the forecast load is assumed to be the greater of 10% (as per the GRA forecast) and the actual diesel generation percentage of actual year-end YEC firm generation.

Non-fuel O&M costs related to YEC thermal generation are not included in the LWRF calculations.

QUANTUM & CAP:

The Board in Order 2015-01 approved a "cap" for the DCF of +/- $8 million as an acceptable balance between frequency of rider applications and ability to handle material (drought) changes in hydro availability. This cap was retained in YEC's 20217-18 GRA Compliance Filing. Effective 2021, this cap for the LWRF is increased to +/- $16 million in YEC's 2021 GRA.

In any year when the balance in the LWRF falls outside of the approved LWRF cap range at fiscal year end, YEC shall apply forthwith to the Board, and in any event within 60 days of the financial year end, for approval of a rate rider to dispense with the balance that is outside of that range.

The refund (when LWRF balance exceeds the approved maximum cap level) or collection (when LWRF balance is below the approved minimum cap level) is to be made by way of a rate-rider to customers over next 12 month period. YEC may apply and the Board may approve a longer/shorter refund/collections period depending of the amount of refund/collections required. The rider is applicable for all retail and industrial firm sales in Yukon for both YEC and AEY.

INTEREST:

The Fund is to attract interest based upon the short/intermediate term bond rates in which YEC may invest the Fund and any negative balances would only attract interest at the lowest short-term borrowing rate available to YEC through a line of credit.

QUARTERLY & ANNUAL REPORTING:

An annual report is required to be filed with the Board for approval of the Board detailing additions and deletions to the Fund and a forecast of water conditions for the next year. The annual report to the Board is also to include a proposed rate rider to refund/collect any amount that exceeds the approved cap. The Board will direct YEC on the additions and deletions to the Fund, and on any proposed rate rider.

Quarterly reports regarding the LWRF calculations and LWRF balance updates will be provided to the Board based on interim determinations prior to a fiscal year end. The quarterly LWRF calculations will be based on forecast loads for the year at the time of calculation as the LWRF table calculates the expected diesel amount based on annual load, not quarterly.

Any interim determinations prior to a financial year end will only be placeholders; only the year end determinations will in fact have ongoing relevance for accounting and rate riders.

Table 1.1-1: 2018 Expected LTA Generation as Approved

Line Number	YEC Grid Load Net of Wind (GWh)	YEC Hydro Generation (GWh)	YEC Thermal Generation (GWh)	Increase in Load (GWh)	Increase in Thermal Generation (GWh)	Thermal as % of Increased Load
	Column A	Column B	Column C	Column D	Column E	Column F = E/D
1	400.0	391.135	8.865			
2	405.0	394.564	10.436	5.0	1.572	31%
3	410.0	397.834	12.166	5.0	1.730	35%
4	415.0	400.909	14.091	5.0	1.924	38%
5	420.0	403.769	16.231	5.0	2.140	43%
6	425.0	406.404	18.596	5.0	2.365	47%
7	430.0	408.818	21.182	5.0	2.587	52%
8	435.0	411.027	23.973	5.0	2.791	56%
9	440.0	413.062	26.938	5.0	2.965	59%
10	445.0	414.965	30.035	5.0	3.096	62%
11	450.0	416.794	33.206	5.0	3.171	63%

Notes:
1. "YEC Grid Load" is annual YEC generation load on the Integrated Grid, excluding actual less expected renewable other than YEC hydro generation, e.g., Fish Lake hydro, YEC wind, IPP renewables.
2. The thermal generation and increase for the added load are based on a polynomial equation derived from "YECSIM" - the simulation model developed for the Integrated Grid by KGS Group.

3. The model calculates expected hydro plant generation for each load scenario. It incorporates, on a weekly time step, 35 "water years" on record (1981-2015) and 20 "load years" (each examines a different hypothetical scenario to evaluate generation under different sequences of the recorded water years), of which 13 load years (load years 7-19) are used for the final averaging (this removes results distorted by starting or ending year volumes). "Hydro Generation" is long-term average hydro generation as estimated by YECSIM.

4. The simulation model results used for this table assume the current operation rule in effect at Aishihik Lake (i.e., 10-year rolling average spring elevation no lower than 913.7 m), current Mayo Lake operation rule (no additional storage, impact of sedimentation at the outlet of Mayo Lake) and restricted Mayo GS winter flows.
5. The simulation model results are based on the 2018 forecast load distributions, and requires modifications when new mines or industrial loads are connected [or disconnected from] to the grid.
6. This table assumes max load at 450 GW.h and minimum load at 400 GW.h. If the load exceeds these limits then the table needs to be updated.
7. Numbers are subject to rounding.

2019 Update Example
Expected YEC Thermal Generation for YEC generation at 437,248.5 MWh (net of expected renewable other than YEC hydro)

Step 1. Find the closest load from Column A that is less than 437 GW.h = 435 GW.h (Line 8).

Step 2. Find the thermal generation from Column C = 23.973 GW.h (Line 8).

Step 3. Find the difference between the given load (437.2485 GW.h) and load from Step 1 (435 GW.h) = 2.2485 GW.h

Step 4. Apply the percentage from Column F (Line 9, 59%) to the difference from Step 3 (2.2485 GW.h) = 1.327 GW.h

Step 5. Add numbers from Step 2 (23.973 GW.h) and Step 4 (1.327 GW.h) = 25.300 GW.h

The expected thermal generation at 437.2485 GW.h load is 25.300 GW.h.

Table 1.1-2: LWRF Analysis – 2019 Year End Example

		Year end LWRF Deferral Account
	Actual Outcomes	**2019** GW.h
1	**Actual Thermal Generation**	68.265
1a	**Actual Diesel Generation**	2.371
1b	**Actual LNG Generation**	65.894
1c	**Actual Diesel Generation as percentage of total Actual Thermal Generation (1a/1)**	*3.47%*
2	**LTA Thermal Generation at Actual Load (see Table 1.1-1)**	25.300
2a	**LTA Diesel Generation (2-2b)**	2.530
2b	**LTA LNG Generation*** **	22.770
3	**YEC Thermal Generation to be included in LWRF (1-2)****	42.965
3a	**YEC Diesel Generation to be included in LWRF(1a-2a)**	(0.159)
3b	**YEC LNG Generation to be included in LWRF (1b-2b)**	43.124
4	**Incremental YEC Thermal Generation Cost to Charge (Refund) LWRF ($000s) (diesel at $0.26333/kWh x row 3a + LNG at $0.14668/kWh*row 3b)**	**$6,284**

* Actual Thermal for Generation excludes RFID, capital and maintenance thermal.

** Negative is charge to YEC for water>LTA; positive is credit to YEC for water<LTA.

*** 90% of LTA thermal (row 2), subject to not exceeding total LTA thermal less estimated LTA diesel (row 1c*row2) when actual thermal> LTA thermal and not exceeding total LTA thermal less actual diesel (row 1a) when actual thermal< LTA thermal.

YUKON

CANADA

ORDER-IN-COUNCIL 2021/ 16

PUBLIC UTILITIES ACT

Pursuant to the *Public Utilities Act*, the Commissioner in Executive Council orders

1 The attached *2021 Direction to amend the Rate Policy Directive (1995)* is issued.

Dated at Whitehorse, Yukon, February 11, 2021.

YUKON

CANADA

DÉCRET 2021/ 16

LOI SUR LES ENTREPRISES DE SERVICE PUBLIC

La commissaire en conseil exécutif, conformément à la *Loi sur les entreprises de service public*, décrète :

1 Est donnée l'*Instruction de 2021 modifiant les Instructions sur la politique tarifaire (1995)* paraissant en annexe.

Fait à Whitehorse, au Yukon, le 11 février 2021.

Commissioner of Yukon / Commissaire du Yukon

2020-0000216

PUBLIC UTILITIES ACT

2021 DIRECTION TO AMEND THE RATE POLICY DIRECTIVE (1995)

1 This Direction amends the *Rate Policy Directive (1995)*.

Section 1 amended

2 In section 1, the following definition is added in alphabetical order:

"renewable generation" means generation of electricity from renewable sources, including hydro, wind, solar, geothermal and biomass sources; *« production d'énergie renouvelable »*

Sections 9, 10 and 11 added

3 The following sections are added immediately after section 8:

Fuel costs and low water deferral account

9(1) In this section

"long-term average annual renewable source availability" means the annual amount of renewable generation that would be available to contribute to meeting forecast or actual customer requirements, based on average annual renewable source availability over the life of a renewable generation facility, as determined using available historical water records respecting long-term average annual hydro generation and available information respecting other

LOI SUR LES ENTREPRISES DE SERVICE PUBLIC

INSTRUCTION DE 2021 MODIFIANT LES INSTRUCTIONS SUR LA POLITIQUE TARIFAIRE (1995)

1 La présente instruction modifie les *Instructions sur la politique tarifaire (1995)*.

Modification de l'article 1

2 À l'article 1, la définition qui suit est insérée selon l'ordre alphabétique :

« production d'énergie renouvelable » Production d'électricité à partir de sources d'énergie renouvelable, y compris l'énergie hydroélectrique, l'énergie éolienne, l'énergie solaire, l'énergie géothermique et la biomasse. *"renewable generation"*

Ajout des articles 9, 10 et 11

3 Les articles qui suivent sont ajoutés après l'article 8 :

Coûts du combustible et compte de report de bas niveau d'eau

9(1) La définition qui suit s'applique au présent article.

« disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable » La quantité annuelle de la production d'énergie renouvelable qui serait disponible pour aider à répondre aux besoins prévus ou réels de clients, fondée sur la disponibilité annuelle moyenne de sources d'énergie renouvelable au cours de la durée utile d'une installation de production d'énergie renouvelable, déterminée à l'aide des documents historiques de niveau d'eau disponibles

renewable generation. *« disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable »*

concernant la production hydroélectrique annuelle moyenne à long terme et les renseignements disponibles concernant d'autre production d'énergie renouvelable. *"long-term average annual renewable source availability"*

(2) The Board must include in the rates of Yukon Energy Corporation provision to recover forecast fuel costs for the amount of thermal generation needed to meet forecast customer requirements.

(2) La Régie doit prévoir dans les tarifs de la Société d'énergie du Yukon les mesures pour recouvrer les coûts du combustible prévus pour la quantité de production d'énergie thermique nécessaire pour répondre aux besoins prévus de clients.

(3) For the purpose of subsection (2), the Board must determine the forecast fuel costs for a financial year of Yukon Energy Corporation by

(3) Pour l'application du paragraphe (2), la Régie détermine les coûts du combustible prévus pour un exercice de la Société d'énergie du Yukon de la façon suivante :

(a) forecasting the amount of renewable generation available to contribute to meeting forecast customer requirements, based on long-term average annual renewable source availability;

a) en prévoyant la quantité de production d'énergie renouvelable disponible pour aider à répondre aux besoins prévus des clients, fondée sur la disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable;

(b) forecasting the amount of thermal generation needed to meet any shortfall between the forecast renewable generation under paragraph (a) and forecast customer requirements; and

b) en prévoyant la quantité de production d'énergie thermique nécessaire pour combler tout manque entre la production d'énergie renouvelable prévue au titre de l'alinéa a) et les besoins prévus des clients;

(c) determining the costs of fuel for forecast thermal generation under paragraph (b) based on forecast prices for diesel fuel and natural gas as approved by the Board.

c) en déterminant les coûts du combustible pour la production d'énergie thermique au titre de l'alinéa b) en fonction des prix prévus du mazout et du gaz naturel approuvés par la Régie.

(4) After each financial year of Yukon Energy Corporation, the Board must review and approve the difference between the following:

(4) Après chaque exercice de la Société d'énergie du Yukon, la Régie examine et approuve la différence entre les éléments suivants :

(a) the fuel costs for the amount of thermal generation needed to meet actual customer requirements for the financial year as a result of any shortfall between

a) les coûts du combustible pour la quantité de production d'énergie thermique nécessaire pour répondre aux besoins réels de clients pour l'exercice

actual renewable generation and actual customer requirements;

(b) the fuel costs for the amount of thermal generation that would have been needed to meet actual customer requirements for the financial year if renewable generation had been consistent with long-term average annual renewable source availability.

(5) The fuel costs referred to in subsection (4) are to be determined based on the forecast prices referred to in paragraph (3)(c) that are applicable to that financial year.

(6) The Board must require Yukon Energy Corporation to operate a low water deferral account for the purpose of minimizing the effect on rates for retail customers and major industrial customers that would otherwise be caused by the variation in actual renewable source availability, including the variation caused by drought conditions.

(7) For each financial year of Yukon Energy Corporation, the Board must require Yukon Energy Corporation

(a) to credit the low water deferral account by the amount of the difference in fuel costs for thermal generation approved under subsection (4), if actual renewable source availability is greater than long-term average annual renewable source availability; or

(b) to charge the low water deferral account by the amount of the difference in fuel costs for thermal generation approved under subsection (4), if actual renewable

résultant de tout manque entre la production d'énergie renouvelable réelle et les besoins réels de clients;

b) les coûts du combustible pour la quantité de production thermique qui aurait été requise pour répondre aux besoins réels des clients pour l'exercice si la production d'énergie renouvelable avait été conforme à la disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable.

(5) Les coûts du combustible mentionnés au paragraphe (4) sont déterminés en fonction des prix prévus mentionnés à l'alinéa (3)c) qui sont applicables à l'exercice en cause.

(6) La Régie exige de la Société d'énergie du Yukon qu'elle gère un compte de report de bas niveau d'eau dans le but d'atténuer les effets sur les tarifs pour les clients au détail et les clients industriels majeurs qui seraient autrement causés par la variation de disponibilité réelle de sources d'énergie renouvelable, y compris la variation causée par des conditions de sécheresse.

(7) Pour chaque exercice de la Société d'énergie du Yukon, la Régie exige de la Société d'énergie du Yukon, selon le cas :

a) qu'elle porte au crédit du compte de report de bas niveau d'eau les sommes correspondant à la différence des coûts du combustible pour la production énergie thermique approuvés en application du paragraphe (4), si la disponibilité réelle de sources d'énergie renouvelable est supérieure à la disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable;

b) qu'elle débite le compte de report de bas niveau d'eau des sommes correspondant à la différence des coûts du combustible pour la production d'énergie

source availability is less than long-term average annual renewable source availability.

thermique approuvés en application du paragraphe (4), si la disponibilité réelle de sources d'énergie renouvelable est inférieure à la disponibilité annuelle moyenne à long terme de sources d'énergie renouvelable.

(8) The Board must set the maximum balance and minimum balance for the low water deferral account at amounts sufficient to achieve the purpose described in subsection (6).

(8) La Régie fixe les soldes maximal et minimal du compte de report de bas niveau d'eau aux montants suffisants pour atteindre le but mentionné au paragraphe (6).

(9) The Board must require that Yukon Energy Corporation apply to the Board for approval of an adjustment of rates for customers to enable

(9) La Régie exige que la Société d'énergie du Yukon lui présente une demande d'approbation d'un ajustement tarifaire pour les clients afin de permettre, selon le cas :

(a) a drawdown of the low water deferral account if the balance of the low water deferral account is greater than the maximum balance set under subsection (8); or

a) le prélèvement du compte de report de bas niveau d'eau si le solde est supérieur au solde maximal fixé en application du paragraphe (8);

(b) a replenishment of the low water deferral account if the balance of the low water deferral account is less than the minimum balance set under subsection (8).

b) la reconstitution de ce compte si le solde est inférieur au solde minimal fixé en application du paragraphe (8).

(10) This section applies only in respect of an application, report or other filing that is made in the first instance to the Board on or after November 1, 2020 and for which no order is issued under section 27 of the Act before this section comes into force.

(10) Le présent article s'applique seulement à l'égard d'une demande, d'un rapport ou d'un autre dépôt fait à la Régie en tout premier lieu à compter du 1er novembre 2020 et pour lesquels aucune ordonnance n'a été rendue en vertu de l'article 27 de la Loi avant l'entrée en vigueur du présent article.

Recovery of costs for demand-side management program

Recouvrement des coûts d'un programme de gestion axée sur la demande

10(1) In this section

10(1) La définition qui suit s'applique au présent article.

"demand-side management program" means a measure, action or program intended to promote customer

« programme de gestion axée sur la demande » Mesure, action ou programme destiné à promouvoir une consommation

use of electricity that optimizes economy or efficiency of electricity generation or transmission by a public utility, including through the promotion of customer use of electricity that

(a) is more efficient, or

(b) better aligns electricity supply and demand. *« programme de gestion axée sur la demande »*

(2) The Board must include in the rates of a public utility for retail customers and major industrial customers provision to recover costs the public utility reasonably incurs to provide or participate in a demand-side management program.

(3) In determining whether costs are reasonably incurred by a public utility to provide or participate in a demand-side management program, the Board must consider the extent of any duplication between the program for which costs are incurred and a demand-side management program provided by the Government of Yukon or in which the Government of Yukon is a participant.

(4) This section applies only in respect of an application, report or other filing that is made in the first instance to the Board on or after November 1, 2020 and for which no order is issued under section 27 of the Act before this section comes into force.

Recovery of costs for renewable generation project planning or development

11(1) The Board must include in the rates of a public utility for retail customers and major industrial customers provision to

d'électricité par les clients qui optimise l'économie ou l'efficacité de la production ou la transmission d'électricité par une entreprise de service public, notamment grâce à la promotion d'une consommation d'électricité par les clients qui, selon le cas :

a) est plus efficace;

b) harmonise mieux l'approvisionnement et la demande en électricité. *"demand-side management program"*

(2) La Régie doit prévoir dans les tarifs d'une entreprise de service public pour les clients au détail et les clients industriels majeurs les mesures pour recouvrer les frais que l'entreprise de service public engage raisonnablement pour fournir un programme de gestion axée sur la demande ou y participer.

(3) Pour établir si les frais sont raisonnablement engagés par une entreprise de service public pour fournir un programme de gestion axée sur la demande ou y participer, la Régie tient compte de l'étendue de tout chevauchement entre le programme pour lequel les frais ont été engagés et un programme de gestion axée sur la demande que fournit le gouvernement du Yukon ou auquel il participe.

(4) Le présent article s'applique seulement à l'égard d'une demande, d'un rapport ou d'un autre dépôt fait à la Régie en tout premier lieu à compter du 1er novembre 2020 et pour lesquels aucune ordonnance n'a été rendue en vertu de l'article 27 de la Loi avant l'entrée en vigueur du présent article.

Recouvrement des coûts de planification ou de développement de projets de production d'énergie renouvelable

11(1) La Régie doit prévoir dans les tarifs d'une entreprise de service public pour les clients au détail et les clients industriels

recover costs the public utility reasonably incurs to plan or develop renewable generation projects.

(2) This section applies only in respect of an application, report or other filing that is made in the first instance to the Board on or after November 1, 2020 and for which no order is issued under section 27 of the Act before this section comes into force.

majeurs les mesures pour recouvrer les frais que l'entreprise de service public engage raisonnablement pour planifier ou développer des projets de production d'énergie renouvelable.

(2) Le présent article s'applique seulement à l'égard d'une demande, d'un rapport ou d'un autre dépôt fait à la Régie en tout premier lieu à compter du 1er novembre 2020 et pour lesquels aucune ordonnance n'a été rendue en vertu de l'article 27 de la Loi avant l'entrée en vigueur du présent article.

Expression replaced

4 In the French version, the expression "Commission" **is replaced, wherever it occurs, with the expression** "Régie".

Remplacement d'une expression

4 Dans la version française, l'expression « Commission » **est remplacée, à chaque occurrence, par l'expression** « Régie ».

ATTACHMENT 2

LWRF ANNUAL REPORT and ERA FILING for 2019-2020

ATTACHMENT 2: Low Water Reserve Fund (LWRF) Annual Report and Energy Reconciliation Adjustment (ERA) Filing for 2019-2020

Attachment 2 provides Yukon Energy Corporation's ("Yukon Energy" or "YEC") Annual Report summarizing Low Water Reserve Fund ("LWRF") and Energy Reconciliation Adjustment ("ERA") activities for the years ending December 31, 2019 and December 31, 2020 based on actual results. The LWRF Annual Report and ERA Filing for 2019 and 2020 has been prepared pursuant to the LWRF Term Sheet in Attachment 1, Appendix 1-1 of YEC's current LWRF filing and in conformance with OIC 2021/16. A forecast water conditions for 2021 is also provided as required in the LWRF Term Sheet.

The following information is attached:

- **Appendix 2-1 –** LWRF Calculations for 2019 and 2020, and Balance Updates.
- **Appendix 2-2 -** 2019 and 2020 ERA Filing.
- **Appendix 2-3** – Forecast Water Conditions for 2021

The following are noted with regard to the direction provided in Order 2018-10:

- All funds in the Diesel Contingency Fund as of January 1, 2017 were transferred to the LWRF effective that date, as per the LWRF Term Sheet. The opening balance of LWRF for 2017 started with 2016 DCF closing balance as reviewed in the tables below.

- Due to the Board Order 2018-10 direction that 2017 test year revenue requirement reflect actual grid loads, grid generation and fuel costs no payments into or out of the LWRF occurred in 2017 other than interest and Rider E rebates.

As reviewed in Attachment 1 of this LWRF filing, the updated LWRF Term Sheet for 2019 and 2020 as provided in Appendix 1-1 applies the LWRF determinations to the total actual load for each fiscal year in compliance with OIC 2021/ 16.

- Table 1.1-1 and Table 1.1-2 in Attachment 1 provide the LTA thermal generation calculations for 2019 based on the Expected LTA Generation table as approved for 2018.
- Table 2-1 attached to this Attachment 2 provides an updated Expected LTA Generation table for 2020 to reflect the material change in load shape due to connection of the Victoria Gold mine load as well as three years of added water year information and updated grid configuration information applicable to 2020; the LTA thermal generation for the 2020 actual grid load is determined in the example at the bottom of this table.

A summary of each of the appendices to Attachment 2 follows.

Appendix 2-1: LWRF Calculations and Balance as of December 31, 2019, and December 31, 2020

Appendix 2-1, Table 2.1-1 provides LWRF calculations and balance for 2019 and 2020 actuals; and Table 2.1-2 provides a LWRF Continuity Schedule for 2017 through 2020.

Board Order 2019-02 set Rider E to 0.00 cents/kW.h effective April 1, 2019. The LWRF balance as reported on in this filing remains within +/- $8 million, and therefore no Rider E calculation is provided in this filing.

In summary, the tables in Appendix 2-1 indicate as follows regarding the annual LWRF calculations and balance for 2019 and 2020:

- 2019 Actuals
    - Based on actual annual load for 2019, and the LWRF Term Sheet in Attachment 1, Appendix 1-1 of the current LWRF filing, the LTA thermal generation requirement for 2019 is 25.300 GW.h with 22.770 GW.h LNG at 90% of LTA thermal generation (Table 2.1-1, L16)[1].
    - The actual thermal generation requirement for 2019 was 68.205 GW.h, including 2.311 GW.h diesel and 65.894 GW.h LNG[2] (Table 2.1-1, L17).
    - The resulting overall gap between LTA and actual thermal generation for the 2019 load equals 42.905 GW.h (Table 2.1-1B, L18); including 43.124 GW.h LNG and offset negative 219 GW.h diesel. The resulting payment required from LWRF to YEC for 2019 is $6.268 million (Table 2.1-1, L20).[3]
- 2020 Actuals
    - Based on actual annual load for 2020, and the LWRF Term Sheet in Attachment 1, Appendix 1-1 of the current LWRF filing, the LTA thermal generation requirement for 2020 is 67.443 GW.h with 46.391 GW.h LNG which is about 69% of LTA thermal generation (Table 2.1-1, L16)[4].

[1] LNG is assumed to displace 90% of the 2019 expected long-term average thermal requirements, subject to the constraints noted in Table 1.2-1B and the Update LWRF Term Sheet in Attachment 1, Appendix 1-1.

[2] The diesel and LNG mix in the GRA forecast was based on 10% diesel and 90% LNG.

[3] Based on 2017/18 GRA average fuel costs at $0.1467 per kW.h for LNG and $0.2633 per kW.h for diesel as approved by YUB in Order 2018-10.

[4] LNG is assumed to displace up to 90% of the expected long-term average thermal requirements, subject to the constraints noted in Table 1.2-1B and the Update LWRF Term Sheet in Attachment 1, Appendix 1-1. Due to higher diesel generation in 2020, the LNG expected to displace about 69% of LTA thermal.

- The actual thermal generation requirement for 2020 was 69.366 GW.h, including 21.652 GW.h diesel and 47.714 GW.h LNG[5] (Table 2.1-1, L17).
- The resulting overall gap between LTA and actual thermal generation for the 2020 load equals 1.923 GW.h (Table 2.1-1B, L18); including 1.323 GW.h LNG and 0.600 GW.h diesel. The resulting payment required from LWRF to YEC for 2020 is $0.352 million (Table 2.1-1, L20).[6]

- LWRF balances (see Table 2.1-2):
  - 2019
    - Opening balance of $3.379 million.
    - Incremental thermal generation charge at $6.268 million [YEC withdraws from LWRF, as per Table 2.1-1B].
    - Less Rider E rebates for 2019 at $1.004 million.
    - Add interest charged to the balance at -$0.007 million.
    - Closing balance of -$3.900 million (reflects rounding).
  - 2020
    - Opening balance of -$3.900 million.
    - Incremental thermal generation charge at $0.352 million [YEC withdraws from LWRF, as per Table 2.1-1B].
    - Add interest charged to the balance at -$0.020 million.
    - Closing balance of -$4.272 million.

Appendix 2-2: 2019 and 2020 ERA Filing

Appendix 2-2, Table 2.2-1 provides the 2019 and 2020 actual ERA Filing and notes as follows:

- 2019 actuals:
  - 2019 wholesales over GRA forecast results in added YEC costs of $1.217 million and added YEC revenues from increase in wholesale of $1.880 million. As a result, the change in revenues exceeds the change in costs, and no ERA amount is payable to YEC.
  - 2020 wholesales over GRA forecast results in added YEC costs of $3.178 million and added YEC revenues from increase in wholesale of $3.726 million. As a result, the change in revenues exceeds the change in costs, and no ERA amount is payable to YEC.

[5] The diesel and LNG mix in the GRA forecast was based on 10% diesel and 90% LNG.
[6] Based on 2017/18 GRA average fuel costs at $0.1467 per kW.h for LNG and $0.2633 per kW.h for diesel as approved by YUB in Order 2018-10.

Appendix 2-3: Forecast Water Conditions for 2021

Appendix 2-3 provides an update on forecast water conditions for 2021 as at late March and notes as follows:

- The elevation of Aishihik Lake, as of March 01 2021, was 914.272m or 0.888m below Full Supply Level. This water level is 0.06m below the historic median level (grey line in figure 1), largely due to high summer 2020 inflows. Even with average snow, the Aishihik watershed has continued to experience higher than average winter inflows and is forecasted to be drafted to about 913.93m in May of 2021. This will allow Aishihik to recover to the median line assuming average inflows into the Aishihik Lake during reminder of the 2021. In 2022, we expect that Aishihik will draw-down to 913.8m elevation in May 2022.

- The elevation of Marsh Lake, as of March 01 2021, was 655.199m, which 15cm above the median lake level for March 1, 2021. Marsh has experienced higher than average inflows over the summer of 2020 and continues to have higher than average winter inflows. With the higher that average inflows and one of the highest snow packs on record for the southern lakes, Yukon Energy, as of March 19, 2021 has opened all Marsh lake gate (almost 2 months early). In addition to opening all the gates, Yukon Energy will request an emergency water license amendment to temporarily lower the licensed Low Supply Level to reduce likelihood of high water levels in spring of 2021. In an effort to increase flows, Yukon Energy is also planning to draw down Schwatka Lake and open the boat lock permanently for the season. With these measure Yukon Energy forecasts to draft Marsh Lake down to about 10 cm below the LSL by May 2021 as shown in the red dotted line on the graph. If the higher than average flows continue into the summer Yukon Energy forecast Marsh Lake could get up to 656.82m by the end of August 2021.

- The elevation of Mayo Lake, as of March 01, 2021, was 665.046m which is .52m above the mean lake level for March 1, 2021. This is due a very wet 2020 summer which kept Mayo above the FSL into November 2020. Also Mayo had a warmer than average winter which delayed forming of a full ice coverage on Mayo River bellow Mayo generation which than caused a delay in ramping Mayo to full output. Therefore Mayo is not expected to reach the Low Supply Line in May 2021 but is forecasted to return back to full supply by October 2021.

Table 2-1: 2020 Expected LTA Generation

Line Number	YEC Grid Load Net of Wind (GWh)	YEC Hydro Generation (GWh)	YEC Thermal Generation (GWh)	Increase in Load (GWh)	Increase in Thermal Generation (GWh)	Thermal as % of Increased Load
	Column A	Column B	Column C	Column D	Column E	Column F = E/D
1	480.0	427.633	52.367			
2	485.0	428.931	56.069	5.0	3.703	74%
3	490.0	430.383	59.617	5.0	3.547	71%
4	495.0	431.934	63.066	5.0	3.449	69%
5	500.0	433.533	66.467	5.0	3.401	68%
6	505.0	435.137	69.863	5.0	3.396	68%
7	510.0	436.708	73.292	5.0	3.429	69%
8	515.0	438.217	76.783	5.0	3.491	70%
9	520.0	439.641	80.359	5.0	3.576	72%
10	525.0	440.963	84.037	5.0	3.678	74%
11	530.0	442.173	87.827	5.0	3.790	76%
12	535.0	443.268	91.732	5.0	3.905	78%
13	540.0	444.252	95.748	5.0	4.016	80%

Notes:
1. "YEC Grid Load" is annual YEC generation load on the Integrated Grid net of secondary sales related generation and net of expected renewable other than YEC hydro generation, e.g., Fish Lake hydro, YEC wind, IPP renewables.
2. The thermal generation and increase for the added load are based on a polynomial equation derived from "YECSIM" - the simulation model developed for the Integrated Grid by KGS Group.

3. The model calculates expected hydro plant generation for each load scenario. It incorporates, on a weekly time step, 38 "water years" on record (1981-2018) and 20 "load years" (each examines a different hypothetical scenario to evaluate generation under different sequences of the recorded water years), of which 13 load years (load years 7-19) are used for the final averaging (this removes results distorted by starting or ending year volumes). "Hydro Generation" is long-term average hydro generation as estimated by YECSIM.

4. The simulation model results used for this table assume the current operation rule in effect at Aishihik Lake (i.e., 10-year rolling average spring elevation no lower than 913.7 m), current Mayo Lake operation rule (no additional storage, impact of sedimentation at the outlet of Mayo Lake) and restricted Mayo GS winter flows (based on new Mayo Ice Protocol Mayo GS outflows are restricted at max 19 cms in November and 15 cms in December, after which restrictions are relaxed by 1.75 cms/week reaching 20 cms by early January and 24 cms by February [compared to 20 cms restriction through winter used in the 2017/18 GRA]. The model aslo assumes Whitehorse GS winter max flows at 170 cms compared to 160 cms in 2017/18 GRA.

5. The simulation model results are based on 2020 forecast load and IPP distributions, and requires modifications when new mines, industrial loads or IPP generation are connected to [or disconnected from] the grid.
6. The table assumes max YEC Grid Load (i.e., excluding IPP generation) at 540 GW.h and minimum YEC Grid Load at 480 GW.h. If the YEC Grid Load exceeds these limits then the table needs to be updated.
7. Numbers are subject to rounding.

2020 Example
Expected YEC Thermal Generation for the YEC generation at 501.335 GW.h (net of expected renewable other than YEC hydro)

Step 1. Find the closest load from Column A that is less than 501 GW.h = 500 GW.h (Line 5).

Step 2. Find the thermal generation from Column C = 66.467 GW.h (Line 5).

Step 3. Find the difference between the given load (501.335 GW.h) and load from Step 1 (500 GW.h) = 1.335 GW.h

Step 4. Apply the percentage from Column F (Line 6, 68%) to the difference from Step 3 (1.335 GW.h) = 0.908 GW.h

Step 5. Add numbers from Step 2 (66.467 GW.h) and Step 4 (0.908 GW.h) = 67.375 GW.h

The expected thermal generation at 501.335 GW.h load is 67.375 GW.h.

APPENDIX 2-1: 2019-2020 LWRF Annual Reports

Table 2.1-1: LWRF Calculations for 2019 and 2020

Line No		2019	2020		Notes
L1a	Diesel Fuel Cost per kW.h	26.333	26.333	cents/kW.h	GRA Application Average Fuel cost (2017/18 GRA Application)
L1b	LNG Fuel Cost per kW.h	14.668	14.668	cents/kW.h	
L1c	GRA YIS firm Load forecast	420,265	420,265	MW.h	
L1d	GRA LTA Thermal Generation forecast	16,355	16,355	MW.h	
Calculation of Thermal Cost to Charge (Refund) LWRF					
	Assumptions				
L2	YEC Grid load	440,676	504,793	MW.h	Actual
L3	Fish Lake	4,964	5,034	MW.h	Actual
L4=L2+L3	Total Grid load	445,639	509,827	MW.h	
	Assumed Actual Generation Sources				
L5	YECL Fish Lake	4,964	5,034	MW.h	Actual
L6	YEC Hydro	370,818	435,356	MW.h	assumed actual (L2-L7-L8)
L7	YEC Thermal	69,858	69,437	MW.h	Actual
	Diesel	3,793	21,723	MW.h	Actual
	LNG	66,065	47,714	MW.h	Actual
L7a	*YEC Diesel/LNG charged to capital, RFID and maintenance*	1,653	71	MW.h	Actual
L7a1	*Diesel*	1,482	71	MW.h	Actual
L7a2	*LNG*	171	-	MW.h	Actual
L7b=L7-L7a	*YEC Net Diesel/LNG*	68,205	69,366	MW.h	Actual
L7b1	*Diesel*	2,311	21,652	MW.h	Actual
L7b2	*LNG*	65,894	47,714	MW.h	Actual
L7b3=L7b1/L7b	*Diesel % of total net thermal*	*3%*	*31%*		
L8	YEC Wind	-	-	MW.h	Actual
L9	Total Grid load	445,639	509,827	MW.h	
	LTA Expected Generation Sources				
L10	YECL Fish Lake (expected)	8,391	8,391	MW.h	Based on YEC forecast in 2017/18 GRA.
L11	YEC Wind (expected)	-	-	MW.h	
L12=L9-L10-L11	YEC Grid load net of expected Fish Lake and Wind	437,248	501,436	MW.h	
L13=L12-L1c+L11	Load Variance	16,984	81,171	MW.h	
L14	LTA Thermal Generation at Actual Load	25,300	67,443	MW.h	Estimated based on LWRF Term Sheet
L15=L7b/L14	Actual Thermal Generation as % of LTA Thermal Generation	270%	103%		
L16=L14	Expected YEC Thermal Generation in Rates	25,300	67,443	MW.h	
L16a	Diesel	*2,530*	*21,052*	MW.h	Total thermal less LNG below.
L16b	LNG	*22,770*	*46,391*	MW.h	90% of total thermal, subject to not exceeding total thermal less estimated diesel (when L15>100%) or actual diesel (when L15<100%).
L17=L7b	YEC Net Thermal Generation	68,205	69,366	MW.h	
L17a=L7b1	Diesel	*2,311*	*21,652*	MW.h	
L17b=L7b2	LNG	*65,894*	*47,714*	MW.h	
L18=L17-L15	YEC Thermal Generation to be included in LWRF	42,905	1,923	MW.h	
L18a=L17a-L16a	YEC Diesel Generation to be included in LWRF	-219	600	MW.h	
L18b=L15b-L16b	YEC LNG Generation to be included in LWRF	43,124	1,323	MW.h	
L19=L1axL18a+L1bxL18b	Incremental YEC Thermal Generation Cost to Charge (Refund) LWRF ($000s)	$6,268	$352		

Table 2.1-2: LWRF Continuity Schedule – 2017 to 2020

Line	Activity	2017 ($000s)	2018 ($000s)	2019 ($000s)	2020 ($000s)
A	**Opening Balance[1]**	**$9,485**	**$6,709**	**$3,379**	**($3,900)**
B	Incremental Diesel Generation Cost to Charge/(Refund)[2] to LWRF	$0	$534	$6,268	$352
C=B	Total LWRF operation for YEC				
	YEC pays to LWRF	$0	$0	$0	$0
	YEC withdraws from LWRF	$0	($534)	($6,268)	($352)
D=A+C	**LWRF Balance after Annual Operation**	**$9,485**	**$6,176**	**($2,889)**	**($4,252)**
E	**Interest on LWRF Balance[3]**	**$86**	**$76**	**($7)**	**($20)**
F=D+E	**LWRF Balance after Interest charge**	**$9,570**	**$6,252**	**($2,896)**	**($4,272)**
G	**Rider E (Rebate)/Collections [January - December]**	**($2,861)**	**($2,874)**	**($1,004)**	**$0**
H=F+G	**LWRF Ending Balance**	**$6,709**	**$3,379**	**($3,900)**	**($4,272)**
I	**LWRF Cap [4]**		**`+/-8000**	**`+/-8000**	**`+/-8000**
J	**LWRF Rebate/(Collections) Required**		**$0**	**$0**	**$0**

Notes:

1. Opening Balance is based on 2016 DCF ending balance as provided in DCF 2016 Annual Filing.
2. Based on calculations in Table 2.1-1.
3. Per the March 11, 1996 letter recording the settlements [provided as Exhibit B-16 in the 2008/2009 GRA] the DCF fund is to attract interest based upon the short/intermediate term bond rates in which the Companies may invest the fund and any negative balances would only attract interest at the lowest short-term borrowing rate available to the Companies through a line of credit.
4. LWRF cap based on LWRF Term Sheet, YEC 2017-18 GRA Compliance Filing, Appendix 2.1, Attachment 2.1-1.

APPENDIX 2-2: 2019-2020 ERA Filings

Table 2.2-1: ERA Determination for 2019 and 2020

	2019	2020	
A Wholesales Variance for AEY (MW.h)			
Actual wholesales	331,495	347,277	A1
GRA approved wholesales assuming Fish Lake LTA generation	314,700	314,700	A2 [See note 1]
Fish Lake generation adjustment (expected LTA less actual)	3,427	3,357	A3 [See note 2]
Change in wholesales for ERA	**13,367**	**29,220**	A4=A1-A2-A3
B YEC Cost Impact per kW.h change in Wholesales			
Losses (%)	9.22%	9.12%	B1 [Actuals]
Total YEC's actual generation net of secondary (MWh)	437,248	501,436	B2 [See note 2]
GRA approved firm load forecast (MWh)	420,265	420,265	B3 [See note 1]
YEC incremental generation relative to GRA approved (MW.h)	16,984	81,171	B4=B2-B3
YEC's actual Thermal Generation not funded by LWRF (MWh)	25,300	67,443	B5 [See note 2]
GRA LTA Thermal Generation (MWh)	16,355	16,355	B6 [See note 1]
YEC Incremental thermal generation relative to GRA approved (MWh)	8,945	51,088	B7=B5-B6
Incremental thermal generation for incremental total generation (%)	52.67%	62.94%	B8=B7/B4
Thermal Generation cost per GRA ($/kW.h)	0.1583	0.1583	B9 [See note 2]
YEC thermal cost change ($/kWh wholesales)	**0.0911**	**0.1087**	B10=B9*B8*(1+B1)
C YEC Revenue Impact per kW.h change in Wholesales			
Rate Schedule 42 Energy Charge ($/kW.h wholesales)	**0.08298**	**0.08298**	C1
Average YEC rider applicable to AEY retails ($/kWh wholesales)	**0.03640**	**0.03501**	C2 [See note 3]
D Net thermal cost impact on YEC ($000)			
Wholesale Change: Cost Impact (YEC thermal generation costs)	**1,217**	**3,178**	D1=A4*B10
Wholesale Change: Revenue Impact (YEC revenues)	**1,880**	**3,726**	D2=A4*(C1+C2)+A3*C1
Cost change>revenue change ("Yes"=1, "No"=0)	**0**	**0**	D3=is D1>D2 (absolute)
ERA Charge (rebate) to AEY [Net added cost (cost saving) for YEC]	**0**	**0**	D4=D3*(D1-D2)

Notes:

1. Based on last approved GRA forecasts, i.e., the 2018 forecast as directed by YUB in Order 2018-10 [both subject to 2017/18 GRA Compliance Filing approval].

2. Please see LWRF calculations in Table 2.1-1 for actual thermal generation numbers. B5 for 2019 equals actual thermal less LWRF funded water availability impacts at forecast load.

3. YEC Rider J revenues include actual Rider J [pre-2017/18 GRA] plus increase in Rider J based on YEC's 2017/18 GRA Compliance Filing. Average Rider is estimated total Rider J revenues [including 2017/18 GRA increase] from AEY retail customers divided by wholesales net of Fish Lake adjustments.

MEMO

From: Kevin Maxwell
To: Andrew Hall
Date: 31 March, 2021
Pages: 6
Subject: 2021 Water Availability Forecast

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Whitehorse, YT Y1A 3A1

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Dear Mr. Hall,

1.0 Reservoir Water Levels

The historic and forecast reservoir water levels for the three Yukon Energy reservoirs Aishihik, Marsh and Mayo are shown in Figures 1-3. In addition to the figures a description of the current elevations relative to historical elevations are discuss below. These figures show actual water elevation to March 01 2021 and the expected forecasted elevation based on average historic inflows[1] for the balance of the year shown with the orange dotted line. Historic water levels for each reservoir are shown in grey:

- The solid grey line shows the median historic water level
- The light grey shaded area shows the Min-Max rage of water levels
- The medium grey shaded area shows the 25th-75th percentile water level

The following trends can be observed with the current water levels:

Aishihik Lake: The elevation of Aishihik Lake, as of March 01 2021, was 914.272m or 0.888m below Full Supply Level. This water level is 0.06m below the historic median level (grey line in figure 1), largely due to high summer 2020 inflows. Even with average snow, the Aishihik watershed has continued to experience higher than average winter inflows and is forecasted to be drafted to about 913.93m in May of 2021. This will allow Aishihik to recover to the median line assuming average inflows into the Aishihik Lake during reminder of the 2021. In 2022, we expect that Aishihik will draw-down to 913.8m elevation in May 2022.

Marsh Lake: The elevation of Marsh Lake, as of March 01 2021, was 655.199m, which 15cm above the median lake level for March 1, 2021. Marsh has experienced higher than

[1] Marsh Lake also includes a Hydrotel high inflow based on current snow conditions shown as a red dotted line.

average inflows over the summer of 2020 and continues to have higher than average winter inflows. With the higher that average inflows and one of the highest snow packs on record for the southern lakes, Yukon Energy, as of March 19, 2021 has opened all Marsh lake gate (almost 2 months early). In addition to opening all the gates, Yukon Energy will request an emergency water license amendment to temporarily lower the licensed Low Supply Level to reduce likelihood of high water levels in spring of 2021. In an effort to increase flows, Yukon Energy is also planning to draw down Schwatka Lake and open the boat lock permanently for the season. With these measure Yukon Energy forecasts to draft Marsh Lake down to about 10 cm below the LSL by May 2021 as shown in the red dotted line on the graph. If the higher than average flows continue into the summer Yukon Energy forecast Marsh Lake could get up to 656.82m by the end of August 2021.

Mayo Lake: The elevation of Mayo Lake, as of March 01, 2021, was 665.046m which is .52m above the mean lake level for March 1, 2021. This is due a very wet 2020 summer which kept Mayo above the FSL into November 2020. Also Mayo had a warmer than average winter which delayed forming of a full ice coverage on Mayo River bellow Mayo generation which than caused a delay in ramping Mayo to full output. Therefore Mayo is not expected to reach the Low Supply Line in May 2021 but is forecasted to return back to full supply by October 2021.

Figure 1: Aishihik Lake Elevations

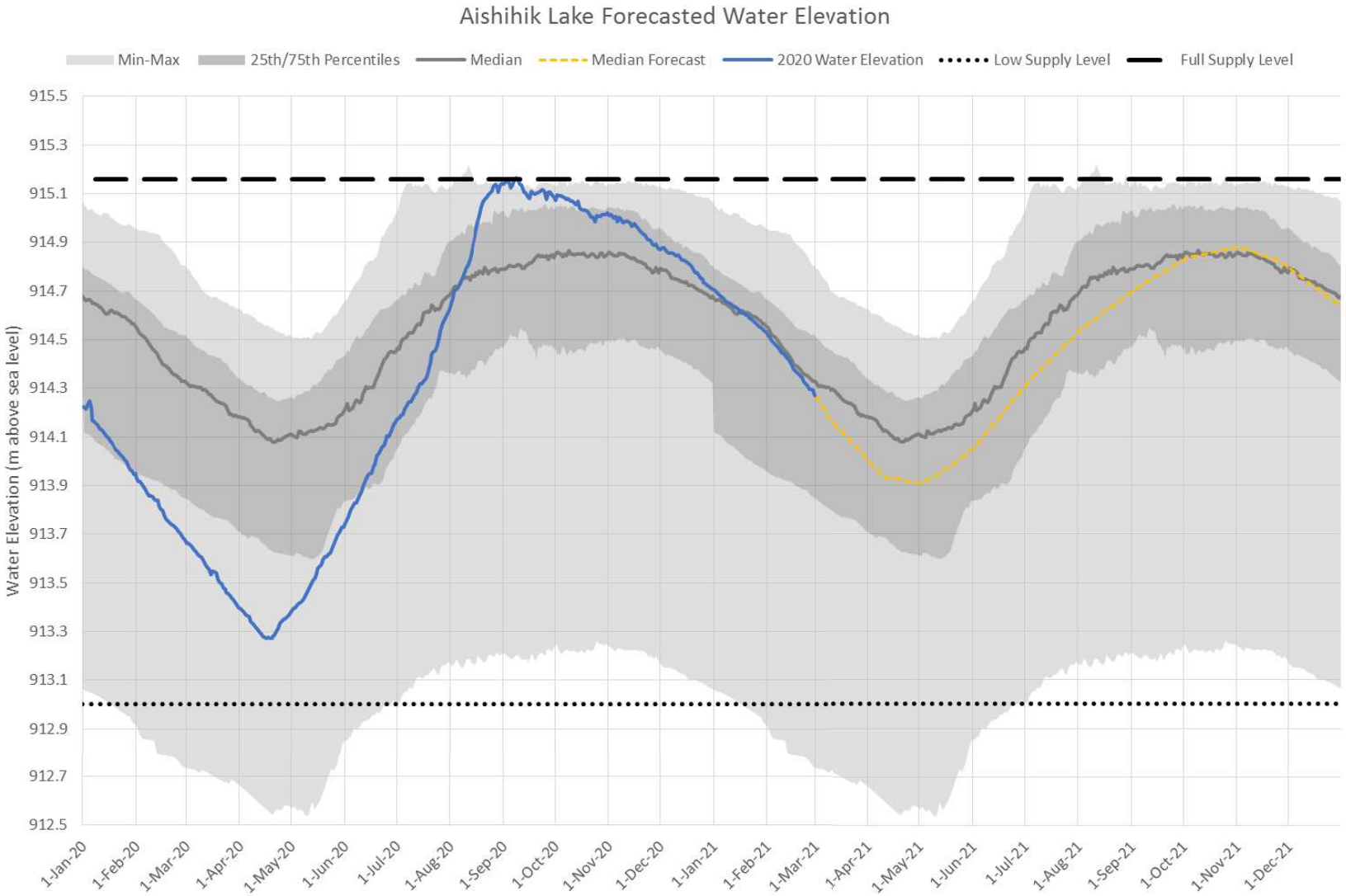


Figure 2: Marsh Lake Forecasted Elevations

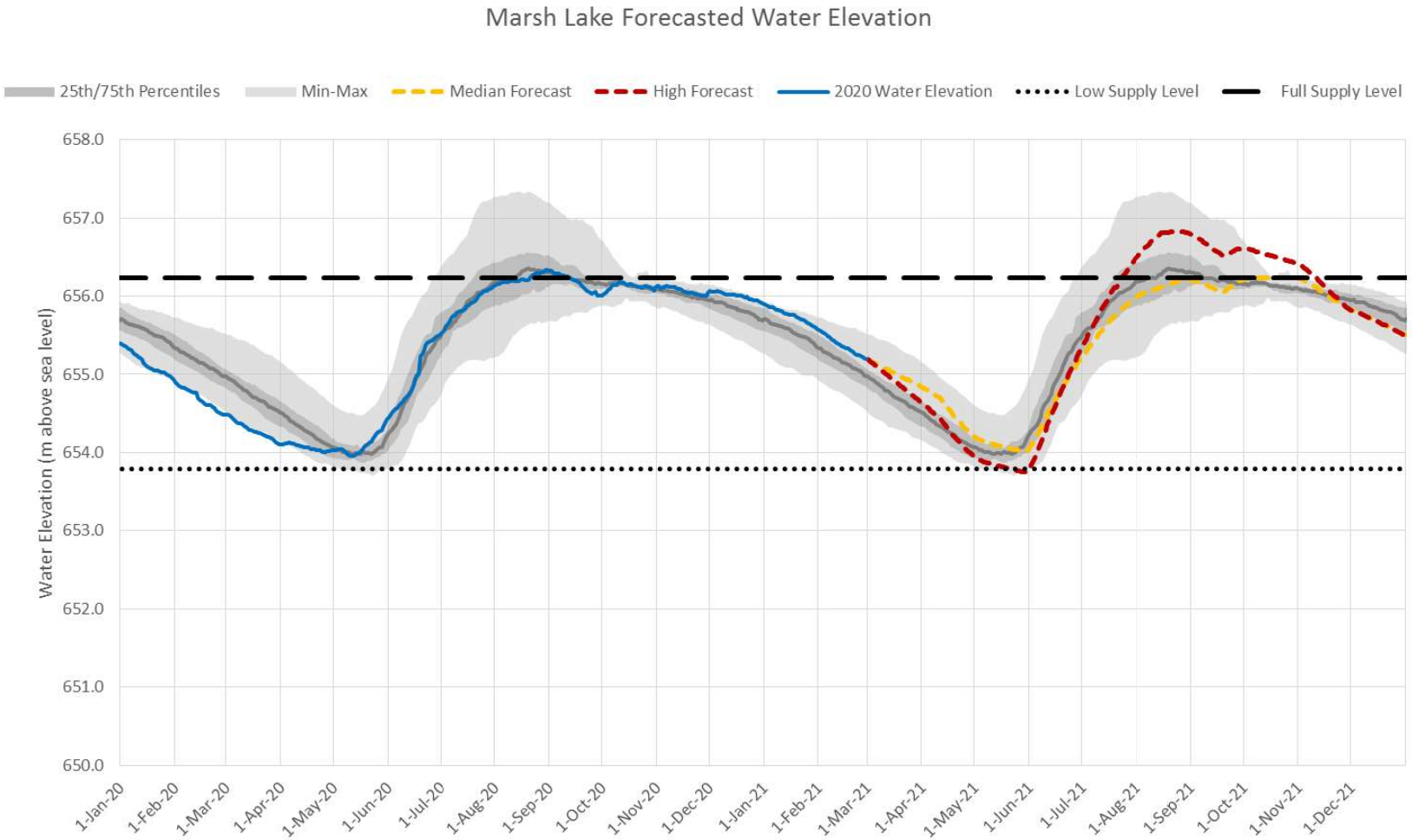
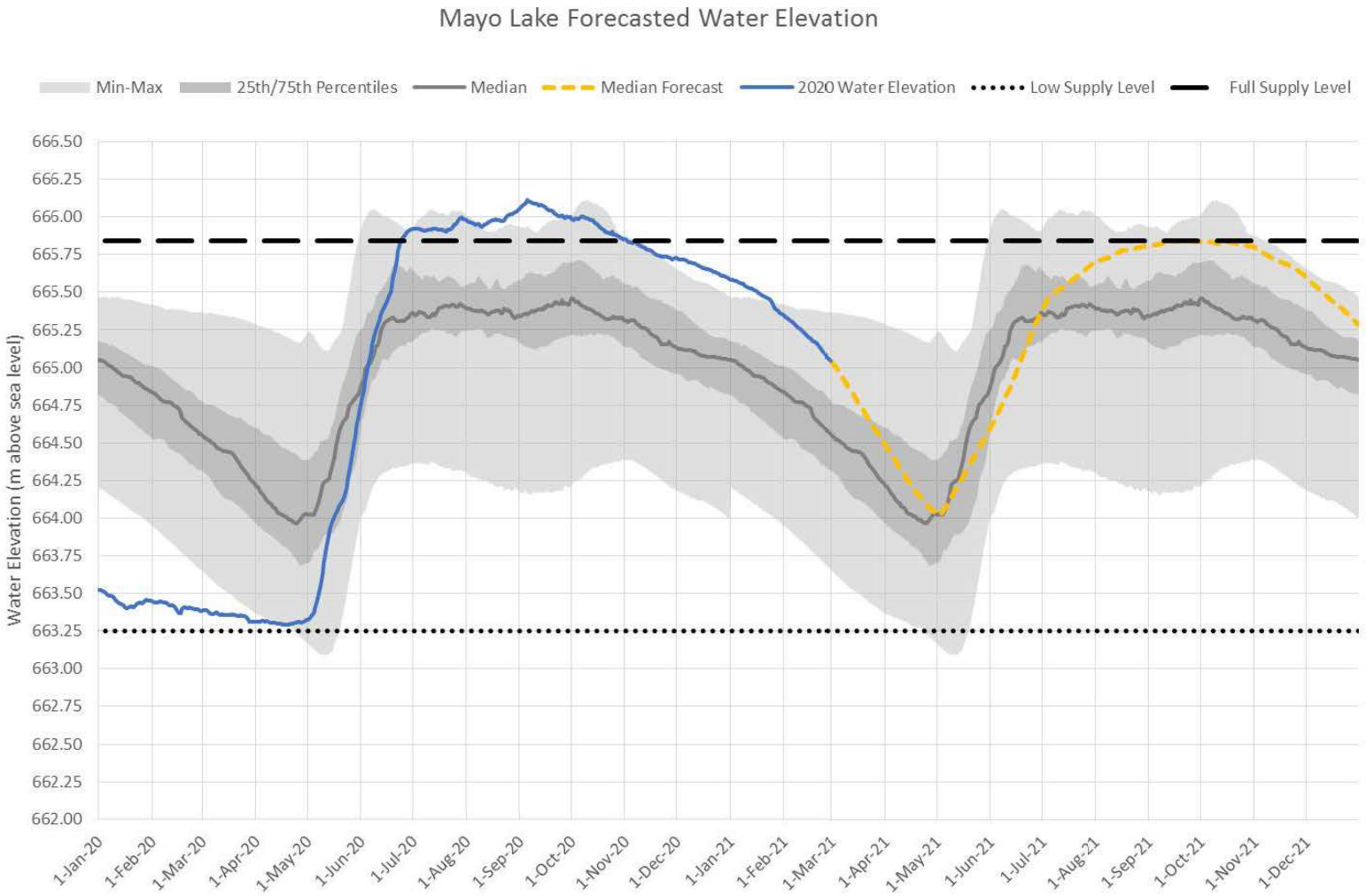


Figure 3: Mayo Lake Forecasted Elevations Mayo Lake Forecasted Elevations



2.0 2021 Generation Forecast

The present 2021 total Yukon Energy grid generation forecast, with actuals to March and forecast for the balance of the year is 540.7 GWh. Of the 540.7 GWh 260.0 GWh will come from Whitehorse generation, 176.9 GWh will come from Aishihik generation, 67.2 GWh will come from Mayo Generation, 8.0 GWh will come from Diesel generation and 27.2 GWh will come from LNG generation, and 1.4 GWh will come from SOP. Yukon Energy always optimizes the system to maximize Hydro generation with the goal to minimize thermal generation.

Regards,

Kevin Maxwell
Resource Planner
Yukon Energy Corporation