B-17

April 2, 2014

References re: Yukon Energy Argument - Part 3 Application regarding the Proposed Whitehorse Diesel-Natural Gas Conversion Project (the "Project")

1. **Public need for the Project under various reasonable electric load forecasts, including near term requirements related to industrial and non-industrial loads, and the effect of the Project on the rates of customers.**

YEC Opening Statement re: Need for the Project [Exhibit B-14, p3-4]

The need for the Project is driven by a forecast grid capacity shortfall of 7 MW by the start of 2015, 10.9 MW by the start of 2017 and 17 MW by the start of 2019.

These forecast grid capacity shortfalls reflect forecast non-industrial peak winter load, reserve capacity needed to meet N-1 risk (loss of Aishihik line) and the firm winter capacity capability of existing and currently committed generation and transmission. The fact that WD1 and WD2 are end of life in 2014/15 removes 8 MW of derated capacity at Whitehorse and drives the need for 7.0 MW of new capacity by the start of 2015.

The Project's initial 8.8 MW of new gas-fired generation to be in service by the start of 2015 will meet this capacity shortfall need. The third 4.375 MW gas-fired unit is currently expected to be in service by the start of 2017 to meet the capacity shortfall need forecast at that time.

This need also results in an opportunity to modernize the existing Whitehorse diesel plant with gas-fired generating units that are cleaner burning and cheaper to run than diesel units – benefiting the Yukon environment and ratepayers.

Effect of Project on Rates of Customers [Exhibit B-13, Table 1; Transcript (Osler) pages 34-35]

Diesel Costs ($000)	**2015**	**2016**	**2017**	**2018**
Fuel cost without Project[1]	5,236	7,053	8,285	9,671
Ratepayer cost with Project[2]	5,243	6,362	6,965	7,539
Impact of Project[3]	7	-691	-1,320	-2,131

Notes:

1. Forecast LTA Diesel at 30.8 cents/kW.h for existing diesel on grid (Ex. B-14, Table 1).

2. Ex. B-13, Table 1 (Net Ratepayer Impact with LNG)

3. Ratepayer cost with Project, less Fuel Cost without Project.

Other References

- Application - Section 4 and Appendix C (forecast)
- YUB-YEC-1-30(b)

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2. Capability of existing and currently committed generation and transmission facilities including thermal generation to provide reliable electric power generation to meet the forecast load requirements and YEC's capacity planning criteria, and the effect of the Project on this capability.

YEC Opening Statement re: Capability of existing & currently committed facilities [Exhibit B-14, p4]

WD1 and WD2 have been in service for 46 years and are now at end of life.

Plans for the retirement of these units have been in place as far back as the 1992 Resource Plan hearing. In the past, retirement could be deferred due to the material surplus hydro generation available on the WAF grid after the closure of the Faro mine in 1998, the re-commissioning of FD1 and refurbishment of WD3, and the expectation that the WD1 and WD2 units would not yet be needed to meet grid capacity requirements.

Retirement of these Whitehorse diesel units can no longer be delayed – and maintaining these units in service beyond the end of 2014 in their current condition is not an option.

In planning for the future, it is also relevant to recognize that the remaining five diesel units at the Whitehorse plant are all planned to be retired within the next 13 years - and that ongoing modernization of this key facility at Yukon's largest load centre will be needed over this period.

Other References

- Application, Section 4.1.4 and Appendix C
- Transcript, Mr. Morrison, pages 131-132, 199-201, 312-314

3. Risks facing the Project and their potential impacts on rates for customers.

- **General**
  - Exhibit B-14 (opening statement), pp. 6-7, 9-10
  - Application, Section 4.3
- **Security of Supply**
  - Exhibit B-13 and YUB-YEC-1-4 (Shell and Fortis)
  - Exhibit B-14, pp. 6-7, 9-10
  - YUB-YEC-1-5 and YUB-YEC-1-44 (LNG transport)
- **Licencing and Other Factors Affecting Project Schedule Risks & Costs**
  - YUB-YEC-1-1 and transcript (capital costs and schedule)
  - YUB-YEC-1-2 and transcript (risk impacts from delay or cancellation)
  - YUB-YEC-1-18(c) and transcript (First Nation agreements)
- **Natural Gas Price relative to Oil Price**
  - Exhibit B-14, p. 9
  - Transcript, pages 251-253, 301-305, 423-424
  - Application, pp 40-41
  - UCG-YEC-1-13(e)
- **Safety**
  - Exhibit B-11 (YESAB DSR)
  - YUB-YEC-1-7
  - UCG-YEC-1-8; UCG-YEC-1-15(e)

4. **What if any alternatives to the Project might be advisable given reasonable load assumptions and risk assessments.**
   - **General**
     - Application, Section 4.2
     - Exhibit B-14, pp 4-5
   - **WD1/ WD2 –**
     - Transcript reference, pages 131-132, 199-201, 312-314
     - Application, Section 4.2.3
     - Exhibit B-14, p 5
     - YUB-YEC-1-13
   - **New Diesel**
     - YECL-YEC-1-6; YUB-YEC-1-14
     - YUB-YEC-1-13(f) and Transcript pages 64-67, 269, 391-394
   - **Renewables**
     - Application, Section 4.2.2
     - Exhibit B-14, pp 4-5
     - CW-YEC-1-10 (general)
     - YUB-YEC-1-49 and YCS/LE-YEC-1-59(c) and attachment
     - Transcript pages 43-47, 290-291, 305-307

5. **Whether it is prudent to build the Project at this time.**
    - Exhibit B-14, pp. 7-10 (see below)
    - Exhibit B-13, Table 1 and Figure 1 (see attached)
    - Application Section 4.2.1.4 and Section 4.3 (robust, sensitivity tests, risk management)

YEC Opening Statement re: Project Economics - Expected Ratepayer Savings [Exhibit B-14, pp 7-10]

The economics of the Project focus on three key comparisons with the only other feasible alternative new diesel:

- Capital costs;
- Fuel costs per kW.h; and
- Volume of diesel displaced by the Project.

Project Capital Cost Estimates

There is no material difference in terms of equipment costs new gas or diesel generation units. The primary capital cost difference between the new alternatives is the requirement to establish new facilities needed for LNG truck unload, storage and vapourization.

The capital cost estimates included in Table 4-3 of the March 27, 2014 update filing show $36.5 million for the Project to the end of 2014, and $5.5 million for the third engine in 2016 (including an added contingency of $1.1 million), compared with $32.7 million for the New Diesel Alternative assumed to be completed in two stages over 2014 and 2015.

The updated capital costs estimate reflects :

- The outcomes of tenders and RFPs carried out for engineering, project management, LNG plant and equipment, and transformer equipment.
- Include $1.0 million in contingency for construction contracts not yet awarded.

Release of a positive YESAB DSR means that Yukon Energy's mid-May estimated construction schedule is on track and, subject to formal completion of the YESAB and Decision Document and permit processes, effectively mitigates one of the remaining risks to capital costs, i.e., cost impacts from delays in construction. Yukon Energy continues to work cooperatively with YESAB and the relevant Yukon Government officials to ensure that the mid-May schedule is met.

Further, in order to protect overall Project construction schedule, tenders for the civil construction contracts have also now been issued.

Project Fuel Cost Savings per kW.h

The update filed March 27, 2014 shows estimated fuel cost saving in 2015 at 12.3 c/kW.h of generation for gas versus new diesel and 16.8 c/kW.h for gas versus other diesel on the grid.

Focusing on the updated fuel cost savings per KW.h for 2015, the following are noted:

- Updated diesel fuel costs reflect average diesel price to YEC at Whitehorse for the latest six months as reviewed in IR responses.
- Updated LNG costs reflect updated haul costs;
- The assumed AECO gas price of $4.50/MMBtu is retained. It is still considered a conservative assumption based on the average of AECO prices over the last six months (averaged $3.7/MMBtu as reviewed in IR responses).

The updated fuel cost saving per kW.h has not been materially impacted by the change in LNG supply to the existing FortisBC plant at Tilbury.

The material fuel cost saving for gas versus diesel is forecast to be sustained in North America over at least the next two to three decades. Aside from US Energy Information Administration (EIA) long term world crude oil and US natural gas price forecasts reviewed in the Application and in IRs, active ongoing consideration of various LNG export opportunities from British Columbia to Asia as well as development of new LNG production facilities in western Canada to supply domestic markets, reflect key stakeholders (including the B.C. Government) expectations that the major gap between North American natural gas prices and world crude oil prices (on an equivalent price per Btu basis) will likely be sustained for the next 20 years or more into the future.

Overall Ratepayer Savings and Risks with the Project

Given that Yukon electricity rates are based on long-term average hydro generation (Board Order 2013-1), projected ratepayer fuel cost savings from the Project over the four initial years approximate $11.9 million using the conservative Base Case load forecast with no Alexco load. (Table 4-3 in the Application, as updated March 27, 2014).

These fuel cost savings are well in excess of the projected capital cost charges of approximately $2.7 million for the Project compared to new diesel, resulting in overall ratepayer savings exceeding $9 million over that time period including $1 million in 2015 alone.

Projected fuel cost savings of $11.9 million in the first four years are also in excess of the $9.3 million additional capital costs assumed for the Project compared to the New Diesel Alternative which means that the Project's added capital costs are projected to be fully recovered during these initial four operating years.

The Application demonstrates that the Project's economics and ratepayer cost savings are very robust, confirming that ratepayer cost savings would be sustained under a wide range of possible scenarios including material capital cost increases, reductions in fuel cost savings and changes in diesel generation forecasts.

Table 1

Table 4-3 Updated: Ratepayer Impacts from Whitehorse Diesel-Natural Gas Conversion Project - Supply From Fortis at Tilbury BC ($million) (Project compared to New Diesel Alternative)

		2014	2015	2016	2017	2018	Total
Capital cost ($million) at yr end							
Total	Diesel (new)	21.60	11.10				**32.70**
	LNG	36.50		5.50			**42.00**
Net	Diesel (new)	21.60	32.2	31.4	30.6	29.8	
	LNG	36.5	35.6	40.2	39.2	38.1	
Difference (LNG-Diesel)							**9.30**
Annual Capital Cost ($million)							
Deprec	Diesel (new)		0.516	0.794	0.794	0.794	
	LNG		0.899	0.899	1.036	1.036	
Return	Diesel (new)		1.466	1.732	1.689	1.646	
	LNG		1.965	2.066	2.163	2.106	
Total	Diesel (new)		1.982	2.526	2.483	2.440	
	LNG		2.863	2.964	3.199	3.143	
Difference (LNG-Diesel)			**0.882**	**0.438**	**0.716**	**0.703**	**2.739**
Annual Fuel Cost ($million)							
Forecast LTA Diesel (GWh)			17	22.9	26.9	31.4	
% New	Diesel (new)		90%	100%	100%	100%	
	LNG		100%	95%	100%	100%	
Fuel Cost	Diesel (new)		4.541	6.014	7.064	8.246	
	LNG		2.380	3.398	3.766	4.396	
Difference (LNG-Diesel)			**-2.161**	**-2.616**	**-3.298**	**-3.850**	**-11.924**
Net Ratepayer Impact ($million)							
	Diesel (new)		6.522	8.540	9.547	10.685	
	LNG		5.243	6.362	6.965	7.539	
Difference (LNG-Diesel)			**-1.279**	**-2.178**	**-2.582**	**-3.147**	**-9.185**

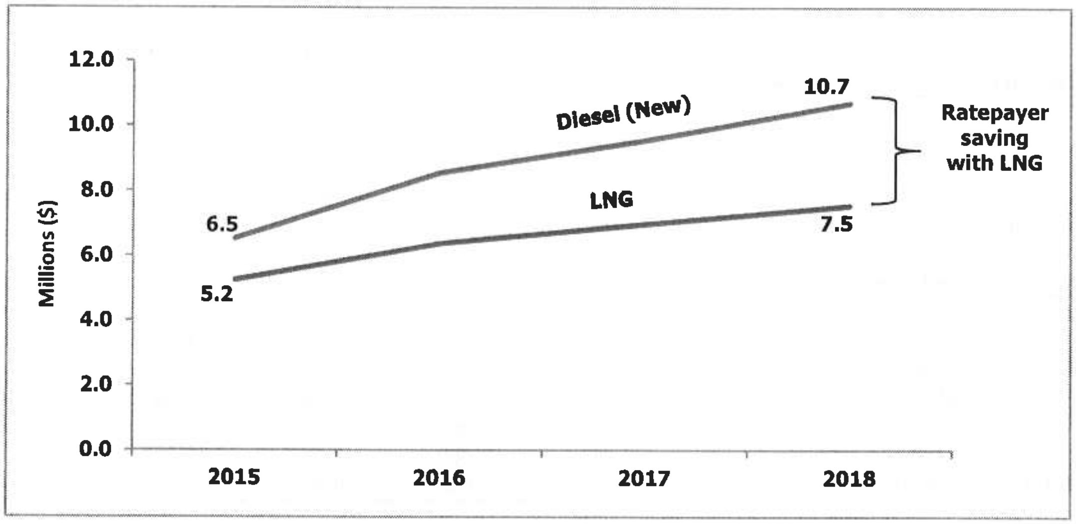
Notes:

1. Updated capital costs per YUB-YEC-1-1(d), YUB-YEC-1-13(a), YUB-YEC-1-14(c-d) and YECL-YEC-1-6(b). All capital costs depreciated over 40 years; return on mid-year rate base at 5.45%/year.
2. Updated diesel fuel costs at 26.3 c/kWh new diesel (Whitehorse), 30.8 c/kWh other diesel (grid average), per YUB-YEC-1-13(a) and YUB-YEC-1-42(c)
3. LNG delivered fuel costs at 14.0 c/kWh (assumes supply from Fortis at Tilbury, BC at an AECO gas price of $4.50 per MMBtu plus $0.30/MMBtu [to reflect Sumas equivalent price] and using A-Train units for delivery to Whitehorse with updated haul cost of $6.59/MMBtu [$5.99/MMBtu plus 10% for initial low utilization]). [YUB-YEC-1-44]
4. Forecast LTA Default Diesel (GW.h) for Base Case (no Alexco).

Source; Exhibit B-13 (shaded items added)

Figure 1

Figure 3-1 Updated: Annual Ratepayer Costs - LNG vs New Diesel: 2015-2018 (Supply from Fortis at Tilbury BC)



Annual Ratepayer Cost for Capital & Fuel ($million per year)

	2015	2016	2017	2018
Diesel (New)	6.5	8.5	9.5	10.7
Gas/LNG	5.2	6.4	7.0	7.5
Saving (Diesel-LNG)	**1.3**	**2.2**	**2.6**	**3.1**