JM-AEY-1

Reference: Section 1 Introduction

Page 1-5 In "**Key Assumptions**" the labour inflation rates in each of the test years of 2016 and 2017 are stated to be 3.25% and 3.0% while general inflation rates are forecasted to be 2.20%

Request:

(a) Please provide a table that provides for the last 10 years (2006 to 2015 inclusive) and the two test years, each of: requested labour inflation rates requested of the Yukon Utilities Board ("Board") in GRAs; the labour inflation rates approved by the Board; the general inflation rates forecasted in GRAs; and the actual inflation rates for Yukon.

(b) Please explain why labour inflation rates are consistently above general inflation rates.

Response:

(a) Please refer to JM-AEY-1(a) Attachment 1.

(b) Labour inflation is consistently above general inflation in order for AEY to attract and retain the skilled employees necessary. Salaries and wages are only one component of total compensation. AEY, with support from the ATCO Electric Human Resources group, works to ensure that the total compensation offered to employees remains competitive with other employers, not only in the Yukon but also in other areas (such as Alberta) in which AEY competes for skilled labour.

ATCO Electric Yukon
2016-2017 GRA
Applied For, Approved, & Actual Inflation Rates
(%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Applied For:												
Labour Inflation												
In-Scope Employees	n/a	n/a	4.00	9.50	n/a	n/a	n/a	3.50	3.50	3.50	3.25	3.00
Out-of-Scope Employees	n/a	n/a	5.00	7.50	n/a	n/a	n/a	3.50	3.50	3.50	3.25	3.00
Non-Labour Inflation	n/a	n/a	5.00	5.00	n/a	n/a	n/a	1.90	2.00	2.10	2.20	2.20
Approved:												
Labour Inflation												
In-Scope Employees	n/a	n/a	6.00	6.00	n/a	n/a	n/a	3.50	3.50	3.50	n/a	n/a
Out-of-Scope Employees	n/a	n/a	6.00	6.00	n/a	n/a	n/a	3.50	3.50	3.50	n/a	n/a
Non-Labour Inflation	n/a	n/a	3.75	3.75	n/a	n/a	n/a	1.90	2.00	2.10	n/a	n/a
Actual:												
Labour Inflation - Yukon	3.00	4.04	1.06	3.07	2.32	4.67	2.13	1.64	2.59	1.91	n/a	n/a
Non-Labour Inflation	1.40	2.50	3.60	0.40	0.80	3.00	2.30	1.70	1.30	(0.20)	n/a	n/a

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Table 281-0027[4, 15, 16, 18]

Survey of Employment, Payrolls and Hours (SEPH), average weekly earnings by type of employee, overtime status and detailed North American Industry Classification System (NAICS) (Percentage Change (year-to-year))

annual (current dollars)

Data table | Add/Remove data | Manipulate | Download | Related information | Help

The data below is a part of CANSIM table 281-0027. Use the Add/Remove data tab to customize your table.

Note: Scaling and units of measure are not applicable because these figures represent percentage change, year to year and not raw data.

Selected items [Add/Remove data]

Geography = Yukon
Type of employees = All employees[19]
Overtime = Excluding overtime
North American Industry Classification System (NAICS)[18] = Industrial aggregate excluding unclassified businesses [11-91N][5, 6]

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Percentage Change (year-to-year)										
	3.00	4.04	1.06	3.07[A]	2.32[A]	4.67[A]	2.13[A]	1.64[A]	2.59[A]	1.91[A]

Back to original table

Footnotes:

1. Although the creation of Nunavut officially took place in April 1999, the Survey of Employment, Payrolls and Hours (SEPH) was only able to begin publishing separate estimates for Northwest Territories and Nunavut with the release of the January 2001 data. Efforts were undertaken to estimate the employment for Nunavut back to April 1999. These are available upon request by contacting Client Services at 1-866-873-8788 (toll-free) or 613-951-4090 (labour@statcan.gc.ca).
2. Since January 2001, the Survey of Employment, Payrolls and Hours (SEPH) program no longer combines Northwest Territories and Nunavut. They are produced as two separate territories.
3. These terminated series are based on the North American Industry Classification System (NAICS) 2002.
4. Data quality indicators are based on the coefficient of variation (CV). Quality indicators indicate the following: A - Excellent (CV from 0% to 4.99%); B - Very good (CV from 5% to 9.99%); C - Good (CV from 10% to 14.99%); D - Acceptable (CV from 15% to 24.99%); E - Use with caution

(CV from 25% to 34.99%); F - Too unreliable to publish (CV greater than or equal to 35% or sample size is too small to produce reliable estimates).

5. Industrial aggregate covers all industrial sectors except those primarily involved in agriculture, fishing and trapping, private household services, religious organisations and the military personnel of the defence services.
6. Unclassified businesses (00) are businesses for which the industrial classification (North American Industry Classification System [NAICS] 2012) has yet to be determined.
7. Goods producing industries (11-33N) includes the following sectors: forestry, logging and support (11N), mining, quarrying, and oil and gas extraction (21), utilities (22), construction (23) and manufacturing (31-33).
8. Forestry, logging and support (11N) includes the following industries: forestry and logging (113) and support activities to forestry (1153).
9. Non-durable goods (311N) of the manufacturing sector includes the following industries: food manufacturing (311), beverage and tobacco products manufacturing (312), textiles mills (313), textile products mills (314), clothing manufacturing (315), leather and allied products manufacturing (316), paper manufacturing (322), printing and related support activities (323), petroleum and coal products manufacturing (324), chemical manufacturing (325) and plastics and rubber products manufacturing (326).
10. Durable goods (321N) of the manufacturing sector includes the following industries: wood products manufacturing (321), non-metallic mineral products manufacturing (327), primary metal manufacturing (331), fabricated metal products manufacturing (332), machinery manufacturing (333), computer and electronic products manufacturing (334), electrical equipment, appliances and components manufacturing (335), transportation equipment manufacturing (336), furniture and related product manufacturing (337) and miscellaneous manufacturing (339).
11. Service producing industries (41-91N) includes the following industries: trade (41-45N), transportation and warehousing (48-49), information and cultural industries (51), finance and insurance (52), real estate and rental and leasing (53), professional, scientific and technical services (54), management of companies and enterprises (55), administrative and support, waste management and remediation services (56), educational services (61), health care and social assistance (62), arts, entertainment and recreation (71), accommodation and food services (72), other services (except public administration) (81) and public administration (91).
12. Trade (41-45N) industry includes the following sectors: wholesale (41) and retail trade (44-45).
13. Education special (611N) industry includes the following industries: elementary and secondary schools (6111), community colleges and CEGEP (6112), universities (6113), business schools and computer management training (6114) and technical and trade schools (6115).
15. The introduction of administrative data in 2001 and the associated change in methodology resulted in level shifts for some series. This affects the comparability of pre- and post-2001 estimates.
16. Earnings data are based on gross payroll before source deductions.
17. These terminated series are based on the North American Industry Classification System (NAICS) 2007.
18. Industry estimates in this table are based on the 2012 North American Industry Classification System (NAICS).
19. "All employees" is the sum of employees paid by the hour, salaried employees and other employees.

Source: Statistics Canada. *Table 281-0027 - Survey of Employment, Payrolls and Hours (SEPH), average weekly earnings by type of employee, overtime status and detailed North American Industry Classification System (NAICS) (Percentage Change (year-to-year)), annual (current dollars),* CANSIM (database). (accessed:)

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Table 326-0021[2, 9]
Consumer Price Index (Percentage Change (year-to-year))
annual (2002=100)

Data table | Add/Remove data | Manipulate | Download | Related information | Help

The data below is a part of CANSIM table 326-0021. Use the Add/Remove data tab to customize your table.

Note: Scaling and units of measure are not applicable because these figures represent percentage change, year to year and not raw data.

Selected items [Add/Remove data]

Geography = Whitehorse, Yukon [6001009][13]
Products and product groups[15] = All-items

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Percentage Change (year-to-year)										
	1.4	2.5	3.6	0.4	0.8	3.0	2.3	1.7	1.3	-0.2

Back to original table

Footnotes:

2. The Consumer Price Index (CPI) is not a cost-of-living index. The objective behind a cost-of-living index is to measure changes in expenditures necessary for consumers to maintain a constant standard of living. The idea is that consumers would normally switch between products as the price relationship of goods changes. If, for example, consumers get the same satisfaction from drinking tea as they do from coffee, then it is possible to substitute tea for coffee if the price of tea falls relative to the price of coffee. The cheaper of the interchangeable products may be chosen. We could compute a cost-of-living index for an individual if we had complete information about that person's taste and spending habits. To do this for a large number of people, let alone the total population of Canada, is impossible. For this reason, regularly published price indexes are based on the fixed-basket concept rather than the cost-of-living concept.

9. This table replaces CANSIM table 326-0002 which terminated with the release of April 2007 data

11. With the introduction of the 1992 basket in January 1995, emphasis was shifted from city data t provincial data. City all-items series were continued since many users had come to rely on this service, but the method of calculation was changed. Shelter indexes are calculated for each city. This recognizes the importance of shelter in the basket, the significant and persistent differences in price movements between cities, and the availability of local data. For the other seven major components, the movement of the provincial counterpart is used except in the cases of Montréal Toronto, and Vancouver, where a sub-provincial counterpart is used. The major components are aggregated using the city's expenditure pattern to arrive at each city's all-items index.

12. Formerly Ottawa (Ottawa-Gatineau, Ontario part), represents Ottawa only.

13. The relatively small size of the housing market in these two cities makes it difficult to construct reliable price indexes for new houses. To compensate, the price movements of rental accommodation are used to approximate the price movements of new houses. The rent information itself is collected using different pricing frequencies and collection methods than in the rest of the country. Because of these problems, the indexes for rented accommodation, and owned accommodation are not published for these two cities. Further, the all-items indexes published for these two cities are not strictly comparable with the same indexes for the provinces or the other 16 cities.

14. Data for Iqaluit are on a December 2002=100 base (200212=100) and the Standard Geographical Classification (SGC) 2001. Previous to April 1, 1999, the town of Iqaluit formed part of the Northwest Territories. On April 1, 1999, the town of Iqaluit formed part of the newly-created territory of Nunavut.

15. The goods and services that make up the Consumer Price Index (CPI) are organized according to a hierarchical structure with the "all-items CPI" as the top level. Eight major components of goods and services make up the "all-items CPI". They are: "food", "shelter", "household operations, furnishings and equipment", "clothing and footwear", "transportation", "health and personal care", "recreation, education and reading", and "alcoholic beverages and tobacco products". These eight components are broken down into a varying number of sub-groups which are in turn broken down into other sub-groups. Indents are used to identify the components that make up each level of aggregation. For example, the eight major components appear with one indent relative to the "all-items CPI" to show that they are combined to obtain the "all-items CPI". NOTE: Some items are recombined outside the main structure of the CPI to obtain special aggregates such as "all-items CPI excluding food and energy", "energy", "goods", "services", or "fresh fruit and vegetables". They are listed after the components of the main structure of the CPI following the last major component entitled "alcoholic beverages and tobacco products".

17. Food includes non-alcoholic beverages.

18. Part of the increase first recorded in the shelter index for Yellowknife for December 2004 inadvertently reflected rent increases that actually occurred earlier. As a result, the change in the shelter index was overstated in December 2004, and was understated in the previous two years. The shelter index series for Yellowknife has been corrected from December 2002. In addition, the Yellowknife All-items consumer price index (CPI) and some Yellowknife special aggregate index series have also changed. Data for Canada and all other provinces and territories were not affected.

21. About two thirds (4.7%) of the 7.4% decrease registered between September and October 2004 in the "Digital computing equipment and devices" index series represents a revision to source data.

22. From April 2006, Statistics Canada changed its implementation of the price index formula used for traveller accommodation. As a result, data from April 2006 are not strictly comparable to earlier time periods.

23. The Bank of Canada's core index excludes eight of the Consumer Price Index's most volatile components (fruit, fruit preparations and nuts; vegetables and vegetable preparations; mortgage interest cost; natural gas; fuel oil and other fuels; gasoline; inter-city transportation; and tobacco products and smokers' supplies) as well as the effects of changes in indirect taxes on the remaining components. For additional information on the core index, please consult the Bank of Canada website: http://www.bankofcanada.ca/rates/indicators/key-variables/inflation-control-target/. Starting with the October 2006 Consumer Price Index, Statistics Canada produces and disseminates the core index as defined by the Bank of Canada.

24. Excluded from the All-items Consumer Price Index (CPI) are the following eight of the most volatile components identified by the Bank of Canada: fruit, fruit preparations and nuts; vegetables and vegetable preparations; mortgage interest cost; natural gas; fuel oil and other fuels; gasoline; inter-city transportation; and tobacco products and smokers' supplies. This series is used to obtain core inflation which also excludes the effect of changes in indirect taxes.

25. The special aggregate "energy" includes: "electricity", "natural gas", "fuel oil and other fuels", "gasoline", and "fuel, parts and accessories for recreational vehicles".

26. The 1986 basket content was divided into seven major components. With the introduction of the 1992 basket, the "housing" component from the 1986 basket definition was split into two components: "shelter" and "household operations, furnishings and equipment". This brought the number of major components to a total of eight. Also, the definition of "shelter" was changed.

The traveller accommodation category, which was part of the 1986 definition of "shelter", was moved to "recreation" with the introduction of the 1992 basket. To provide some continuity certain aggregates were reconstructed using their 1986 basket definitions.

27. Goods are physical or tangible commodities usually classified according to their life span into nor -durable goods, semi-durable goods and durable goods. Non-durable goods are those goods that can be used up entirely in less than a year, assuming normal usage. For example, fresh food products, disposable cameras and gasoline are non-durable goods. Semi-durable goods are those goods that may last less than 12 months or greater than 12 months depending on the purpose to which they are put. For example, clothing, footwear and household textiles are semi-durable goods. Durable goods are those goods which may be used repeatedly or continuously over more than a year, assuming normal usage. For example, cars, audio and video equipment and furniture are durable goods.

28. A service in the Consumer Price Index (CPI) is characterized by valuable work performed by an individual or organization on behalf of a consumer, for example, car tune-ups, haircuts and city public transportation. Transactions classified as a service may include the cost of goods by their nature. Examples include food in restaurant food services and materials in clothing repair services.

29. Revision of the methodology of the home insurance component of the Consumer Price Index (CPI) beginning with the February 2008 CPI - http://www23.statcan.gc.ca/imdb-bmdi/document/2301_D39_T9_V1-eng.pdf.

30. Revision of the methodology of the Internet access services component of the Consumer Price Index (CPI) beginning with the March 2008 CPI- http://www23.statcan.gc.ca/imdb-bmdi/document/2301_D40_T9_V1-eng.pdf.

31. In previous years, Statistics Canada updated, by province, the model year of passenger vehicles used in the calculation of the passenger vehicle insurance premiums index over a three month period. Since 2008, this quality adjustment exercise is reflected in the month of May for all provinces.

32. Revision of the methodology of the Rent component of the Consumer Price Index (CPI) beginning with the July 2009 CPI - http://www23.statcan.gc.ca/imdb-bmdi/document/2301_D41_T9_V1-eng.pdf.

33. Revision of the methodology of the prescribed medicines component of the Consumer Price Index (CPI), beginning with the September 2012 CPI - http://www23.statcan.gc.ca/imdb-bmdi/document/2301_D50_T9_V1-eng.htm.

34. The timing for the introduction of new model year vehicles into the purchase of passenger vehicles index of the Consumer Price Index (CPI) has changed in 2012. Please consult - http://www23.statcan.gc.ca/imdb-bmdi/document/2301_D51_T9_V1-eng.htm.

Source: Statistics Canada. *Table 326-0021 - Consumer Price Index (Percentage Change (year-to-year)), annual (2002=100 unless otherwise noted),* CANSIM (database). (accessed:)

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Date modified: 2016-01-22

JM-AEY-2

Reference: Section 1 Introduction

Request:

Page 1-6 Regarding staff positions:

(a) Please provide the actual average annual staffing levels for the last 10 years as well as the two test years.

(b) How many (number and percentage) full time staff earned $100,000 or more per year in wages and benefits?

Response:

(a) Average annual FTEs for 2006-2015 is as follows:

2006	2007	2008	2009	2010	2011	2012	2013[1]	2014	2015
46.70	50.00	52.85	55.51	54.64	54.47	56.36	65.23	68.65	69.37

For the two test years, AEY is applying for 70.39 FTE with a 4.0% vacancy rate. Please refer to AEY's response to YUB-YECL-27(d) for the calculation of the vacancy rate.

(b) Given the small number of personnel employed by AEY, whose positions are well-known to the community, AEY is not in a position to provide the requested information.

[1] 2013-2015 are inclusive of Head Office personnel.

JM-AEY-3

Reference: Section 2 Sales and Revenue, Page 2-1

Request:

(a) Please describe how facilities like the new Sarah Steele Building, the new Salvation Army building, the new food store, and the Whistle Bend extended care facility have been included in the forecast.

(b) What are the actual sales from each of these four large customers that have been included in each of the test years?

Response:

(a-b) When AEY prepares its sales forecast, it obtains information from field staff about new customer additions that are forecast to be added during the test year as well as the estimated sales for the customer. New customers are added to the appropriate rate class in the test year that they would be in-service and form part of the sales forecast.

As stated in the Application (page 2-6, lines 24-27), AEY has included three large commercial customers (i.e. customers above 200 kW) in the test period. The fourth facility referenced in this Information Request is included as part of the commercial adds below 200 kW. For details on the three large customers load forecasts, please refer to YEC-AEY-4(a) Attachment 1.

JM-AEY-4

Reference: Section 2 Sales and Revenue, Table 2 page 2-2

Request:

(a) Please provide a version of Table 2 that adds a column of Actual non-normalized sales so comparisons can be made with the figures in Table 1.

Response:

(a) Please refer to revised Table 2 below to show actual non-normalized sales.

Table 2
ATCO Electric Yukon Sales Variance
2008-2009 GRA and 2013-2015 GRA Forecasts

Year	Forecast (MWh)	Actual (MWh)	Variance (MWh)	Variance (%)
2008 Filed [1]	269,913	274,182	4,269	1.6
2008 Approved [2]	275,224	274,182	-1,043	-0.4
2009 Filed [1]	272,054	276,714	4,660	1.7
2009 Approved [2]	278,133	276,714	-1,419	-0.5
2013 Filed [3]	309,891	312,372	2,481	0.8
2013 Approved [4]	309,894	312,372	2,477	0.8
2014 Filed [3]	315,876	306,272	-9,604	-3.0
2014 Approved [4]	323,823	306,272	-17,552	-5.4
2015 Filed [3]	321,818	308,356	-13,463	-4.2
2015 Approved [4]	330,274	308,356	-21,918	-6.6

Notes:

1) 2008-2009 GRA, Schedule 2.1

2) 2008-2009 Compliance Filing (Board Order 2009-5), Schedule 2.1

3) 2013-2015 GRA Omissions & Updates (excluding Industrial), Attachment 2 - Schedule 2.1

4) 2013-2015 Compliance Filing (Board Order 2014-06), Schedule 2.1

JM-AEY-5

Reference: Section 2 Sales and Revenue, Page 203 lines 23 to 27

Request:

(a) Please provide any information available to AEY on the reduction in sales due to the DSM program as distinct from any other reason. If no distinction can be made between DSM and other reason (e.g. price elasticity) please indicate so.

(b) What microgeneration capacity was connected at the end of 2015?

(c) Please detail the lost sales in 2014 and 2015 due to the micro-generation program.

(d) With respect to the microgeneration program please provide information on the revenue lost due to reduced sales as well as the cost reductions due to reduced wholesale purchases from Yukon Energy and the resale of no-cost energy exported to the grid from the microgeneration customers.

Response:

(a) Please refer to AEY's response to YUB-YECL-6.

(b) There was approximately 73 kW of micro-generation capacity installed at the end of 2015.

(c-d) AEY does not measure actual generation at the source. However, total generation was estimated using NRCan's Photovoltaic and solar resource maps (dataset found here https://www.nrcan.gc.ca/18366), and actual installed PV capacity throughout ATCO Electric Yukon's communities.

For the information requested, please refer to JM-AEY-5(c-d) Attachment 1.

ATCO Electric Yukon - 2016-2017 General Rate Application
JM-AEY-5(c&d)

Community	Type	Installation Date	Capacity (kW)	Export Credits (kWh)		Estimated Generation (kWh)		Reduced Sales (kWh)		Reduced Sales		Losses 6.20% Reduced Purchase Power / Fuel Costs		Resale Power		Net (Cost) / Benefit	
				2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Burwash Landing	General Service	2013-03-02	4.70	3,739	3,475	4,689	4,689	950	1,214	($101)	($130)	$1,728	$1,293	$374	$351	$2,001	$1,513
Whitehorse	Residential	2014-07-17	3.50	534	1,886	1,138	3,157	604	1,271	($78)	($165)	$100	$278	$65	$231	$87	$344
Whitehorse	Residential	2014-07-17	2.58	408	1,563	839	2,327	431	764	($56)	($99)	$74	$205	$49	$192	$68	$297
Whitehorse	Residential	2014-07-22	2.58	787	2,674	797	2,327	10	-	($1)	$0	$70	$205	$95	$328	$164	$533
Whitehorse	Residential	2014-08-22	5.00	540	3,754	1,038	4,510	498	756	($64)	($98)	$92	$397	$65	$460	$93	$759
Whitehorse	Residential	2014-08-29	2.00	120	834	370	1,804	250	970	($32)	($126)	$33	$159	$15	$102	$15	$135
Whitehorse	Residential	2014-09-05	2.58	93	1,407	425	2,327	332	920	($43)	($120)	$37	$205	$11	$172	$6	$258
Whitehorse	Residential	2014-09-14	2.00	1	1,306	282	1,804	281	498	($36)	($65)	$25	$159	$0	$160	($11)	$254
Whitehorse	Residential	2014-09-16	1.00	1	4	136	902	135	898	($17)	($117)	$12	$79	$0	$0	($5)	($37)
Whitehorse	General Service	2014-12-18	2.11	-	-	15	1,903	15	1,903	($2)	($204)	$1	$168	$0	$0	($0)	($36)
Whitehorse	Residential	2015-04-28	2.50	-	109	-	1,509	-	1,400	$0	($182)	$0	$133	$0	$13	$0	($36)
Old Crow	General Service	2015-07-07	11.80	-	2,740	-	3,672	-	932	$0	($100)	$0	$2,387	$0	$277	$0	$2,564
Whitehorse	Residential	2015-10-27	5.30	-	67	-	285	-	218	$0	($28)	$0	$25	$0	$8	$0	$5
Whitehorse	Residential	2015-11-03	5.30	-	48	-	231	-	183	$0	($24)	$0	$20	$0	$6	$0	$2
Whitehorse	Residential	2015-11-15	5.00	-	-	-	159	-	159	$0	($21)	$0	$14	$0	$0	$0	($7)
Old Crow	General Service	2015-11-05	3.33	-	-	-	76	-	76	$0	($8)	$0	$49	$0	$0	$0	$41
Haines Junction	Residential	2015-12-24	5.20	-	-	-	31	-	31	$0	($4)	$0	$3	$0	$0	$0	($1)
Whitehorse	Residential	2015-02-02	1.14	-	176	-	992	-	816	$0	($106)	$0	$87	$0	$22	$0	$3
Whitehorse	Residential	2015-12-17	5.00	-	-	-	39	-	39	$0	($5)	$0	$3	$0	$0	$0	($2)
			72.62	**6,223**	**20,043**	**9,730**	**32,744**	**2,557**	**11,833**	**($430)**	**($1,603)**	**$2,172**	**$5,871**	**$675**	**$2,322**	**$2,417**	**$6,590**

JM-AEY-6

Reference: Section 2 Sales and Revenue, Schedule 2.1

Request:

(a) The residential sales forecast for 2016 (147,111 MWh) are below any of the 3 previous test years even though 2015 sales (148,605 MWh) were over 1,300 MWh higher than in 2014 (the lowest of the 3 previous test years). Please explain how this can be considered realistic?

(b) Are residential sales for the first 6 months of 2016 above or below the 2015 sales?

(c) Similarly the commercial sales forecast 2016 (152,187 MWh) are about 2,500 MWH below the lowest sales of the 3 previous test years (2014 was least at 154,709) and even though 2015 (155,346 MWh) was up over 1,600 MWh from 2014. Please explain how this can be considered realistic given some major commercial projects now under construction?

(d) Are commercial sales for the first 6 months of 2016 above or below the 2015 sales?

Response:

(a-b) AEY submits that the 2016 residential forecast is reasonable as evidenced by the recent trend of decreasing UPC over the 2013 to 2015 period. As well, actual Residential sales for the first 6 months of 2016 have come in approximately 2.8% lower (2,190 MWh) than 2015 sales for the same period.

(c-d) AEY submits that the 2016 commercial forecast is reasonable as evidenced by the recent trend of decreasing UPC over the 2013 to 2015 period. As well, actual Commercial sales for the first 6 months of 2016 have come in approximately 3.0% lower (2,359 MWh) than 2015 sales for the same period.

JM-AEY-7

Reference: Section 3 Purchase Power
Schedule 3.2 Hydro Generation (Fish Lake)

Request:

(a) Please provide justification as to why the projected generation from the Fish Lake hydro system for 2016 and 2017 is below the approved generation levels for 2014 and 2015 and substantially below the actual generation for 2014 and 2015?

(b) What has been the actual generation from the Fish Lake hydro system for the first 6 months of 2016 and how does that compare to the first 6 months of each of 2014 and 2015?

Response:

(a) The net projected generation is lower in 2016 and 2017 due to the capital builds forecast during the test years.

Gross generation output is forecast to be 9,576 MWh in both 2016 and 2017 before planned outages and flow reduction for the Fish Lake capital program. This forecast is above the previously approved generation levels and slightly below the average of 2014 and 2015.

(b) Actual June year to date generation from the Fish Lake Hydro system has been as follows for 2014-2016:

2014	2015	2016
5,005	4,405	5,083

AEY notes however, that the first half of the year is not reflective of the impact the capital program has on the output of the hydro system as the majority of the planned capital season is from May-October.

JM-AEY-8

Reference: Section 4 Fuel Costs
Schedule 4.2

Request:

(a) Please provide a table detailing the most recent fuel purchase cost and the average diesel fuel cost in the first 6 months of 2016 in cents per litre by community.

Response:

(a) Please refer to the following table.

June 2016 Diesel Fuel Price (cents per litre)		
	Current Month	YTD Average
Watson Lake	81.33	78.66
Beaver Creek	76.40	73.58
Destruction Bay	73.19	68.51
Old Crow	179.71	178.53
Swift River	83.60	74.57
Standby Units	82.96	103.06

JM-AEY-9

Reference: Section 5 Operations and Maintenance Expenses
Page 5-3 Pension costs

Request:

(a) Please confirm that if AEY's request for the continuation of the deferral account for pension cost is granted, the ratepayers would in effect experience the actual cost determined to be appropriate by the AUC rather than the "placeholder" amounts shown for 2016 and 2017.

Response:

(a) Confirmed.

JM-AEY-10

Reference: Section 5 Operations and Maintenance Expenses
Schedule 5.2 Public Information

Request:

(a) Please justify why ratepayers should have paid for the AEY's cost related to AEY's choice to change its name from YECL to AEY.

Response:

(a) One of the drivers for the name change was to eliminate confusion within the community with two utilities operating under very similar trade names. AEY in the past has found itself mistaken for Yukon Energy and assumes Yukon Energy has been confused with "Yukon Electrical" as well.

As identified in response YUB-YECL-35(b), AEY took the opportunity provided by the street name change of 1st Street to Front Street to change its operating name at the lowest possible cost.

The incremental costs that AEY incurred to change its name were not included the forecast costs submitted in the YECL 2013-2015 GRA, therefore customers have not paid for these costs in their rates, nor have the costs been included in the inflationary base for the 2016-2017 forecast.

JM-AEY-11

Reference: Section 7 - Depreciation

Request:

(a) Please confirm that the depreciation rates used in 2016 and 2017 will be the same as in effect in 2015, and if not please explain any changes.

Response:

(a) Please refer to AEY's response to CW-YECL-19(a).

JM-AEY-12

Reference: Section 8 Return on Rate Base
Page 8-2 BCUC GCOC proceeding

Request:

(a) Has the BCUC issued its decision? If so please provide the relevant information.

Response:

(a) Please refer to AEY's response to YEC-AEY-11.

JM-AEY-13

Reference: Section 8 Return on Rate Base
Page 8.7 item (b) Watson Lake LNG Bi-Fuel study cost – deferred charge

Request:

(a) Please justify why any portion of the $493,000 study cost should be paid for by ratepayers given that this project has not been approved by the YUB?

Response:

(a) Please refer to AEY's response to YUB-YECL-75.

JM-AEY-14

Reference: Section 8 Return on Rate Base
Schedule 8.2

Request:

(a) For each year from 2008 to 2015, and including the applied for parameters for the test years 2016 and 2017, please provide a table that includes for each year the applied for capital borrowing, the applied for borrowing interest rate, the approved capital borrowing, the approved borrowing interest rate, the actual amount borrowed, and the actual interest rate.

Response:

(a) For the applied for, approved, and actual capital borrowing and interest rate for each year from 2008 to 2015 please refer to Table 1 below.

Table 1:
ATCO Electric Yukon
Borrowing Amount and Interest Rate by Year

	Principal ($000s)			Effective Cost Rate		
	Applied	Approved	Actual	Applied	Approved	Actual
2008 Series T	2,150	6,242	860	6.60%	5.62%	5.61%
2009 Series U	5,200	2,576	2,900	6.60%	6.60%	6.28%
2009 Series V	n/a	n/a	3,700	n/a	n/a	6.55%
2010 Series	n/a	n/a	n/a	n/a	n/a	n/a
2011 Series W	n/a	n/a	5,000	n/a	n/a	4.58%
2012 Series X	n/a	n/a	4,000	n/a	n/a	3.89%
2013 Series Y	9,100	9,100	9,400	4.76%	4.76%	4.76%
2014 Series Z	6,400	6,400	7,900	5.08%	5.08%	4.12%
2015 Series AA	4,900	4,900	750	5.08%	5.08%	4.00%
2016 Series AB	5,480	n/a	n/a	4.35%	n/a	n/a
2017 Series AC	6,990	n/a	n/a	4.85%	n/a	n/a

JM-AEY-15

Reference: Section 8 Return on Rate Base
Attachment 8.1 Concentric Energy Advisors evidence

Request:

(a) Page 6: Noted that the AUC set the 2015 ROE at 8.30%. Has the AUC reached a decision yet in its 2016 Cost of Capital hearing and if so what were their decisions with respect to interest rates on debt and ROE?

(b) Page 11 lines 9 through 21 and page 16 lines 5 through 11: Based on the arguments presented here please confirm that the Brexit vote is also likely to represent a drag on the Canadian economy and reduce debt interest costs?

(c) Page 23 lines 16 and 17: Please confirm that weather normalization of forecasts will in the longer term provide AEY with adjustments for non-normal weather, i.e. some years weather related sales will be higher and in others lower but they should even out if the normalization has been correctly carried out.

(d) Page 23 lines 16 and 17: Please confirm that the YUB, in past decisions, has indicated that AEY is to make adjustments for DSM sales reductions at the time of submitting its GRAs.

(e) Page 24 lines 15 to 18 and page 25 line 1:

i. Please confirm that in order for customers to switch between electric and oil or propane heating requires customers to have dual heating systems including electricity and either oil or propane.

ii. Please provide the data the AEY relied on to conclude how many customers have dual systems and that this represents enough to make a measurable difference to AEY sales.

iii. Does AEY believe that the choice of heating systems in new building construction (residential and or commercial) has changed due to the recent drop in oil and gas prices? If so please provide the data supporting this conclusion.

(f) Page 25 lines 4 to 9: Please confirm that any reduction in sales due to the microgeneration program will result in a reduction in wholesale purchase cost, and that any microgeneration export to the grid is available to AEY at no cost

(paid for by GY) and is re-sold at retail prices without attracting any wholesale cost.

(g) Page 26 lines 9 through 14:

i. Please provide the data that AEY relied on to conclude that residential customers are changing their heating systems from electric to oil or propane.

ii. Given the cost of replacing heating systems in residential dwellings, is this not highly unlikely?

(h) Page 29 Weather Related Risk: Please confirm that AEY and its predecessors have operated in Yukon for over 100 years and that they understand and take weather into account in their planning to address disruptions.

(i) Page 30 competition from alternative fuels: As government policies that discourage the use of fossil fuels take effect, does not AEY stand to benefit substantially in the form of increased sales volumes as customers switch from oil and propane to electric heat?

(j) Page 30 lines 26 and 27: Please confirm that the present Yukon Government has repeatedly stated a position opposed to a carbon tax.

Response:

(a) A decision has not yet been issued by the AUC.

(b) Concentric has not analyzed the possible impact of the Brexit vote on the Canadian economy. While Great Britain's decision to leave the European Union creates uncertainty around the future path of interest rates and central bank policy, it is too soon to evaluate what effect there might be on debt costs in Canada. The initial reaction in equity markets was dramatic, with elevated volatility and sharp drops in equity prices for several days following the vote. The equity markets have since stabilized; however, even if interest rates decrease further (which seems unlikely given the current low levels on government bond yields around the world), it will not necessarily result in lower equity cost rates.

(c) There is an important distinction between a utility that weather normalizes its sales forecast and a utility that is allowed to recover revenues that were lost due to abnormal weather. In the former case, it depends on the ability of the utility to

accurately forecast the effect of weather on sales. In the latter case, the utility is allowed to recover revenues if actual sales are different than forecast sales due to the effect of abnormal weather. Weather normalizing the sales forecast does not protect the utility's earnings and cash flows in the event of abnormal weather.

(d) Not confirmed. In Decision 2014-06, the Board did not specify that AEY is to make adjustments for DSM sales reductions. In Board order 2014-06 on page 101 the Board directed YECL "within its compliance filing, to quantitatively provide the load reduction in GWh related to DSM for each of the years 2014 and 2015, by rate class that has been incorporated in YECL's load forecast and to explain and quantify the changes to the load forecast based on the determination of the Board regarding DSM." Please refer to response YUB-YECL-6(c).

(e) Please refer to response to YUB-YECL-68.

(f) Confirmed.

(g) Please refer to response to YUB-YECL-68.

(h) While AEY plans for and manages weather-related risk, there is no cost effective way to maintain the uninterrupted reliability of the electric transmission and distribution system. Each weather-related event presents unique challenges no matter how well the utility has planned and prepared to avoid service outages.

(i) This was not taken into consideration in Concentric's risk assessment. Mr. Coyne believes it would be speculative to evaluate the outcome of government policies until actual legislation has been passed and implemented.

(j) Yukon government leaders have recently expressed opposition to a carbon tax, while certain industries such as mining support the tax. Canadian Prime Minister Trudeau has also indicated recently that he is considering imposing a national carbon tax on all Canadian provinces.

JM-AEY-16

Reference: Section 9 Capital Additions
Page 9-3 conversion of existing street lights to LED

Request:

(a) Please provide the average capital cost of the replacement of a conventional street light to LED; the average life forecasted for an LED street light; the reduction in energy consumption per unit in conversion from conventional to LED; the average life of a conventional street light; the average life of an existing conventional street light; and the average cost of replacing a conventional street light bulb.

(b) Please provide a life cycle cost and energy comparisons between conventional and LED street lights.

Response:

(a) Please refer to AEY's response to CW-YECL-27(a).

(b) Please refer to AEY's response to YUB-YECL-10(b).

JM-AEY-17

Reference: Section 9 Capital Additions
Schedule 9.2

Request:

(a) For the Fish Lake hydro system please provide a table summarizing the total capital expenditures (actuals) in each year for 2010 to 2015 and projected expenditures in 2016 and 2017. If capital expenditures beyond 2017 are anticipated please also indicate what they are.

Response:

(a) The following table shows the Fish Lake capital expenditures for each year in thousands of dollars:

2010	2011	2012	2013	2014	2015	Test Period	
Actual	Actual	Actual	Actual	Actual	Actual	2016	2017
1,069	1,730	2,092	2,915	2,703	103	3,100	1,063

JM-AEY-18

Reference: Section 12 Diesel Displacement
Page 12-1

Request:

(a) Please confirm that it is the intention of the governments, first Nations, and others referenced to replace the use of fossil fuels with renewable energy rather than to switch from one fossil fuel to another.

(b) In lines 20 to 22 please confirm that ATCO is referring to its intent to reduce environmental impact by replacing fossil fuel generation with renewable generation.

(c) Please confirm that it is ATCO's understanding from all information tabled in the lengthy Yukon Energy YESAB and YUB proceedings that the life cycle GHG impacts of LNG / gas generation is in the same order of magnitude as diesel generation.

Response:

(a) AEY is unable to confirm the intentions of governments, First Nations or others; however, AEY believes that they want to displace diesel with renewable generation or other low cost sources of generation. Renewable energy solutions, such as wind and solar, are intermittent in nature and will require contingent thermal fuel based energy sources to maintain reliable electrical service to customers. Even with robust energy storage options in place, there are situations where thermal generation needs to operate to make up any renewable generation deficiency. In some instances, LNG may be lower cost than either diesel or renewables.

(b) It is AEY's desire to reduce the environmental impacts of power generation, however our overriding goal is to provide cost effective, and reliable electricity to customers.

(c) Based on the following excerpt from page 60 of the June 10, 2014 YESAB Whitehorse Diesel Natural Gas Conversion Screening and Recommendation Report 2013-0115:

"Table 9 demonstrates that once converted to the carbon dioxide equivalent (CO2e) emission factors, the emissions are essentially the same."

AEY understands that YESAB concluded that the GHG impacts of the combustion of fuel in an LNG and diesel generation plant are essentially the same.

AEY did not find any conclusions regarding the life cycle GHG impacts of LNG or diesel generation in the Yukon Utilities Board Report to Yukon Minister of Justice regarding the Proposed Whitehorse Diesel to Natural Gas Conversion Project dated May 14, 2014.

JM-AEY-19

Reference: Section 12 Diesel Displacement
Page 12-2 lines 13 to 16

Request:

(a) Is its ATCO's assumption that renewable energy will be more expensive in the long term for Yukon's electricity customers than continued fossil fuel generation?

(b) If the answer to (a) above is yes, is it also ATCO's assumption that the diesel generation will be the main supply and the renewable energy generation will only displace a convenient portion of the diesel generation as opposed to making the renewable generation the main supply and having the diesel fill in around it only as required?

Response:

(a) The purpose of the Renewables and Alternative Energy Study is to address the question posed in JM-AEY-19(a). If the answer is that renewable energy is more expensive than diesel, AEY will look to government agencies for capital contribution to make the project economically viable.

(b) Please refer to AEY's response to JM-AEY-19(a).

JM-AEY-20

Reference: Section 12 Diesel Displacement
Page 12-2 Renewable and alternative energy study

Request:

(a) The implied assumption in this section appears to be that ATCO owned and operated renewable energy facilities would be the most cost effective for the ratepayers. Please explain.

Response:

(a) AEY has not made that assumption. There is currently a Yukon IPP policy in development that would allow for third party power generation in the Yukon, including AEY's thermal communities. This program will have a standard offer price that does not preclude AEY from developing its own projects.

JM-AEY-21

Reference: Section 12 Diesel Displacement
Page 12-3 Study Overview

Request:

(a) It appears that ATCO will only study and consider dispatch controlled renewable energy options, is this correct?

(b) If so what technologies will be considered?

Response:

(a) From an operational standpoint, if and when fluctuating customer loads and intermittent renewables force the diesel generators to operate outside manufacturers recommended limits, AEY requires the ability to reduce generation output from renewables to maintain reliable service to customers. Inverters on solar PV systems can be controlled to limit output when demand is low in the community. Energy storage can also be used to balance intermittent generation and a fluctuating demand. Many scenarios and configurations will be considered during the Renewable and Alternative Energy Study.

(b) AEY will consider technologies with proven reliability. As each of the communities we serve vary in size and demand profile, and renewable resource potential is highly site specific, and therefore, each proposed solution(s) will be unique. The initial focus of the study will be on Wind, solar PV, energy storage and waste heat recovery, however hydro and geothermal may also be considered based on the unique circumstances of each community.

JM-AEY-22

Reference: Section 12 Diesel Displacement
Page 12-6

Request:

(a) Please confirm that this $500,000 study will go out to public tender.

Response:

(a) This is not one single study covering all communities. AEY will retain third party expertise based on the skills required through a combination of competitive processes and sole sourcing.

JM-AEY-23

Reference: Section 12 Diesel Displacement
Page 12-6 lines 10 to 13 Watson Lake bi-fuel

Request:

(a) Given that governments have stated that intent is to displace fossil fuel generation, is it not incorrect to say that this project meets the governments' goal by displacing one fossil fuel with another?

Response:

(a) It is AEY's belief that the government's goal is to reduce or eliminate the use of diesel in northern and remote communities. Although renewable energy generation may be preferable it cannot be at any cost.

JM-AEY-24

Reference: Appendices – Business Cases
Appendix 3 Watson Lake bi-fuel

Request:

(a) Page 1 No 2 (LNG is often cheaper…: Please provide a 25 year or longer historical comparison of energy cost in oil and in natural gas per million BTU (or per GJ) by either the US Energy Information Agency or the Canadian National Energy Board.

(b) Please provide the Sproule price forecasts that ATCO relied on.

(c) What is the ratio of prices at present?

(d) At what ratio of prices would the delivered diesel and the delivered Fortis and AltaGas LNG options break even?

Response:

(a) Please refer to the table below. Note the US EIA provides 19 years of Henry Hub Natural Gas Prices and 30 years of Cushing, OK WTI Pricing.

Date	Cushing, OK WTI Spot Price FOB		Henry Hub Natural Gas Spot Price
	(Dollars per Barrel)	(Dollars per Million Btu)	(Dollars per Million Btu)
1986	$ 15.05	$ 2.59	Data Not Provided
1987	$ 19.20	$ 3.31	Data Not Provided
1988	$ 15.97	$ 2.75	Data Not Provided
1989	$ 19.64	$ 3.39	Data Not Provided
1990	$ 24.53	$ 4.23	Data Not Provided
1991	$ 21.54	$ 3.71	Data Not Provided
1992	$ 20.58	$ 3.55	Data Not Provided
1993	$ 18.43	$ 3.18	Data Not Provided
1994	$ 17.20	$ 2.97	Data Not Provided
1995	$ 18.43	$ 3.18	Data Not Provided
1996	$ 22.12	$ 3.81	Data Not Provided
1997	$ 20.61	$ 3.55	$ 2.49
1998	$ 14.42	$ 2.49	$ 2.09
1999	$ 19.34	$ 3.33	$ 2.27
2000	$ 30.38	$ 5.24	$ 4.31
2001	$ 25.98	$ 4.48	$ 3.96
2002	$ 26.18	$ 4.51	$ 3.38
2003	$ 31.08	$ 5.36	$ 5.47
2004	$ 41.51	$ 7.16	$ 5.89
2005	$ 56.64	$ 9.77	$ 8.69
2006	$ 66.05	$ 11.39	$ 6.73
2007	$ 72.34	$ 12.47	$ 6.97
2008	$ 99.67	$ 17.18	$ 8.86
2009	$ 61.95	$ 10.68	$ 3.94
2010	$ 79.48	$ 13.70	$ 4.37
2011	$ 94.88	$ 16.36	$ 4.00
2012	$ 94.05	$ 16.22	$ 2.75
2013	$ 97.98	$ 16.89	$ 3.73
2014	$ 93.17	$ 16.06	$ 4.37
2015	$ 48.66	$ 8.39	$ 2.62
Conversion			
1 barrel (42 gallons) of crude oil = 5,800,000 BTU			

Source:
Henry Hub Natural Gas Prices (Date queried: 2016-07-20): https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm
Cushing/OK WTI Prices (Date queried: 2016-07-20):
https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=rwtc&f=a
Conversion (Date queried: 2016-07-20): http://www.eia.gov/energyexplained/?page=about_energy_units

(b) Please refer to JM-AEY-24(b) Attachment 1.

Table 1 provided the oil price forecast for Canadian Light Sweet. Historical prices AEY has incurred at Watson Lake for diesel were correlated to historical Canadian Light Sweet prices. This relationship between the prices was used to forecast future prices for Watson Lake diesel.

Table 2 provided the B.C. Westcoast Station 2 forecast for LNG sourced from AltaGas and Huntington / Sumas forecast for LNG sourced from Fortis.

(c) On July 18, 2016, the daily average Henry Hub Price was $2.83 / MMBTU, as reported by the EIA: https://www.eia.gov/dnav/ng/hist/rngwhhdD.htm

On July 18, 2016, the daily average Cushing, OK WTI Price was $45.23 / Barrel ($7.80/MMBTU), as reported by the EIA: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D

The Ratio of Henry Hub to OK WTI on July 18, 2016 was:

$$\frac{\text{Henry Hub \$2.83/MMBTU}}{\text{OK WTI \$7.80/MMBTU}} \times 100 = 36.2\%$$

(d) Using delivered diesel prices based on the Sproule forecast, the LNG option breaks even at an average delivered-LNG-price-to-delivered-diesel-price ratio of 75.6% over the lifetime of the project.

SPROULE ASSOCIATES LTD.
TABLE 1
OIL PRICE FORECAST
****

- Prices in Canadian Dollars -

Year	Canadian Light Sweet 40 API $/Bbl
2005 Act	69.29
2006 Act	73.30
2007 Act	77.06
2008 Act	102.85
2009 Act	66.20
2010 Act	77.80
2011 Act	95.16
2012 Act	86.57
2013 Act	93.27
2014 Act	93.99
2015 Act	57.45
2016 1 mo. Act	39.28
2016 11 mo. Est	55.20
2017	69.00
2018	78.43
2019	89.41
2020	91.71
2021	93.08
2022	94.48
2023	95.90
2024	97.34
2025	98.80
2026	100.28

Escalation Rate of 1.5% Thereafter

1. 40 Deg API, 0.4% sulphur
2. Based on WTI
3. Based on IHS Upstream Capital Cost Index
4. Projects with minimal cost containment in 2015

SPROULE ASSOCIATES LTD.
TABLE 2
NATURAL GAS PRICE FORECASTS
****

- Prices in Canadian Dollars -

Year	B.C. Westcoast Station 2 $/MMbtu	Huntingdon / Sumas 30 d Spot $/MMbtu
2005 Act	8.22	8.59
2006 Act	6.58	7.13
2007 Act	6.40	7.01
2008 Act	8.20	8.78
2009 Act	4.17	4.54
2010 Act	4.01	4.43
2011 Act	3.39	3.88
2012 Act	2.38	2.76
2013 Act	3.11	3.84
2014 Act	4.16	4.82
2015 Act	1.81	2.96
2016 1 mo. Act	1.87	3.21
2016 11 mo. Est	1.45	2.35
2017	2.55	3.05
2018	3.02	3.52
2019	3.51	4.01
2020	3.80	4.30
2021	3.88	4.38
2022	3.95	4.45
2023	4.03	4.53
2024	4.11	4.61
2025	4.19	4.69
2026	4.27	4.77

Escalation Rate of 1.5% Thereafter

JM-AEY-25

Reference: Appendices – Business Cases
Appendix 4 Watson lake Unit #2 replacement

Request:

(a) Should renewable energy generation be connected to the Watson Lake system, how would the dispatch on various diesel generators vary from the present?

(b) What factors would limit the amount of various renewable generation options that the system could absorb? Please explain.

Response:

(a) The dispatch scheme of various diesel generators would depend on the level of penetration and the type of renewable energy. Low penetration levels of non dispatchable renewable energy can typically be absorbed in electrical systems without major adjustments to control systems, generating equipment or the electrical protection. High penetration levels require in depth analysis to ensure successful integration in to an isolated micro grid. Integration would require a system impact study to ensure compatibility with the electrical system to ensure continued reliable operation. The study would create a complete system model to analyze the various impacts the type and amount of renewable energy would have on the distribution system and the generators. Considerations include; system voltage, frequency, coordination with system protection schemes and impact on line equipment at varying levels of energy supply due to low renewable availability. Also, the ability of diesel generators to remain in hot standby mode, type of energy storage, location of renewable supply in relation to existing power plant have to be considered.

(b) Limiting factors for the amount of renewable generation will vary for all communities with micro grids. The successful coordination with the existing distribution line equipment and generators is paramount. The factors that will need to be considered would be identified by a system impact study as noted in (a). Technical problems arise in the areas of power quality, voltage stability, harmonics, reliability, protection, and control. Behavior of protective devices on the grid must be examined for all combinations of energy supply.

JM-AEY-26

Reference: Appendices – Business Cases
Appendix 5 Old Crow unit 3 replacement

Request:

(a) We hear that there are plans to add a significant amount of solar PV generation to the Old Crow system. How will this change the hours each unit operates?

(b) What factor or factors will limit the amount of solar PV generation that the Old Crow system can absorb? Would a new 600 kW generator not limit the amount of solar or other renewable generation that can be added to the grid?

(c) With an increase in the amount of solar PV generation added to the system would a 250 kW unit not operate more hours rather than fewer?

Response:

(a) AEY understands that the solar PV system proposed has just completed the pre-feasibility stage. There is not enough information yet available to determine how it will affect the hours of operation of each generator.

(b) Limiting factors for the amount of renewable generation will vary for all communities with micro grids. The successful coordination with the existing distribution line equipment and generators is paramount. The factors that will need to be considered would be identified by a system impact study. Technical problems arise in the areas of power quality, voltage stability, harmonics, reliability, protection, and control. Behavior of protective devices on the grid must be examined for all combinations of energy supply.

The 600 kW generator was selected based on a review of community loading, forecast infrastructure development in the community and adequate contingency for this isolated community. As noted in (a), the Old Crow solar project is in the prefeasibility stage without a firm in service date. The timely replacement of generators to provide firm capacity in an isolated community must proceed on schedule to ensure the continued safe and reliable operation of the electrical system. Also, peak loading in the community occurs in the winter months, which is the time of the least amount of solar generation.

(c) As noted in (b), the timely replacement of generators to provide firm capacity in an isolated community must proceed on schedule to ensure the continued safe

and reliable operation of the electrical system. Also, peak loading in the community occurs in the winter months, which is the time of the least amount of solar generation. AEY's review of the community loading identified a 600 kW unit as the recommended replacement. Without a firm in service date of a renewable source of generation AEY must move forward with scheduled maintenance and replacement projects.

JM-AEY-27

Reference: Appendices – Business Cases
Appendix 6 Destruction Bay unit 2 replacement and Appendix 11 Destruction Bay unit 3 replacement

Request:

(a) An increasing amount of solar PV generation is being added to the Destruction Bay – Burwash Landing system and there are plans for a wind power project of about 300 kW as well. Please describe how these projects were factored into the selection of the size of the generator.

(b) What is the lowest amount of diesel generation that, in ATCO's opinion, must be kept running at all times?

(c) How can the amount of renewable energy be increased and the amount of diesel generation be reduced further?

(d) What steps will ATCO take to displace more diesel generation with renewable energy once the wind project is operational?

(e) There appears to be an inconsistency between the background information provided in the two referenced appendices, please explain.

Response:

(a) As noted in Appendix 6, Destruction Bay Unit #2 Replacement in the Project Cost & Schedule section 'The new unit was selected and the tender process was completed in 2015. Receipt of the unit and installation is scheduled to be completed in 2016.'

Similarly in Appendix 11, Destruction Bay Unit #3 Replacement in the Project Cost & Schedule section it states 'The new unit was selected and the tender process was initiated late in 2013. Receipt of the unit and installation was scheduled to be completed in 2014.'

The replacement projects were scheduled, and in the case of Destruction Bay Unit #3 Replacement completed, prior to the recent installation of the increased amount of solar PV generation.

The Burwash Landing wind project has been in progress for a number of years and does not have a firm in service date. The project may eventually be a source of renewable energy on the Destruction Bay/Burwash micro grid but does not impact firm capacity requirements. Therefore the timely replacement of generators to provide firm capacity in an isolated community must proceed on schedule to ensure the continued safe and reliable operation of the electrical system.

(b) The lowest amount of diesel generation to be kept running is dependent on a number of factors. Typically, manufacturers recommend that units are operated in the range of 50 – 80% of rated capacity. This is to ensure efficient operation (heat rate), acceptable performance and alignment with warranty. If units operate outside that range for a sustained amount of time the effects can be detrimental to the unit as excessive wear can lead to premature failure of components. Also, at AEY's Burwash Landing / Destruction Bay power plant, the operating unit provides space heating to the power plant building and heat for idle units in hot standby for timely dispatch.

(c) System stability and reliability is a primary concern of AEY's. Once intermittent generation supplies a significant amount of the community load at any point in time, advanced controls, dispatch logic and energy storage are required to maintain reliable service. Under a high penetration of intermittent renewables scenario, energy storage can be used to balance intermittent renewable generation and a fluctuating demand while ensuring the diesel generators operate within proper specifications. Balancing generation and demand is essential in an isolated micro grid to ensure reliable grid stability.

(d) AEY is proposing to conduct studies to determine the viability of the displacement of diesel generation with renewable generation sources in Section 12 of the Application. The further steps that can be taken on this micro grid will be contingent on the outcome of the wind project in Burwash.

(e) The Background of Appendix 11 Destruction Bay Unit #3 Replacement indicates the new unit selected is 312 kW; this is the operational rating of the unit. In the Background section of Appendix 6, Destruction Bay Unit #2 Replacement the new unit rating is 315 kW; this is the capacity rating of the generator. With generator coupled to the engine the unit is rated for 312 kW.