

1 Q. **2017 General Rate Application - Operations**

2 Page 3.24, Table 3-15 – Provide the detailed calculations for the Holyrood
3 conversion factor for the test years 2018 and 2019.

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6 A. The detailed calculation for the 2018 and 2019 Test Year Holyrood fuel net
7 conversion factor of 616 kWh/bbl, draws on monthly operating data for 2011-2015,
8 i.e.:

9 i. Unit average gross loading (kW);

10 ii. Running fuel heating content (BTU/US gal); and

11 iii. Fuel consumption rate (bbl/hour).

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13 Please refer to Table 1 in PUB-NLH-043, Attachment 1 for the detailed calculations.

14 A linear regression analysis was performed using Microsoft Excel in order to
15 correlate the gross average unit loading, the fuel heating content and the fuel
16 consumption rate. The results of the regression analysis including the regression
17 correlation are presented in Table 2 provided in PUB-NLH-042, Attachment 1.

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19 In the 2018 and 2019 Test Years, Hydro is forecasting the average unit loading to be
20 122 MW while the unit is operating (on a net basis). The methodology and
21 formulas that result in a net forecast fuel conversion rate of 616 kWh/bbl are also
22 outlined in Table 2 in PUB-NLH-043, Attachment 1.

Table 1 Holyrood Fuel Conversion Rate Regression Analysis							
Month	Year	Gross Average Unit Load (KW)	Running Heat Content (BTU/gal)	Consumption Rate (Bbl/Hr)	Actual (kWh/Bbl)	Regression Consumption Rate (Bbl/Hr)	Regression (kWh/Bbl)
Jan	2011	77,676	153,232	122	638	124	628
Feb	2011	85,344	153,401	132	647	134	635
Mar	2011	84,075	155,008	130	647	131	640
Apr	2011	75,640	156,505	117	645	118	639
May	2011	72,994	155,126	116	630	116	631
Jun	2011	71,342	153,958	114	626	114	625
Oct	2011	71,770	153,824	111	644	115	625
Nov	2011	81,673	153,938	126	648	129	634
Dec	2011	80,565	154,179	123	657	127	634
Jan	2012	84,168	155,071	131	643	131	641
Feb	2012	85,815	155,043	132	652	134	642
Mar	2012	88,363	154,738	136	648	138	642
Apr	2012	82,420	154,956	129	638	129	639
May	2012	79,936	153,499	128	622	127	631
Jun	2012	80,683	153,380	129	627	128	632
Oct	2012	68,480	153,380	111	614	111	619
Nov	2012	87,972	154,232	136	647	137	640
Dec	2012	92,417	154,699	145	636	143	645
Jan	2013	114,417	151,528	177	648	177	648
Feb	2013	116,354	152,966	180	646	178	653
Mar	2013	88,437	153,627	139	635	138	639
Apr	2013	83,883	153,192	134	625	132	634
May	2013	77,727	153,476	125	620	124	629
Jun	2013	73,148	153,388	123	597	117	624
Oct	2013	66,210	153,662	108	611	107	618
Nov	2013	79,103	153,368	124	637	126	630
Dec	2013	101,525	152,493	157	648	158	644
Jan	2014	93,026	150,413	152	612	147	631
Feb	2014	108,111	151,743	170	636	168	645
Mar	2014	98,353	150,900	154	641	155	637
Apr	2014	83,670	148,228	134	624	136	616
May	2014	84,570	149,898	138	614	136	622
Jun	2014	71,873	150,054	116	618	118	610
Jul	2014	69,459	148,672	118	591	116	601
Aug	2014	70,242	149,225	116	606	116	604
Sep	2014	70,269	152,233	120	588	114	616
Oct	2014	73,695	151,903	123	600	119	619
Nov	2014	86,013	150,550	139	620	137	626
Dec	2014	93,017	149,736	147	631	148	629
Jan	2015	106,956	149,673	168	636	168	638
Feb	2015	101,291	149,880	158	643	159	635
Mar	2015	101,884	150,878	157	649	159	639
Apr	2015	84,191	151,685	132	636	134	628
May	2015	75,849	148,969	121	629	124	610
Jun	2015	70,308	148,514	110	640	117	602
Jul	2015	72,124	148,913	116	621	119	606
Aug	2015	68,219	148,913	118	580	114	600
Sep	2015	68,330	150,049	117	585	113	605
Oct	2015	82,074	149,693	132	621	133	619
Nov	2015	111,656	151,990	175	640	172	648
Dec	2015	106,510	152,513	164	650	165	646

Table 2
Holyrood Fuel Conversion Rate
Regression

Line
No

SUMMARY OUTPUT

<i>Regression Statistics</i>	
1	Multiple R 0.991032538
2	R Square 0.982145492
3	Adjusted R Square 0.981401554
4	Standard Error 2.585836868
5	Observations 51

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
6	Regression 2	17655.1508	8827.575399	1320.198361	1.10141E-42
7	Residual 48	320.9545108	6.686552308		
8	Total 50	17976.10531			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
9	Intercept 130.5581893	25.66683696	5.086648953	5.99763E-06	78.95155484	182.1648239	78.95155484	182.1648239
10	Average Unit Load (kW) 0.001406916	2.75098E-05	51.14227765	1.59091E-43	0.001351604	0.001462228	0.001351604	0.001462228
11	Heat Content (BTU/bbl) -0.000758311	0.000167815	-4.518724624	4.06151E-05	-0.001095727	-0.000420896	-0.001095727	-0.000420896

Calculation of 2018 and 2019 Test Year Conversion Rate:

	2018	2019
12	Unit net average loading (kW) 122,244	122,221
13	Fuel Heating Content (BTU/US gal) 152,400	152,400
14	Station Service Factor 6.2%	6.2%
15	Unit gross average loading (kW) 130,310	130,285 Line 12 / (1 - Line 14)
16	Fuel consumption rate (bbl/hour) 198	198 Line 9 + (Line 15 x Line 10) + (Line 13 x Line 11)
17	Net fuel conversion factor (kWh/bbl) 616	616 Line 12 / Line 16