

***Corner Brook Pulp and Paper Generation Credit***

October 2014



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**1 SUMMARY**

2 In April of 2009<sup>1</sup> the Board of Commissioners of Public Utilities (the Board) approved a  
3 pilot supply agreement between Newfoundland and Labrador Hydro (Hydro) and Corner  
4 Brook Pulp and Paper (CBPP) whereby CBPP will, under normal circumstances, be free to  
5 operate its generating units to most efficiently convert water to energy. The intent is to  
6 allow the Deer Lake Power (DLP) 60 Hz generators to be operated at their most efficient  
7 load settings. This is a similar benefit provided to Newfoundland Power<sup>2</sup> through its rate  
8 from Hydro whereby its level of generation output does not affect its demand costs.  
9 Operation under the pilot supply agreement commenced on April 30, 2009.

10

11 In June 2011, and in December 2011, Hydro completed assessments of the demand  
12 credit rate structure for the CBPP Service Agreement and determined that it provides  
13 hydraulic energy production efficiencies that permit lower energy production from  
14 Hydro's Holyrood Thermal Generating Station. Reports with Hydro's findings were  
15 submitted to the Board with the request that the pilot agreement be permanently  
16 instated.

17

18 In subsequent orders<sup>3</sup> the Board approved extensions to the Service agreement and  
19 requested that the analysis include additional considerations. In its latest ruling, the  
20 Board has requested that another updated report be filed with the 2013 General Rate  
21 Application<sup>4</sup>, with the following:

22 *...analysis in relation to potential and actual fuel savings at Holyrood, the*  
23 *efficiency factor at the Holyrood Thermal Generating Station, the Rate*  
24 *Stabilization Plan, and the allocation of costs in revenue requirement.*

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<sup>1</sup> Order No. P.U. 17(2009)

<sup>2</sup> Newfoundland Power's generation credit is applied to its demand in determining cost of service allocations.

<sup>3</sup> Order No.'s P.U. 15(2011) and P.U. 4(2012)

<sup>4</sup> This report has to been updated to cover the period to the end of the 2015 Test Year.

1 In the update to the December 2011 report, the study period was extended to include  
2 the actual DLP operating experience from November 2011 to April 2012 (for a total  
3 period of three years). The benefit improved from 3.36 to 3.60 GWh/year.

4

5 Although the energy benefit remains lower than anticipated<sup>5</sup>, the total energy benefit  
6 since the pilot implementation to the end of 2015 produces a potential for significant  
7 fuel savings at Holyrood (approximately 39,600 bbls at a savings of \$3.79 million) and  
8 reductions in greenhouse gas emissions of 20,500 tonnes. Since 2009, Hydro's reservoir  
9 storage levels have been high and the increased generation at DLP has resulted in little  
10 to no displacement of fuel consumption at the Holyrood generating station. It has  
11 resulted in displacement of Hydro's hydraulic production resulting in the storage of  
12 water in Hydro's reservoirs which will, in the future, result in reduced Holyrood  
13 production. The benefit to CBPP over the pilot period and ending in 2015 from the  
14 improved water utilization and reduction in firm purchases is determined to be  
15 \$935,000. The impact on Holyrood efficiency for analysis was assumed to occur in 2015.  
16 It is insignificant, at less than one kWh/bbl because the energy benefit represents only  
17 0.23% of the forecast 2015 Test Year production requirements at Holyrood. The impact  
18 on the Rate Stabilization Plan (RSP) for the 2009 to 2015 period is a net benefit of \$2.72  
19 million, which is comprised of a \$1.32 million benefit to all customers through the No. 6  
20 fuel price variation component and \$1.40 million to the load variation component. It  
21 should be noted that in this analysis, the proposed 2015 Test Year Industrial Customer  
22 firm energy rate of \$0.05151 has been used.

23

24 The sensitivity of the contract change was checked under the scenario that CBPP was  
25 able to use it to reduce non-firm power purchases and convert them to firm power  
26 purchases. CBPP's average non-firm energy purchases for the five years prior to  
27 implementation of the agreement (3.46 GWh) were tested against the provisions of the  
28 pilot agreement. The results indicate a net savings to CBPP of \$3.11 million in

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<sup>5</sup> Refer to June 2011 report for the explanation as to why the benefits fall short of original expectations.

1 converting non-firm energy costs to firm energy costs. The net impact to the RSP of this  
2 change is an amount owing to customers of \$104,000. However, there is an impact to  
3 Hydro's revenue in this case resulting from a loss of the ten percent administration fee  
4 on non-firm purchases of \$364,000.

5  
6 In a review of the impact of the energy benefit applied to the 2015 Test Year cost of  
7 service allocation, it was determined that the overall cost benefit to all customers is  
8 \$573,000. The savings are shared among all customer groups with the allocation as  
9 follows; \$484,000 for NP, \$51,000 for the Industrials, and \$38,000 for Hydro Rural  
10 customers.

11  
12 Based on this review, it is recommended that the pilot agreement be permanently  
13 instated. There is significant benefit identified for CBPP in firm and potentially non-firm  
14 power costs and benefits to the other customers through the mechanisms of the RSP  
15 and Test Year cost of service allocation.

## 1 **1.0 INTRODUCTION**

2 In order to more efficiently operate the DLP generators, in April of 2009 the Board  
3 approved a pilot supply agreement between Hydro and CBPP whereby CBPP, under  
4 normal circumstances, is free to operate its units to most efficiently convert water to  
5 energy. The intent is to allow the Deer Lake 60 Hz generators to be operated at fixed  
6 output levels matching the generators' combined most efficient load as the customer  
7 gets credit for its generation capacity regardless of whether it is operated. The units  
8 would no longer be adjusted to follow the mill's load. This is similar to the benefit  
9 provided to Newfoundland Power, through its rate from Hydro, where Newfoundland  
10 Power's level of generation output does not affect its demand costs. Operation under  
11 the pilot supply agreement commenced on April 30, 2009.

12

13 Hydro completed an initial assessment of the demand credit rate structure for the CBPP  
14 Service Agreement following two years of operation of the pilot and determined that it  
15 provides hydraulic energy production efficiencies that permit lower energy production  
16 from Hydro's Holyrood Thermal Generating Station. The rate structure achieves these  
17 energy savings by providing an incentive for CBPP to operate its hydraulic generation  
18 resources in a manner which provides more efficient energy production as opposed to  
19 operating those resources so as to ensure that CBPP can maintain power production at  
20 levels that avoid the incurring of additional capacity charges. The initial report with  
21 Hydro's findings was submitted to the Board in June 2011, with the request that the  
22 pilot agreement be permanently instated.

23

24 In July 2011<sup>6</sup>, the Board approved an extension of the Service Agreement on a pilot basis  
25 and requested that an updated report be filed with the proposed 2012 General Rate  
26 Application (GRA), with an extension of the analysis.

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<sup>6</sup> Order No. P.U. 15(2011)

1 Although a GRA was not filed, in December 2011 Hydro completed a second assessment  
2 of the demand credit rate structure and a report with the updated findings was  
3 submitted to the Board, again with the request that the pilot agreement be  
4 permanently instated.

5

6 In February 2012<sup>7</sup>, the Board approved another extension of the Service Agreement on  
7 a pilot basis and requested that another updated report be filed with the 2013 General  
8 Rate Application, with the following considerations:

9 *...analysis in relation to potential and actual fuel savings at Holyrood, the*  
10 *efficiency factor at the Holyrood Thermal Generating Station, the Rate*  
11 *Stabilization Plan, and the allocation of costs in revenue requirement.*

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<sup>7</sup> Order No. P.U. 4(2012)

1 **2.0 METHODOLOGY**

2 The determination of the water utilization benefit remains the same as in the  
3 June/December 2011 analyses except that the dataset was extended to include the  
4 additional months of November 2011 to April 2012. The water utilization following  
5 implementation of the pilot agreement improves slightly, from 5.571 m<sup>3</sup>/kWh to 5.569  
6 m<sup>3</sup>/kWh. The annual energy benefit also indicates an increase, from 3.36 GWh/year to  
7 3.60 GWh/year.



1 **3.0 BENEFIT ANALYSIS**

2 **3.1 Generating Plant Efficiency Improvements**

3 The analysis of the benefit resulting from increased water utilization at the Deer Lake  
 4 Power Plant covers the period from the implementation of the pilot agreement (May,  
 5 2009) to the end of 2015 (the assessment period). The following tables outline the  
 6 potential fuel savings at the Holyrood Thermal Plant for this period. Table 1 considers  
 7 only Test Year Holyrood fuel conversion efficiencies, with the efficiency for 2015 as  
 8 proposed in Hydro’s current GRA. Table 2 considers only actual and forecast  
 9 efficiencies.

10

<b>Table 1</b> <b>Potential Fuel Savings Arising from the Demand Credit Contract</b> <b>May 2009 - December 2015</b> <b>Using Test Year Fuel Conversion Rates</b>					
	Energy (kWh)	Conversion (kWh/bbl)	Fuel Savings (bbls)	Average Fuel Price (\$/bbl)	Cost Savings (\$\$\$)
<b>2009-2011</b>	9,933,120	630	15,770	\$ 79.31	\$ 1,250,719
<b>2012</b>	3,724,920	630	5,910	\$ 115.56	\$ 682,960
<b>2013</b>	3,724,920	630	5,910	\$ 106.63	\$ 630,183
<b>2014</b>	3,724,920	630	5,910	\$ 109.59	\$ 647,677
<b>2015</b>	<u>3,724,920</u>	607	<u>6,140</u>	\$ 93.32	<u>\$ 572,985</u>
<b>Totals</b>	<b>24,832,800</b>		<b>39,640</b>		<b>\$ 3,784,523</b>

**Table 2**  
**Potential Fuel Savings Arising from the Demand Credit Contract**  
**May 2009 - December 2015**  
**Using Actual and Forecast Fuel Conversion Rates**

	Energy (kWh)	Conversion (kWh/bbl)	Fuel Savings (bbls)	Average Fuel Price (\$/bbl)	Cost Savings (\$\$\$)
<b>2009-2011</b>	9,933,120	596	16,670	\$ 79.31	\$ 1,322,098
<b>2012</b>	3,724,920	602	6,190	\$ 115.56	\$ 715,316
<b>2013</b>	3,724,920	594	6,270	\$ 106.63	\$ 668,570
<b>2014</b>	3,724,920	588	6,330	\$ 109.59	\$ 693,705
<b>2015</b>	<u>3,724,920</u>	607	<u>6,140</u>	\$ 93.32	<u>\$ 572,985</u>
<b>Totals</b>	<b>24,832,800</b>		<b>41,600</b>		<b>\$ 3,972,674</b>

1

2 Three percent has been added to the energy benefit to reflect the reduction in  
 3 transmission losses. Both tables indicate a significant benefit in the order of \$3.8 to  
 4 \$4.0 million. In addition, there is a potential environmental benefit of a reduction in CO<sub>2</sub>  
 5 emissions of 20,500 tonnes. This uses the latest five year average emissions intensity  
 6 factor at Holyrood of 0.826 kg/kWh.

7

8 It should be noted that, throughout the study period, the storage levels in Hydro’s  
 9 reservoirs have been high. Therefore the increase in Deer Lake Power generation has  
 10 resulted in little to no displacement of fuel consumption at the Holyrood generating  
 11 station to date. It has resulted in displacement of Hydro’s hydraulic production and is  
 12 reflected as an increase in the storage of water in Hydro’s reservoirs which will, in the  
 13 future, be used to produce hydroelectric energy, resulting in reduced Holyrood  
 14 production.

15

16 The potential benefit to CBPP resulting from the energy improvement at its 60 HZ  
 17 generation over the assessment period is \$935,000. This total benefit is determined by  
 18 applying the 2007 Test Year Industrial Customer firm rate of \$0.03676 for the period of  
 19 2009 – 2014 and the proposed Test Year firm rate of \$0.05151 for 2015.

1 **3.2 Impact on Other Customers**

2 The potential benefit to other customers through the fuel price and load variation  
 3 Components of the RSP over the assessment period is as outlined in Tables 3 and 4.

4

**Table 3 - Rate Stabilization Plan  
 No. 6 Fuel Variation - CBPP Demand Credit Contract**

2009-2011			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(9,600,000)	CBPP water utilization benefit
2.	Actual Quantity No. 6 Fuel <sup>(2)</sup> (bbl)	(15,238)	Line 1/630
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	
4.	Net Quantity No. 6 Fuel (bbl)	(15,238)	Line 2 - Line 3
5.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$Can/bbl)	79.31	May 2009 - December 2011 Average fuel price
7.	Cost Variance (\$Can/bbl)	24.20	Line 6 - Line 7
8.	No. 6 Fuel Variation (\$000)	(369)	Line 4 * Line 7
2012			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Actual Quantity No. 6 Fuel <sup>(2)</sup> (bbl)	(5,714)	Line 1/630
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	
4.	Net Quantity No. 6 Fuel (bbl)	(5,714)	Line 2 - Line 3
5.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$Can/bbl)	115.56	2012 Average fuel price
7.	Cost Variance (\$Can/bbl)	60.45	Line 6 - Line 7
8.	No. 6 Fuel Variation (\$000)	(345)	Line 4 * Line 7
2013			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Actual Quantity No. 6 Fuel <sup>(2)</sup> (bbl)	(5,714)	Line 1/630
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	
4.	Net Quantity No. 6 Fuel (bbl)	(5,714)	Line 2 - Line 3
5.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$Can/bbl)	106.63	2013 Average fuel price
7.	Cost Variance (\$Can/bbl)	51.52	Line 6 - Line 7
8.	No. 6 Fuel Variation (\$000)	(294)	Line 4 * Line 7

**Table 3 (cont'd) - Rate Stabilization Plan  
No. 6 Fuel Variation - CBPP Demand Credit Contract**

2014			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Actual Quantity No. 6 Fuel <sup>(2)</sup> (bbl)	(5,714)	Line 1/630
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	
4.	Net Quantity No. 6 Fuel (bbl)	(5,714)	Line 2 - Line 3
5.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$Can/bbl)	109.59	2014 Forecast Average fuel price
7.	Cost Variance (\$Can/bbl)	54.48	Line 6 - Line 7
8.	<b>No. 6 Fuel Variation (\$000)</b>	<b>(311)</b>	<b>Line 4 * Line 7</b>
2015			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Actual Quantity No. 6 Fuel <sup>(2)</sup> (bbl)	(5,930.81)	Line 1/607
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	
4.	Net Quantity No. 6 Fuel (bbl)	(5,931)	Line 2 - Line 3
5.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	93.32	Average 2015 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$Can/bbl)	93.32	2015 Forecast Average fuel price
7.	Cost Variance (\$Can/bbl)	-	Line 6 - Line 7
8.	<b>No. 6 Fuel Variation (\$000)</b>	<b>-</b>	<b>Line 4 * Line 7</b>

Notes: 1. Load reduction possible due to improved water utilization at the DLP 60 Hz Plant

2. 2007 Test Year Holyrood Operating Efficiency of 630 kWh/bbl

3. Proposed 2015 Test Year Holyrood Operating Efficiency of 607 kWh/bbl

**Table 4 - Rate Stabilization Plan  
Industrial Load Variation- CBPP Demand Credit Contract**

<b>2009-2011</b>			
1.	CBPP Firm Sales Reduction <sup>(2)</sup> (KWh)	(9,600,000)	CBPP water utilization benefit
2.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
3.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 test year)
4.	Industrial Load Variation <sup>(2)</sup> (\$000)	<u>(487)</u>	Line 1 * (Line 2/630 - Line 3)
<b>2012</b>			
1.	CBPP Firm Sales Reduction <sup>(2)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
3.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 test year)
4.	Industrial Load Variation <sup>(2)</sup> (\$000)	<u>(183)</u>	Line 1 * (Line 2/630 - Line 3)
<b>2013</b>			
1.	CBPP Firm Sales Reduction <sup>(2)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Cost of Service No. 6 Fuel Cost (\$Can/bbl)	55.11	Average 2007 Test Year price of fuel
3.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 test year)
4.	Industrial Load Variation <sup>(2)</sup> (\$000)	<u>(183)</u>	Line 1 * (Line 2/630 - Line 3)

**Table 4 (cont'd) - Rate Stabilization Plan  
Industrial Load Variation- CBPP Demand Credit Contract**

2014			
1.	CBPP Firm Sales Reduction <sup>(2)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11	Average 2007 Test Year price of fuel
3.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 test year)
4.	Industrial Load Variation <sup>(2)</sup> (\$000)	<u>(183)</u>	Line 1 * (Line 2/630 - Line 3)

  

2015			
1.	CBPP Firm Sales Reduction <sup>(2)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
2.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	93.32	Average 2015 Test Year price of fuel
3.	Firm Energy Rate (\$/kWh) <sup>(4)</sup>	0.05151	Industrial firm rate (2015 test year)
4.	Industrial Load Variation <sup>(2)</sup> (\$000)	<u>(368)</u>	Line 1 * (Line 2/607 - Line 3)

Notes: 1. Load reduction possible due to improved water utilization at the DLP 60 Hz Plant  
 2. 2007 Test Year Holyrood Operating Efficiency of 630 kwh/bbl  
 3. Proposed 2015 Test Year Holyrood Operating Efficiency of 607 kwh/bbl  
 4. Proposed IC Rates for 2015 Test Year of \$005151/kwh

1

2 The tables indicate that the total projected impact to the RSP is a decrease or benefit of  
 3 \$2.72 million, with \$1.32 million benefiting all customers through the No. 6 fuel price  
 4 variation and \$1.40 million benefiting Industrial Customers through the Industrial load  
 5 variation.

6

7 **3.3 Sensitivity Impact of a Reduction of Non-Firm Power Purchases by CBPP**

8 **3.3.1 Benefits to Corner Brook Pulp and Paper Limited**

9 As indicated in the June, 2011 report, CBPP has benefited and will continue to benefit  
 10 from the pilot agreement through a reduction in the amount of energy it purchases at

1 non-firm energy prices<sup>8</sup>. With the new agreement, CBPP no longer has to purchase non-  
2 firm energy for reductions in DLP generation unless it occurs when Hydro requests the  
3 generation for system purposes. The total benefit of this change remains difficult to  
4 quantify as DLP generation reduction can occur at any time due to a number of factors  
5 (e.g. equipment breakdown, planned shutdowns for capital refurbishment, low water  
6 levels, frazil ice). In the five years prior to the implementation of the pilot contract,  
7 CBPP purchased, on average, 3.46 GWh of energy at non-firm rates that would have  
8 been subject to firm rates if the provisions of this pilot contract were in place. Over the  
9 period from May 2009 to December 2015, using actual fuel prices, this amount of  
10 energy is projected to cost \$4.01 million at non-firm rates. If the equivalent energy is all  
11 supplied under the firm power block rates, it is at a reduced cost to CBPP of \$899,000.  
12 This results in net savings to CBPP of \$3.11 million, exclusive of the savings of \$935,000  
13 achieved through the improved water utilization.

14

### 15 **3.3.2 Impacts on Other Customers**

16 As demonstrated in the previous reports, a reduction in energy at non-firm rates and a  
17 corresponding increase in energy at firm rates will have an impact on the fuel and load  
18 variation components of the RSP. Tables 5 and 6 illustrate this impact over the entire  
19 period of 2009-2015, using CBPP's average non-firm usage (3.46 GWh) during the five  
20 years prior to implementation of the pilot contract in combination with the base  
21 efficiency improvements described in Section 3.1.

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<sup>8</sup> Refer to the June 2011 report for a more detailed description of the non-firm energy savings to CBPP.

**Table 5 - Rate Stabilization Plan  
No. 6 Fuel Variation - CBPP Demand Credit Contract  
Sensitivity Analysis - Reduction in CBPP Non-Firm Energy Usage**

<b>2009-2011</b>		
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000) CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	9,226,667 CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(373,333) Line 1a + 1b
3.	Actual Quantity No. 6 Fuel <sup>(3)</sup> (bbl)	(593) Line 2/630
4.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	- No recovery through non-firm rates
5.	Net Quantity No. 6 Fuel (bbl)	(593) Line 3 - Line 4
6.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11 Average 2007 Test Year price of fuel
7.	Actual Average No. 6 Fuel Cost (\$/Can/bbl)	79.31 May 2009 - December 2011 Average fuel price
8.	Cost Variance (\$/Can/bbl)	24.20 Line 7 - Line 6
9.	No. 6 Fuel Variation (\$000)	(14) Line 5 * Line 8
<b>2012</b>		
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000) CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000 CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000) Line 1a + 1b
3.	Actual Quantity No. 6 Fuel <sup>(3)</sup> (bbl)	(222) Line 2/630
4.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	- No recovery through non-firm rates
5.	Net Quantity No. 6 Fuel (bbl)	(222) Line 3 - Line 4
6.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11 Average 2007 Test Year price of fuel
7.	Actual Average No. 6 Fuel Cost (\$/Can/bbl)	115.56 2012 Average fuel price
8.	Cost Variance (\$/Can/bbl)	60.45 Line 7 - Line 6
9.	No. 6 Fuel Variation (\$000)	(13) Line 5 * Line 8
<b>2013</b>		
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000) CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000 CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000) Line 1a + 1b
3.	Actual Quantity No. 6 Fuel <sup>(3)</sup> (bbl)	(222) Line 2/630
4.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	- No recovery through non-firm rates
5.	Net Quantity No. 6 Fuel (bbl)	(222) Line 3 - Line 4
6.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11 Average 2007 Test Year price of fuel
7.	Actual Average No. 6 Fuel Cost (\$/Can/bbl)	106.63 2013 Average fuel price
8.	Cost Variance (\$/Can/bbl)	51.52 Line 7 - Line 6
9.	No. 6 Fuel Variation (\$000)	(11) Line 5 * Line 8



**Table 5 (cont'd) - Rate Stabilization Plan  
No. 6 Fuel Variation - CBPP Demand Credit Contract  
Sensitivity Analysis - Reduction in CBPP Non-Firm Energy Usage**

2014			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000	CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000)	Line 1a + 1b
3.	Actual Quantity No. 6 Fuel <sup>(3)</sup> (bbl)	(222)	Line 2/630
4.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	No recovery through non-firm rates
5.	Net Quantity No. 6 Fuel (bbl)	(222)	Line 3 - Line 4
6.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11	Average 2007 Test Year price of fuel
7.	Actual Average No. 6 Fuel Cost (\$/Can/bbl)	109.59	2014 Forecast Average fuel price
8.	Cost Variance (\$/Can/bbl)	54.48	Line 7 - Line 6
9.	No. 6 Fuel Variation (\$000)	(12)	Line 5 * Line 8
2015			
1.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000	CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000)	Line 1a + 1b
3.	Actual Quantity No. 6 Fuel <sup>(4)</sup> (bbl)	(230.64)	Line 2/607
3.	Actual Quantity No. 6 Fuel for Non-firm Sales (bbl)	-	No recovery through non-firm rates
4.	Net Quantity No. 6 Fuel (bbl)	(231)	Line 3 - Line 4
5.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	93.32	Average 2015 Test Year price of fuel
6.	Actual Average No. 6 Fuel Cost (\$/Can/bbl)	93.32	2015 Forecast Average fuel price
7.	Cost Variance (\$/Can/bbl)	-	Line 7 - Line 6
8.	No. 6 Fuel Variation (\$000)	-	Line 5 * Line 8

Notes 1. Load reduction possible due to improved water utilization at the DLP 60 Hz Plant

2. Energy that would have been charged at non-firm is now firm

3. 2007 Test Year Holyrood Operating Efficiency of 630 kWh/bbl

4. Proposed 2015 Test Year Holyrood Operating Efficiency of 607 kWh/bbl

**Table 6 - Rate Stabilization Plan  
Industrial Load Variation- CBPP Demand Credit Contract  
Sensitivity Analysis - Reduction in CBPP Non-Firm Energy Usage**

<b>2009-2011</b>			
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(9,600,000)	CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	9,226,667	CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(373,333)	Line 1a + 1b
3.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11	Average 2007 Test Year price of fuel
4.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 Test Year)
5.	No. 6 Fuel Variation(2) (\$000) <sup>(3)</sup>	<u>(19)</u>	Line 2 * (Line 3/630 - Line 4)

<b>2012</b>			
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000	CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000)	Line 1a + 1b
3.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11	Average 2007 Test Year price of fuel
4.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 Test Year)
5.	No. 6 Fuel Variation(2) (\$000) <sup>(3)</sup>	<u>(7)</u>	Line 2 * (Line 3/630 - Line 4)

<b>2013</b>			
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000)	CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000	CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000)	Line 1a + 1b
3.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11	Average 2007 Test Year price of fuel
4.	Firm Energy Rate (\$/kWh)	0.03676	Industrial firm rate (2007 Test Year)
5.	No. 6 Fuel Variation(2) (\$000) <sup>(3)</sup>	<u>(7)</u>	Line 2 * (Line 3/630 - Line 4)

**Table 6 (cont'd) - Rate Stabilization Plan  
Industrial Load Variation- CBPP Demand Credit Contract  
Sensitivity Analysis - Reduction in CBPP Non-Firm Energy Usage**

2014		
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000) CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000 CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000) Line 1a + 1b
3.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	55.11 Average 2007 Test Year price of fuel
4.	Firm Energy Rate (\$/kWh)	0.03676 Industrial firm rate (2007 Test Year)
5.	No. 6 Fuel Variation(2) (\$000) <sup>(3)</sup>	<u><u>(7)</u></u> Line 2 * (Line 3/630 - Line 4)

2015		
1a.	CBPP Firm Sales Reduction <sup>(1)</sup> (KWh)	(3,600,000) CBPP water utilization benefit
1b.	CBPP Firm Sales Increase <sup>(2)</sup> (KWh)	3,460,000 CBPP 5-year average non-firm usage
2.	CBPP Net Firm Sales Increase/(Reduction)	(140,000) Line 1a + 1b
3.	Cost of Service No. 6 Fuel Cost (\$/Can/bbl)	93.32 Average 2015 Test Year price of fuel
4.	Firm Energy Rate (\$/kWh) <sup>(5)</sup>	0.05151 Industrial firm rate (2015 Test Year)
5.	No. 6 Fuel Variation(2) (\$000) <sup>(4)</sup>	<u><u>(14)</u></u> Line 2 * (Line 3/612 - Line 4)

Notes 1. Load reduction possible due to improved water utilization at the DLP 60 Hz Plant  
 2. Energy that would have been charged at non-firm is now firm  
 3. 2007 Test Year Holyrood Operating Efficiency of 630 kwh/bbl  
 4. Proposed 2015 Test Year Holyrood Operating Efficiency of 607 kwh/bbl  
 5. Proposed IC Rates for 2015 Test Year of \$0.05151/kwh

1

2 The tables indicate that, with the assumed reduction in energy at non-firm rates, the  
 3 total projected impact to the RSP is a net decrease of \$104,000 with \$54,000 through  
 4 the No. 6 fuel price variation and \$50,000 through the load variation.

5

6 **3.3.3 Impact on Hydro**

7 In addition to the RSP impacts, there would be an impact to Hydro’s revenue with a  
 8 reduction in non-firm sales, as this would result in a corresponding reduction in the ten  
 9 percent administration fee applied to non-firm rates. At CBPP’s five year average (firm

1 eligible) non-firm power purchases of 3.46 GWh, actual and forecast fuel prices for  
 2 2009-2014, and 2007 Test Year and proposed 2015 Test Year operating efficiencies, the  
 3 reduction in Hydro’s revenue is approximately \$364,000.

4

5 **3.4 Cost of Service Impact**

6 The Board requested that Hydro determine the impact of the potential and resulting  
 7 changes in the allocation of costs in the revenue requirement for any test year included  
 8 in the period from the commencement of the pilot contract to the end of 2013<sup>9</sup>. The  
 9 following table outlines the benefits of the improved water utilization at CBPP’s 60 Hz  
 10 generators when applied to the 2015 Test Year cost allocation.

11

<b>Table 7 Newfoundland and Labrador Hydro CBPP Generation Credit Load Reduction Impacts</b>			
<b>Based on 2015 Load</b>			
	<b>Existing (MWh Required)</b>	<b>Adjustment (Note 1)</b>	<b>Revised (MWh Required)</b>
Newfoundland Power	5,924,100		5,924,100
Industrial - Firm	621,400	(3,600)	617,800
Industrial - Non-Firm	-		-
Rural	463,900		463,900
Losses	229,500	(125)	229,375
<b>Total</b>	<b>7,238,900</b>	<b>(3,725)</b>	<b>7,235,175</b>
	(\$000)	Note 2	(\$000)
Estimated Energy Costs	361,749	(573)	361,176
<b>Cost Allocation</b>			
Newfoundland Power	305,738	(327)	305,410
Industrial - Firm	32,070	(220)	31,850
Industrial - Non-Firm	-	-	-
Rural	23,941	(26)	23,916
<b>Total</b>	<b>361,749</b>	<b>(573)</b>	<b>361,176</b>
Note 1:	Energy benefit of 3.60 GWh plus losses of 3.47%		
Note 2:	Holyrood Costs Savings (3.60 GWh @ 3.47% losses, 607 kWh/bbl, \$93.32/bbl)		

<sup>9</sup> Hydro has now extended the benefit analysis to the end of the 2015 Test Year.

1 As indicated in the table, using the proposed Test Year conversion rate of 607 kWh/bbl  
2 and average fuel costs of \$93.32/bbl, the total cost of service benefit is \$573,000  
3 allocated among all the customer groups.

4

### 5 **3.5 Holyrood Efficiency Impact**

6 In the latest order, the Board requested that Hydro determine the impact on Holyrood  
7 efficiency resulting from the provisions of the CBPP Demand Credit rate structure. In  
8 the 2015 Test Year, Hydro is proposing a Holyrood efficiency factor of 607 kWh. As  
9 outlined in Hydro's GRA application, this is determined from an analysis which inputs  
10 the forecast monthly average generation requirements for Holyrood into a regression  
11 equation. The regression equation is developed using the past five years of generation  
12 and fuel consumption data for the facility.

13

14 If the Holyrood energy requirements in 2015 are increased by 3.73 GWh<sup>10</sup>, the impact  
15 on the efficiency using this method is an increase of only 0.1 kWh/bbl. This would be  
16 considered insignificant given the level of precision of the proposed Test Year efficiency  
17 (rounded to the nearest whole kWh/bbl).

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<sup>10</sup> This is the equivalent energy benefit realized by improved water utilization at DLP's 60 HZ turbines, plus 3.47% losses, and represents 0.23% of the 2015 Holyrood forecast energy requirements.

1    **4.0    CONCLUSIONS AND RECOMMENDATIONS**

2    The pilot agreement intended to allow Deer Lake Power to operate its generation at  
3    more efficient fixed output levels has brought benefit to the customer and will result in  
4    displaced oil consumption at Holyrood following a return to normal reservoir levels and  
5    expected system load growth. The annual generation benefit to DLP is estimated to be  
6    3.60 GWh when considering the historical water usage. This represents a savings to  
7    CBPP of \$935,000 over the period of May 2009 to December 2015 in firm power  
8    purchases. It should be noted that in this analysis the proposed Test Year Industrial  
9    Customer firm energy rate of \$0.05151 was assumed for 2015. In addition, there is a  
10   potential annual displacement of approximately 39,600 barrels of oil usage at an  
11   associated fuel savings of \$3.79 million. Environmentally, there is a potential reduction  
12   of 20,500 tonnes of greenhouse gas emissions at Holyrood.

13

14   A sensitivity check performed determines the impact to CBPP, the RSP and Hydro's  
15   revenue, namely the impact of a decrease in non-firm sales to CBPP as the provisions of  
16   the pilot agreement allow for energy that would have traditionally been purchased as  
17   Interruptible or Generator Outage power to now be purchased as firm. CBPP's five year  
18   average non-firm purchases which would be eligible for firm energy pricing under the  
19   provisions of the pilot were used for this analysis.

20

21   The following table summarizes the impact under each scenario.

<b>Table 8</b> <b>June 2009-December 2015</b> <b>Summary of Impacts</b>		
<b>Cost Savings Calculation</b>		
Holyrood Greenhouse Gas Reduction (tonnes)		20,500
Energy Sales Reduction (GWh)		24.00
System Loss Reduction @ 3.47% (GWh)		0.83
Total Energy Reduction (GWh)		24.83
Holyrood Fuel Usage Reduction (bbls) <sup>(1)</sup>		39,600
Holyrood Fuel Cost Reduction (\$000) <sup>(2)</sup>		3,785
<b>Stakeholder Impacts</b>		
	<b>Base Case</b> <b>CBPP Improved</b> <b>Water Utilization</b>	<b>Sensitivity</b> <b>CBPP Reduced</b> <b>Non-Firm Usage</b>
CBPP Firm Energy Purchases (\$000)	\$ (935)	\$ (935)
CBPP Non-Firm Energy Purchases (\$000)	\$ -	\$ (3,107)
RSP No. 6 Fuel Variation Component (\$000)	\$ (1,319)	\$ (50)
RSP Load Variation Component (\$000)	\$ (1,404)	\$ (54)
Hydro Revenue Loss (\$000) <sup>(3)(4)</sup>	\$ (127)	\$ 364
Total Impact <sup>(5)</sup>	\$ (3,785)	\$ (3,782)
<b>Notes:</b> 1. Assumes Holyrood operating efficiency of 630 kWh/bbl 2009-2014 and 607 kWh/bbl for 2015 2. Uses actual and projected fuel prices 2009-2015 3. Hydro gains revenue from reduced system losses 4. Hydro loses revenue due to reduction in 10% administration charge on non-firm rates 5. Differences in Total Stakeholder Impact vs. Holyrood Fuel Cost Reduction is due to rounding		

1

2 In its review of the impact of the energy benefit to the 2015 Test Year cost allocation,

3 realized through improved water utilization at CBPP’s 60 Hz generating units, Hydro

4 determined that the overall costs savings are \$573,000. These savings are allocated

5 among all customer groups with \$327,000 for NP, \$220,000 for the Industrial Customers

6 and \$26,000 for Hydro Rural customers.

7

8 The impact on Holyrood efficiency is minimal and determined to be less than one

9 kWh/bbl in the 2015 Test Year. This is due to the magnitude of the DLP water utilization

10 benefit relative to the Test Year Holyrood requirements (0.23%).

- 1 As a result of this review it is recommended that the pilot agreement be permanently
- 2 implemented. There is significant benefit identified for CBPP in firm and potentially
- 3 non-firm power costs and benefits to the other customers through the mechanisms of
- 4 the RSP and Test Year cost of service allocation.