1	Q.	Please explain the difference for th	e Island Pond total development costs (Jan 2010
2		dollars) in Exhibit 5 from what was	provided in the SNC Lavalin engineering report
3		Exhibit 5b Rev. 1, page 80 (Dec 200	6 dollars).
4			
5			
6	Α.	The costs from the SNC Lavalin eng	gineering Exhibit 5b Rev. 1 report were used as a
7		basis for costs entered in NL Hydro	's Capital Cost Estimate & Cash Flow
8		Requirements sheet, from which th	ne \$166,220,000 in Exhibit 5 is derived. The costs
9		reported in Exhibit 5 are in January	2010 dollars and are direct costs, while the costs
10		reported in the SNC Lavalin engine	ering report represent in service costs and
11		include escalation and AFUDC. As v	well, the SNC Lavalin contingency was adjusted
12		for conformance to Nalcor's standa	ards, which was 10% applied to all direct costs.
13			
14		These numbers may be reconciled	by taking the SNC Lavalin estimate, deducting
15		escalation and AFUDC, adjusting th	e contingency, and then escalating the
16		December 2006 amount to January	y of 2010:
17			
18		SNC Lavalin Estimate	173,592,362
19		Less escalation	(8,700,000)
20		Less AFUDC	(16,530,000)
21		Plus Contingency Adjustment	1,945,671
22		to 10% of Direct costs	
23		Direct 2006 \$	150,308,033
24			
25		Applying escalation from Decembe	r 2006 (January 2007) to January 2010, the
26		resulting amount is \$150,308,033 >	K 1.1075 = \$166,464,952 or \$166.5 million (direct

# Page 2 of 2

1	costs - January 2010\$). This compares to the Exhibit 5 estimate of \$166.2 million
2	(direct costs - January 2010\$). There is a \$0.3 million difference due to rounding.
3	
4	The 1.1075 escalation factor was slightly different than the corporate escalation
5	factor and was established by Nalcor's engineering staff based on their
6	understanding of the project at that time

1	Q.	With reference to the response to MHI-Nalcor-13, page 3 of 3, 2010 PLF Forecast,
2		Energy Balance and LOLH Results, Labrador HVDC Link, please describe the
3		source(s) for the addition of 5,943.0 GW.h in 2017.
4		
5		
6	A.	The 5,943 GWh referred to in MHI-Nalcor-13 represents the transfer capability of
7		the HVDC link with the energy to fill the link being sourced from:
8		
9		a) the Muskrat Falls generating facility,
10		b) surplus recall energy from Churchill Falls not required for use in Labrador,
11		c) Market purchases if necessary.
12		
13		It should be noted that in the 2010 analysis this limit was never reached. The
14		capacity factor of the link is approximately 85% of delivered peak capacity of 804
15		MW.

1	Q.	Please provide information on Total Island Energy Requirements (GW.h) and Total
2		Island Peak Demand (MW) forecasts prepared since 2000. The response should be
3		prepared in a format similar to information previously provided on Exhibit 46. As
4		part of this request, please also provide the actual and weather-adjusted figures for
5		the categories requested above for the 2000-2010 period, similar to page 1 of
6		Exhibit 46.
7		
8		
9	Α.	Exhibit-103 provides actual and forecast information on total Island energy and
10		peak demand requirements including actual and forecast energy for the utility,
11		industrial, and transmission loss components of Island load. The industrial load in
12		the table excludes forecast non-firm energy that is included with the industrial
13		energy information provided in Exhibit 46.

1	Q.	Please provide the thermal design parameters (ambient temperature range, and							
2		ground thermal resistivity) for the following marine crossing segments:							
3		i. land installations							
4		ii. HDD installations where the cables are in a tube							
5		iii. Sea bed installation with rock berm.							
6		For each of these three installations, also provide the cable burial depth and							
7		separation details.							
8									
9									
10	Α.	The required specifications for the land installations will be established by the cable							
11		provider, and an appropriately designed backfill or chaseway will be designed							
12		during detailed engineering to meet the cable thermal specifications.							
13									
14		For the HDD portions, geotechnical investigations for the area indicate the HDD							
15		portion will be run through dolomite/limestone. The thermal resistivity to be used							
16		for design would be 0.5 K-m/W. Ambient temperature for design is 8 degrees							
17		centigrade. 20 m cable spacing has been established for underwater portions of the							
18		borehole, and 35 m for the air filled portions. Burial depth is expected to be up to							
19		40 m below seabed.							
20									
21		For the subsea portions, the cables are assumed to be placed on the seabed and							
22		buried under a sediment impregnated rock berm of 1 m height. The design thermal							
23		resistivity is 0.8 K-m/W, and the maximum seabed temperature is 11 degrees							
24		centigrade. Cable spacing will be greater than 10 m.							
25									
26		All these parameters will be confirmed during detailed engineering.							

1	Q.	The response to MHI-Nalcor-60 is insufficient. Please provide an update of Exhibit 4
2		using the PIRA forecast of May, 2011 with comparable column headings and
3		comparable detail as set out on pg. 1, Exhibit 4.
4		
5		
6	Α.	Please see table below that provides a thermal fuel price forecast based on PIRA
7		price forecast of May, 2011.
8		

### MHI-Nalcor-126 Muskrat Falls Review

### Page 2 of 2

	#6 0.3%s	#6 0.7%s	#6 1.0%s	#6 2.2%s	#6 3.0%s	Diesel
	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/l)</u>
2011	110.90	100.50	96.40	93.60	93.50	0.894
2012	125.60	118.40	117.00	113.70	113.60	0.990
2013	129.10	122.50	121.30	119.20	118.90	1.025
2014	133.70	126.90	125.70	123.40	123.10	1.060
2015	138.20	130.80	129.50	127.10	126.80	1.100
2016	143.20	135.60	134.10	131.60	131.20	1.140
2017	148.40	140.70	138.90	136.00	135.60	1.180
2018	152.20	144.30	142.40	139.00	138.50	1.210
2019	156.00	147.90	145.90	141.80	141.20	1.240
2020	161.10	151.50	148.30	142.80	142.00	1.275
2021	164.00	153.60	150.00	144.20	143.40	1.315
2022	166.60	155.50	151.80	145.80	144.90	1.350
2023	169.60	157.80	154.00	147.70	146.80	1.385
2024	173.10	160.70	156.80	150.20	149.20	1.425
2025	175.90	162.80	158.80	152.00	151.00	1.460
2026	179.40	166.00	162.00	155.00	154.00	1.490
2027	183.00	169.30	165.20	158.10	157.10	1.520
2028	186.70	172.70	168.50	161.30	160.20	1.550
2029	190.40	176.20	171.90	164.50	163.40	1.580
2030	194.20	179.70	175.30	167.80	166.70	1.615
2031	198.10	183.30	178.80	171.20	170.00	1.645
2032	202.10	187.00	182.40	174.60	173.40	1.680
2033	206.10	190.70	186.10	178.10	176.90	1.715
2034	210.20	194.50	189.80	181.60	180.40	1.745
2035	214.40	198.40	193.60	185.30	184.00	1.780
2036	218.70	202.40	197.40	189.00	187.70	1.820
2037	223.10	206.40	201.40	192.70	191.40	1.855
2038	227.50	210.50	205.40	196.60	195.30	1.890
2039	232.10	214.80	209.50	200.50	199.20	1.930
2040	236.70	219.10	213.70	204.50	203.20	1.970
2041	241.50	223.40	218.00	208.60	207.20	2.005
2042	246.30	227.90	222.30	212.80	211.40	2.045
2043	251.20	232.50	226.80	217.00	215.60	2.090

#### **Thermal Fuel Price Forecast**

Note: 1. Product prices reflect landed values on Avalon Peninsula.

2. Diesel represents No. 2 distillate gas turbine fuel fob Holyrood.

Source: - PIRA Energy Group forecasts as of May 26, 2011

- Exchange rate forecasts by Canadian financial institutions and Conference Board of Canada, Corporate Assumptions, May 2011

1	Q.	Please provide the latest PIRA fuel price forecast in comparable detail to that set
2		out on pg. 1, Exhibit 4.
3		
4		
5	Α.	Please see table below that provides a thermal fuel price forecast based on PIRA
6		price forecast as of Oct 23, 2011.
7		

### MHI-Nalcor-127 Muskrat Falls Review

### Page 2 of 2

	#6 0.3%s	#6 0.7%s	#6 1.0%s	#6 2.2%s	#6 3.0%s	Diesel			
	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/bbl)</u>	<u>(\$Cdn/l)</u>			
2011	112.10	100.30	96.40	93.90	93.90	0.883			
2012	108.40	100.90	98.30	94.30	94.30	0.879			
2013	119.80	113.10	112.00	109.80	109.50	0.960			
2014	129.30	122.40	121.20	119.00	118.60	1.030			
2015	139.20	131.80	130.50	128.10	127.80	1.110			
2016	144.50	136.90	135.40	132.90	132.50	1.150			
2017	149.70	142.00	140.20	137.30	136.90	1.190			
2018	153.70	145.80	143.90	140.50	140.00	1.220			
2019	157.60	149.50	147.50	143.40	142.80	1.250			
2020	162.80	153.20	150.00	144.50	143.70	1.285			
2021	165.50	155.00	151.50	145.70	144.80	1.325			
2022	167.90	156.80	153.10	147.10	146.20	1.360			
2023	170.80	159.00	155.20	148.90	148.00	1.395			
2024	174.10	161.70	157.80	151.20	150.30	1.430			
2025	176.90	163.70	159.80	152.90	151.90	1.470			
2026	180.40	167.00	163.00	156.00	155.00	1.500			
2027	184.00	170.30	166.20	159.10	158.10	1.530			
2028	187.70	173.70	169.50	162.30	161.20	1.560			
2029	191.40	177.20	172.90	165.50	164.40	1.590			
2030	195.30	180.80	176.40	168.90	167.70	1.620			
2031	199.20	184.40	179.90	172.20	171.10	1.655			
2032	203.20	188.10	183.50	175.70	174.50	1.685			
2033	207.20	191.80	187.20	179.20	178.00	1.720			
2034	211.40	195.70	190.90	182.80	181.60	1.755			
2035	215.60	199.60	194.70	186.40	185.20	1.790			
2036	219.90	203.60	198.60	190.20	188.90	1.825			
2037	224.30	207.60	202.60	194.00	192.70	1.865			
2038	228.80	211.80	206.70	197.80	196.50	1.900			
2039	233.30	216.00	210.80	201.80	200.40	1.940			
2040	238.00	220.30	215.00	205.80	204.40	1.975			
2041	242.80	224.70	219.30	209.90	208.50	2.015			
2042	247.60	229.20	223.70	214.10	212.70	2.055			
2043	252.60	233.80	228.20	218.40	217.00	2.100			

#### **Thermal Fuel Price Forecast**

Note: 1. Product prices reflect landed values on Avalon Peninsula.

2. Diesel represents No. 2 distillate gas turbine fuel fob Holyrood.

Source: - PIRA Energy Group forecasts as of Oct 23, 2011

- Exchange rate forecasts by Canadian financial institutions and Conference Board of Canada, Corporate Assumptions, Oct 2011

1	Q.	Further to MHI-Nalcor-126 and MHI-Nalcor-127, please provide the high and low
2		PIRA prices, in each of the forecasts referenced, for i) No. 6 0.7% sulphur fuel; ii) No.
3		6 2.2% sulphur fuel and iii) No. 2 diesel fuel.
4		
5		
6	Α.	Please see tables below that provide high and low thermal fuel price forecasts for i)
7		No. 6 0.7% sulphur fuel; ii) No. 6 2.2% sulphur fuel and iii) No. 2 diesel fuel. The
8		thermal fuel price forecasts from 2011 to 2025 are based on high and low price
9		projections for benchmark global crude from PIRA's Scenario Planning Service that
10		is updated quarterly. Thermal fuel prices post 2025 are increased by a two percent
11		general inflation rate. The high and low thermal fuel price forecast as of May 2011 is
12		based on PIRA's Scenario Planning Service forecast of May 10, 2011 and is
13		applicable for the May 2011 thermal fuel price reference forecast provided in MHI-
14		Nalcor-126. The high and low thermal fuel price forecast as of October 2011 is
15		based on PIRA's Scenario Planning Service forecast of August 11, 2011 and is
16		applicable for the October 2011 thermal fuel price reference forecast provided in
17		MHI-Nalcor-127.

### Page 2 of 3

	#6 0.7%s		#6 2.2%s			#2 Diesel	
	(\$Cdn	/bbl)	(\$Cdn	(\$Cdn/bbl)		(\$Cdn/l)	
	High	Low	High	Low		High	Low
2011	120.20	81.50	112.00	76.00		1.065	0.730
2012	135.00	69.00	129.50	66.20		1.120	0.585
2013	142.80	52.60	139.00	51.10		1.195	0.450
2014	162.80	47.70	158.30	46.40		1.355	0.410
2015	171.50	50.30	166.70	48.90		1.440	0.435
2016	183.90	55.00	178.40	53.30		1.540	0.475
2017	192.70	61.40	186.20	59.30		1.605	0.525
2018	203.50	65.30	196.00	62.80		1.695	0.560
2019	221.10	69.10	211.90	66.20		1.845	0.590
2020	240.80	70.90	227.10	66.80		2.010	0.605
2021	255.30	73.20	239.90	68.70		2.175	0.640
2022	262.80	74.00	246.50	69.40		2.270	0.655
2023	273.70	75.10	256.20	70.30		2.390	0.670
2024	284.40	76.40	265.90	71.40		2.505	0.690
2025	289.20	77.40	270.10	72.20		2.580	0.710
2026	295.00	78.90	275.50	73.70		2.630	0.720
2027	300.90	80.50	281.00	75.10		2.680	0.735
2028	306.90	82.10	286.60	76.60		2.735	0.750
2029	313.00	83.80	292.30	78.20		2.790	0.765
2030	319.30	85.40	298.20	79.70		2.845	0.780
2031	325.70	87.10	304.10	81.30		2.905	0.795
2032	332.20	88.90	310.20	83.00		2.960	0.815
2033	338.80	90.70	316.40	84.60		3.020	0.830
2034	345.60	92.50	322.80	86.30		3.080	0.845
2035	352.50	94.30	329.20	88.00		3.145	0.865
2036	359.60	96.20	335.80	89.80		3.205	0.880
2037	366.70	98.10	342.50	91.60		3.270	0.900
2038	374.10	100.10	349.40	93.40		3.335	0.915
2039	381.60	102.10	356.30	95.30		3.400	0.935
2040	389.20	104.10	363.50	97.20		3.470	0.955
2041	397.00	106.20	370.70	99.10		3.540	0.970
2042	404.90	108.40	378.20	101.10		3.610	0.990
2043	413.00	110.50	385.70	103.10		3.680	1.010

## High-Low Thermal Fuel Price Forecasts as of May 2011

Notes: 1. Product prices reflect landed values on Avalon Peninsula.

1

### Page 3 of 3

### High-Low Thermal Fuel Price Forecasts as of October 2011

	#6.0.7%		#6.2.2%		1	innel		
	0 0#	./ 705 / h h l )						
	(şcan					<u>(ŞUC</u>	<u>in/i)</u>	
	Hign	LOW	Hign	LOW		Hign	LOW	
2011	107.30	99.10	100.40	92.80		0.940	0.870	
2012	140.70	91.30	131.60	85.30		1.215	0.795	
2013	142.40	62.10	138.20	60.20		1.205	0.535	
2014	160.80	55.00	156.20	53.40		1.345	0.475	
2015	171.00	54.20	166.20	52.70		1.430	0.470	
2016	182.40	55.70	177.00	54.10		1.525	0.480	
2017	191.30	61.70	184.90	59.60		1.595	0.530	
2018	202.30	65.60	194.90	63.10		1.680	0.560	
2019	219.80	69.50	210.80	66.60		1.830	0.595	
2020	240.80	71.10	227.20	67.10		2.010	0.610	
2021	253.50	73.30	238.30	68.80		2.155	0.640	
2022	260.80	74.00	244.60	69.40		2.250	0.655	
2023	271.30	75.00	254.20	70.20		2.365	0.670	
2024	281.60	76.20	263.40	71.20		2.475	0.685	
2025	288.60	77.10	269.70	72.00		2.570	0.705	
2026	294.40	78.70	275.00	73.40		2.620	0.720	
2027	300.30	80.20	280.50	74.90		2.675	0.735	
2028	306.30	81.80	286.20	76.40		2.725	0.750	
2029	312.40	83.50	291.90	77.90		2.780	0.765	
2030	318.70	85.20	297.70	79.50		2.835	0.780	
2031	325.00	86.90	303.70	81.10		2.895	0.795	
2032	331.50	88.60	309.70	82.70		2.950	0.810	
2033	338.20	90.40	315.90	84.40		3.010	0.825	
2034	344.90	92.20	322.30	86.00		3.070	0.840	
2035	351.80	94.00	328.70	87.80		3.135	0.860	
2036	358.90	95.90	335.30	89.50		3.195	0.875	
2037	366.00	97.80	342.00	91.30		3.260	0.895	
2038	373.40	99.80	348.80	93.10		3.325	0.910	
2039	380.80	101.80	355.80	95.00		3.390	0.930	
2040	388.40	103.80	362.90	96.90		3.460	0.950	
2041	396.20	105.90	370.20	98.80		3.530	0.965	
2042	404.10	108.00	377.60	100.80		3.600	0.985	
2043	412.20	110.10	385.10	102.80		3.670	1.005	

No

Notes: 1. Product prices reflect landed values on Avalon Peninsula.

1	Q.	Please provide a copy of the latest PIRA Energy SPS Quarterly Bulletin.
2		
3		
4	Α.	Please see confidential exhibit CE-60 dated August 11, 2011 "PIRA Oil and Gas
5		Scenarios: Q3 2011 Update"

1	Q.	Given the May 2011 PIRA fuel price forecast referenced in MHI-Nalcor-126 and the
2		updated fuel price forecast referenced in MHI-Nalcor-127, please provide the
3		corresponding "expected price" for each of the two forecasts based on a weighted
4		average of the reference, high and low price.
5		
6		
7	Α.	The tables below provide weighted average price forecasts for No. 6 0.7% sulphur
8		fuel, No. 6 2.2% sulphur fuel and No. 2 diesel fuel based on a weighted average of
9		reference, high and low prices provided in MHI-Nalcor-126, MHI-Nalcor-127 and
10		MHI-Nalcor-128. The weights used are from PIRA's Scenario Planning Service that is
11		updated quarterly. The weights used to calculate the weighted average thermal fuel
12		prices as of May 2011 are 45%, 30% and 25% for reference, high and low pricing
13		respectively and were from the applicable PIRA Scenario Planning Service forecast
14		of May 10, 2011. The weights used to calculate the weighted average thermal fuel
15		prices as of October 2011 are 45%, 27.5% and 27.5% for reference, high and low
16		pricing respectively and were from the applicable PIRA Scenario Planning Service
17		forecast of August 11, 2011.

### Page 2 of 3

	#6 0.7%s	#6 2.2%s	#2 Diesel
	(\$Cdn/bbl)	(\$Cdn/bbl)	<u>(\$Cdn/l)</u>
2011	101.66	94.72	0.904
2012	111.03	106.57	0.928
2013	111.12	108.12	0.932
2014	117.87	114.62	0.986
2015	122.89	119.43	1.036
2016	129.94	126.07	1.094
2017	136.48	131.89	1.144
2018	142.31	137.05	1.193
2019	150.16	143.93	1.259
2020	158.14	149.09	1.328
2021	164.01	154.04	1.404
2022	167.32	156.91	1.452
2023	171.90	160.90	1.508
2024	176.74	165.21	1.565
2025	179.37	167.48	1.609
2026	182.93	170.83	1.640
2027	186.58	174.22	1.672
2028	190.31	177.72	1.706
2029	194.14	181.27	1.739
2030	198.01	184.90	1.775
2031	201.97	188.60	1.811
2032	206.04	192.38	1.848
2033	210.13	196.22	1.885
2034	214.33	200.14	1.921
2035	218.61	204.15	1.961
2036	223.01	208.24	2.001
2037	227.42	212.37	2.041
2038	231.98	216.64	2.080
2039	236.67	220.94	2.122
2040	241.38	225.38	2.166
2041	246.18	229.86	2.207
2042	251.13	234.50	2.251
2043	256.15	239.14	2.297

Weighted Average Thermal Fuel Price Forecast as of May 2011

Notes: 1. Product prices reflect landed values on Avalon Peninsula.

### Page 3 of 3

	#6 0.7%s	#6 2.2%s	#2 Diesel
	(\$Cdn/bbl)	(\$Cdn/bbl)	<u>(\$Cdn/l)</u>
2011	101.90	95.39	0.895
2012	109.21	102.08	0.948
2013	107.13	103.97	0.911
2014	114.43	111.19	0.964
2015	121.24	117.84	1.022
2016	127.08	123.36	1.069
2017	133.48	129.02	1.120
2018	139.28	134.18	1.165
2019	146.83	140.82	1.229
2020	154.71	145.96	1.299
2021	159.62	150.02	1.365
2022	162.63	152.55	1.411
2023	166.78	156.22	1.462
2024	171.16	160.06	1.513
2025	174.23	162.77	1.562
2026	177.75	166.01	1.594
2027	181.27	169.33	1.626
2028	184.89	172.75	1.658
2029	188.61	176.17	1.690
2030	192.43	179.74	1.723
2031	196.25	183.31	1.760
2032	200.17	186.98	1.792
2033	204.18	190.72	1.829
2034	208.27	194.54	1.865
2035	212.42	198.42	1.904
2036	216.69	202.41	1.941
2037	220.97	206.46	1.982
2038	225.44	210.53	2.020
2039	229.92	214.78	2.061
2040	234.49	219.06	2.102
2041	239.19	223.43	2.143
2042	243.97	227.91	2.186
2043	248.84	232.45	2.231

Weighted Average Thermal Fuel Price Forecast as of October 2011

Notes: 1. Product prices reflect landed values on Avalon Peninsula.

1	Q.	Please provide the rationale for using the "reference price" for fuel as the basis for
2		the computed CPW contained within Exhibit 14 in contrast to using the "expected
3		price".
4		
5		
6	Α.	Based on a comprehensive global economic and energy demand analysis, the
7		Reference Case represents PIRA's most likely view of how the energy markets
8		events will evolve. This Reference Case "is not just one of many plausible scenarios
9		but one that (PIRA) put(s) forward as a most likely basis for decision-making." <sup>1</sup> For
10		this reason, Nalcor uses PIRA's Reference Price for oil products and not an
11		"expected price". NLH subscribes to PIRA's retainer service for Global Oil and
12		Refined Products and this service contains only Reference Case analysis and
13		detailed forecasts for crude oil and related products. NLH also subscribes to PIRA's
14		Scenario Planning Service retainer to obtain access to internally consistent low and
15		high price scenario alternatives to the Reference Case for the purposes of
16		conducting sensitivity analysis.

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<sup>&</sup>lt;sup>1</sup> PIRA Energy SPS Annual Guidebook 2011