Q. Please confirm that Exhibit 30 – Section 6.5, 6.6 and 6.7 stands as the Design Basis for the cost estimated arrangement (both capital and operating) for the Labrador HVDC scenario.

A. Nalcor confirms that Exhibit 30 – Section 6.5, 6.6 and 6.7 stands as the Basis of Design, which was used for the DG2 CPW analysis. The Basis of Design will be further defined during detailed engineering and updated as necessary at DG3.

Q. Page 3 of the "Synopsis of 2010 Generation Expansion Decision" states that the reliability criteria governing capacity requirements is a Loss of Load Hours (LOLH) target of not more than 2.8 hours per year. What is the basis for the value of "2.8 hours" in the LOLH criteria?

A. Please see Section 3.1 - Generation Planning Criteria of Nalcor's *Submission to the Board of Commissioners of Public Utilities with respect to the Reference from the Lieutenant-Governor in Council on the Muskrat Falls Project* November 10, 2011 for a description of the basis of the Loss of Load Hours (LOLH) target of not more than 2.8 hours per year.

Q. The Island Pond 2006 study shows a capital cost estimate of $173,592,362, the AFUDC and Escalation Calculation (Batch 06 NHI-Nalcor-49.3 AFUDC and Escalation) shows a "Cap Cost In" of $166,220,000. Please show how these individual costs are derived.

A. Referring to the response to MHI-Nalcor-121, the direct cost for Island Pond in 2006$ is $150,308,033. This amount is then escalated to 2010$ to derive the $166.2 million used as an input to Strategist. As indicated in MHI-Nalcor-121 there is a minor rounding difference.

Q. Exhibit 30 – LCP Design Progression indicates "Fish habitat will be based on compensation strategy agreed with DFO". It also indicates a "Fish Compensation Flow will be approximately 30% of mean annual flow". What variations in generation from Muskrat Falls could be expected as a result of changes in projected in stream flow requirements? Please show anticipated seasonal generation profile of Muskrat Falls.

A. The requirement of 30% mean annual flow for fish compensation flow is a requirement for the impoundment of the reservoir during construction and is not an operations requirement.

Q. In Exhibit 15m why was the HVDC line cost not rolled into the cost of service pricing for Muskrat Falls?

A. Exhibit 15 provides the internal rate of return calculation for Muskrat Falls based on its capital costs and net cash flows. As outlined in Exhibit 36 and MHI-PUB-58(h), the underlying price for Muskrat Falls power has not been derived in a traditional cost of service manner. The HVdc line that is included in the CPW analysis is, by contrast, costed on a traditional cost of service basis.

The reason for this different treatment of costs is that while investments in power generation facilities in open markets are typically not regulated on selling price, transmission investments, in most instances, are recovered through a cost of service based model. Nalcor wished to ensure that future pricing for transmission services on the Labrador Island Link (LIL) would be consistent with this established model.

Q. Both Schedule A – "The Project" and Schedule B – "Isolated Island Option" to the Terms of Reference refer to the period 2030 – 2067 as follows:

> In Schedule "A" – "2030 – 2067 Primarily thermal units for system reliability support" and in Schedule "B" – "2030 – 2067 Holyrood replacement; additional thermal."

Given that thermal based power and energy can be generated from various fuel types, please explain what fuel types were considered for providing thermal power in the 2030 – 2067 timeframe under Schedule A and B. Please also explain, of the fuel types considered, the reason for choosing and excluding (as applicable) fuel types from thermal generation in this period.

A. The fuel sources considered by Nalcor are discussed in detail in Section 4.2 of Nalcor's Submission filed with the Board on November 10, 2011. Following is a summary of Nalcor's conclusions on the various thermal generation alternatives, as extracted from the November 10 submission to the Board:

<u>Nuclear (Volume 1, Section 4.2.1)</u>

Given that nuclear generation a) is prevented by provincial legislation and b) would not integrate well into the Isolated Island system, nuclear generation was screened out as a possible supply option alternative.

Natural Gas (Volume 1, Section 4.2.2)

Given the lack of a confirmed development plan for Grand Banks natural gas, the small domestic requirement in comparison to the economic threshold for development, as well as the varying uses by operators, Nalcor has screened out domestic natural gas as a supply option.

Liquefied Natural Gas (LNG) (Volume 1, Section 4.2.3)

When analyzed from a cost perspective, LNG supplied at Asian prices virtually mirrors the forecasted cost of fuel for the Holyrood Thermal Generating Station. This means there is no clear advantage to LNG for rate payers. Nalcor's extensive analysis of supply alternatives show that the Interconnected Island Alternative, specifically Muskrat Falls and LIL, is considerably less expensive than the Isolated Island alternative, which is a predominantly thermal future.

Coal (Volume 1, Section 4.2.4)

Because of uncertainty in costs and feasibility associated with meeting gazetted federal regulations, there is significant risk in pursuing coal-fired generation as a resource option. Carbon capture and storage technology (CCS) would be required for a coal-fired facility to achieve the proposed federal target. This unproven technology is still at the research and development phase and has not been deployed on a commercial scale. Saskatchewan recently approved a $1.2 billion project to implement CCS demonstration project on the 110 MW Unit 3 of SaskPower's Boundary Dam thermal facility.

Given the potential for GHG regulation and the uncertainty and cost associated with CCS coal fired generation was screened out as an alternative source for the Isolated Island alternative.

Heavy Fuel Oil (HFO) (Volume 1, Section 4.2.5)

Continued oil-fired generation at the Holyrood plant is viewed as a viable alternative in both the short- to medium-term. Consequently, the continued operation of Holyrood with the appropriate pollution abatement technology was included in the generation expansion alternatives.

Light Fuel Oil (LFO) (Volume 1, Section 4.2.6 for Simple Cycle Combustion Turbine and Section 4.2.7 for Combined Cycle Combustion Turbine)

Combustion turbine technology is an integral part of the resource mix on the Isolated Island system today. CTs are applicable and necessary supply resource for both the Isolated Island alternative and the Interconnected Island alternative. Consequently, the combustion turbine technology was included in the generation expansion alternatives.

CCCTs are an applicable supply resource for both the Isolated Island alternative and the Interconnected Island alternative. Consequently, the combined cycle combustion turbine technology was included in the generation expansion alternatives.

Biomass (Volume 1, Section 4.2.9)

While biomass and other co-generation alternatives, when economically feasible, will be considered as future supply alternatives, they are not considered to be appropriate replacements for large-scale generation requirements due to the significant costs and risks around securing significant supply of feedstock. On this basis, biomass was screened out as an Isolated Island supply alternative.

Q. Further to the previous question, has LNG been excluded for consideration as a source of thermal generation and if so, what assumptions did Nalcor make as regards both the future availability and pricing of LNG to meet the island's energy needs in excluding it as an option.

A. Nalcor's assessment of LNG is provided in Section 4.2.3 of its Submission to the Board.

With respect to availability and pricing of LNG, Nalcor is of the view that:

a) While LNG supplies would be available from the global market for power generation purposes in Newfoundland, the identified market in Newfoundland is small. Approximately 100 million standard cubic feet per day would be required on peak for power generation.

b) The price for LNG would be at a modest discount to equivalent oil pricing because

    a. The only available alternative to LNG is distillate, and

    b. Long term firm utility supply contracts for LNG are frequently linked to oil prices. This is the case in supply contracts for Asian utilities.

Given the small Newfoundland market and the lack of alternatives to heavy fuel oil or distillate for thermal generation in the Isolated Island alternative, Nalcor expects LNG delivered to Newfoundland to be priced at a relatively smaller discount to oil than could be achieved in larger markets with greater diversity of alternatives, such as domestic natural gas.

Navigant reached the same conclusion in its Independent Supply Decision Review:[1]

> "Navigant estimates that the capital cost of an 84,000 Mcfd regasification and storage facilities would run in the range of $1 billion, plus the capital required for the new natural gas CCCT.
>
> The commodity costs for LNG also need to be considered. The prices for long term, firm supply of LNG are normally linked to crude oil prices. As such, any long term utility contract that would be necessary for deliveries to the regasification facility in Newfoundland would see LNG prices linked to oil prices. In Navigant's opinion, the delivered prices to a LNG regasification facility sited on the Island under a long term contract are expected to be at a modest discount to the price of fuel oil Nalcor is already purchasing therefore offering no clear economic advantage for LNG as a fuel source.
>
> Although the current tie between LNG prices and crude oil in the global LNG market is one that could change towards gas on gas pricing in the future, the market for long term, firm supply of LNG is currently, and for the foreseeable future is expected to be, referenced to oil."

[1] Exhibit 101, page 37

Q. Consumer Question: On June 17, 2009 the NL Gov issued a press release "Province Positions Hydro To Make Critical Investments in infrastructure" to permit Hydro to earn a a(sic) return on equity equal to Newfoundland Power". The previous Hydro return was 4.47 % Nalcor uses a 10 % return in the Muskrat study (see p 17 Nalcor Presentation to PUB in July 2011). Please provide a detailed analysis by year of the impact of the increase in rate of return from 4.4 7 % to 10 % (an increase of 5.53 %) on the consumer power rates over the 50 years project analysis period?

A. Consistent with the Terms of Reference and the Reference Question, Nalcor's analyses for this proceeding have considered the Cumulative Present Worth (CPW) of the Interconnected Island alternative and the Interconnected Island alternative. The rate analysis requested does not assist consideration of the Reference Question.

The reference in line 6 to "rate of return" should refer to "regulated return on equity". Please note the following rates of return, including return on equity and cost of debt, are used in Nalcor's analyses:

<u>Regulated Assets</u>

The rate of return for regulated assets in this analysis is 8.0%[1]. This rate of return is based on the following formula:

Cost of debt x percentage of debt + cost of equity x percentage of equity

7.4% x 75 % + 10% x 25% = 8.0 %

[1] Nalcor's presentation to the Board, July 2011, page 17

Non-regulated Assets

The rate of return for the Muskrat Falls generation facility (non-regulated asset) in this analysis is 8.4%[2].

The return on equity used in the analysis completed by Nalcor (i) is consistent with the direction given by the Province, as announced on June 17, 2009, and (ii) was established based on the advice of Nalcor's financial advisors, who have advised that a return on equity in the range of the rate used for modeling for both the Labrador Island Transmission Link and Muskrat Falls would be required in order to obtain financing for the assets under construction.

Based on these considerations, using a return on equity which would preclude access to capital to construct either Muskrat Falls or the Labrador Island Transmission Link, and which would be inconsistent with previous direction provided by the Government of Newfoundland and Labrador, would not assist consideration of the Reference Question.

[2] Nalcor's presentation to the Board, July 2011, page 22

Q. Consumer Question: Please provide the impact on Muskrat project costs of the 5.53% increase in the rate or (sic) return from 4.47% to 10%.

A. Please refer to Nalcor's response to CA/KPL-Nalcor-18.

Q. Consumer Question: The Muskrat Falls project cost is financed 75% debt/25% equity. Please provide a 50 year schedule of the 25% equity in the Muskrat Falls project. Please show the opening equity + the yearly additions - the yearly reductions = end of year equity by each year of the 50 years.

A. The Interconnected Island alternative includes the Muskrat Falls generating facility and the Labrador-Island Transmission Link between Muskrat Falls in Labrador and Soldier's Pond on the Avalon Peninsula. For analysis, Nalcor has assumed the Labrador-Island Transmission Link was financed on a regulated cost-of-service basis with 75% debt and a 10% return on equity. The Muskrat Falls generating facility was assumed to be financed with 100% equity with a cost-based escalating rate established to provide an 8.4% internal rate of return based on sales to the Island.

Assumptions common to all generation expansion alternatives, including "regulated financial assumptions", are provided on page 17 of Nalcor's July 2011 presentation to the Board[1]. The methodology and calculations to establish costs and rates for the Muskrat Falls generating project are more fully described in Exhibit 36 and the response to Request for Information MHI-Nalcor-58.

Please refer to the attached schedule of Shareholder's Equity, which includes both the Muskrat Falls generating facility and the Labrador Island Transmission Link.

[1] http://www.pub.nl.ca/applications/MuskratFalls2011/files/presentation/Nalcor-ProjectOverview-July18-11.pdf

SHAREHOLDER'S EQUITY ($ millions)

Muskrat Falls Generating Facility (100% Equity)						Labrador-Island Transmission Link (25% Equity)					
Project Yr Ending Jun 30	Opening Balance	Plus Equity Contributions	Plus Net Income	Less Dividends & Return of Equity Contributions	Ending Balance		Opening Balance	Plus Equity Contributions	Plus Net Income	Less Dividends & Return of Equity Contributions	Ending Balance
2010	-	33.80	-	-	33.80	2010	-	109.65	-	-	109.65
2011	33.80	59.98	-	-	93.79	2011	109.65	20.30	-	-	129.94
2012	93.79	272.02	-	-	365.80	2012	129.94	218.96	-	-	348.91
2013	365.80	643.86	-	-	1,009.66	2013	348.91	-	37.00	-	385.91
2014	1,009.66	795.69	-	-	1,805.35	2014	385.91	-	39.30	-	425.21
2015	1,805.35	514.43	-	-	2,319.78	2015	425.21	59.60	45.70	-	530.51
2016	2,319.78	428.72	-	-	2,748.50	2016	530.51	52.00	55.79	-	638.31
2017	2,748.50	104.41	107.66	-	2,960.57	2017	638.31	-	63.19	(75.96)	625.54
2018	2,960.57	-	82.66	(200.04)	2,843.19	2018	625.54		61.92	(74.68)	612.78
2019	2,843.19	-	91.56	(152.00)	2,782.75	2019	612.78		60.67	(72.75)	600.70
2020	2,782.75	-	101.63	(162.06)	2,722.32	2020	600.70		59.40	(72.85)	587.24
2021	2,722.32	-	111.16	(171.57)	2,661.90	2021	587.24		58.14	(69.75)	575.63
2022	2,661.90	-	128.77	(189.14)	2,601.53	2022	575.63		56.91	(69.97)	562.58
2023	2,601.53	-	143.85	(204.21)	2,541.18	2023	562.58		55.61	(68.66)	549.52
2024	2,541.18	-	164.69	(224.94)	2,480.92	2024	549.52		54.30	(67.35)	536.47
2025	2,480.92	-	176.16	(236.53)	2,420.55	2025	536.47		52.99	(66.05)	523.41
2026	2,420.55	-	186.98	(247.38)	2,360.14	2026	523.41		51.77	(63.23)	511.95
2027	2,360.14	-	200.78	(261.13)	2,299.79	2027	511.95		50.54	(63.63)	498.86
2028	2,299.79	-	218.55	(275.70)	2,242.65	2028	498.86		49.23	(62.32)	485.77
2029	2,242.65	-	237.98	(294.97)	2,185.66	2029	485.77		47.92	(61.02)	472.68
2030	2,185.66	-	267.06	(323.88)	2,128.83	2030	472.68		46.61	(59.71)	459.58
2031	2,128.83	-	281.83	(338.94)	2,071.73	2031	459.58		45.39	(56.68)	448.30
2032	2,071.73	-	297.10	(354.23)	2,014.59	2032	448.30		44.17	(57.31)	435.16
2033	2,014.59	-	312.83	(369.88)	1,957.54	2033	435.16		42.86	(56.00)	422.02
2034	1,957.54	-	329.04	(386.12)	1,900.46	2034	422.02		41.55	(54.68)	408.89
2035	1,900.46	-	345.78	(402.85)	1,843.39	2035	408.89		40.23	(53.37)	395.75
2036	1,843.39	-	362.05	(419.17)	1,786.27	2036	395.75		39.02	(50.11)	384.66
2037	1,786.27	-	377.80	(434.85)	1,729.22	2037	384.66		37.81	(50.99)	371.47
2038	1,729.22	-	378.11	(435.50)	1,671.83	2038	371.47		36.49	(49.67)	358.29
2039	1,671.83	-	395.08	(452.15)	1,614.76	2039	358.29		35.17	(48.35)	345.11
2040	1,614.76	-	413.01	(470.10)	1,557.67	2040	345.11		33.85	(47.04)	331.92
2041	1,557.67	-	430.48	(487.49)	1,500.66	2041	331.92		32.65	(43.52)	321.05
2042	1,500.66	-	448.38	(505.43)	1,443.61	2042	321.05		31.44	(44.68)	307.81
2043	1,443.61	-	466.83	(523.87)	1,386.57	2043	307.81		30.12	(43.36)	294.57
2044	1,386.57	-	485.81	(542.89)	1,329.48	2044	294.57		28.79	(42.03)	281.33
2045	1,329.48	-	505.39	(562.36)	1,272.52	2045	281.33		27.47	(40.71)	268.09
2046	1,272.52	-	525.48	(582.49)	1,215.51	2046	268.09		26.28	(36.90)	257.47
2047	1,215.51	-	546.19	(603.18)	1,158.51	2047	257.47		25.08	(38.38)	244.16
2048	1,158.51	-	553.98	(611.03)	1,101.47	2048	244.16		23.75	(37.05)	230.86
2049	1,101.47	-	575.89	(632.80)	1,044.55	2049	230.86		22.42	(35.72)	217.56
2050	1,044.55	-	598.41	(655.37)	987.59	2050	217.56		21.09	(34.39)	204.26
2051	987.59	-	620.29	(677.27)	930.62	2051	204.26		19.91	(30.25)	193.92
2052	930.62	-	642.75	(699.79)	873.58	2052	193.92		18.72	(32.10)	180.54
2053	873.58	-	665.84	(722.73)	816.70	2053	180.54		17.39	(30.76)	167.17
2054	816.70	-	689.57	(746.51)	759.76	2054	167.17		16.05	(29.42)	153.80
2055	759.76	-	713.28	(770.23)	702.82	2055	153.80		14.71	(28.08)	140.43
2056	702.82	-	737.63	(794.64)	645.81	2056	140.43		13.54	(23.57)	130.40
2057	645.81	-	762.68	(819.52)	588.97	2057	130.40		12.37	(25.82)	116.95
2058	588.97	-	784.59	(841.56)	531.99	2058	116.95		11.02	(24.47)	103.50
2059	531.99	-	801.25	(858.33)	474.91	2059	103.50		9.68	(23.13)	90.05
2060	474.91	-	818.24	(875.40)	417.75	2060	90.05		8.33	(21.78)	76.60
2061	417.75	-	835.58	(892.56)	360.77	2061	76.60		7.18	(16.84)	66.93
2062	360.77	-	853.25	(910.31)	303.70	2062	66.93		6.02	(19.56)	53.39
2063	303.70	-	871.27	(928.33)	246.65	2063	53.39		4.66	(18.20)	39.85
2064	246.65	-	889.65	(946.79)	189.50	2064	39.85		3.31	(16.85)	26.31
2065	189.50	-	908.40	(965.35)	132.55	2065	26.31		1.95	(15.50)	12.77
2066	132.55	-	927.51	(984.54)	75.51	2066	12.77		0.81	(10.07)	3.51
2067	75.51	-	947.10	(1,004.12)	18.49	2067	3.51		0.31	(1.18)	2.63