

**Lower Churchill Project - Master AFE's**

**1. Master AFE's**

The following project component Master AFE's are attached (Appendix A) for Board of Directors review and approval:

- a) Muskrat Falls (MF)
- b) Labrador Island Transmission Link (LITL)
- c) Labrador Transmission Asset (LTA)

Approval of these Master AFE's by the Board of Directors will release the necessary funding, the allocation of which will be managed by the President and CEO, for execution of work scope leading to in-service of each of MF, LITL and LTA.

**2. Work Scope**

A summary of the scope of work associated with these AFE's is contained in Appendix A. Appendix B contains a pictorial representation of the asset schematic by project component, including asset demarcation.

**3. Cost**

The Master AFE cost estimates include allowances for escalation, estimate contingency and financing costs directly attributable to debt financing, but exclude interest during construction, return on equity and other management reserves.

**Master AFE Cost Estimates**

(\$ Million)	Muskrat Falls	LITL	LTA	Total
Nalcor Owners Team and Administration	172.6	211.8	17.0	401.4
EPCM Services	213.8	136.0	75.3	425.1
Procurement and Construction Works (see Appendix C)	2,262.4	2,138.7	541.1	4,942.2
Legal and Commercial Costs	12.8	5.6	1.9	20.3
Environmental, Lands, Permitting & Aboriginal Affairs	45.2	27.2	0.7	73.1
Insurance	8.3	15.1	0.6	24.0
Contingency	186.0	75.4	55.0	316.4
<b>DG3 Capital Cost Estimate <sup>(1)</sup></b>	<b>2,901.2</b>	<b>2,609.7</b>	<b>691.6</b>	<b>6,202.5</b>
Add: Total Project Debt Financing <sup>(2)</sup>	74.3	83.2	8.2	165.7
<b>MASTER AFE VALUE (excluding IDC)</b>	<b>2,975.5</b>	<b>2,692.9</b>	<b>699.8</b>	<b>6,368.2</b>
Less Approved Funding to Date per pre sanction AFE LCP 2012-02:				
Capital costs excluding financing costs	260.9	116.9	36.6	414.4
Financing costs (IDC excluded)	8.3	9.6	0.9	18.9
<b>New Funding Requested <sup>(3)</sup></b>	<b>2,706.3</b>	<b>2,566.3</b>	<b>662.2</b>	<b>5,934.8</b>

**Notes:**

- (1) Master AFE Request aligns with DG3 CCE as presented in *Decision Gate 3 Capita/Cost Estimate*, document no. LCP-PT-ED-0000-EP-ES-0002-01 adjusted to reflect latest forecast dated October 31, 2012.
- (2) Project Debt Financing Costs exclude Interest during Construction and return on equity.
- (3) Excludes any funding related to Maritime Link or LCP Phase II.

**Lower Churchill Project - Master AFE's**

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These AFE's are based on the latest forecasted final cost for the Project and are anchored to the DG3 estimate.

Previously appropriated funds for these project components total \$433 million. These Master AFE's encompass the total DG3 Cost Control Estimate of \$6.2 billion plus financing costs directly attributable to debt financing (excluding interest during construction) of \$166 million, for a total cost estimate of \$6.37 billion.

These Master AFE's will supplant and replace work scope for these project components as contained in the previously approved Pre-Sanction AFE # LCP-2012-02. Gateway Phase 4 work will be carried out under the authority of the President and CEO, as granted by the Board's approval of these Master AFE's, and will be performed within the confines of the work scope as outlined in Appendix A and the Project documents noted above. Work entailing a material change of project scope as outlined in the basis of design, as summarized in Appendix A, or increases in the overall anticipated total cost of a project component as noted herein will require further authorization by the Board of Directors.

**4. Schedule**

The target milestone dates for the various project components are:

<b>Milestone</b>	<b>Target Milestone Date</b>
Project Sanction	Q4 2012
LITL – LTA ready for energy transfer	June 2017
MF First Power to Island via LITL	July 2017
MF Full Power	December 2017

Appendix B contains the Target Milestone Schedule for each project component.

**5. Allowance For Funds Used During Construction**

While costs directly attributable to debt financing, (e.g. lead arranger, rating agency fees, etc.) have been included in the scope of these AFE requests, the Board should be aware that their approval of the AFE will trigger activity to obtain the necessary funding in the form of debt and equity. Such funding will be obtained with the objective of optimizing the resultant cost of capital within acceptable levels of financial risk. A Supplemental AFE incorporating interest during construction and return on equity will be presented for Board of Directors approval upon financial close.



Appendix A

Authorization for Expenditure (AFE)

COMPANY NAME <b>Nalcor Energy</b>		AFE NUMBER <b>LCPMF-2013-01</b>	SUPP. <b>N/A</b>	WBS No. <b>N/A</b>
DEPARTMENT NAME <b>Lower Churchill Project</b>		PROJECT DESCRIPTION <b>Muskrat Falls</b>		
PREPARED BY <b>James Meaney</b>	DATE (Y/M/D) <b>8-Jan-13</b>			
AFE DESCRIPTION & JUSTIFICATION Master AFE to allow funding for progression of work to Gate 4 as defined in the Gateway Process LCP-PT-MD-0000-PM-PR-0001-01 and encompasses execution work scope leading to in-service. Further scope definition is contained in memo to E. Martin from LCP GM Finance dated January 8, 2013.				
Note: All monies in Canadian currency.				
PARTICIPANTS NAME AFE OPERATOR <b>Nalcor Energy</b>	INTEREST % <b>100.00</b>	AMOUNT (\$) <b>\$2,706,270,998</b>	TOTAL AFE AMOUNT <b>\$2,706,270,998</b>	
AFE will be transferred from Nalcor Energy to Muskrat Falls Corporation upon formation of such wholly owned subsidiary.			WORKING INTEREST <b>100.00%</b>	
			NET AMOUNTS	
			Original	<b>\$0</b>
			Prev. Supps	<b>\$269,217,813</b>
			Current Supp	<b>\$2,706,270,998</b>
			Cummulative Total	<b>\$2,975,488,811</b>
NET EXPENDITURE FORECAST				
YEAR		NET AMOUNT		
Underspend LCP-2012-02		<b>-\$41,196,617</b>		
2013		<b>\$550,177,648</b>		
2014		<b>\$671,737,639</b>		
2015		<b>\$681,750,506</b>		
2016		<b>\$572,507,588</b>		
2017		<b>\$232,900,821</b>		
2018		<b>\$38,393,414</b>		
TOTAL		<b>\$2,706,270,998</b>		
Projected Start Date			Upon Sanction	
Est. Completion Date			2018/07/31	
TOTAL COST		100%	<b>\$2,706,270,998</b>	
AFE APPROVAL				
PROJECT CONTROLLER	DATE (Y/M/D)	VICE PRESIDENT - LCP	DATE (Y/M/D)	
	<b>13 Jan 10</b>		<b>13/01/10</b>	
GENERAL MANAGER OF FINANCE - LCP	DATE (Y/M/D)	CHIEF FINANCIAL OFFICER	DATE (Y/M/D)	
	<b>13 Jan 10</b>		<b>13/01/10</b>	
PROJECT DIRECTOR	DATE (Y/M/D)	CHIEF EXECUTIVE OFFICER	DATE (Y/M/D)	
	<b>10 Jan 2013</b>		<b>13/01/14</b>	

**Muskrat Falls Generation - Work Scope**

Muskrat Falls Generation includes the following sub-components which are broken down under the following principal areas of the development:

- a) 22 km of access roads, including upgrading and new construction, and temporary
- b) bridges;
- c) A 1,500 person accommodations complex (for the construction period);
- d) A north Roller Compacted Concrete (RCC) overflow dam;
- e) A south rock fill dam;
- f) River diversion during construction via the spillway;
- g) 5 vertical gate spillway;
- h) Reservoir preparation and reservoir clearing;
- i) Replacement of fish and terrestrial habitat;
- j) North spur stabilization works, and;
- k) A close coupled intake and powerhouse, including:
  - i. 4 intakes with gates and trash racks
  - ii. 4 turbine/generator units at approximately 206 MW each with associated ancillary electrical/mechanical and protection/control equipment
  - iii. 5 power transformers (includes 1 spare), located on the draft tube deck of the powerhouse
  - iv. 2 Overhead cranes each rated at 450 Tonnes

Appendix A



Authorization for Expenditure (AFE)

COMPANY NAME <b>Labrador-Island Link Limited Partnership</b>		AFE NUMBER <b>LCPLITL-2013-01</b>	SUPP <b>N/A</b>	WBS No <b>N/A</b>
DEPARTMENT NAME <b>Lower Churchill Project</b>		PROJECT DESCRIPTION <b>Labrador Island Transmission Link</b>		
PREPARED BY <b>James Meaney</b>	DATE (Y/M/D) <b>8-Jan-13</b>			
AFE DESCRIPTION & JUSTIFICATION Master AFE to allow funding for progression of work to Gate 4 as defined in the Gateway Process LCP-PT-MD-0000-PM-PR-0001-01 and encompasses execution work scope leading to in-service. Further scope definition is contained in memo to E. Martin from LCP GM Finance dated January 8, 2013.				
Note: All monies in Canadian currency.				
PARTICIPANTS NAME AFE OPERATOR <b>Labrador-Island Link Limited Partnership</b>	INTEREST % <b>100.00</b>	AMOUNT (\$) <b>\$2,566,344,488</b>	TOTAL AFE AMOUNT <b>\$2,566,344,488</b>	
Ownership of the Labrador-Island Link Partnership ("LIL LP") is held by the Labrador-Island Linking Holding Corporation (a wholly owned subsidiary of Nalcor Energy) and ENL Island Link Corporation (a wholly owned subsidiary of Emera Inc.), with interests currently estimated at 71% and 29%, respectively.			WORKING INTEREST <b>100.00%</b>	
			NET AMOUNTS	
Through the terms and conditions of the Labrador-Island Link Limited Partnership Agreement dated July 31, 2012, the officers of the Labrador-Island Link General Partner Corporation (a wholly owned subsidiary of Nalcor Energy) have the authority to execute this AFE on behalf of the LIL LP.			Original	\$0
			Prev. Supps	\$126,565,930
			Current Supp	\$2,566,344,488
			Cummulative Total	<b>\$2,692,910,418</b>
NET EXPENDITURE FORECAST				
		YEAR	NET AMOUNT	
		Underspend LCP-2012-02	-\$2,101,354	
		2013	\$254,355,785	
		2014	\$713,070,891	
		2015	\$853,300,940	
		2016	\$630,980,236	
		2017	\$107,749,827	
		2018	\$8,988,163	
		TOTAL	<b>\$2,566,344,487</b>	
		Projected Start Date	Upon Sanction	
		Est. Completion Date	2017/07/31	
<b>TOTAL COST</b>		<b>100%</b>	<b>\$2,566,344,488</b>	
AFE APPROVAL				
PROJECT CONTROLLER	DATE (Y/M/D)	VICE PRESIDENT	DATE (Y/M/D)	
	13 Jan 10		2013/01/10	
GENERAL MANAGER OF FINANCE - LCP	DATE (Y/M/D)	CHIEF FINANCIAL OFFICER	DATE (Y/M/D)	
	13 Jan 10		13/01/10	
PROJECT DIRECTOR	DATE (Y/M/D)	CHIEF EXECUTIVE OFFICER	DATE (Y/M/D)	
	10 Jan 2013		13/01/14	

**Labrador Island Transmission Link (LITL) – Work Scope**

The LITL consists of the overland high voltage direct current (HVdc) Transmission system and associated HVdc converter station systems, the Strait of Belle Isle (SOBI) crossing and a new synchronous condenser facility. Specifically it includes:

- a) AC Switchyard at Soldier's Pond on the Avalon Peninsula
- b) Muskrat Falls HVdc converter stations: HVdc bipolar converter station; 315 kV ac, converted to  $\pm 350$  kV dc; Pole capacity of 450 MW
- c) Shoreline pond electrode located on the Labrador side of the Strait of Belle Isle. The anseau- Diable shoreline pond electrode will be connected to the converter station at Muskrat Falls with dual overhead conductors supported on a wood pole line from the pond electrode site to the HVdc transmission line Right of Way and from there on will be supported on the HVdc Line structures
- d) Soldier's Pond HVdc converter station: HVdc bipolar converter station; 230 kV ac, converted from  $\pm 350$  kV dc; Pole capacity of 450 MW; and Shoreline pond electrode located on the east shore of Conception Bay Dowden's Point shoreline pond electrode will be connected to the converter station at Soldiers Pond with dual overhead conductors supported on a wood pole line
- e) HVdc Transition Compounds for the Strait of Belle Isle submarine cable terminations
- f) 3 Mass Impregnated 450MW capacity each submarine cables crossing the SOBI protected using HDD boreholes and seabed rocking dumping
- g) One transition compound for each side of the Strait of Belle Isle submarine cable crossing, with associated switch works to manage the junction of multiple submarine cables and the overhead transmission line
- h) Overhead transmission line from the Muskrat Falls converter station to Soldiers Pond converter station: 900 MW,  $\pm 350$  kV dc, bipolar line, single conductor per pole; Galvanized lattice steel guyed suspension and rigid angle towers; 1100 km long
- i) New synchronous condenser at Soldier's Pond - 3 x 175 MVar units Decision
- j) Breaker upgrades / replacements at the Sunnyside Terminal Station
- k) ECC Upgrades and fibre communication connections to Soldier's Pond
- l) Operations Telecommunication system



**Authorization for Expenditure (AFE)**

COMPANY NAME <b>Nalcor Energy</b>		AFE NUMBER <b>LCPLTA-2013-01</b>	SUPP. <b>N/A</b>	WBS No <b>N/A</b>
DEPARTMENT NAME <b>Lower Churchill Project</b>		PROJECT DESCRIPTION <b>Labrador Transmission Asset</b>		
PREPARED BY <b>James Meaney</b>	DATE (Y/M/D) <b>8-Jan-13</b>			
AFE DESCRIPTION & JUSTIFICATION Master AFE to allow funding for progression of work to Gate 4 as defined in the Gateway Process LCP-PT-MD-0000-PM-PR-0001-01 and encompasses execution work scope leading to in-service. Further scope definition is contained in memo to E. Martin from LCP GM Finance dated January 8, 2013.				
Note: All monies in Canadian currency.				
PARTICIPANTS NAME	INTEREST %	AMOUNT (\$)	TOTAL AFE AMOUNT	
<b>Nalcor Energy</b>	<b>100.00</b>	<b>\$662,214,668</b>	<b>\$662,214,668</b>	
AFE will be transferred from Nalcor Energy to Labrador Transmission Corporation upon formation of such wholly owned subsidiary.			WORKING INTEREST	
			100.00%	
			NET AMOUNTS	
			Original	\$0
			Prev Supps	\$37,542,641
			Current Supp	\$662,214,668
			Cummulative Total	\$699,757,309
NET EXPENDITURE FORECAST				
YEAR		NET AMOUNT		
Underspend LCP-2012-02		-\$5,598,693		
2013		\$163,696,656		
2014		\$233,205,092		
2015		\$177,950,593		
2016		\$73,753,565		
2017		\$19,207,454		
2018		\$0		
TOTAL		\$662,214,668		
Projected Start Date			Upon Sanction	
Est. Completion Date			2017/12/31	
<b>TOTAL COST</b>		<b>100%</b>	<b>\$662,214,668</b>	
AFE APPROVAL				
PROJECT CONTROLLER	DATE (Y/M/D)	VICE PRESIDENT - LCP	DATE (Y/M/D)	
<i>[Signature]</i>	<b>13 Jan 10</b>	<i>[Signature]</i>	<b>2013/01/10</b>	
GENERAL MANAGER OF FINANCE - LCP	DATE (Y/M/D)	CHIEF FINANCIAL OFFICER	DATE (Y/M/D)	
<i>[Signature]</i>	<b>13 Jan 10</b>	<i>[Signature]</i>	<b>13/01/10</b>	
PROJECT DIRECTOR	DATE (Y/M/D)	CHIEF EXECUTIVE OFFICER	DATE (Y/M/D)	
<i>[Signature]</i>	<b>10 Jan 2013</b>	<i>[Signature]</i>	<b>13/01/14</b>	

LTA consists in the AC transmission line system from Churchill Falls to Muskrat Falls, specifically:

- a) Churchill Falls switchyard extension
- b) Muskrat Falls switchyard
- c) Transmission lines from Muskrat Falls to Churchill Falls: double-circuit 315 kV ac, 3 phase lines, double bundle conductor, Single circuit galvanized lattice steel guyed suspension and rigid angle towers; 247 km long
- d) 735 kV Transmission Line at Churchill Falls interconnecting the existing and the new CF switchyards
- e) Labrador fibre project (Nalcor's participation in Bell Aliant led initiative)



Lower Churchill Project Master AFE's

Project Asset Schematic  
Appendix B

Lower Churchill Project – Asset Schematic by Project (Excluding Maritime Link)

LCP Document No.: LCP-PT-MD-0000-PC-BD-0001-01 REV B1



