

1 Q. CE-27 from 1999 performs a system optimization to determine the optimal installed  
2 capacity for MF at 824 MW. This number has been carried forward but may not  
3 necessarily be optimal in the context of providing energy to the Island, a context of  
4 offsetting thermal based power, or in the context of an absence of a Gull Island  
5 Development.

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7 Please indicate if there is an alternate layout for Muskrat Falls that could be  
8 developed at the expense of a Gull Island development that is more optimal from a  
9 cost perspective (for example an increased Dam height, with a lower design flow  
10 and higher capacity factor).

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13 A. Nalcor does not intend to advance a Muskrat Falls development at the expense of  
14 Gull Island. Consistent with Nalcor's development plans for the entire river, the two  
15 sites are optimized in a manner to enable development of the potential of the  
16 Churchill River in the most efficient manner on the basis that both Gull Island and  
17 Muskrat Falls will be developed.

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19 No alternative development of Muskrat Falls has been studied that would be at the  
20 expense of a future Gull Island development.

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22 As discussed in Nalcor's response to CA/KPL-Nalcor-82, the full supply level and  
23 maximum flood level for Muskrat Falls have been established based on the future  
24 location for Gull Island dam, and are therefore constrained. This precludes  
25 increasing the dam height.

1 Reducing the design flow was previously addressed in the 1998 optimization  
2 studies, where a 618 MW 3 unit plant was considered, but an 824 MW 4 unit plant  
3 was ultimately selected.

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5 Although the Terms of Reference require Nalcor's CPW analysis to be based on  
6 Island requirements without consideration of export revenue, export markets are  
7 available for energy not used domestically. As a result, Nalcor believes the 1998  
8 optimization to still be relevant and appropriate.

1 Q. Is the development of Muskrat Falls constrained in any way by the perceived future  
2 development of Gull Island?

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5 A. The development concept for the Muskrat Falls and Gull Island sites has been  
6 refined over many years, and is the result of site investigations and engineering  
7 designs for both locations. Since Nalcor intends to develop both Muskrat Falls and  
8 Gull Island, the construction sequence and feasibility of both sites must not be  
9 adversely affected by a design decision for one location.

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11 As an example, the optimal locations of the Gull Island dam, powerhouse and other  
12 structures have been established after several rounds of investigations. The  
13 location for the Gull Island dam constrains the full supply level (FSL) at Muskrat Falls  
14 at 39.0 m and the maximum flood level (MFL) at 44.0 m.

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16 Increasing FSL and MSL at Muskrat Falls would also require design changes to and  
17 increased cost for Muskrat Falls, including dam height and length, design of the  
18 intake/powerhouse and the spillway structures, a significant enlargement of the  
19 control and protection schemes required for the North Spur natural dam, increased  
20 reservoir clearing and necessary rerouting of the Trans Labrador Highway due to  
21 flooding.

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23 Since Nalcor's ultimate objective is to develop both Muskrat Falls and Gull Island,  
24 Nalcor has established the specifications, design, and construction of both facilities  
25 accordingly.

1 Q. PUB-Nalcor-73 seems to imply that if excess energy from Muskrat Falls could be  
2 sold, the financial terms of the PPA for the purchase of Muskrat Falls energy would  
3 not change to the benefit of customers. What opportunities will there be for the  
4 consumer to recover costs associated with the sale of surplus energy once the  
5 decision to advance the MF and LIL project has been made? Will the PPA terms be  
6 flexible, or is it envisaged that the customers will be subject to a fixed term despite  
7 the ability to sell excess energy?

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10 A. Consistent with the Reference Question, for the purposes of DG2, Nalcor's analysis  
11 has assumed that no monetization of surplus energy will occur. Even with this  
12 assumption, the Interconnected Island alternative has a \$2.2 billion preference over  
13 the Isolated Island alternative.

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15 The distribution of benefits from the sale of surplus energy is a policy decision  
16 within the purview of the Government of Newfoundland and Labrador.

1 Q. What allowance for fish habitat compensation has been included?

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4 A. The allowance for fish habitat compensation is included in the cost estimate for the  
5 Muskrat Falls generating facility. While the specific amount is commercially  
6 sensitive and may not be released into the public domain, the cost estimate for fish  
7 habitat compensation is available to the Board and its Consultant in Confidential  
8 Exhibit CE-65.

1 Q. If any, please present any fisheries related ramping restrictions or emergency flow  
2 bypass requirements.

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5 A. While Nalcor has not concluded negotiation of the Section 35 *Fisheries Act*  
6 authorization for Muskrat Falls, Nalcor does not expect any fisheries related  
7 ramping restriction. Minimum flow for the plant is expected to be approximately  
8 500 m<sup>3</sup>/s, based on minimum production of 1,425 MW at Churchill Falls.

1 Q. What allowance for head pond clearing access has been included?

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4 A. Access for clearing the reservoir (head pond) has been included in the Muskrat Falls  
5 capital cost estimate. While the specific amount is commercially sensitive and may  
6 not be released into the public domain, the cost estimate for reservoir preparation,  
7 including road construction for clearing, is available to the Board and its Consultant  
8 in Confidential Exhibit CE-65.

1 Q. Starting in 2050 the current supply profile shows energy supply from Labrador (up  
2 to an average of 5,389 GWh) in excess of what is available on a FIRM basis from  
3 Muskrat Falls (4,506 MWh) and average basis (4,873 MWh). Please provide the  
4 energy supplied by Churchill Falls on an average and FIRM basis over time. Please  
5 explain the justification for merging the unit cost from energy outside of that  
6 supplied directly from Muskrat Falls.

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9 A. The firm production of Churchill Falls is 31.4 TWh and the average production is  
10 34.5 TWh.<sup>1</sup>

11

12 As of 2057, the energy requirements on the Island begin to exceed the total  
13 average annual production of Muskrat Falls as per the Strategist generation  
14 expansion analysis. At this point, incremental power purchase requirements have  
15 been assumed to be sourced from the Churchill Falls plant and delivered to the  
16 Island utilizing available capacity on the Labrador Island Transmission Link. The  
17 amount and price of incremental supply sourced from the Churchill Falls plant have  
18 been provided in MHI-Nalcor-49.2 and PUB-Nalcor-92 Rev. 1.

19

20 Given the available energy supply with the expiry of the Hydro Quebec power  
21 contract in 2041 and the modest energy requirements to be met, Nalcor believed it  
22 to be appropriate to include supply from Churchill Falls in the latter part of the  
23 study.

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<sup>1</sup> Confidential Exhibit CE-28 (Public), page 10



1 Q. Please outline the compensation transactions during the use of Churchill Falls  
2 energy.

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5 A. Nalcor interprets this question to be in relation to the incremental power purchases  
6 from Churchill Falls at the end of the economic study. Please refer to Nalcor's  
7 response to MHI-Nalcor 49.2 and PUB-Nalcor-92 Rev. 1.

1 Q. Can the cost of the HVAC Transmission System in Labrador be deferred?

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4 A. An ac interconnection between the Churchill Falls and Muskrat Falls plants is  
5 required for the reliable supply of power over the Labrador-Island HVdc link and to  
6 the Labrador-East Transmission System. This interconnection consists of two 315 kV  
7 ac lines between the two plants.

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9 This infrastructure is required for the stable operation of the power system and

10 cannot be deferred. Please refer to CA/KPL-Nalcor-91 for additional information.

1 Q. As per CA/KPL-Nalcor-7, two 345 kV transmission lines between Churchill Falls and  
2 Muskrat Falls are required in order to maintain the stability of the eastern Labrador  
3 power system. How does Nalcor foresee the energy priorities between Muskrat Falls  
4 and Churchill Falls occurring since the sources are not separated. Please distinguish  
5 average energy and firm energy supplied by Muskrat Falls and Churchill Falls in the  
6 Interconnected Scenario.

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9 A. The connection or separation of the sources does not affect the obligations of  
10 Churchill Falls and Muskrat Falls. Churchill Falls has its operational and contractual  
11 obligations in the same manner that Muskrat Falls will. Production and deliveries  
12 for both facilities will be metered in order to ensure that each plant's operations  
13 are properly accounted for.

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15 The average production for Muskrat Falls used in modeling is 4.9 TWh and the firm  
16 production is 4.5 TWh.<sup>1</sup> As indicated in the response to CA/KPL-Nalcor-87, the firm  
17 production of Churchill Falls is 31.4 TWh and the average production is 34.5 TWh.<sup>2</sup>

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<sup>1</sup> Confidential Exhibit CE-53 Rev. 2 (Public) (see note 3)

<sup>2</sup> Confidential Exhibit CE-28 (Public), page 10