

1 Q. The response to GRK-NLH-038 states that after MHI's initial review Nalcor made  
2 changes to upgrade designs and provide increased reliability particularly in the Long  
3 Range Mountains and other regions in Labrador. Explain in detail the specific design  
4 changes that were made, the time they were made and how such changes will  
5 provide increased reliability.

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8 A. The changes to the transmission line design were the result of the completion of  
9 detailed engineering at project sanction. During Phase III (detailed) engineering for  
10 the transmission line, several design features were implemented to improve  
11 reliability:

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- 13 a) The guyed structure configuration will naturally resist failure from  
14 cascading events and is more stable in the rugged terrain found along  
15 the route;
- 16 b) Provision of special anti-cascade towers every ten to 20 structures to  
17 contain and isolate failures and prevent them from impacting large  
18 sections of line;
- 19 c) In sections of the transmission line with the most severe combined ice-  
20 and-wind loading, the spans have been shortened appropriately to  
21 reduce structure loading to manageable levels;
- 22 d) Selection of a single large conductor in place of a multi-bundled  
23 conductor arrangement;
- 24 e) Insulator suppliers were limited only to vendors with international  
25 reputations for quality, [and] operational reliability;
- 26 f) The average tower strength utilization on tangent towers will be  
27 somewhat less than designed capacity. This has the effect of increasing

1 tower resistance and stability during extreme weather events, thus  
2 increasing overall reliability;

3 g) Sections of the final alignment within the route corridor were adjusted  
4 to reduce exposure to the extreme climatic-loading regions such as the  
5 Long Range Mountain Ridge, and to avoid areas where the terrain acts to  
6 accelerate and funnel the wind;

7 h) Tower window dimensions and spans are designed to comply with the  
8 most up-to-date theory predicting conductor motion in extreme wind  
9 and ice events. This will reduce if not eliminate outages during these  
10 events, increasing the overall transmission line reliability; and

11 i) Tower prototype testing on the most common line structures to affirm  
12 capacity and behaviour. Testing, which has now been completed, has  
13 confirmed conformance to specifications.

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15 All of these design features were confirmed and incorporated into the transmission  
16 line during detailed design engineering for the line.