

- 1 Q. Reference: Response to Request for Information NP-NLH-004
- 2 Please provide a table that compares the transmission line parameters for the as-
- 3 designed structures to the parameters used to verify conformance to the CAN/CSA-
- 4 C22.3 No. 60826-10 standard. The response should include the following
- 5 parameters:
- 6 a) Design overload and strength factors
 - 7 b) Tower loading cases
 - 8 c) Wind and weight spans
 - 9 d) Conductors and OPGW sag and tensions
 - 10 e) Unbalanced ice loading cases
 - 11 f) Security loads, including broken conductor loads
 - 12 g) Clearances under maximum ice and after load
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- 14
- 15 A. Engineering for the verification activities has used all of the same design criteria
- 16 that were used for the original line design, with maximum wind, maximum ice and
- 17 combined wind and ice loads increased as applicable for the verification. The as-
- 18 designed analysis used the actual design, so some data, such as wind/weight span
- 19 tables are not relevant for the actual design given that they represent planning
- 20 information for the initial design.
- 21
- 22 a) Design overload and strength factors – 0.9 for A-Type and B-Type suspension
 - 23 towers, 0.8 for C-type, D-Type and E-Type towers, 0.7 for guy wire, 0.7 for
 - 24 insulator strength.
 - 25 b) Tower Loading Cases – reference NP-NLH-018 (Revision 1, June 3-15).
 - 26 c) Wind and Weight Spans – please refer to Table 1 on the following page.

d) Conductor and OPGW sag and tensions – reference NP-NLH-018 (Revision 1, June 3-15).

e) Unbalanced ice loading cases – reference NP-NLH-061.

f) Security loads, including broken conductor loads - The number of conductors/ground wires considered in the case of broken wire load is one conductor at a time for the suspension tower types A and B. Each broken wire case is considered in a separate combination. For the tower types C, D and E, broken wire cases are considered for one or two or all of the broken cables. For the Labrador line portion with electrode conductor, suspension tower types A and B are designed for one pole and one electrode conductor broken at the same time. Anti-cascade requirements dictated that a maximum of 20 suspension structures would be permitted between full-tension deadends.

g) Clearances under maximum ice and after load - The line is designed for 8.3 m ground clearance for maximum sag condition with maximum ice after load condition or maximum temperature after load condition (85 deg C).

Span by span ground clearances were not verified as part of the as-designed analysis, as the intent of the process was to confirm the capability of the structures to withstand loads consistent with the stated return period. However, conductor tensions were confirmed not to exceed maximum allowable limits, and sags did not increase significantly.

1 Table 1: Wind and Weight Spans

Zone # Ice Ref. Wind Speed Electr. Inland or Coastal RS Span						Steel Tower Design																																	
						Tower Type A			Tower Type B				Tower Type C						Tower Type D								Tower Type E												
						(0-15°)	Wind Span	Weight Span	(0-15°)	Wind Span at 6°	Weight Span at 6°	Wind Span at 0°	Weight Span at 0°	(0-30°)	Wind Span (30°)	Wind Span (20°)	Wind Span (10°)	Wind Span (0°)	Min Weight Span	Max Weight Span	(0-45°)	Wind Span (45°)	Wind Span (35°)	Wind Span (25°)	Wind Span (15°)	Min Weight Span Angle	Max Weight Span Angle	Min Weight Span D. E.	Max Weight Span D. E.	(45-90°)	Wind Span (90°)	Wind Span (80°)	Wind Span (70°)	Wind Span (60°)	Min Weight Span Angle	Max Weight Span Angle	Min Weight Span D. E.	Max Weight Span D. E.	
							(m)	(m)		(m)	(m)	(m)	(m)		(m)	(m)	(m)	(m)	(m)	(m)		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
Labrador	1	50	105	Y	Inland	370	A1	410	465	B1	410	465	465	565	C1	410	460	500	540	-230	590	D1	410	460	500	540	-315	670	-245	515	E1	410	460	500	540	-315	670	-245	515
	2a	115*	135	Y	Inland	230	A2	255	300	B1	255	300	280	350	C2	255	290	310	340	-230	370	D2	255	290	310	340	-300	420	-220	350	E1	255	290	310	340	-300	420	-220	350
	2b	135*	135	Y	Inland	200	A2	220	250	B1	220	250	250	270	C2	220	250	270	290	-250	320	D2	220	250	270	290	-300	360	-200	275	E1	220	250	270	290	-300	360	-200	275
	2c	115*	135	Y	Inland	230	A2	255	300	B1	255	300	280	350	C2	255	290	310	340	-230	370	D2	255	290	310	340	-300	420	-220	350	E1	255	290	310	340	-300	420	-220	350
	3a	50	120	Y	Inland	360	A1	400	450	B1	400	450	450	550	C1	400	440	480	520	-235	575	D1	400	440	480	520	-325	650	-250	500	E1	400	440	480	520	-325	650	-250	500
	3b	50	120	N	Coastal	430	A3	475	540	B1	475	540	520	570	C1	475	530	570	620	-300	700	D1	475	530	570	620	-400	750	-300	600	E1	475	530	570	620	-400	750	-300	600
Newfoundland	4b	50	120	N	Coastal	430	A3	475	540	B1	475	540	520	570	C1	475	530	570	620	-300	700	D1	475	530	570	620	-400	750	-300	600	E1	475	530	570	620	-400	750	-300	600
	4a	50	120	N	Inland	430	A1	475	540	B1	475	540	520	570	C1	475	530	570	620	-300	700	D1	475	530	570	620	-400	750	-300	600	E1	475	530	570	620	-400	750	-300	600
	5	115*	150	N	Inland	280	A2	310	350	B1	320	360	350	400	C2	310	350	380	410	-250	460	D2	310	350	380	410	-300	520	-270	440	E1	310	350	380	410	-300	520	-270	440
	6	50	120	N	Inland	430	A1	475	540	B1	475	540	520	570	C1	475	530	570	620	-300	700	D1	475	530	570	620	-400	750	-300	600	E1	475	530	570	620	-400	750	-300	600
	7a	115*	180	N	Inland	250	A2	275	315	B1	275	315	320	380	C2	275	310	330	360	-250	400	D2	275	310	330	360	-300	460	-250	400	E1	275	310	330	360	-300	460	-250	400
	7b	135*	180	N	Inland	230	A2	255	300	B1	255	300	280	350	C2	255	290	310	340	-230	370	D2	255	290	310	340	-300	420	-220	350	E1	255	290	310	340	-300	420	-220	350
	7c	115*	180	N	Inland	250	A2	275	315	B1	275	315	320	380	C2	275	310	330	360	-250	400	D2	275	310	330	360	-300	460	-250	400	E1	275	310	330	360	-300	460	-250	400
	8a	50	120	N	Inland	430	A1	475	540	B1	475	540	520	570	C1	475	530	570	620	-300	700	D1	475	530	570	620	-400	750	-300	600	E1	475	530	570	620	-400	750	-300	600
	8b	50	105	N	Inland	440	A1	485	555	B1	485	555	535	585	C1	485	540	590	640	-295	715	D1	485	540	590	640	-390	770	-295	615	E1	485	540	590	640	-390	770	-295	615
	9	75	130	N	Inland	350	A3	385	440	B1	385	440	440	480	C1	385	430	470	510	-240	550	D1	385	430	470	510	-320	600	-240	480	E1	385	430	470	510	-320	600	-240	480
	10	50	105	N	Inland	440	A1	485	555	B1	485	555	535	585	C1	485	540	590	640	-295	715	D1	485	540	590	640	-390	770	-295	615	E1	485	540	590	640	-390	770	-295	615
	11a	75	130	N	Inland	350	A3	385	440	B1	385	440	440	480	C1	385	430	470	510	-240	550	D1	385	430	470	510	-320	600	-240	480	E1	385	430	470	510	-320	600	-240	480
	11b	75	130	N	Coastal	350	A3	385	440	B1	385	440	440	480	C1	385	430	470	510	-240	550	D1	385	430	470	510	-320	600	-240	480	E1	385	430	470	510	-320	600	-240	480

* means time ice 0.5 g/cm² for zones 2a,2b,2c,5,7a,7b,7c