

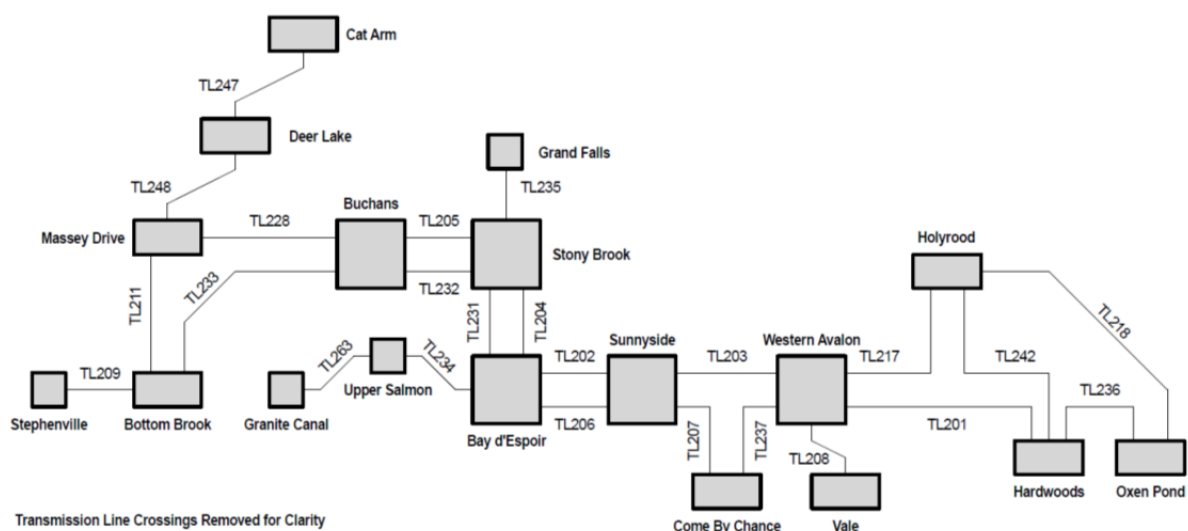
1 Q. **System Design**

2 Describe Hydro's 230kV, 138kV, and 69/66kV loops. Provide lists of transmission  
3 lines showing whether each circuit is radial or looped.

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6 A. Figure 1 provides a diagram of the existing Island Interconnected 230 kV  
7 Transmission System. The 230 kV transmission system provides multiple 230 kV  
8 connections, either parallel or looped circuits, between eleven of Hydro's 18 230 kV  
9 terminal stations. Stephenville, Cat Arm, Granite Canal, Upper Salmon, Grand Falls  
10 and Vale are connected to the system radially. Deer Lake is connected to Stony  
11 Brook via a 138 kV transmission loop and a 66 kV transmission path via Deer Lake  
12 Power to both Massey Drive and the Corner Brook Pulp and Paper mill. For outages  
13 to TL209 between Bottom Brook and Stephenville, a normally open underlying 66  
14 kV transmission path owned by Newfoundland Power between Bottom Brook and  
15 Stephenville can be utilized for up to 20 MW or the combustion turbine at  
16 Stephenville can be operated to supply the isolated load.



**Figure 1 – Existing Island Interconnected 230 kV Transmission System**

## Island Interconnected System Supply Issues and Power Outages

Table 1 provides a listing of Hydro's 230 kV transmission lines.

<b>Table 1</b> <b>Hydro 230 kV Transmission Lines</b> <b>Island Interconnected system</b>			
TL No	From	To	Comments
201	Western Avalon	Hardwoods	Parallel with TL217-TL242 and TL217-TL218-TL236 to Hardwoods
202	Bay d'Espoir	Sunnyside	Parallel with TL206
203	Western Avalon	Sunnyside	Parallel with TL237-TL207
204	Bay d'Espoir	Stony Brook	Parallel with TL231
205	Stony Brook	Buchans	Parallel with TL232
206	Bay d'Espoir	Sunnyside	Parallel with TL202
207	Sunnyside	Come-By-Chance	TL207 and TL237 combined in parallel with TL203
208	Western Avalon	Vale	Radial transmission line
209	Stephenville	Bottom Brook	Radial transmission line
211	Massey Drive	Bottom Brook	One of three 230 kV lines connecting to Bottom Brook, one of three 230 kV lines connected to Massey Drive
217	Western Avalon	Holyrood	TL217 and TL242 parallel with TL201
218	Holyrood	Oxen Pond	Parallel with TL242-TL236 Part of 230 kV loop TL242-TL236-TL218 between Holyrood, Hardwoods and Oxen Pond
228	Buchans	Massey Drive	One of three 230 kV lines connecting Massey Drive. TL228-TL211 parallel with TL233 Buchans to Bottom Brook
231	Bay d'Espoir	Stony Brook	Parallel with TL204
232	Stony Brook	Buchans	Parallel with TL205
233	Buchans	Bottom Brook	One of three 230 kV lines connecting Bottom Brook TL233 parallel with TL228-TL211 Buchans to Bottom Brook
234	Upper Salmon	Bay d'Espoir	Radial transmission line
235	Stony Brook	Grand Falls Freq	Radial transmission line
236	Hardwoods	Oxen Pond	Part of 230 kV loop TL242-TL236-TL218 between Holyrood, Hardwoods and Oxen Pond
237	Western Avalon	Come-By-Chance	TL237 and TL207 combined in parallel with TL203
238	Stephenville	Abitibi Price	Radial transmission line - out of service
242	Holyrood	Hardwoods	Parallel with TL218-TL236 Part of 230 kV loop TL242-TL236-TL218 between Holyrood, Hardwoods and Oxen Pond
247	Cat Arm	Deer Lake	Radial transmission line
248	Massey Drive	Deer Lake	Parallel with Deer Lake Power 66 kV 60 Hz lines
263	Granite Canal	Upper Salmon	Radial transmission line

Hydro owns and operates 16 138 kV transmission lines on the Island Interconnected System. Four 138 kV transmission lines (TL245, TL224, TL223 and TL222) form the Deer Lake to Stony Brook 138 kV Loop. This is the only 138 kV loop completely

1 owned and operated by Hydro. Five 138 kV transmission lines (TL239, TL259, TL241,  
2 TL244 and TL256) form the radial 138 kV transmission system along the Great  
3 Northern Peninsula (GNP). Hydro operates three 66 kV transmission lines (TL226,  
4 TL227 and TL262) between Deer Lake and Peters Barren that operate as radial  
5 transmission lines out of Deer Lake, Berry Hill and Peters Barren, but may be  
6 connected to assist in supply of the northern portion of the GNP should either  
7 TL239 or TL259 be out of service. Hydro owns and operates one 138 kV  
8 transmission line TL210 that is part of the Stony Brook to Sunnyside 138 kV Loop.  
9 Hydro owns and operates two 138 kV transmission lines on the Burin Peninsula  
10 (TL212 and TL219). The termination points of TL212 (Linton Lake) and TL219 (Salt  
11 Pond) on the southern portion of the peninsula are connected by Newfoundland  
12 Power 138 kV transmission lines to form a normally closed 138 kV loop via  
13 Marystown. The remaining Hydro owned 138 kV lines operate as radial  
14 transmission lines. Table 2 provides a listing of Hydro's 138 kV transmission lines.

## Island Interconnected System Supply Issues and Power Outages

Page 4 of 5

<b>Table 2</b> <b>Hydro 138 kV Transmission Lines</b> <b>Island Interconnected System</b>			
TL No	From	To	Comments
210	Stony Brook	Cobb's Pond	Parallel to Newfoundland Power 138 kV transmission lines between stony Brook, Grand Falls, Bishop's Falls, Cobb's Pond and Gander. The 138 kV loop continues east from Gander to Sunnyside
212	Sunnyside	Linton Lake	Parallel to TL219. Newfoundland Power 138 kV lines 300L and 308L connect Linton Lake and Salt Pond at 138 kV via Marystown.
214	Doyles	Bottom Brook	Radial transmission line
219	Sunnyside	Salt Pond	Parallel to TL212. Newfoundland Power 138 kV lines 300L and 308L connect Linton Lake and Salt Pond at 138 kV via Marystown.
222	Stony Brook	Springdale	Part of 138 kV loop Deer Lake to Stony Brook. Intermediate station at South Brook.
223	Springdale	Indian River	Part of 138 kV loop Deer Lake to Stony Brook
224	Howley	Indian River	Part of 138 kV loop Deer Lake to Stony Brook
239	Deer Lake	Berry Hill	Radial transmission line under normal operation. Underlying 66 kV line TL226 normally open at Berry Hill
241	Peter's Barren	Plum Point	Radial transmission line
243	Hinds Lake	Howley	Radial transmission line
244	Plum Point	Bear Cove	Radial transmission line
245	Deer Lake	Howley	Part of 138 kV loop Deer Lake to Stony Brook
250	Bottom Brook	Grandy Brook	Radial transmission line
256	Bear Cove	St. Anthony Airport	Radial transmission line
259	Berry Hill	Peter's Barren	Radial transmission line under normal operation. Underlying 66 kV line TL227 normally open at Cow Head.
260	Seal Cove Road	Bottom Waters	Radial transmission line connected to Deer Lake to Stony Brook 138 kV Loop via Newfoundland Power radial 138 kV transmission line 363L Indian River to Seal Cove Road

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Hydro owns and operates 15 66/69 kV transmission lines on the Island Interconnected System. With the exception of 66 kV transmission line TL225 between Deer Lake Power and Deer Lake Terminal Station, all of Hydro's 66/69 kV transmission lines operate as radial transmission lines under normal operation. As noted above, three 66 kV transmission lines (TL226, TL227 and TL262) provide a 66 kV transmission path underlying the 138 kV transmission lines TL239 and TL259 on the GNP. The 66 kV lines are operated in a radial configuration under normal operation but may be connected to assist in supplying the GNP when either TL239

## Island Interconnected System Supply Issues and Power Outages

or TL259 are out of service. Table 3 provides a listing of Hydro's 66/69 kV transmission lines.

Table 3 Hydro 66/69 kV Transmission Lines Island Interconnected System			
TL No	From	To	Comments
215	Doyles	Grand Bay	Radial transmission line
220	Bay D'Espoir	Barachoix	Radial transmission line
221	Peter's Barren	Hawke's Bay	Radial transmission line
225	Deer Lake Power	Deer Lake - NLH	Intermediate station Newfoundland Power Deer Lake Substation. With Deer lake Power 66 kV lines, parallel to TL248 to Massey Drive
226	Deer Lake	Berry Hill	Radial transmission line under normal operation open at Berry Hill. Intermediate stations at Wiltondale and Rocky Harbour.
227	Berry Hill	Daniel's Harbour	Radial transmission line under normal operation. TL227 open at Cow Head. Intermediate stations at Sally's Cove, Cow Head and Parson's Pond
229	Wiltondale	Glenburnie	Radial transmission line
251	Howley	Hampden	Radial transmission line
252	TL252 Tap	Jackson's Arm	Radial transmission line
253	Jackson's Arm	Coney Arm	Radial transmission line. Connects Rattle Brook (4 MW) to system. Coney Arm alternative station service supply to Cat Arm.
254	Boyd's Cove	Farewell Head	Radial transmission line
257	St. Anthony Airport	Roddickton	Radial transmission line. Intermediate station at Main Brook.
261	St. Anthony Airport	St. Anthony Diesel Plant	Radial transmission line
262	Peter's Barren	Daniel's Harbour	Radial transmission line under normal operation
264	Buchan's	Duck Pond	Radial transmission line