

1 **Reference: Tab 2.1: 2022 Substation Refurbishment and Modernization**

2

3 **Page 3 states:**

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5 *“...Prior to 2022, the Company addressed ground grid upgrades primarily at substations*
6 *included in the refurbishment and modernization projects. In order to address deficiencies*
7 *identified in an assessment carried out in 2020, additional ground grid projects will be*
8 *undertaken in 2022 and subsequent years.”*

9

10 **Q. Please provide the assessment carried out in 2020.**

11

12 A. See Attachment A for the results of the engineering assessment completed for
13 Newfoundland Power’s substation ground grids. The assessment determined that 46
14 substations have deficiencies that need to be addressed in compliance with *ANSI/IEEE*
15 *Standard 80-2013*.

Newfoundland Power
Substation Ground Grid Deficiencies

Table 1
Substation Ground Grid Deficiencies

Substation	Field Study Completed [1]	Grounding Analysis Completed [2]	L-L Voltages (kV)	L-G Fault Level (A)	No Connection Between Fence - Main Grid [3]	Equipment Loops Only (No Main Grid) [3]	No Fence Grounding or Fence Ground Inside Fence Only [3]
BVJ	No	No	24.94	754		X	X
CAB	Yes	No	12.47	2,781	X	X	X
DUN	Yes	No	24.94	1,271	X	X	
FPD	No	No	12.47	1,420	X	X	
GAM	Yes	No	66.00	2,273	X		
GBE	No	No	66.00	1,476	X	X	X
GLV Tap	No	No	138.00	1,657	TBD	TBD	TBD
GOU	Yes	No	12.47	13,707		X	X
GPD Tap	No	No	66.00	1,263	TBD	TBD	TBD
GRH GT	No	No	12.47	5,430	X	X	X
GRH	No	No	12.47	5,443	X		
HAR	No	No	12.47	5,083	X	X	X
HBS	No	No	66.00	1,237	X	X	X
HCP Tap	No	No	66.00	2,956	TBD	TBD	TBD
HUM	No	No	4.16	8,992		X	X
HWD West	Yes	No	66.00	16,384	X	X	X
LLK	No	No	12.47	7,800	X	X	X
LWN	No	No	24.94	1,143	X	X	X
MIL	No	No	24.94	1,816	X		
MKS	No	No	24.94	3,910		X	X
MOP	Yes	No	12.47	7,532		X	X
MRP Tap	No	No	66.00	3,320		X	
MUN	No	No	12.47	13,971	X	X	X
NCH	Yes	No	12.47	2,881		X	X
OPL	No	No	12.47	2,954		X	X
OXF	Yes	No	66.00	15,551		X	
PBD Tap	No	No	138.00	1,973	TBD	TBD	TBD
PIT	No	No	12.47	1,260		X	X
PRC	No	No	138.00	1,382	X	X	X
PUN	No	No	66.00	1,000		X	X
QTZ	No	No	4.16	1,639	X	X	X

Substation	Field Study Completed [1]	Grounding Analysis Completed [2]	L-L Voltages (kV)	L-G Fault Level (A)	No Connection Between Fence - Main Grid [3]	Equipment Loops Only (No Main Grid) [3]	No Fence Grounding or Fence Ground Inside Fence Only [3]
QTZ Tap	No	No	66.00	1,224	TBD	TBD	TBD
ROB Tap	No	No	66.00	1,865	TBD	TBD	TBD
SCR	No	No	24.94	1,577	X		
SCV HV	No	No	66.00	4,285	X	X	X
SCV LV	No	No	12.47	5,050	X	X	X
SJM	Yes	Yes	12.47	14,782	X	X	X
SLA	No	No	4.16	17,234		X	X
SMV	No	No	24.94	760		X	X
STG	No	No	12.47	2,870	TBD	TBD	TBD
SUN	No	No	138.00	7,013	X	X	X
TCV	No	No	66.00	2,801		X	X
TNS	No	No	138.00	1,726	X	X	
TOP	No	No	24.94	4,509	X	X	X
WBK	No	No	12.47	1,860	X	X	
WHE	No	No	66.00	3,325		X	

Notes:

1. A Field Study is completed at the substation to test the continuity of the existing grounding system, and to test the soil resistivity using the Fall-of-Potential Method for input into the Grounding Analysis.
2. A Grounding Analysis is completed using computer modeling to complete a step and touch potential analysis to identify the grounding upgrades required to eliminate these step and touch potential hazards.
3. Items showing TBD require further site investigation to determine the state of the existing ground grid.