1	Q.	Reference: Teshmont Report - Section 4.3.3 – 230 KV Transmission Lines (pg 16):
2		"Outages due to ac terminal station equipment such as circuit breaker failures
3		or misoperations are not included in this analysis."
4		Hydro provided Teshmont with detailed outage data for the transmission lines.
5		Please provide the outage data (failure frequency, failure rate and average outage
6		duration) for the terminal stations for the same five-year period as the transmission
7		lines.
8		
9		
10	A.	It is noted that the 230 kV transmission line outage statistics provided to Teshmont
11		included outages caused by all CEA subcomponent classifications including those
12		caused by the line itself, those caused by control and protection systems, and those
13		caused by terminal station equipment associated with the transmission line (i.e.
14		dedicated disconnect switches, lightning arrestors, etc.).
15		
16		In addition to the above, Hydro maintains forced outage data by voltage class for
17		major terminal station equipment such as transformers and circuit breakers. Hydro
18		maintains terminal station equipment performance data on average forced outage
19		frequency per annum and average forced outage duration per annum. Detailed
20		outage data for the terminal station equipment for the same five-year period
21		provided to Teshmont is provided in CA-NLH-154 Attachment 1.

CA-NLH-154, Attachment 1 Page 1 of 2, Isl Int System Power Outages (Phase Two)

Part										
May 10, 2009 20-77 330 DOES DOES 100 100 30 5 Septem Conditions Control and Protection Equipment Co		Outage ID		Outage Duration (Hours)	CEA Primary Cause	CEA Subcompent Failure	Notes			
May 12, 2009 646 3346 0.010	Feb 04, 2009 08:12	5303	OPDC1	8.1	Defective Equipment	Control and Protection Equipment	Blown Fuse on capacitors			
May 12, 2009 664 3346 OPC1 30.6 System Controllons Control and Protection Equipment Speid 2, 2009 6623 547 SMEDILITY 7.7 Defective Equipment Control and Protection Equipment High Revision Fig. or all control Speid 2, 2009 6623 547 SMEDILITY 7.7 Defective Equipment Control and Protection Equipment High Revision Fig. or all control Speid 2, 2009 6623 548 SSEC	Human Element - Incorrect Construction, Installation									
Ag 20, 0009 07:16 9-77,	May 10, 2009 20:47	5340	BDEB10B11	0.0	or Maintenance	Control and Protection Equipment	Breaker opening during lightning storm			
Sept 02,000 08.13	May 13, 2009 06:46	5346	OPDC1	30.6	System Conditions	Control and Protection Equipment	Undetermined cause			
Sep 08,000 08.21 599	Aug 20, 2009 07:16	5471	HRDB1L17	7.7	Defective Equipment	Control and Protection Equipment	High Resistive Trip coil contact			
Cot 07, 2009 1018 S17	Sep 04, 2009 08:13	5487	BBKL11L33	9.9	Defective Equipment	Auxilairy Equipment	Burnt out close coil			
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CA-NLH-154, Attachment 1 Page 2 of 2, Isl Int System Power Outages (Phase Two)

Jan 10, 2012 18:31	6002	CBCC2	5.1	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	Protection setting error
Mar 27, 2012 07:50	6009	DLKB1L45	0.2	Defective Equipment	Control and Protection Equipment	Faulty disagreement timer on breaker
May 25, 2012 19:00	6021	BDEB10B11	11.9	Defective Equipment	Operating Mechanisms	Breaker contact stuck during open attempt
Jun 05, 2012 09:11	6034	BBKB1L09	7.4	Defective Equipment	Interrupting Medium	Air leak on breaker
Jul 06, 2012 13:27	6071	BBKL09L33	30.0	Defective Equipment	Interrupting Medium	Air leak on breaker
Jul 12, 2012 13:00	6064	HRDB1L17	485.6	Defective Equipment	Resistors or grading capacitors	Oil leak on capacitor on breaker
Jul 19, 2012 17:16	6074	HRDB8L39	0.0	System Conditions - Switching Transient	Operating Mechanisms	Breaker contact stuck
Aug 14, 2012 06:41	6082	BDEB2T3	11.2	Defective Equipment	Interrupting Medium	Air leak on breaker
						Incorrect protection setting on transformer
Aug 21, 2012 10:00	6091	BWTT1	1.7	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	protection relay
						Incorrect protection setting on transformer
Aug 21, 2012 11:55	6092	BWTT1	1.1	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	protection relay
						Inadvetent opening due to ground loop in PLC
Aug 22, 2012 07:48	6093	BDEB4B5	0.6	Human Element - Incorrect Use of Equipment	Control and Protection Equipment	controls
Oct 01, 2012 17:22	6132	BDEB10B11	0.0	Unknown	Other	Undetermined cause
Oct 12, 2012 12:43	6124	OPDT1	1.3	Human Element - Incorrct Circuit Labelling	Terminal Set - Other	Faulty gas relay on GT1 - shared alarm
Jan 10, 2013 11:47	6157	STBB3L130	0.0	Human Element - Testing	Control and Protection Equipment	Inadevertenet trip during testing
						Breaker flashed over on outside on support
Jan 11, 2013 06:42	6158	HRDB1L17	75.0	Defective Equipment	Insulation System	insultor
Jan 11, 2013 06:42	6158	CBCC1	0.1	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:42	6158	CBCC2	0.1	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:42	6158	CBCC3	0.1	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:42	6158	CBCC4	0.1	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:48	6158	CBCC2	0.3	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:48	6158	CBCC1	0.4	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:48	6158	CBCC3	0.4	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 11, 2013 06:48	6158	CBCC4	0.4	System Conditions	Control and Protection Equipment	Severe Winter Storm
Jan 13, 2013 02:19	6163	OPDC1	3.9	Defective Equipment	Control and Protection Equipment	Blown Fuse on capacitors
Jan 23, 2013 12:19	6160	CBCB1B2	0.0	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	Related to protection design and settings
Feb 04, 2013 16:54	6175	CBCC2	53.0	Adverse Environment - Flying Debris	Bushings	Plastic wrap on support insulators
Feb 04, 2013 16:54	6175	CBCC3	53.0	Adverse Environment - Flying Debris	Bushings	Plastic wrap on support insulators
Feb 07, 2013 15:23	6185	CBCC1	30.2	Adverse Envirnoment - Industrial Pollution	Bushings	Dirt and smoke from NARL on insualtors
Feb 17, 2013 16:07	6186	BHLT1	14.8	Defective Equipment	Control and Protection Equipment	Protection relay issues
Feb 18, 2013 13:16	6182	BHLT1	52.8	Defective Equipment	Control and Protection Equipment	Protection relay issues
Feb 21, 2013 00:55	6184	DHRT2	3.6	Adverse Envirnoment - Salt Spray	Bushings	Salt built up on bushings
Mar 06, 2013 08:17	6202	OPDC1	11.9	Defective Equipment	Control and Protection Equipment	Blown Fuse on capacitors
Mar 30, 2013 10:30	6200	VBNT1	3.1	Human Element - Switch Error	Terminal Set - Other	Vale switching problem
Aug 06, 2013 01:35	6258	DLKT1	4.8	Adverse Weather - Lightning	Terminal Set - Other	Lightning strike in station
7.08 00, 2013 01.33	0230	222		Autorise Weather Eightiming	remmarger office.	Incorrect protection setting on transformer
Aug 06, 2013 12:11	6254	STAB1T1	0.1	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	protection relay
7 tag 00, 2013 12:11	0234	317/0111	0.1	ridinal Elifett meoreeer roteetion setting	control and Protection Equipment	Breaker failed to close due to auxilary relay
Aug 10, 2013 09:43	6262	SSDB1L03	8.3	Defective Equipment	Control and Protection Equipment	failure
10, 2013 03.43	0202	33001103	0.5	Defective Equipment	control and Protection Equipment	Incorrect protection setting on transformer
Nov 28, 2013 04:57	6294	BHLT1	7.4	Human Elment - Incorrect Protection Setting	Control and Protection Equipment	protection setting on transformer
1404 20, 2013 04.37	0234	DIILIT	7.7	Haman Emient - meorreet i rotection setting	control and i rotection Equipment	protection relay