

EB-2018-0165

## Ontario Energy Board

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, Schedule B to the *Energy Competition Act, 1998*, S.O. 1998, c. 15;

**AND IN THE MATTER OF** an Application by Toronto Hydro-Electric System Limited for an Order or Orders approving or fixing just and reasonable distribution rates and other charges, effective January 1, 2020 to December 31, 2024.

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## PWU Compendium – Panel 1

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July 2, 2019

Asset Class	Change from Current to 2024				
	HI1	HI2	HI3	HI4	HI5
Overhead Gang-Operated Switches	(142)	108	(54)	38	50
SCADA-Mate Switches	(69)	42	1	-	26
Wood Poles	(8,574)	2,990	(16,738)	6,572	15,750
4kV Oil Circuit Breakers (MS)	-	(4)	(117)	95	26
KSO Circuit Breakers (TS)	(9)	2	(4)	(1)	12
SF6 Circuit Breakers (TS)	(3)	(3)	(14)	2	18
Vacuum Circuit Breakers (MS & TS)	(3)	(43)	(8)	52	2
Air Magnetic Circuit Breakers (MS & TS)	(48)	(42)	(190)	256	24
Airblast Circuit Breakers (MS & TS)	(12)	3	(185)	193	1
Station Power Transformers	(8)	(52)	(3)	49	14
Network Transformers	(181)	(82)	63	42	158
Network Protectors	(59)	(128)	(272)	103	356
Cable Chambers	(1,283)	384	581	(71)	389
Submersible Transformers	(369)	(224)	266	(29)	356
Air-Insulated Padmount Switches	(33)	10	(53)	(24)	100
Vault Transformers	(1,410)	(2,692)	3,460	277	365
Underground Vaults (combined)	(57)	(116)	90	73	10
ATS Vaults	(1)	1	-	-	-
CLD Vaults	-	-	-	-	-
CRD Vaults	(2)	2	(1)	1	-
Network Vaults	(49)	(65)	40	65	9
Submersible Switch Vaults	(2)	2	-	-	-
URD Vaults	(3)	(56)	51	7	1
Padmount Transformers	(373)	(311)	322	114	248
SF6-Insulated Padmount Switches	-	-	(2)	-	2
SF6-insulated Submersible Switches	(7)	(5)	5	1	6
Air-Insulated Submersible Switches	(45)	(24)	42	16	11

Reference: Exhibit 2B, Section D, Appendix C, Table 2 and Table 3

Asset Class	Current Health Score					Future Health Score (2024)					Change from Current to 2024				
	HI1	HI2	HI3	HI4	HI5	HI1	HI2	HI3	HI4	HI5	HI1	HI2	HI3	HI4	HI5
Overhead Gang-Operated Switches	854	27	76	3	9	712	135	22	41	59	(142)	108	(54)	38	50
SCADA-Mate Switches	1,084	1	26	-	8	1,015	43	27	-	34	(69)	42	1	-	26
Wood Poles	68,425	5,777	20,915	10,877	1,074	59,851	8,767	4,177	17,449	16,824	(8,574)	2,990	(16,738)	6,572	15,750
4kV Oil Circuit Breakers (MS)	36	4	123	24	-	36	-	6	119	26	-	(4)	(117)	95	26
KSO Circuit Breakers (TS)	10	7	11	11	1	1	9	7	10	13	(9)	2	(4)	(1)	12
SF6 Circuit Breakers (TS)	130	6	18	3	3	127	3	4	5	21	(3)	(3)	(14)	2	18
Vacuum Circuit Breakers (MS & TS)	578	46	13	2	29	575	3	5	54	31	(3)	(43)	(8)	52	2
Air Magnetic Circuit Breakers (MS & TS)	145	90	247	21	53	97	48	57	277	77	(48)	(42)	(190)	256	24
Airblast Circuit Breakers (MS & TS)	15	9	206	1	3	3	12	21	194	4	(12)	3	(185)	193	1
Station Power Transformers	83	77	61	13	8	75	25	58	62	22	(8)	(52)	(3)	49	14
Network Transformers	1,334	255	166	60	7	1,153	173	229	102	165	(181)	(82)	63	42	158
Network Protectors	1,086	185	319	74	26	1,027	57	47	177	382	(59)	(128)	(272)	103	356
Cable Chambers	8,112	1,162	1,350	398	89	6,829	1,546	1,931	327	478	(1,283)	384	581	(71)	389
Submersible Transformers	7,816	588	271	172	55	7,447	364	537	143	411	(369)	(224)	266	(29)	356
Air-Insulated Padmount Switches	404	20	73	30	45	371	30	20	6	145	(33)	10	(53)	(24)	100
Vault Transformers	6,807	4,315	450	214	45	5,397	1,623	3,910	491	410	(1,410)	(2,692)	3,460	277	365
Underground Vaults (combined)	1,017	186	72	12	29	960	70	162	85	39	(57)	(116)	90	73	10
ATS Vaults	8	-	-	-	-	7	1	-	-	-	(1)	1	-	-	-
CLD Vaults	21	-	-	-	-	21	-	-	-	-	-	-	-	-	-
CRD Vaults	9	-	1	-	-	7	2	-	1	-	(2)	2	(1)	1	-
Network Vaults	322	120	63	11	29	273	55	103	76	38	(49)	(65)	40	65	9
Submersible Switch Vaults	115	5	-	-	-	113	7	-	-	-	(2)	2	-	-	-
URD Vaults	542	61	8	1	-	539	5	59	8	1	(3)	(56)	51	7	1
Padmount Transformers	5,547	656	283	113	18	5,174	345	605	227	266	(373)	(311)	322	114	248
SF6-Insulated Padmount Switches	402	-	2	-	6	402	-	-	-	8	-	-	(2)	-	2
SF6-insulated Submersible Switches	353	14	7	3	19	346	9	12	4	25	(7)	(5)	5	1	6
Air-Insulated Submersible Switches	755	79	27	7	-	710	55	69	23	11	(45)	(24)	42	16	11

Reference: Exhibit 2B, Section D, Appendix C, Table 2 and Table 3

Asset Class	Change from Current to 2024				
	HI1	HI2	HI3	HI4	HI5
Overhead Gang-Operated Switches	-15%	+11%	-6%	+4%	+5%
SCADA-Mate Switches	-6%	+4%	+0%	+0%	+2%
Wood Poles	-8%	+3%	-16%	+6%	+15%
4kV Oil Circuit Breakers (MS)	+0%	-2%	-63%	+51%	+14%
KSO Circuit Breakers (TS)	-23%	+5%	-10%	-3%	+30%
SF6 Circuit Breakers (TS)	-2%	-2%	-9%	+1%	+11%
Vacuum Circuit Breakers (MS & TS)	-0%	-6%	-1%	+8%	+0%
Air Magnetic Circuit Breakers (MS & TS)	-9%	-8%	-34%	+46%	+4%
Airblast Circuit Breakers (MS & TS)	-5%	+1%	-79%	+82%	+0%
Station Power Transformers	-3%	-21%	-1%	+20%	+6%
Network Transformers	-10%	-5%	+3%	+2%	+9%
Network Protectors	-3%	-8%	-16%	+6%	+21%
Cable Chambers	-12%	+3%	+5%	-1%	+4%
Submersible Transformers	-4%	-3%	+3%	-0%	+4%
Air-Insulated Padmount Switches	-6%	+2%	-9%	-4%	+17%
Vault Transformers	-12%	-23%	+29%	+2%	+3%
Underground Vaults (combined)	-4%	-9%	+7%	+6%	+1%
ATS Vaults	-13%	+13%	+0%	+0%	+0%
CLD Vaults	+0%	+0%	+0%	+0%	+0%
CRD Vaults	-20%	+20%	-10%	+10%	+0%
Network Vaults	-9%	-12%	+7%	+12%	+2%
Submersible Switch Vaults	-2%	+2%	+0%	+0%	+0%
URD Vaults	-0%	-9%	+8%	+1%	+0%
Padmount Transformers	-6%	-5%	+5%	+2%	+4%
SF6-Insulated Padmount Switches	+0%	+0%	-0%	+0%	+0%
SF6-insulated Submersible Switches	-2%	-1%	+1%	+0%	+2%
Air-Insulated Submersible Switches	-5%	-3%	+5%	+2%	+1%

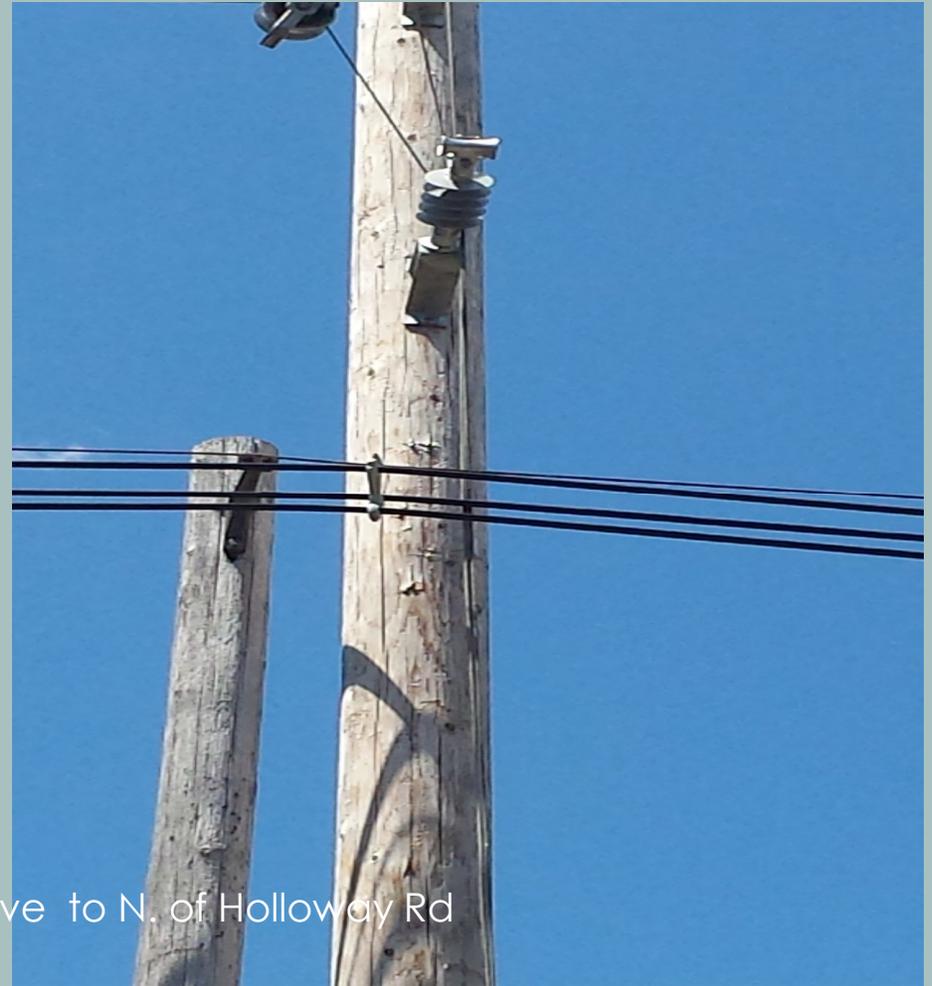
Reference: Exhibit 2B, Section D, Appendix C, Table 2 and Table 3

Asset Class	Current Health Score					Future Health Score (2024)					Change from Current to 2024				
	HI1	HI2	HI3	HI4	HI5	HI1	HI2	HI3	HI4	HI5	HI1	HI2	HI3	HI4	HI5
Overhead Gang-Operated Switches	88%	3%	8%	0%	1%	73%	14%	2%	4%	6%	-15%	+11%	-6%	+4%	+5%
SCADA-Mate Switches	97%	0%	2%	0%	1%	91%	4%	2%	0%	3%	-6%	+4%	+0%	+0%	+2%
Wood Poles	64%	5%	20%	10%	1%	56%	8%	4%	16%	16%	-8%	+3%	-16%	+6%	+15%
4kV Oil Circuit Breakers (MS)	19%	2%	66%	13%	0%	19%	0%	3%	64%	14%	+0%	-2%	-63%	+51%	+14%
KSO Circuit Breakers (TS)	25%	18%	28%	28%	3%	3%	23%	18%	25%	33%	-23%	+5%	-10%	-3%	+30%
SF6 Circuit Breakers (TS)	81%	4%	11%	2%	2%	79%	2%	3%	3%	13%	-2%	-2%	-9%	+1%	+11%
Vacuum Circuit Breakers (MS & TS)	87%	7%	2%	0%	4%	86%	0%	1%	8%	5%	-0%	-6%	-1%	+8%	+0%
Air Magnetic Circuit Breakers (MS & TS)	26%	16%	44%	4%	10%	17%	9%	10%	50%	14%	-9%	-8%	-34%	+46%	+4%
Airblast Circuit Breakers (MS & TS)	6%	4%	88%	0%	1%	1%	5%	9%	83%	2%	-5%	+1%	-79%	+82%	+0%
Station Power Transformers	34%	32%	25%	5%	3%	31%	10%	24%	26%	9%	-3%	-21%	-1%	+20%	+6%
Network Transformers	73%	14%	9%	3%	0%	63%	9%	13%	6%	9%	-10%	-5%	+3%	+2%	+9%
Network Protectors	64%	11%	19%	4%	2%	61%	3%	3%	10%	23%	-3%	-8%	-16%	+6%	+21%
Cable Chambers	73%	10%	12%	4%	1%	61%	14%	17%	3%	4%	-12%	+3%	+5%	-1%	+4%
Submersible Transformers	88%	7%	3%	2%	1%	84%	4%	6%	2%	5%	-4%	-3%	+3%	-0%	+4%
Air-Insulated Padmount Switches	71%	3%	13%	5%	8%	65%	5%	3%	1%	25%	-6%	+2%	-9%	-4%	+17%
Vault Transformers	58%	36%	4%	2%	0%	46%	14%	33%	4%	3%	-12%	-23%	+29%	+2%	+3%
Underground Vaults (combined)	77%	14%	5%	1%	2%	73%	5%	12%	6%	3%	-4%	-9%	+7%	+6%	+1%
ATS Vaults	100%	0%	0%	0%	0%	88%	13%	0%	0%	0%	-13%	+13%	+0%	+0%	+0%
CLD Vaults	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	+0%	+0%	+0%	+0%	+0%
CRD Vaults	90%	0%	10%	0%	0%	70%	20%	0%	10%	0%	-20%	+20%	-10%	+10%	+0%
Network Vaults	59%	22%	12%	2%	5%	50%	10%	19%	14%	7%	-9%	-12%	+7%	+12%	+2%
Submersible Switch Vaults	96%	4%	0%	0%	0%	94%	6%	0%	0%	0%	-2%	+2%	+0%	+0%	+0%
URD Vaults	89%	10%	1%	0%	0%	88%	1%	10%	1%	0%	-0%	-9%	+8%	+1%	+0%
Padmount Transformers	84%	10%	4%	2%	0%	78%	5%	9%	3%	4%	-6%	-5%	+5%	+2%	+4%
SF6-Insulated Padmount Switches	98%	0%	0%	0%	1%	98%	0%	0%	0%	2%	+0%	+0%	-0%	+0%	+0%
SF6-insulated Submersible Switches	89%	4%	2%	1%	5%	87%	2%	3%	1%	6%	-2%	-1%	+1%	+0%	+2%
Air-Insulated Submersible Switches	87%	9%	3%	1%	0%	82%	6%	8%	3%	1%	-5%	-3%	+5%	+2%	+1%

Reference: Exhibit 2B, Section D, Appendix C, Table 2 and Table 3



# Unsafe/Hazardous Condition Observed



**Unsafe/Hazardous Condition Observed**

**Public Safety Before**

Hazard Created  
Danger or Not  
Assess Hazards  
Analyze

Contractor Hazard P.1053 N. on  
Kipling Ave to N. of Holloway Rd



**CORRECTIVE ACTIONS COMPLETED/MADE SAFE**

**Public Safety AFTER**

Report Hazard to Supervisor



Report to P.S.O. Contract Inspector



Report Hazard to Outside Contractor



Eliminate Danger



Follow up make safe



**Public Safety**



**Public Safety**

# Contractor Hazard P.1053 N. on Kipling Ave to N. of Holloway Rd

## Unsafe/Hazardous Condition Observed



**Your safety observations and actions are another persons safe day.**

**What you do does make a difference.**

**Thank you**



## Unsafe/Hazardous Condition Observed



**Unsafe/Hazardous Condition Observed**

**Public Safety Before**

Hazard Created  
Danger or Not  
Assess Hazards  
Analyze

Contractor Hazard P.120  
Llyod Manor Dr & Safety  
June 2016



# Public Safety AFTER

## CORRECTIVE ACTIONS COMPLETED/MADE SAFE

Report Hazard to Supervisor



Report Hazard 3<sup>rd</sup> Party Attachments within Toronto Hydro



Report Hazard to Outside Contractor



Eliminate Danger



Follow up make safe



Public Safety



Public Safety

# Contractor Hazard P.120 Llyod Manor Dr & Safety June 2016

Report Hazard to Supervisor

## Unsafe/Hazardous Condition Observed

Hazard Created



DANGER or Not



**Public Safety BEFORE**

Report Hazard to Outside Contractor



Eliminate Danger



**Public Safety AFTER**

Follow up make safe



**Public Safety**



Analyze



Assess Hazard



**CORRECTIVE ACTIONS COMPLETED/MADE SAFE**

**Unsafe/Hazardous Condition Observed**

**Public  
Safety  
Before**

Hazard Created

Danger or Not

Assess Hazards

Analyze

140 Ormont Drive



## Unsafe/Hazardous Condition Observed

**Public  
Safety  
Before**

Questions must be asked and responded to in the interest of safety ?

Hazard Created ➡ YES/No ?

Danger or Not ➡ YES/NO ?

Assess Hazards ➡ REPAIR or Not ?

Analyze ➡ SITE & PUBLIC SAFETY



**CORRECTIVE ACTIONS COMPLETED/MADE SAFE**

**Public  
Safety  
AFTER**



**Public  
Safety  
AFTER**

**Report Hazard to Shift Supervisor**



**Shift Supervisor report to  
Manager/Director responsible**



**Follow up make safe and/or  
Eliminate Danger**



**Public Safety**



**Duties of Employers and Other Persons.** Every worker, employer has duties & responsibilities under the OHSA to report the absence of or defect in any equipment or protective device which may endanger. **Section 23 through to section 29 of OHSA** for the province of Ontario.

**Your safety observations and actions are another persons safe day.**

**What you do does make a difference.**

**Thank you**



0590883