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E-FILE

October 30, 2020

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: PPL Electric Utilities Corporation
Quarterly Reliability Report for the
Period Ended September 30, 2020
Docket No. M-2016-2522508

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation ("PPL Electric") is the **NON-CONFIDENTIAL** version of PPL Electric's Quarterly Reliability Report for the Period Ended September 30, 2020 ("Quarterly Reliability Report"). The report is being filed pursuant to 52 Pa. Code § 57.195(d).

Pursuant to 52 Pa. Code § 1.11, the enclosed document is to be deemed filed on October 30, 2020, which is the date it was filed electronically with the Commission's E-Filing System.

PPL Electric has also electronically submitted a proprietary and confidential version of this filing pursuant to the Pennsylvania Public Utility Commission's instructions in the *Emergency Order re Suspension of Regulatory and Statutory Deadlines; Modification to Filing and Service Requirements* at Docket No. M-2020-3019262 (Order entered March 20, 2020).

If you have any questions regarding this document, please call me or

Nikki Jones, PPL Electric's Director, State Government Relations at (717) 603-4029.

Very truly yours,

Michael J. Shafer

Enclosures

cc: Tanya J. McCloskey, Esquire
Mr. John R. Evans
Mr. Daniel Searfoorce
Mr. David Washko

PPL Electric Utilities Corporation

Quarterly Reliability Report

to the

Pennsylvania Public Utility Commission

October 2020

1) A description of each major event that occurred during the preceding quarter, including the time and duration of the event, the number of customers affected, the cause of the event and any modified procedures adopted in order to avoid or minimize the impact of similar events in the future.

No major events occurred during the third quarter of 2020.

2) Rolling 12-month reliability index values (SAIFI, CAIDI, SAIDI, and if available, MAIFI) for the EDC's service territory for the preceding quarter. The report shall include the data used in calculating the indices, namely the average number of customers served, the number of sustained customer interruptions, the number of customers affected, and the customer minutes of interruption. If MAIFI values are provided, the report shall also include the number of customer momentary interruptions.

The following table provides data for the 12 months ending September 30, 2020.

SAIFI	BM 0.98	0.88
	STD 1.18	0.88
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	BM 145	145
	STD 174	145
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	BM 142	128
	STD 205	128
MAIFI		5.6
Average Number of Customers Served [1]		1,435,484
Number of Sustained Customer Interruptions (Trouble Cases)		22,142
Number of Customers Affected [2]		1,263,206
Customer Minutes of Interruptions (CMI)		183,674,493
Number of Customer Momentary Interruptions		8,092,232

During the third quarter, there were no (0) PUC major events, two (2) PUC reportable events, and six (6) other storms that required the opening of one or more area emergency centers to manage restoration efforts.

[1] PPL Electric calculates the annual indices using customers served at the end of period. This is consistent with the method used to calculate PPL Electric's benchmarks.

[2] The data reflects the number of customers interrupted for each interruption event summed for all events, also known as customer interruptions. If a customer is affected by three separate cases of trouble, that customer represents three customer interruptions, but only one customer interrupted.

PPL Electric's third quarter reliability performance was within the PUC standard and benchmark for all metrics.

Because weather has a significant impact to volatility in reliability metrics, PPL Electric's IEEE Metrics are shown below. The IEEE 1366 standard is a widely used methodology that allows for weather normalized performance evaluation that better reflects system performance during non-major storm events. PPL Electric is consistently a first quartile SAIFI performer, a first quartile SAIDI performer, and a second quartile CAIDI performer. The table below lists PPL Electric's IEEE performance metrics compared to the performance quartiles for large utilities nationally, as issued by the IEEE annual reliability survey. This survey comprises some 100 utilities serving 85 million customers across the country. PPL Electric's continued focus on improving system reliability and response is directly related to its strong SAIFI performance.

	IEEE CAIDI	IEEE SAIFI	IEEE SAIDI
2017	116	0.60	70.0
2018	112	0.74	82.5
2019	113	0.66	74.3
Rolling 4Q ending 2020 Q3	101	0.71	70.9
IEEE First Quartile Ceiling	100	0.80	85
IEEE Second Quartile Ceiling	114	1.00	112

Rolling 12-month reliability index values (SAIFI, CAIDI, SAIDI, CMI, and if available, MAIFI) and other pertinent information such as customers served, number of interruptions, customer minutes interrupted, number of lockouts, and so forth, for the worst performing 5% of the circuits in the system. An explanation of how the EDC defines its worst performing circuits shall be included.

Note: PPL Electric changed its methodology for identifying worst performing circuits beginning Q1 of 2020. See Appendix for an explanation of the methodology and a comparison of the worst performing circuits under the previous and current methods.

The following table provides reliability index values for the worst performing 5% of the circuits in the system for the 12 months ended at the current quarter. An explanation of how PPL Electric defines its worst performing circuits is included in Appendix A.

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
1	55001	3031	157	19.34	1.0	497	120	1,506,376
2	52401	457	106	4.33	0.8	2,438	75	1,114,299
3	20601	584	146	4.00	7.8	1,312	85	767,268
4	20402	762	222	3.43	5.3	1,292	65	984,250
5	50503	503	99	5.06	9.3	1,459	24	733,243
6	28101	1083	119	9.06	1.3	580	103	627,890
7	52402	716	93	7.70	4.0	738	72	528,261
8	45002	1487	499	2.98	7.8	1,170	52	1,739,848
9	40201	438	172	2.55	4.6	1,597	124	700,033
10	28102	370	169	2.19	12.9	1,573	73	582,194
11	11506	174	108	1.61	4.7	2,552	64	443,236
12	24901	472	89	5.32	7.8	1,131	82	533,478
13	46702	581	259	2.24	2.7	1,383	71	803,445
14	61304	343	98	3.50	6.1	1,286	22	441,092
15	27301	582	268	2.17	6.7	1,578	19	917,762
16	58401	203	88	2.31	8.8	1,905	68	386,181
17	59002	188	107	1.76	6.5	1,931	66	363,150
18	14501	185	64	2.88	21.4	1,467	28	271,644
19	24502	172	142	1.21	16.8	2,468	34	424,276
20	20403	238	198	1.21	5.0	2,508	99	597,627
21	40602	178	95	1.86	10.5	2,784	79	494,194
22	45902	698	292	2.39	4.9	1,132	90	789,882
23	25801	319	81	3.92	17.1	1,252	69	399,929
24	22905	501	76	6.56	4.4	1,104	28	553,488

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	52403	197	71	2.79	9.0	1,506	83	297,037
26	53601	145	108	1.34	17.1	2,277	37	331,164
27	13606	205	92	2.22	6.7	1,825	34	374,092
28	56504	668	116	5.75	7.8	690	126	460,937
29	24401	123	90	1.38	13.5	2,417	105	298,197
30	13601	145	148	0.98	3.1	2,814	34	409,140
31	14403	287	116	2.47	19.8	1,671	94	480,452
32	47502	288	125	2.30	4.0	1,093	27	314,803
33	55002	599	212	2.82	7.5	833	51	498,952
34	64304	220	129	1.70	10.7	1,673	62	368,317
35	59401	157	108	1.45	4.5	2,317	85	362,796
36	13704	162	63	2.55	8.6	1,476	57	238,886
37	24602	390	111	3.50	10.3	845	84	329,410
38	54701	458	114	4.02	8.3	711	83	325,693
39	41602	285	198	1.44	7.9	1,633	73	465,044
40	56802	316	99	3.20	20.8	980	80	309,413
41	12705	70	47	1.48	6.3	1,927	10	134,182
42	40603	333	193	1.72	13.2	1,337	63	445,827
43	24003	407	234	1.74	5.3	1,258	11	512,153
44	56501	736	240	3.07	0.0	819	58	603,092
45	21206	179	75	2.38	6.3	2,055	50	367,689
46	12802	93	31	2.98	10.3	1,289	12	119,901
47	12202	200	150	1.34	6.2	1,672	29	333,967
48	26602	339	222	1.53	6.6	1,264	21	428,567
49	15001	226	87	2.59	7.2	1,113	38	251,481
50	12301	252	100	2.51	27.4	1,112	55	280,593
51	21901	262	38	6.82	17.0	1,303	74	341,766
52	29702	540	213	2.53	0.0	749	74	404,179
53	11402	180	155	1.17	12.8	2,423	26	436,950
54	26604	175	88	1.99	14.5	1,978	127	346,206
55	64801	209	136	1.54	8.3	1,537	53	321,544
56	43401	178	76	2.35	3.2	1,257	70	224,270
57	17803	145	52	2.78	24.9	1,476	54	214,414
58	56803	206	144	1.43	10.3	1,509	62	310,599
59	43304	267	142	1.88	9.6	1,165	53	310,911
60	15704	212	193	1.10	6.3	1,776	59	376,391
61	10201	66	53	1.26	4.9	1,671	4	110,992
62	57403	154	65	2.37	17.3	1,398	58	214,929
63	41901	319	271	1.18	5.1	1,518	36	484,991

3) ***Specific remedial efforts taken and planned for the worst performing 5% of the circuits identified in paragraph (3).***

01 Circuit 55001 -- NEWPORT 50-01

Performance Analysis

The NEWPORT 50-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On June 4, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 394 customers for up to 1,706 minutes resulting in 666,941 CMI.

In total, this circuit had 142 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (48); Unknown (38); Scheduled Outage (22); equipment failure (20); animal contacts (9); other (2); Improper Design (1); nothing found (1); vehicles (1).

Remedial Actions

- In 2019, a new Smart Grid device was installed.
- In 2019, a battery demonstration energy storage system was installed to study reliability benefits and voltage control. Since that time, it has operated once, saving 2,724 customer minutes.
- In 2019, three single-phase reclosers were installed, along with related fusing.
- In 2019, a substation conversion was performed.
- In 2019, additional single-phase sectionalizing was installed.
- In 2019, a drone and infrared inspection was performed. Several minor remediations will be performed in 2020 as a result.
- In 2020, three single-phase reclosers were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a section of single-phase was resourced.
- In 2020, a Proactive Circuit Analysis will be performed.
- In 2022, a section of three-phase conductor in a heavily wooded area will be relocated.
- In 2022, a section of single-phase will be reconductored.

02 Circuit 52401 -- GREEN PARK 24-01

Performance Analysis

The GREEN PARK 24-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 5, 2020, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 5,050 customers for up to 156 minutes resulting in 662,293 CMI.

In total, this circuit had 91 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (30); Unknown (18); Scheduled Outage (17); equipment failure (14); animal contacts (7); nothing found (4); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2019, two fuses were installed.
- In 2019, two single-phase reclosers were installed.
- In 2020, multiple hazard trees were removed.
- In 2020, three single-phase reclosers were installed.
- In 2020, a transmission upgrade was completed.
- In 2020, a substation upgrade will be evaluated.
- In 2022, three sections of single-phase will be relocated.
- In 2022, a section of single-phase will be reconductored.
- In 2022, additional sectionalizing devices will be installed.
- In 2022, an additional Smart Grid device will be installed.

03 Circuit 20601 -- GREENWOOD 06-01

Performance Analysis

The GREENWOOD 06-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On January 12, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,554 customers for up to 183 minutes resulting in 403,740 CMI.

In total, this circuit had 101 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (37); tree related (24); Scheduled Outage (16); equipment failure (13); animal contacts (8); nothing found (2); vehicles (1).

Remedial Actions

- In 2020, seven additional fuses were installed.
- In 2020, an adjacent circuit was reconductored to improve transfer capability.
- In 2020, two additional single-phase reclosers were installed.
- In 2020, an existing recloser was replaced with a Smart Grid device.
- In 2020, an additional single-phase recloser will be installed.
- In 2020, additional fusing will be installed at six locations.
- In 2020, a section of two-phase conductor will be upgraded to three-phase.
- In 2020, an existing recloser will be replaced with a Smart Grid device.
- In 2020, additional single-phase ties will be evaluated.
- In 2021, full circuit trimming will be performed.

04 Circuit 20402 -- ASHFIELD 04-02

Performance Analysis

The ASHFIELD 04-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On April 26, 2020, during a period of strong wind, a tree contacted a pole or pole arm causing a sectionalizing device to be interrupted. This outage affected 660 customers for up to 199 minutes resulting in 108,193 CMI.

On June 19, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,213 customers for up to 667 minutes resulting in 649,398 CMI.

In total, this circuit had 87 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (20); animal contacts (19); Unknown (18); tree related (15); equipment failure (9); vehicles (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2019, a single-phase recloser was installed.
- In 2020, a new Smart Grid device was installed.
- In 2020, a tie to the PALMERTON 32-01 will be evaluated.
- In 2020, a section of single-phase will be evaluated for relocation.
- In 2021, additional fusing will be installed at five locations.

05 Circuit 50503 -- MECHANICSBURG 05-03

Performance Analysis

The MECHANICSBURG 05-03 circuit experienced three outages of over 100,000 CMI between August 2019 and September 2020.

On August 24, 2020, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,089 customers for up to 206 minutes resulting in 217,797 CMI.

On June 11, 2020, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 1,353 customers for up to 235 minutes resulting in 122,459 CMI.

On August 23, 2020, a vehicle contacted a pole causing an interruption. This outage affected 1,888 customers for up to 517 minutes resulting in 321,292 CMI.

In total, this circuit had 26 outages between August 2019 and September 2020, with the causes breaking down as follows: animal contacts (8); Unknown (6); equipment failure (4); tree related (3); other (2); Scheduled Outage (2); vehicles (1).

Remedial Actions

- In 2020, a new three-phase sectionalizing device was installed.
- In 2020, additional animal guarding was installed with more to be performed.
- In 2020, two new three-phase ties device will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2021, additional animal guarding will be installed.

06 Circuit 28101 -- TWIN LAKES 81-01

Performance Analysis

The TWIN LAKES 81-01 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On December 17, 2019, during a period of strong wind, a tree contact caused a circuit breaker to trip to lockout. This outage affected 1,671 customers for up to 319 minutes resulting in 214,345 CMI.

On December 9, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,024 customers for up to 254 minutes resulting in 129,697 CMI.

In total, this circuit had 111 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (38); tree related (33); equipment failure (12); animal

contacts (9); Scheduled Outage (8); nothing found (7); vehicles (2); contact or dig in (1); other (1).

Remedial Actions

- In 2019, three-phase regulators were installed.
- In 2020, fusing was installed at multiple locations.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, two new three-phase ties will be constructed.
- In 2020, multiple transformers will be replaced.
- In 2020, animal guarding will be installed at multiple locations.
- In 2020, several poles will be replaced.
- In 2020, several reclosers will be replaced.
- In 2020, additional fusing will be evaluated at several locations.
- In 2020, additional single-phase reclosers will be installed on this circuit.

07 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

The GREEN PARK 24-02 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 81 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (34); Unknown (14); equipment failure (11); animal contacts (9); Scheduled Outage (9); other (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2019, a single-phase sectionalizing device was installed.
- In 2019, additional animal guarding was installed.
- In 2019, a section of difficult-to-access single-phase was relocated.
- In 2019, 80 additional fuses were installed.
- In 2020, five sections of conductor were relocated.
- In 2020, a second transmission source to the distribution substation was constructed.
- In 2020, six single-phase sectionalizing devices were installed.
- In 2020, a Proactive Circuit Analysis will be performed.
- In 2020, additional reconductoring and relocation will be evaluated for six sections of line.
- In 2020, a substation upgrade will be evaluated.
- In 2020, a new line and terminal and three-phase tie will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2021, one section of single-phase will be relocated to underground.
- In 2021, one section of single-phase will be reconductored.
- In 2022, an additional section of single-phase will be reconductored.
- In 2022, two sections of single-phase will be re-sourced to reduce exposure.

08 Circuit 45002 -- LIMESTONE 50-02

Performance Analysis

The LIMESTONE 50-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On October 27, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 1,365 customers for up to 560 minutes resulting in 634,142 CMI.

On December 1, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 1,366 customers for up to 817 minutes resulting in 1,001,158 CMI.

In total, this circuit had 97 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (45); tree related (21); equipment failure (16); animal contacts (7); Unknown (7); vehicles (1).

Remedial Actions

- In 2019, a section of difficult-to-access conductor was relocated.
- In 2019, additional fusing was installed.
- In 2019, a new Smart Grid device was installed.
- In 2019 and 2020, ten poles will be replaced.
- In 2019, a Proactive Circuit Analysis was performed. As a result, a single-phase recloser was installed in 2020.
- In 2020, additional fusing was installed.
- In 2020, multiple porcelain cutouts were replaced.
- In 2020, an additional single-phase recloser will be installed.
- In 2020, a section of difficult-to-access single-phase will be relocated.
- In 2021, aerial cable will be installed in a heavily wooded section of this circuit.
- In 2021, full circuit trimming will be performed.

09 Circuit 40201 -- BEAR GAP 02-01

Performance Analysis

The BEAR GAP 02-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 151 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (60); Scheduled Outage (27); Unknown (26); animal contacts (19); equipment failure (11); nothing found (7); other (1).

Remedial Actions

- In 2019, additional fusing was installed at eight locations.
- In 2020, a single-phase recloser was replaced.
- In 2020, additional fusing will be installed at four locations.
- In 2020, full circuit trimming will be performed.
- In 2020, a section of existing conductor will be relocated and reconductored.
- In 2020, several sections of difficult-to-access conductor will be evaluated for relocation.
- In 2021, four single-phase reclosers will be installed.
- In 2021, a single-phase recloser will be replaced.

10 Circuit 28102 -- TWIN LAKES 81-02

Performance Analysis

The TWIN LAKES 81-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On February 27, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,091 customers for up to 123 minutes resulting in 133,571 CMI.

On December 3, 2019, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 131 customers for up to 882 minutes resulting in 102,171 CMI.

In total, this circuit had 84 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (37); animal contacts (18); Scheduled Outage (11); equipment failure (10); Unknown (6); nothing found (1); other (1).

Remedial Actions

- In 2020, additional fusing was installed at multiple locations.
- In 2020, additional animal guarding was installed.
- In 2020, six transformers were replaced.
- In 2020, full circuit trimming will be performed.
- In 2020, dissimilar metal connections will be remediated at four locations.
- In 2020, two additional single-phase reclosers will be evaluated.

11 Circuit 11506 -- FREEMANSBURG 15-06

Performance Analysis

The FREEMANSBURG 15-06 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On January 27, 2020, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,319 customers for up to 185 minutes resulting in 181,648 CMI.

In total, this circuit had 80 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (24); Unknown (17); Scheduled Outage (16); equipment failure (12); nothing found (6); animal contacts (4); vehicles (1).

Remedial Actions

- In 2020, a section of three-phase conductor was extended.
- In 2020, a Smart Grid device was replaced.
- In 2020, a switch at the substation was replaced.
- In 2020, two additional single-phase reclosers will be installed.
- In 2020, accelerating the trim cycle will be evaluated for this circuit.
- In 2020, additional single-phase reclosers will be evaluated for this circuit.
- In 2020, a section of this circuit will be evaluated for reconfiguration.
- In 2022, a section of conductor will be split in two and receive single-phase reclosers.
- In 2023, full circuit trimming will be performed.

12 Circuit 24901 -- WHITE HAVEN 49-01

Performance Analysis

The WHITE HAVEN 49-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On October 4, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 583 customers for up to 296 minutes resulting in 163,339 CMI.

In total, this circuit had 113 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (30); Unknown (26); tree related (24); equipment failure (14); animal contacts (11); nothing found (4); contact or dig in (1); other (1); vehicles (1).

Remedial Actions

- In 2019, the getaway for this circuit was replaced.
- In 2019, a single-phase recloser was installed.
- In 2020, full circuit trimming was performed.
- In 2020, two three-phase extensions were constructed to split up single-phase customers. These projects included additional fusing and single-phase reclosers.
- In 2020, a Proactive Circuit Analysis will be performed.
- In 2020, five new reclosers will be evaluated.
- In 2020, a section of single-phase will be evaluated for reconductoring.
- In 2022, a new Smart Grid device will be installed.

13 Circuit 46702 -- RENOVO 67-02

Performance Analysis

The RENOVO 67-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 26, 2020, an improper operation occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,259 customers for up to 435 minutes resulting in 539,332 CMI.

In total, this circuit had 77 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (28); Unknown (22); animal contacts (10); Scheduled Outage (6); equipment failure (5); nothing found (4); Improper Operation (1); vehicles (1).

Remedial Actions

- In 2020, a battery energy storage system will be evaluated.
- In 2020, two substation transformers will be replaced.
- In 2020, three single-phase reclosers will be evaluated.

14 Circuit 61304 -- EARL 13-04

Performance Analysis

The EARL 13-04 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 17, 2020, during a period of extreme temperatures, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,662 customers for up to 286 minutes resulting in 337,601 CMI.

In total, this circuit had 29 outages between August 2019 and September 2020, with the causes breaking down as follows: animal contacts (8); equipment failure (7); Scheduled Outage (7); Unknown (5); nothing found (1); tree related (1).

Remedial Actions

- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2020, an additional single-phase recloser was installed.
- In 2020, two additional single-phase reclosers will be evaluated.
- In 2020, three additional potential tie lines will be evaluated.
- In 2021, an existing recloser will be replaced with a Smart Grid device.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, a complete substation rebuild will occur.
- In 2021, a new line and terminal will be constructed on an adjacent circuit, increasing tie capabilities.

15 Circuit 27301 -- PARRISH 73-01

Performance Analysis

The PARRISH 73-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On August 24, 2020, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 3,200 customers for up to 1,495 minutes resulting in 891,708 CMI.

In total, this circuit had 21 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (6); animal contacts (5); equipment failure (4); nothing found (2); Scheduled Outage (2); other (1); tree related (1).

Remedial Actions

- In 2019, a three-phase tie was constructed to the PARRISH 73-03.
- In 2020, an additional Smart Grid device will be evaluated for this circuit.
- In 2020, additional single-phase reclosers will be evaluated for this circuit.

16 Circuit 58401 -- MOUNT ROCK 84-01

Performance Analysis

The MOUNT ROCK 84-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 71 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (21); tree related (15); equipment failure (14); animal contacts (13); vehicles (4); Scheduled Outage (3); nothing found (1).

Remedial Actions

- In 2020, a Proactive Circuit Review will be performed.
- In 2020, a section of single-phase will be evaluated for additional storm hardening.
- In 2020, an existing recloser will be evaluated for upgrading to a Smart Grid device.
- In 2020, undergrounding will be evaluated for a section of single-phase conductor.
- In 2022, full circuit trimming will be performed.

17 Circuit 59002 -- MIFFLINTOWN 90-02

Performance Analysis

The MIFFLINTOWN 90-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On March 3, 2020, during a period of strong wind, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 2,244 customers for up to 368 minutes resulting in 188,114 CMI.

In total, this circuit had 72 outages between August 2019 and September 2020, with the causes breaking down as follows: equipment failure (18); tree related (18); Unknown (18); animal contacts (6); Scheduled Outage (6); vehicles (3); nothing found (2); other (1).

Remedial Actions

- In 2019, two single-phase sectionalizing devices were installed.
- In 2019, additional animal guarding was installed.
- In 2019, additional single-phase fusing was installed.
- In 2020, an additional single-phase recloser was installed.
- In 2020, additional single-phase fusing was installed.
- In 2020, additional animal guarding was installed.
- In 2020, a new line and terminal at MIFFLINTOWN substation was installed.
- In 2020, an additional single-phase recloser will be evaluated.
- In 2021, full circuit trimming will be performed.

18 Circuit 14501 -- SCHOENECK 45-01

Performance Analysis

The SCHOENECK 45-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 31 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (10); Unknown (7); animal contacts (4); equipment failure (4); Scheduled Outage (3); nothing found (2); contact or dig in (1).

Remedial Actions

- In 2020, additional fusing was installed at two locations.
- In 2020, additional single-phase reclosers will be installed at two locations on this circuit.
- In 2020, relocating a section of difficult-to-access conductor will be evaluated.
- In 2020, a section of conductor will be evaluated for extension.
- In 2020, the protection scheme for this circuit will be optimized.
- In 2020, an additional single-phase recloser will be evaluated.
- In 2021, additional single-phase reclosers will be installed at three locations on this circuit.
- In 2020, hot spot trimming will be performed.
- In 2021, full circuit trimming will be performed.
- In 2021, additional animal guarding will be installed.

19 Circuit 24502 -- GOULDSBORO 45-02

Performance Analysis

The GOULDSBORO 45-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On December 5, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 557 customers for up to 679 minutes resulting in 173,412 CMI.

In total, this circuit had 40 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (15); animal contacts (6); equipment failure (6); Scheduled Outage (6); Unknown (5); nothing found (2).

Remedial Actions

- In 2020, a single-phase recloser was installed.
- In 2020, additional fusing was installed.
- In 2019 and 2020, multiple poles and arms were replaced on this circuit.
- In 2022, an additional single-phase recloser will be installed.

20 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 136 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (41); Scheduled Outage (35); Unknown (17); animal contacts (14); equipment failure (11); nothing found (8); vehicles (6); other (2).

Remedial Actions

- In 2019, full circuit trimming was performed.
- In 2020, additional hot spot trimming was performed.
- In 2020, 2.5 miles of three-phase conductor was rebuilt.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2020, single-phase ties will be evaluated for this circuit.
- In 2020, additional fusing will be evaluated for this circuit.
- In 2021, three additional single-phase reclosers will be installed on this circuit.

21 Circuit 40602 -- PINE GROVE 06-02

Performance Analysis

The PINE GROVE 06-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On May 29, 2020, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 436 customers for up to 258 minutes resulting in 111,547 CMI.

On November 16, 2019, an equipment failure occurred on an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 1,915 customers for up to 476 minutes resulting in 160,879 CMI.

In total, this circuit had 135 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (56); tree related (37); animal contacts (17); equipment failure (13); Unknown (5); nothing found (4); other (2); vehicles (1).

Remedial Actions

- In 2019, an additional Smart Grid device was installed.
- In 2019, an additional single-phase recloser was installed.
- In 2019, two poles were replaced.
- In 2019, ten additional locations received fusing.
- In 2019, a drone patrol was performed. As a result, several cross-arms, several splices, and a pole were replaced.
- In 2020, an additional single-phase recloser was installed.
- In 2020, a section of single-phase line will be reconductored to three-phase, and the protection scheme will be upgraded.
- In 2021, a section of difficult-to-access single-phase will be relocated.
- In 2021, full circuit trimming will be performed.

22 Circuit 45902 -- AUBURN 59-02

Performance Analysis

The AUBURN 59-02 circuit experienced three outages of over 100,000 CMI between August 2019 and September 2020.

On August 2, 2020, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 455 customers for up to 353 minutes resulting in 103,070 CMI.

On October 27, 2019, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 403 customers for up to 852 minutes resulting in 265,096 CMI.

On July 3, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 188 customers for up to 665 minutes resulting in 125,097 CMI.

In total, this circuit had 119 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (36); Unknown (32); Scheduled Outage (29); animal contacts (8); equipment failure (6); nothing found (5); vehicles (3).

Remedial Actions

- In 2019, a section of three-phase was reconductored.
- In 2019, several hazard trees were removed.
- In 2020, additional fusing was installed at several locations with more to be done in 2020.
- In 2020, a dissimilar metal connection was remediated.
- In 2020, multiple cross arms will be replaced.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2021, the AUBURN substation will be configured to be remotely transferrable.
- In 2021, a section of this circuit will be transferred to a new line.

23 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 73 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (21); equipment failure (14); Unknown (13); animal contacts (12); nothing found (5); Scheduled Outage (4); vehicles (3); other (1).

Remedial Actions

- In 2020, a section of conductor will be evaluated for undergrounding.
- In 2020, additional fusing will be evaluated.
- In 2020, undergrounding will be evaluated for a heavily wooded section of this circuit.
- In 2020, an off-cycle drone inspection was performed with several minor remediations performed as a result.
- In 2021, three additional single-phase reclosers will be installed on this circuit.
- In 2021, a section of three-phase will be reconductored.
- In 2021, a section of three-phase conductor will be extended.
- In 2021, full circuit trimming will be performed.

24 Circuit 22905 -- HARWOOD 29-05

Performance Analysis

The HARWOOD 29-05 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On February 27, 2020, during a period of strong wind, an equipment failure occurred on an overhead transformer causing a sectionalizing device to be interrupted. This outage affected 4,299 customers for up to 284 minutes resulting in 512,107 CMI.

In total, this circuit had 34 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (17); equipment failure (8); Scheduled Outage (6); animal contacts (1); contact or dig in (1); tree related (1).

Remedial Actions

- In 2020, a section of conductor was transferred to an adjacent line.
- In 2020, four dissimilar metal connections were remediated.
- In 2020, a Proactive Circuit Analysis will be performed.

25 Circuit 52403 -- GREEN PARK 24-03

Performance Analysis

The GREEN PARK 24-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On March 13, 2020, a vehicle contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 406 customers for up to 313 minutes resulting in 102,700 CMI.

In total, this circuit had 88 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (30); Unknown (26); equipment failure (15); animal contacts (6); Scheduled Outage (5); contact or dig in (2); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2019, four fuses were installed.
- In 2019, two single-phase reclosers were installed.
- In 2020, two sections of single-phase were relocated.
- In 2020, a single-phase recloser was installed.
- In 2020, a transmission upgrade was completed.
- In 2020, a substation upgrade will be evaluated.
- In 2021, a section of single-phase will be relocated underground.
- In 2022, full circuit trimming will be performed.

26 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On January 16, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 735 customers for up to 182 minutes resulting in 110,650 CMI.

In total, this circuit had 62 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (25); tree related (20); Unknown (12); animal contacts (4); equipment failure (1).

Remedial Actions

- In 2020, fusing was installed at three locations.
- In 2020, an additional single-phase recloser was installed and another will be evaluated.
- In 2020, additional fusing will be installed.
- In 2020, full circuit trimming will be performed.
- In 2022, a section of single-phase will be relocated.

27 Circuit 13606 -- RICHLAND 36-06

Performance Analysis

The RICHLAND 36-06 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On August 5, 2020, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,539 customers for up to 103 minutes resulting in 207,672 CMI.

In total, this circuit had 44 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (10); tree related (10); Unknown (10); animal contacts (8); equipment failure (6).

Remedial Actions

- In 2020, a section of this circuit was reconductored.
- In 2020, a section of aerial cable will be replaced.
- In 2020, additional animal guarding will be installed.
- In 2020, additional fusing will be installed.
- In 2021, two single-phase reclosers will be replaced.

28 Circuit 56504 -- ROCKVILLE 65-04

Performance Analysis

The ROCKVILLE 65-04 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 131 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (58); Unknown (31); animal contacts (19); equipment failure (14); Scheduled Outage (5); nothing found (3); contact or dig in (1).

Remedial Actions

- In 2019, multiple single-phase sectionalizing devices were installed.
- In 2020, eight fuses were installed.
- In 2020, 150 hazard trees were removed.
- In 2020, five single-phase sectionalizing devices were installed with one more planned.
- In 2020, additional animal guards will be installed.
- In 2022, a section of single-phase will be relocated underground.
- In 2022, an additional single-phase recloser will be installed.

29 Circuit 24401 -- TINKER 44-01

Performance Analysis

The TINKER 44-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 125 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (38); tree related (34); Scheduled Outage (20); equipment failure (16); animal contacts (7); nothing found (6); other (4).

Remedial Actions

- In 2020, multiple poles were replaced.
- In 2020, several dissimilar metal connections will be replaced.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, a new single-phase recloser was installed.
- In 2020, an additional sectionalizing device will be installed.
- In 2020, communications will be upgraded on several Smart Grid devices.
- In 2021, full circuit trimming will be performed.

30 Circuit 13601 -- RICHLAND 36-01

Performance Analysis

The RICHLAND 36-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On August 8, 2020, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,134 customers for up to 0 minutes resulting in 308,352 CMI.

In total, this circuit had 53 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (19); animal contacts (10); Unknown (8); tree related (7); equipment failure (4); other (2); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2020, additional fusing will be installed.
- In 2020, replacing a fuse with a single-phase reclosers will be evaluated.
- In 2020, flood mitigation options will be evaluated for the substation.
- In 2021, additional single-phase reclosers will be installed.

31 Circuit 14403 -- SO SLATINGTON 44-03

Performance Analysis

The SO SLATINGTON 44-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On October 16, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 212 customers for up to 614 minutes resulting in 130,146 CMI.

In total, this circuit had 123 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (32); Scheduled Outage (29); equipment failure (26); Unknown (12); animal contacts (11); vehicles (7); nothing found (5); other (1).

Remedial Actions

- In 2020, additional fusing was installed.
- In 2020, three additional single-phase reclosers will be installed.
- In 2020, additional fusing and single-phase reclosers will be evaluated.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, a section of difficult-to-access single-phase will be relocated.
- In 2022, full circuit trimming will be performed.

32 Circuit 47502 -- NEW COLUMBIA 75-02

Performance Analysis

The NEW COLUMBIA 75-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On June 19, 2020, an equipment failure occurred on an underground conductor causing a circuit breaker to trip to lockout. This outage affected 804 customers for up to 360 minutes resulting in 143,800 CMI.

In total, this circuit had 37 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (12); equipment failure (10); Scheduled Outage (10); nothing found (3); animal contacts (2).

Remedial Actions

- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, a three-phase recloser will be evaluated.
- In 2020, additional single-phase fusing will be evaluated.
- In 2021, two substation transformers will be replaced.

33 Circuit 55002 -- NEWPORT 50-02

Performance Analysis

The NEWPORT 50-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On January 26, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 733 customers for up to 141 minutes resulting in 102,700 CMI.

On November 27, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a load break fuse to operate. This outage affected 307 customers for up to 1,017 minutes resulting in 147,529 CMI.

In total, this circuit had 58 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (34); equipment failure (9); Scheduled Outage (7); animal contacts (6); nothing found (1); vehicles (1).

Remedial Actions

- In 2019, additional animal guarding was installed.
- In 2020, three fuses were installed.
- In 2020, two single-phase sectionalizing devices were installed.
- In 2020, a new Smart Grid device with triple-single operation was installed.
- In 2020, five locations were animal guarded.
- In 2020, a section of single-phase will be reconductored.

34 Circuit 64304 -- LINCOLN 43-04

Performance Analysis

The LINCOLN 43-04 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 3, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 404 customers for up to 272 minutes resulting in 109,645 CMI.

In total, this circuit had 71 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (32); tree related (17); Scheduled Outage (9); animal contacts (5); equipment failure (5); vehicles (3).

Remedial Actions

- In 2019, an additional Smart Grid device was installed.
- In 2020, additional fusing was installed.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2021, numerous ash trees will be removed near this circuit.
- In 2021, seven additional single-phase reclosers will be installed
- In 2021, a section of difficult-to-access single-phase will be relocated.
- In 2021, full circuit trimming will be performed.

35 Circuit 59401 -- RICHFIELD 94-01

Performance Analysis

The RICHFIELD 94-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 94 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (29); equipment failure (22); Unknown (17); animal contacts (10); Scheduled Outage (9); nothing found (3); other (3); vehicles (1).

Remedial Actions

- In 2019, a single-phase sectionalizing device was installed.
- In 2020, one animal guard was installed, with several others to be installed.
- In 2020, a new smart grid device will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2020, a section of three-phase conductor will be evaluated for cross-arm replacement.

36 Circuit 13704 -- SCHNECKSVILLE 37-04

Performance Analysis

The SCHNECKSVILLE 37-04 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On May 5, 2020, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,570 customers for up to 105 minutes resulting in 102,530 CMI.

In total, this circuit had 78 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (22); Scheduled Outage (21); animal contacts (15); tree related (10); equipment failure (6); vehicles (3); nothing found (1).

Remedial Actions

- In 2020, a switch will be replaced with a Smart Grid device.
- In 2020, the protection scheme for this circuit will be optimized.
- In 2020, additional fusing will be installed in 2020.
- In 2021, four additional single-phase reclosers will be installed.

37 Circuit 24602 -- VARDEN 46-02

Performance Analysis

The VARDEN 46-02 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 100 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (27); equipment failure (22); animal contacts (19); Scheduled Outage (16); Unknown (11); vehicles (3); nothing found (1); other (1).

Remedial Actions

- In 2019, additional animal guarding was installed at multiple locations.
- In 2020, additional fusing was installed.
- In 2020, single-phase reclosers will be evaluated for nine locations.
- In 2020, additional animal guarding will be installed.
- In 2020, two single-phase reclosers will be installed.
- In 2020, numerous porcelain cutouts will be replaced.
- In 2020, several poles will be replaced.
- In 2021, several sections of line will be reconductored.
- In 2021, two sections of single-phase will be reconductored.
- In 2022, a tie line will be constructed.

38 Circuit 54701 -- NEW BLOOMFIELD 47-01

Performance Analysis

The NEW BLOOMFIELD 47-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On May 29, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 321 customers for up to 405 minutes resulting in 127,045 CMI.

In total, this circuit had 93 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (47); tree related (19); Scheduled Outage (10); animal contacts (6); equipment failure (5); contact or dig in (2); vehicles (2); nothing found (1); other (1).

Remedial Actions

- In 2019, a protection coordination study was conducted, as a result several changes were applied.
- In 2020, two single-phase reclosers were installed with two more planned.
- In 2020, two single-phase fuses were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a drone patrol and Proactive Circuit Analysis will be performed.
- In 2020, nine additional single-phase reclosers will be evaluated.
- In 2022, a new Smart Grid device will be installed.

39 Circuit 41602 -- CLEVELAND 16-02

Performance Analysis

The CLEVELAND 16-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On April 21, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 249 customers for up to 685 minutes resulting in 169,082 CMI.

In total, this circuit had 83 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (33); equipment failure (13); Unknown (13); animal contacts (12); Scheduled Outage (10); nothing found (2).

Remedial Actions

- In 2019, a single-phase recloser was installed.
- In 2019, a new Smart Grid device was installed.
- In 2020, a Proactive Circuit Analysis will be performed.
- In 2020, multiple cross arms and transformer cutouts will be replaced as the result of a line patrol.
- In 2020, hot spot trimming will be evaluated for this circuit.
- In 2021, multiple porcelain cutouts will be replaced.
- In 2022, full circuit trimming will be performed.

40 Circuit 56802 -- BENVENUE 68-02

Performance Analysis

The BENVENUE 68-02 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 94 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (38); Unknown (20); Scheduled Outage (14); equipment failure (11); animal contacts (5); nothing found (4); contact or dig in (2).

Remedial Actions

- In 2019, four additional single-phase sectionalizing devices were installed.
- In 2019, the protection settings on this circuit were optimized.
- In 2019, a Proactive Circuit Analysis was performed. As a result, six single-phase fusing locations were identified.
- In 2020, seven sectionalizing devices were installed, additional two more devices will be installed in 2020.
- In 2020, a section of single-phase line was resourced.
- In 2020, animal guarding was installed at multiple locations.
- In 2021, full circuit trimming will be performed.
- In 2021, an additional single-phase recloser will be installed.
- In 2022, a section of single-phase will be relocated and reconfigured.

41 Circuit 12705 – MACUNGIE 27-05

Performance Analysis

The MACUNGIE 27-05 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 10 outages between August 2019 and September 2020, with the causes breaking down as follows: equipment failure (6); Unknown (2); animal contacts (1); tree related (1).

Remedial Actions

- In 2020, full circuit trimming will be performed.
- In 2021, additional fusing will be installed.

42 Circuit 40603 -- PINE GROVE 06-03

Performance Analysis

The PINE GROVE 06-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On April 24, 2020, a vehicle contacted an overhead conductor resulting in an outage. This outage affected 1,172 customers for up to 475 minutes resulting in 201,443 CMI.

In total, this circuit had 80 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (17); Unknown (16); animal contacts (13); tree related (13); equipment failure (10); nothing found (6); vehicles (3); contact or dig in (1); other (1).

Remedial Actions

- In 2020, an additional Smart Grid device was installed.
- In 2020, a cross arm and transformer were replaced.
- In 2020, four poles were replaced.
- In 2020, a section of difficult-to-access three-phase conductor was relocated and reconductored.
- In 2020, a section of single-phase will be transferred to an adjacent circuit.
- In 2021, a single-phase recloser will be replaced.
- In 2022, full circuit trimming will be performed.

43 Circuit 24003 -- WILKES-BARRE 40-03

Performance Analysis

The WILKES-BARRE 40-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On August 24, 2020, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 702 customers for up to 880 minutes resulting in 412,477 CMI.

In total, this circuit had 12 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (6); equipment failure (2); animal contacts (1); other (1); Scheduled Outage (1); tree related (1).

Remedial Actions

- In 2020, a Proactive Circuit Review will be performed.
- In 2020, three additional sectionalizing devices will be evaluated.
- In 2021, undergrounding will be evaluated for a section of conductor.

44 Circuit 56501 -- ROCKVILLE 65-01

Performance Analysis

The ROCKVILLE 65-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On October 17, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,218 customers for up to 478 minutes resulting in 553,479 CMI.

In total, this circuit had 64 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (26); tree related (21); Scheduled Outage (7); animal contacts (5); equipment failure (5); vehicles (1).

Remedial Actions

- In 2019, full circuit tree trimming was performed.
- In 2019, voltage support devices were installed.
- In 2019, an existing recloser was upgraded to a Smart Grid device.
- In 2020, 18 locations received animal guarding.
- In 2020, nine new fuses were installed.
- In 2020, a section of line will be re-sourced.
- In 2020, an additional Smart Grid device will be installed.
- In 2020, an additional tie line will be installed.
- In 2020, ten new single-phase reclosers will be installed.
- In 2020, three new Smart Grid devices were evaluated and will be installed in 2023.
- In 2020, a new substation and three-phase reconductoring will be evaluated.

45 Circuit 21206 -- EAST CARBONDALE 12-06

Performance Analysis

The EAST CARBONDALE 12-06 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On February 2, 2020, the circuit was taken out of service at the direction of a non-PPL authority. This outage affected 2,244 customers for up to 153 minutes resulting in 158,242 CMI.

In total, this circuit had 61 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (24); tree related (12); Scheduled Outage (11); equipment failure (7); animal contacts (5); nothing found (1); other (1).

Remedial Actions

- In 2019, the protection settings for this circuit were reviewed. Several minor remediations were performed.
- In 2019, dissimilar metal connections were remediated at two locations.
- In 2020, two Smart Grid devices were replaced.
- In 2020, dissimilar metal connections were remediated at three locations.
- In 2020, full circuit trimming will be performed.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, additional single-phase reclosers will be evaluated.
- In 2020, a section of this circuit will be reconductored.
- In 2020, additional animal guarding will be installed.
- In 2021, a section of this circuit will be re-sourced, and additional sectionalizing will be installed.

46 Circuit 12802 -- MICKLEYS 28-02

Performance Analysis

The MICKLEYS 28-02 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 12 outages between August 2019 and September 2020, with the causes breaking down as follows: equipment failure (6); Unknown (4); nothing found (2).

Remedial Actions

- In 2019, full circuit trimming was performed.
- In 2020, additional animal guarding will be installed.
- In 2021, additional fusing will be installed at four locations.

47 Circuit 12202 -- FOGELSVILLE 22-02

Performance Analysis

The FOGELSVILLE 22-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On November 8, 2019, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 519 customers for up to 667 minutes resulting in 280,360 CMI.

In total, this circuit had 33 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (8); tree related (6); equipment failure (5); animal contacts (4); Scheduled Outage (4); nothing found (3); Improper Operation (1); other (1); vehicles (1).

Remedial Actions

- In 2019, a section of underground cable was replaced.
- In 2020, additional fusing was installed at five locations.
- In 2020, additional animal guarding will be installed.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, additional fusing will be installed.

48 Circuit 26602 -- BROOKSIDE 66-02

Performance Analysis

The BROOKSIDE 66-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On June 3, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,709 customers for up to 688 minutes resulting in 415,595 CMI.

In total, this circuit had 23 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (10); tree related (4); animal contacts (3); equipment failure (3); Scheduled Outage (2); other (1).

Remedial Actions

- In 2019, full circuit trimming was performed.
- In 2020, a Smart Grid device was replaced.
- In 2020, several dissimilar metal connections will be remediated.
- In 2020, numerous porcelain cutouts will be replaced.
- In 2020, additional animal guarding will be evaluated.
- In 2020, a new tie line will be evaluated.
- In 2020, additional fusing and single-phase reclosers will be evaluated.
- In 2022, a section of this line will be reconductored.
- In 2022, a section of single-phase will be extended.
- In 2022, additional fusing and single-phase reclosers will be installed.
- In 2022, an existing recloser will be replaced.

49 Circuit 15001 -- BLUE MOUNTAIN 50-01

Performance Analysis

The BLUE MOUNTAIN 50-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 73 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (35); tree related (12); animal contacts (8); equipment failure (8); Unknown (8); nothing found (1); other (1).

Remedial Actions

- In 2020, a section of multi-phase line was extended.
- In 2020, additional fusing was installed at three locations.
- In 2020, a single-phase recloser will be installed.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, full circuit trimming will be performed.

50 Circuit 12301 -- LANARK 23-01

Performance Analysis

The LANARK 23-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 59 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (19); tree related (15); equipment failure (9); animal contacts (8); Scheduled Outage (4); contact or dig in (2); nothing found (1); vehicles (1).

Remedial Actions

- In 2020, hot spot trimming will be performed.
- In 2020, additional animal guarding will be installed.
- In 2022, full circuit trimming will be performed.

51 Circuit 21901 -- HUMBOLDT 19-01

Performance Analysis

The HUMBOLDT 19-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 81 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (33); equipment failure (16); animal contacts (12); Unknown (9); Scheduled Outage (7); nothing found (3); contact or dig in (1).

Remedial Actions

- In 2019, this circuit was reconfigured.
- In 2019, two additional reclosers were installed.
- In 2019, two reclosers were relocated.
- In 2020, additional sectionalizing will be evaluated.
- In 2020, full circuit trimming will be performed.

52 Circuit 29702 -- ANGELS 97-02

Performance Analysis

The ANGELS 91-02 circuit experienced two outages of over 100,000 CMI between August 2019 and September 2020.

On December 3, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 625 customers for up to 180 minutes resulting in 111,997 CMI.

On January 17, 2020, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 410 customers for up to 411 minutes resulting in 152,223 CMI.

In total, this circuit had 80 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (30); Unknown (18); animal contacts (14); equipment failure (11); Scheduled Outage (6); nothing found (1).

Remedial Actions

- In 2019, multiple cross arms were replaced.
- In 2019, additional animal guarding was installed at multiple locations with more planned for 2020.
- In 2019, multiple transformers were replaced.
- In 2020, several poles and cross arms were replaced.
- In 2020, an existing recloser was replaced.
- In 2020, hot spot trimming will be performed.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, a section of three-phase will be reconductored.
- In 2020, five new single-phase recloser will be installed.
- In 2020, additional fusing will be installed.
- In 2021, full circuit trimming will be performed.

53 Circuit 11402 -- FARMERSVILLE 14-02

Performance Analysis

The FARMERSVILLE 14-02 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On June 12, 2020, a vehicle contacted a pole causing an outage. This outage affected 2,484 customers for up to 513 minutes resulting in 368,095 CMI.

In total, this circuit had 32 outages between August 2019 and September 2020, with the causes breaking down as follows: animal contacts (10); Scheduled Outage (6); tree related (6); equipment failure (5); Unknown (2); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, two locations with dissimilar metal connections were remediated.
- In 2020, a Smart Grid device was replaced.
- In 2020, additional fusing was installed at several locations.
- In 2020, additional locations with dissimilar metal connections will be remediated.
- In 2020, additional animal guarding will be installed.

54 Circuit 26604 -- BROOKSIDE 66-04

Performance Analysis

The BROOKSIDE 66-04 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 140 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (45); tree related (37); equipment failure (20); animal contacts (18); Scheduled Outage (13); nothing found (4); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2020, full circuit trimming will be performed.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2020, additional single-phase reclosers will be evaluated.
- In 2020, splitting a section of this line will be evaluated.
- In 2020, additional animal guarding will be installed.
- In 2021, a new line and terminal will be constructed.

55 Circuit 64801 -- MOUNT NEBO 48-01

Performance Analysis

The MOUNT NEBO 48-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 60 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (19); equipment failure (12); animal contacts (11); Unknown (8); Scheduled Outage (7); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2020, six additional fuses were installed, with three additional fuses to be installed.
- In 2020, two new single-phase reclosers were installed, and another was upgraded.
- In 2020, a Smart Grid device was upgraded.
- In 2020, additional animal guards were installed.
- In 2020, a section of difficult-to-access conductor was terminated.
- In 2020, a multiphase drone and infrared inspection will be performed.
- In 2020, the resourcing of section of difficult-to-access single-phase conductor will be evaluated.
- In 2021, four single-phase reclosers will be installed.
- In 2021, two existing single-phase reclosers will be replaced.
- In 2021, additional fusing will be installed.
- In 2021, several locations with dissimilar conductor will be remediated.
- In 2022, an additional single-phase recloser will be installed.
- In 2022, a section of difficult-to-access three-phase conductor will be relocated.
- In 2022, a new Smart Grid device will be installed.

56 Circuit 43401 -- BENTON 34-01

Performance Analysis

The BENTON 34-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 85 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (30); tree related (25); Scheduled Outage (15); equipment failure (7); animal contacts (5); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2021, two single-phase reclosers will be installed.
- In 2021, a section of inaccessible single-phase line will be relocated.
- In 2021, additional single-phase fusing will be installed.
- In 2022, two single-phase reclosers will be installed, and protection settings will be changed on existing reclosers.

57 Circuit 17803 -- GILBERT 78-03

Performance Analysis

The GILBERT 78-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On October 7, 2019, during a period of heavy rain, an equipment failure occurred on an overhead splice causing a circuit breaker to trip to lockout. This outage affected 3,060 customers for up to 416 minutes resulting in 116,564 CMI.

In total, this circuit had 74 outages between August 2019 and September 2020, with the causes breaking down as follows: Scheduled Outage (20); Unknown (15); tree related (13); animal contacts (12); equipment failure (9); nothing found (4); vehicles (1).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2020, additional single-phase reclosers will be evaluated for this circuit.
- In 2020, an existing device will be evaluated for conversion from a switch to a recloser.

58 Circuit 56803 -- BENVENUE 68-03

Performance Analysis

The BENVENUE 68-03 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On January 16, 2020, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 500 customers for up to 398 minutes resulting in 102,177 CMI.

In total, this circuit had 67 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (25); equipment failure (12); Unknown (11); animal contacts (10); Scheduled Outage (5); vehicles (3); nothing found (1).

Remedial Actions

- In 2019, an additional single-phase recloser was installed.
- In 2019, additional fusing was installed at four locations.
- In 2020, additional fusing was installed at five locations.
- In 2020, additional animal guarding was installed at five locations.
- In 2021, full circuit trimming will be performed.
- In 2021, three additional single-phase sectionalizing devices will be installed.
- In 2022, five additional single-phase sectionalizing devices will be installed.

59 Circuit 43304 -- WATSON 33-04

Performance Analysis

The WATSON 33-04 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On October 3, 2019, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 337 customers for up to 813 minutes resulting in 273,964 CMI.

In total, this circuit had 64 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (18); equipment failure (14); animal contacts (11); Scheduled Outage (11); tree related (7); vehicles (3).

Remedial Actions

- In 2020, a section of this circuit was re-sourced.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2022, a section of difficult-to-access single-phase will be relocated and storm hardened.
- In 2022, an underground dip will be replaced.
- In 2022, a section of difficult-to-access three-phase will be relocated.

60 Circuit 15704 -- TANNERSVILLE 57-04

Performance Analysis

The TANNERSVILLE 57-04 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 2, 2020, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 725 customers for up to 751 minutes resulting in 230,592 CMI.

In total, this circuit had 64 outages between August 2019 and September 2020, with the causes breaking down as follows: tree related (19); animal contacts (18); Unknown (11); equipment failure (8); Scheduled Outage (5); nothing found (2); vehicles (1).

Remedial Actions

- In 2020, two reclosers were replaced on this circuit.
- In 2020, additional single-phase reclosers will be evaluated for this circuit.
- In 2022, full circuit trimming will be performed.

61 Circuit 10201 -- ALLENTOWN 02-01

Performance Analysis

The ALLENTOWN 02-01 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 5 outages between August 2019 and September 2020, with the causes breaking down as follows: equipment failure (3); Scheduled Outage (1); Unknown (1).

Remedial Actions

- In 2020, several dissimilar metal connections will be remediated.
- In 2021, additional fusing will be installed.

62 Circuit 57403 -- SPANGLER 74-03

Performance Analysis

The SPANGLER 74-03 circuit experienced no outages of over 100,000 CMI between August 2019 and September 2020.

In total, this circuit had 60 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (32); tree related (16); animal contacts (5); equipment failure (2); nothing found (2); Scheduled Outage (2); contact or dig in (1).

Remedial Actions

- In 2019, a trip saver was installed.
- In 2020, additional animal guarding was installed.
- In 2020, four single-phase reclosers were installed.
- In 2020, two additional fuses were installed with four more to be completed.
- In 2020, the coordination settings for this circuit will be optimized.
- In 2020, a section of three-phase will be evaluated for expanded tree trimming or reconductoring.
- In 2021, full circuit trimming will be performed.

63 Circuit 41901 -- REED 19-01

Performance Analysis

The REED 19-01 circuit experienced one outage of over 100,000 CMI between August 2019 and September 2020.

On July 5, 2020, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 405 customers for up to 350 minutes resulting in 141,754 CMI.

In total, this circuit had 37 outages between August 2019 and September 2020, with the causes breaking down as follows: Unknown (13); tree related (11); equipment failure (7); animal contacts (5); Scheduled Outage (1).

Remedial Actions

- In 2020, additional fusing was installed at two locations with two more to be performed.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2020, multiple poles were replaced with more to be performed.
- In 2020, dissimilar metal connections were remediated at two locations.
- In 2020, reconfiguring a portion of this circuit will be evaluated.

5) ***A rolling 12-month breakdown and analysis of outage causes during the preceding quarter, including the number and percentage of service outages, the number of customers interrupted, and customer interruption minutes categorized by outage cause such as equipment failure, animal contact, tree related, and so forth. Proposed solutions to identified service problems shall be reported.***

The following table shows a breakdown of service interruption causes for the 12 months ended at the current quarter.

Cause Description	Trouble Cases	Percent of Trouble Cases	Customer Interruptions	Percent of Customer Interruptions	Customer Minutes	Percent of Customer Minutes
Animals	4,651	21.0%	58,762	4.7%	3,856,475	2.1%
Contact / Dig-In	183	0.8%	24,969	2.0%	1,188,095	0.6%
Directed by Non-PPL Authority	76	0.3%	12,357	1.0%	999,918	0.5%
Equipment Failures	5,396	24.4%	368,356	29.2%	30,011,826	16.3%
Improper Design	2	0.0%	295	0.0%	22,885	0.0%
Improper Installation	4	0.0%	1,799	0.1%	85,944	0.0%
Improper Operation	25	0.1%	8,614	0.7%	1,042,569	0.6%
Nothing Found	1,089	4.9%	50,948	4.0%	4,274,094	2.3%
Other Controllable	96	0.4%	13,770	1.1%	321,043	0.2%
Other Non Control	236	1.1%	27,144	2.1%	3,350,810	1.8%
Other Public	32	0.1%	9,063	0.7%	355,222	0.2%
Tree Related	9,639	43.5%	576,466	45.6%	127,425,726	69.4%
Unknown	1	0.0%	426	0.0%	613,423	0.3%
Vehicles	712	3.2%	110,237	8.7%	10,126,464	5.5%
Total	**22,142**	**100.0%**	**1,263,206**	**100.0%**	**183,674,493**	**100.0%**

Analysis of causes contributing to the majority of service interruptions:

Weather Conditions: PPL Electric records weather conditions, such as wind or lightning, as contributing factors to service interruptions, but does not code them as direct interruption causes. Therefore, some fluctuations in cause categories, especially tree- and equipment-related causes, are attributable to weather variations. For the current reporting period, weather was considered a significant contributing cause in 49% of cases, 58% of customer interruptions, and 77% of CMI.

Tree Related: Vegetation is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. For the current reporting period, approximately 82% of the cases of trouble, 84% of the customer interruptions and 92% of the customer minutes attributed to tree related outages were weather-related.

Animals: Animals accounted for approximately 21% of PPL Electric's cases of trouble. Although this represents a significant number of cases, the effect on SAIFI and CAIDI is small because approximately 76% of the number of cases of trouble was associated with individual distribution transformers. However, when animal contacts affect substation equipment, the effect may be widespread and potentially can interrupt thousands of customers on multiple circuits. In addition to guarding new distribution transformers and substations, in 2009, PPL Electric initiated distribution and substation animal guarding programs to focus systematically on protecting existing facilities most at risk of incurring animal-caused interruptions. A complete effectiveness review of this strategy is being evaluated.

Vehicles: Although vehicles cause a small percentage of the number of cases of trouble, they accounted for a large percentage of customer interruptions and customer minutes, because main distribution lines generally are located along major thoroughfares with higher traffic densities. In addition, vehicle-related cases often result in extended repair times to replace broken poles. PPL Electric has a program to identify and relocate poles that are subject to multiple vehicle hits.

Equipment Failure: Equipment failure is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. However, approximately 38% of the cases of trouble, 48% of the customer interruptions and 50% of the customer minutes attributed to equipment failure were weather-related and, as such, are not considered to be strong indicators of equipment condition or performance.

Nothing Found: This description is recorded when the responding crew can find no cause for the interruption. That is, when there is no evidence of equipment failure, damage, or contact after a line patrol is completed. For example, during heavy thunderstorms, when a line fuse blows or a single-phase OCR locks open and when closed for test, the fuse holds, or the OCR remains closed, and a patrol reveals nothing.

6) Quarterly and year-to-date information on progress toward meeting transmission and distribution inspection and maintenance goals/objectives. (For first, second and third quarter reports only.)

Inspection & Maintenance Goals/Objectives	Annual Budget	3rd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of structures)	636	220	220	512	512
Transmission arm replacements (# of arms)	37	7	7	33	33
Transmission air break switch inspections (# of switches)	5	2	2	5	5
Transmission surge arrester installations (# of sets)	1,500	428	429	1,038	1,038
Transmission structure inspections (# of activities)	18,241	3,480	3,480	13,848	13,848
Transmission tree side trim-Bulk Power (linear feet)	N/A				
Transmission herbicide-Bulk Power (# of acres)	N/A				
Transmission reclearing (# of miles) BES Only	844	335	264	801	795
Transmission reclearing (# of miles) 69 kV	1584	833	632	1,396	1,302
Transmission reclearing (# of miles) 138 kV	91	48	14	81	81
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	1,090	54	80	1,045	1,051
Circuit breakers (# of activities)	100	2	18	10	52
Substation inspections (# of activities)	2,589	469	490	1,765	1,818
Transformer maintenance (# of activities)	1,403	25	134	254	279

Inspection & Maintenance Goals/Objectives	Annual Budget	3rd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	1,303	48	487	424	1,237
C-truss distribution poles (# of poles)	3,888	1,440	1,440	2,842	2,842
Capacitor (MVAR added)	1.5	0	0	1.2	0
OCR Replacements (# of)	0	0	0	0	0
Distribution pole inspections (# of poles)	69,900	26,221	26,221	54,539	54,539
Distribution line inspections (miles)	3,288	2,231	2,231	3,288	3,288
Group re-lamping (# of lamps)	24,100	6,025	2,956	18,075	8.687
Test sections of underground distribution cable	N/A	N/A	158	N/A	491
Distribution tree trimming (# of miles)	5,089	1,247	970	3,748	4,165
Distribution herbicide (# of acres)	N/A				
Distribution >18” removals within R/W (# of trees)	N/A				
Distribution hazard tree removals outside R/W (# of trees)	N/A				
LTN manhole inspections (# of)	323	81	69	243	238
LTN vault inspections (# of)	356	89	135	267	259
LTN network protector overhauls (# of)	85	21	21	63	46
LTN reverse power trip testing (# of)	36	9	8	27	16

7) Quarterly and year-to-date information on budgeted versus actual transmission and distribution operation and maintenance expenditures in total and detailed by the EDC's own functional account code or FERC account code as available.

The following table provides the operation and maintenance (O&M) expenses for PPL Electric, as a whole, which includes the work identified in response to Item (6).

Activity		3rd Quarter		Year-to-date	
	2020 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	5,927	1,682	1,925	4,456	5,046
Vegetation Management	36,213	9,336	9,737	28,504	30,405
Customer Response	61,834	17,665	18,902	47,750	52,682
Reliability Maintenance	33,865	9,024	8,797	26,007	22,508
System Upgrade	7,235	1,013	380	6,250	4,652
Customer Service/Accounts	113,140	31,013	17,547	82,080	59,395
Others	38,045	10,142	11,283	28,848	33,522
Total O&M Expenses	**296,258**	**79,875**	**68,571**	**223,895**	**208,210**

8) Quarterly and year-to-date information on budgeted versus actual transmission and distribution capital expenditures in total and detailed by the EDC's own functional account code or FERC account code as available.

The following table provides the capital expenditures for PPL Electric, as a whole, which includes transmission and distribution ("T&D") activities.

Activity		3rd Quarter		Year-to-date	
	2020 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	95,015	25,452	25,776	71,687	70,110
System Upgrade	337,320	92,769	97,773	260,325	263,588
Reliability & Maintenance	567,236	164,402	136,011	414,663	415,255
Customer Response	26,857	7,723	10,286	21,829	24,270
Other	22,667	7,106	7,536	18,376	7,243
Total	**1,049,095**	**297,452**	**277,381**	**786,881**	**780,465**

9) Quarterly and year-to-date information on distribution substation inspections and reliability metrics.

9. *Quarterly and year-to-date information on distribution substation inspections and reliability metrics.*

(a) The Number of Corrective Work Orders by Type (Low-Priority, Mid-Priority, Urgent)

During the 3rd quarter of 2020, 164 corrective work orders were created with the following breakdown by priority.

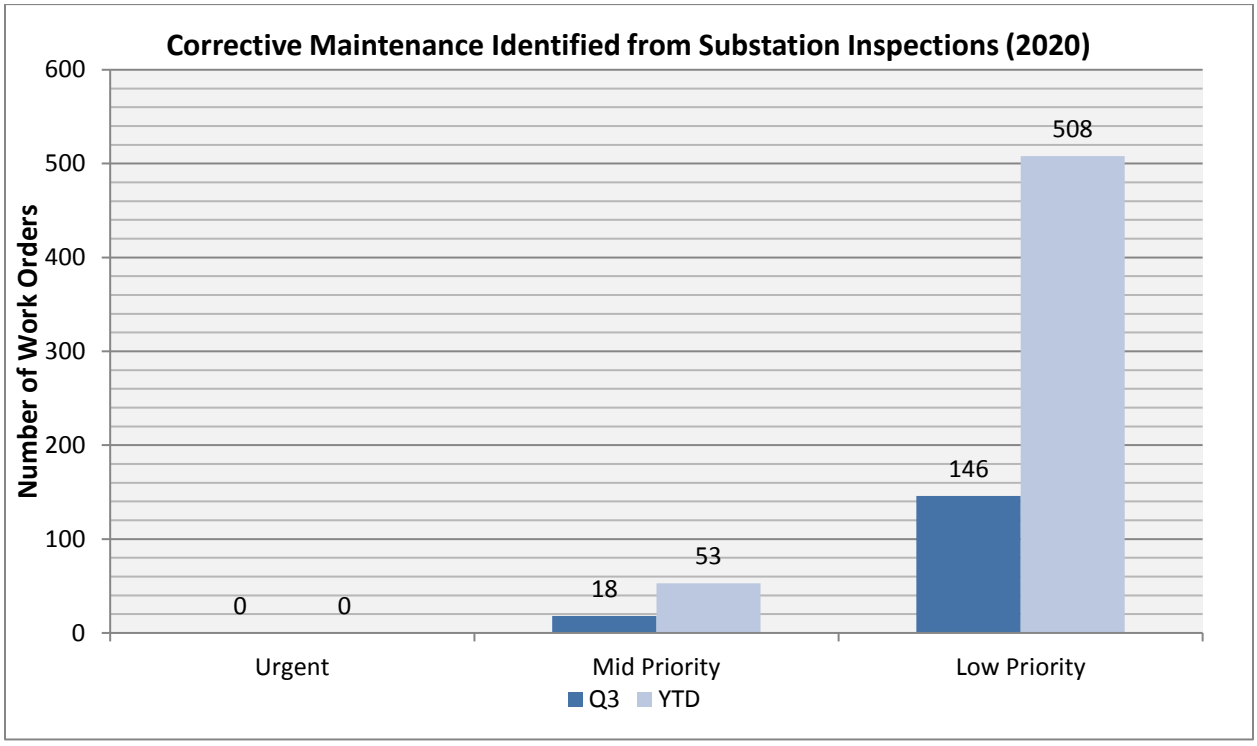

Figure 1: Corrective Maintenance Work Orders by Priority Level for 3rd Quarter and Year-to-Date 2020

(b) The Amount Spent on Substation Inspections

During the 3rd quarter of 2020, PPL Electric Utilities spent approximately $138,000 on substation inspections.

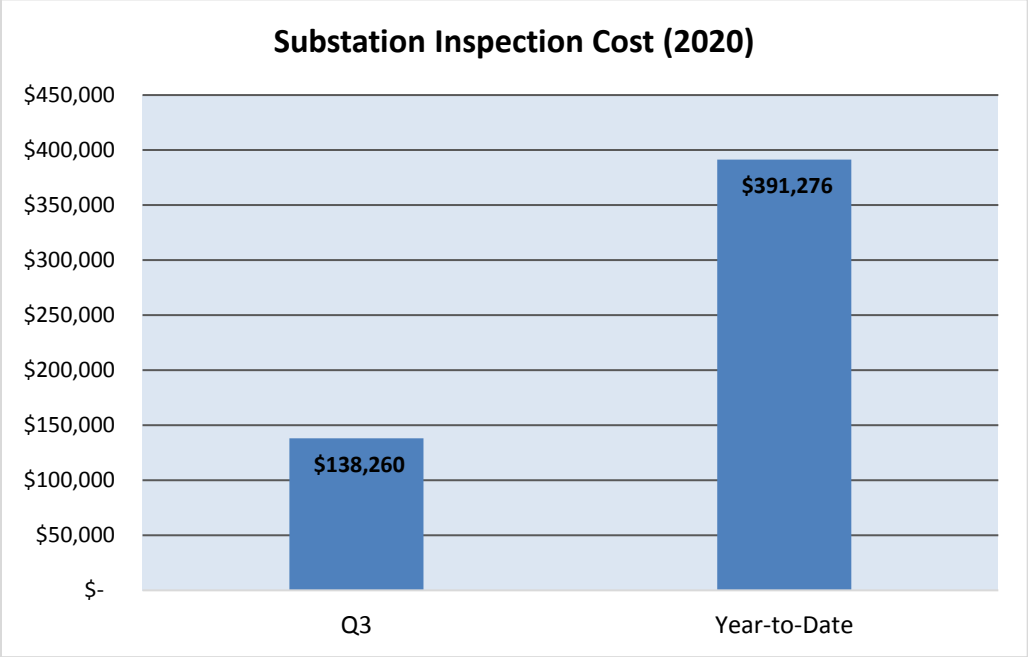

Figure 2: Substation Inspection Costs for 3rd Quarter and Year-to-Date 2020.

(c) The Amount Spent on Vegetation Management

Please refer to Section 7 for vegetation management expenses for the 3rd quarter and year-to-date.

(d) The Projected CMI Avoidance Due to Substation Inspections

Figure 3 below shows the CMI avoidance that PPL Electric Utilities has estimated for the 3rd quarter and year-to-date. During the 3rd quarter of 2020, PPL Electric Utilities avoided a projected 500,000 CMI.

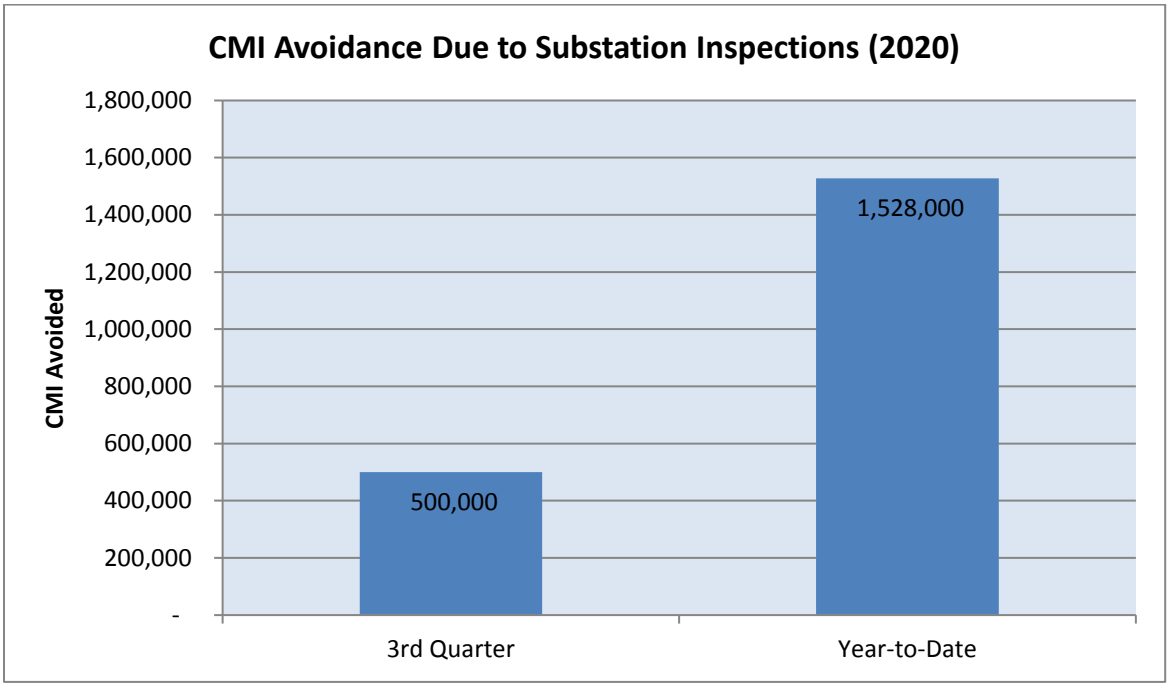

Figure 3: Projected CMI Avoidance Due to Substation Inspections for 3rd Quarter and Year-to-Date 2020

(e) Customer Minutes and Number of Customers Affected Due to Substation Sustained Outages

In the past three years, distribution substations have contributed a small amount toward the reliability metrics. During the 3rd quarter of 2020, the Company interrupted approximately 50,000 customers for a total of 3.8M CMI. The figures below show these results for the number of customers interrupted and CMI experienced, respectively.

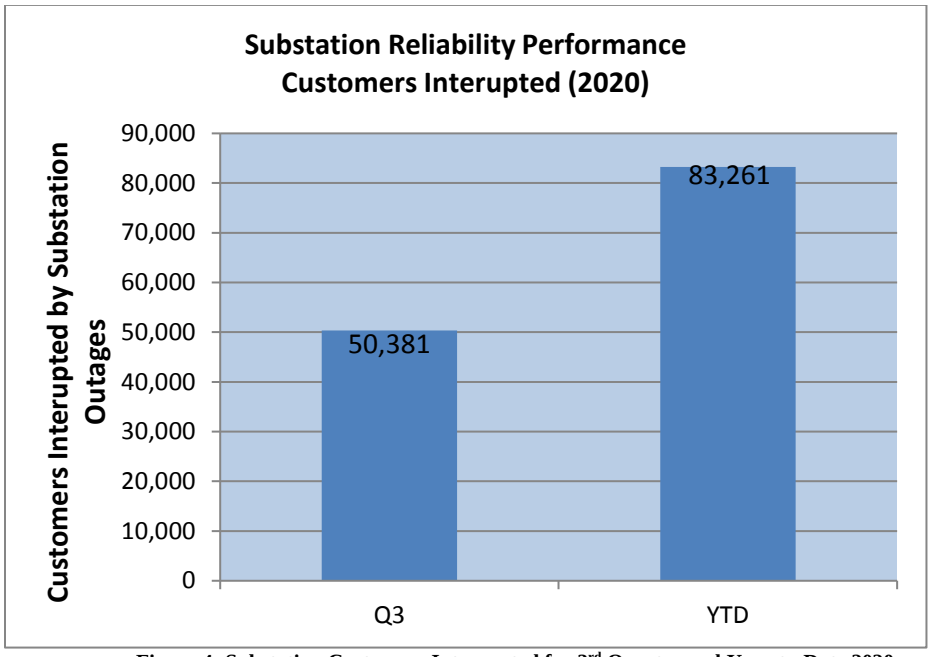

Figure 4: Substation Customers Interrupted for 3rd Quarter and Year-to-Date 2020

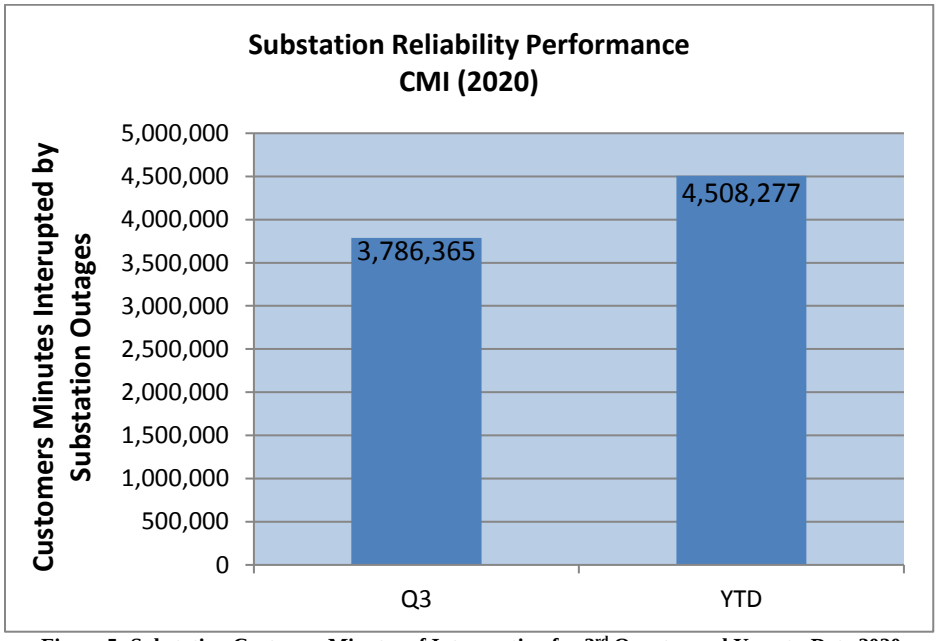

Figure 5: Substation Customer Minutes of Interruption for 3rd Quarter and Year-to-Date 2020

(f) Substation SAIFI Contribution

Overall, substation outages contributed approximately 14% of the total SAIFI experienced by PPL Electric customers in the 3rd quarter of 2020. Historically, PPL Electric Utilities has ranked in the first quartile for substation SAIFI performance on the Southeastern Electric Exchange (SEE) Survey and is on-track to maintain its ranking among other electric utilities.

(g) Number of Substations with Remote Monitoring and Communication Technologies

PPL Electric Utilities has the capability of remotely monitoring its distribution substations through SCADA installations and other telemetered equipment. This equipment allows PPL Electric to closely track the performance of its substation assets and respond to any trouble that is experienced on the distribution system. The table below shows the number of distribution substations that have this functionality.

	3rd Quarter	Year-to-Date
Substations with Remote Monitoring	354	354
Total Number of Substations	356	356

PPL Electric has launched a project to install smart relaying onto all 12kV circuit breakers at its distribution substations. These relays will allow the Company to quickly perform automated switching for lesser system impact during an outage event, and better-estimate fault locations for quicker system restoration. By 2022, the Company expects all 12kV circuit breakers to have these functionalities to enhance reliability performance.

10) Dedicated staffing levels for transmission and distribution operation and maintenance at the end of the quarter, in total and by specific category (for example, linemen, technician and electrician).

The following table shows the dedicated staffing levels as of the end of the quarter. Job descriptions are provided in Appendix B.

Transmission and Distribution	
Lineman Leader	59
Journeyman Lineman	180
Journeyman Lineman-Trainee	28
Helper	16
Groundhand	2
Troubleman	50
T&D Total	**335**
Electrical	
Elect Leaders-UG	2
Elect Leaders-Net	10
Elect Leaders-Sub	24
Journeyman Elect-UG	9
Journeyman Elect-Net	29
Journeyman Elect-Sub	54
Electrical Total	**335**
Overall Total	**670**

Appendix A

PPL Electric Utilities Corporation

Worst Performing Circuit Definition / Comparison under Previous and New Circuit Performance Index (CPI) formulas.

PPL Electric uses an equal weighting of circuit SAIDI and system SAIFI contribution over the previous four quarters to define the worst performing circuits on its system. IEEE Major Event days are excluded. This ranking system was put in place as of the first quarter of 2020, for the following reasons:

- Increased targeting of problem areas versus circuits that may be reasonable performers but are simply long circuits that have been in storms.
- It prioritizes the circuits contributing the most toward system SAIFI.
- It is less biased towards long, rural circuits and more reflective of the customer experience.

Typically, 60 to 70 percent overlap is anticipated between the new and prior methods.

Appendix A

Method Comparison – Circuits Included / Excluded

Feeder	On New List	On Old List	Explanation
55001	Y	Y	On both lists
52401	Y	Y	On both lists
20601	Y	Y	On both lists
20402	Y	Y	On both lists
50503	Y	Y	On both lists
28101	Y	Y	On both lists
52402	Y	Y	On both lists
45002	Y	Y	On both lists
40201	Y	Y	On both lists
28102	Y	Y	On both lists
11506	Y	Y	On both lists
24901	Y	Y	On both lists
46702	Y	Y	On both lists
61304	Y	N	On list primarily for high system SAIFI
27301	Y	Y	On both lists
58401	Y	N	On list primarily for high system SAIFI
59002	Y	N	On list primarily for high system SAIFI
14501	Y	N	On list primarily for high system SAIFI
24502	Y	N	On list primarily for high system SAIFI
20403	Y	Y	On both lists
40602	Y	Y	On both lists
45902	Y	Y	On both lists
25801	Y	Y	On both lists
22905	Y	N	On list primarily for high system SAIFI
52403	Y	N	On list primarily for high system SAIFI
53601	Y	Y	On both lists
13606	Y	N	On list primarily for high system SAIFI
56504	Y	Y	On both lists
24401	Y	N	On list primarily for high system SAIFI
13601	Y	N	On list primarily for high system SAIFI
14403	Y	Y	On both lists
47502	Y	N	On list primarily for high system SAIFI
55002	Y	N	On list primarily for high system SAIFI
64304	Y	N	On list primarily for high system SAIFI
59401	Y	N	On list primarily for high system SAIFI
13704	Y	N	On list primarily for high system SAIFI
24602	Y	Y	On both lists
54701	Y	N	On list primarily for high system SAIFI
41602	Y	Y	On both lists
56802	Y	Y	On both lists
12705	Y	N	On list primarily for high system SAIFI
40603	Y	Y	On both lists
24003	Y	Y	On both lists
56501	Y	Y	On both lists
21206	Y	Y	On both lists
12802	Y	N	On list primarily for high system SAIFI
12202	Y	N	On list primarily for high system SAIFI
26602	Y	N	On list primarily for high system SAIFI
15001	Y	Y	On both lists
12301	Y	N	On list primarily for high system SAIFI
21901	Y	N	On list primarily for high system SAIFI
29702	Y	Y	On both lists
11402	Y	N	On list primarily for high system SAIFI
26604	Y	Y	On both lists
64801	Y	N	On list primarily for high system SAIFI
43401	Y	N	On list primarily for high system SAIFI
17803	Y	N	On list primarily for high system SAIFI
56803	Y	N	On list primarily for high system SAIFI
43304	Y	N	On list primarily for high system SAIFI
15704	Y	N	On list primarily for high system SAIFI
10201	Y	N	On list primarily for high system SAIFI
57403	Y	N	On list primarily for high system SAIFI
41901	Y	Y	On both lists
26703	N	Y	Lower IEEE CMI due to weather normalization
28303	N	Y	Lower IEEE CMI due to weather normalization
45402	N	Y	Lower IEEE CMI due to weather normalization
45602	N	Y	Lower IEEE CMI due to weather normalization
17001	N	Y	Lower IEEE CMI due to weather normalization
18502	N	Y	Lower IEEE CMI due to weather normalization
28801	N	Y	Lower IEEE CMI due to weather normalization
28602	N	Y	Lower IEEE CMI due to weather normalization
10805	N	Y	Lower IEEE CMI due to weather normalization
46001	N	Y	Lower IEEE CMI due to weather normalization
17902	N	Y	Lower IEEE CMI due to weather normalization
18501	N	Y	Lower IEEE CMI due to weather normalization
26001	N	Y	Lower IEEE CMI due to weather normalization
10801	N	Y	Lower IEEE CMI due to weather normalization
23604	N	Y	Lower IEEE CMI due to weather normalization
14103	N	Y	Lower IEEE CMI due to weather normalization
26704	N	Y	Lower IEEE CMI due to weather normalization
25501	N	Y	Lower IEEE CMI due to weather normalization
22003	N	Y	Lower IEEE CMI due to weather normalization
26002	N	Y	Lower IEEE CMI due to weather normalization
46901	N	Y	Lower IEEE CMI due to weather normalization
10902	N	Y	Lower IEEE CMI due to weather normalization
14801	N	Y	Lower IEEE CMI due to weather normalization
17805	N	Y	Lower IEEE CMI due to weather normalization
29501	N	Y	Lower IEEE CMI due to weather normalization
28702	N	Y	Lower IEEE CMI due to weather normalization
26401	N	Y	Lower IEEE CMI due to weather normalization
28803	N	Y	Lower IEEE CMI due to weather normalization
47001	N	Y	Lower IEEE CMI due to weather normalization
44202	N	Y	Lower IEEE CMI due to weather normalization
53803	N	Y	Lower IEEE CMI due to weather normalization

Appendix B

PPL Electric Utilities Corporation

Job Descriptions

Transmission and Distribution

Groundhand	• Performs manual labor and assists employees in higher job classifications.
Helper	• Performs semi-skilled labor at any work location on de-energized overhead and underground transmission, and distribution facilities to prepare the employee for entrance into the Journeyman Lineman Apprenticeship Program.
Journeyman Lineman	• Works alone or as part of a crew on the maintenance, operation, and construction activities of the transmission and distribution systems associated with, but not limited to, PPL Electric facilities.
Journeyman Lineman-Trainee	• Works alone or as part of a crew on the maintenance, operation, and construction activities of the transmission and distribution systems associated with, but not limited to, PPL Electric facilities.
Lineman Leader	• Responsible for completing assigned work by directing one or multiple groups of employees involved in the maintenance, operation, and construction activities of the transmission and distribution systems associated with, but not limited to, PPL Electric facilities. • Engage in and perform work along with providing the necessary leadership, all-around knowledge, program, judgment, and experience to produce a quality job. • Performs all the direct duties of the Journeyman Lineman when not acting as a Lineman Leader.
Troubleman	• Investigates and resolves trouble calls, voltage abnormalities on transmission and distribution systems associated with, but not limited to, PPL Electric facilities.

Appendix B

Electrical

Electrician Leader - Substation - Network - Underground	• Responsible for completing assigned work by directing one or multiple groups of employees involved in the construction and maintenance activities of the transmission and distribution systems associated with, but not limited to, PPL Electric facilities. • Engage in and perform work along with providing the necessary leadership, all-around knowledge, program, judgment, and experience to produce a quality job. • Performs all direct duties of the Journeyman Electrician when not acting as a leader.
Helper - Substation - Network - Underground	• Performs manual labor at any work location including those areas containing non-exposed energized electrical equipment, and to prepare the employee for entrance into the Apprenticeship Program.
Laborer - Substation - Network - Underground	• Performs manual labor and assists employees in higher job classifications.
Journeyman Electrician - Substation - Network - Underground	• Normally under limited supervision performs and is responsible for work associated with, but not limited to, PPL Electric facilities involving the highest degree of skill in construction and maintenance work associated with substations, LTN or underground distribution and transmission. • Uses microprocessor based equipment for troubleshooting and revising relay logic and its control systems related to the field services electrical discipline.

Appendix B

Journeyman Electrician - Trainee - Substation - Network - Underground	• Normally under limited supervision performs and is responsible for work associated with, but not limited to, PPL Electric facilities involving the highest degree of skill in construction and maintenance work associated with substations, LTN or underground distribution and transmission. • Uses microprocessor based equipment for troubleshooting and revising relay logic and its control systems related to the field services electrical discipline.