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E-FILE

February 1, 2021

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 December 31, 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 December 31, 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 February 1, 2021, 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,

Kimberly A. Klock

Enclosures

cc: Tanya J. McCloskey, Esquire
Mr. John R. Evans
Mr. Daniel Searfoorce
Mr. John Van Zant

PPL Electric Utilities Corporation

Quarterly Reliability Report

to the

Pennsylvania Public Utility Commission

January 2021

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 fourth 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 December 31, 2020.

SAIFI	BM 0.98	0.84
	STD 1.18	0.84
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	BM 145	137
	STD 174	137
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	BM 142	116
	STD 205	116
MAIFI		5.3
Average Number of Customers Served [1]		1,438,204
Number of Sustained Customer Interruptions (Trouble Cases)		20,877
Number of Customers Affected [2]		1,212,136
Customer Minutes of Interruptions (CMI)		166,414,603
Number of Customer Momentary Interruptions		7,639,856

During the fourth quarter, there were no (0) PUC major events, three (3) PUC reportable events, and three (3) 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 fourth 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 most recently a first 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
2020	99	0.69	68.6
IEEE First Quartile Ceiling	103	0.85	85
IEEE Second Quartile Ceiling	110	1.01	107

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.

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	1,189	147	8.06	1.1	1,297	94	1,542,731
2	52401	929	110	8.45	0.8	1,298	72	1,206,083
3	20601	778	171	4.55	2.2	1,475	56	1,146,852
4	22602	1152	134	8.61	0.1	590	45	679,869
5	20402	708	265	2.67	1.1	1,903	56	1,348,224
6	56501	770	248	3.11	1.2	2,430	38	1,872,237
7	50503	349	98	3.54	2.3	2,098	18	731,174
8	11506	405	91	4.47	6.0	1,312	58	531,466
9	40201	432	169	2.55	2.3	1,667	103	719,569
10	46001	914	660	1.39	2.6	2,371	58	2,167,732
11	52402	372	96	3.88	0.6	1,672	73	621,731
12	61304	293	101	2.89	3.2	1,691	19	495,367
13	46702	644	254	2.53	1.2	1,260	56	811,938
14	47502	413	98	4.20	4.7	817	31	337,230
15	25801	280	92	3.03	6.5	1,826	66	510,998
16	27301	327	267	1.23	1.8	2,812	17	920,085
17	52403	250	73	3.43	1.9	1,265	63	316,723
18	28102	556	171	3.25	1.8	1,100	78	611,561
19	24901	245	91	2.69	5.8	2,294	62	562,734
20	53601	311	107	2.91	3.2	1,105	32	344,178
21	22905	196	77	2.55	2.0	2,864	17	562,539
22	14501	240	64	3.72	1.2	1,135	21	271,833
23	11303	241	113	2.13	2.3	1,639	47	394,958
24	13606	238	94	2.52	4.0	1,636	28	389,915

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	13704	219	82	2.66	8.0	1,570	43	344,415
26	45902	636	291	2.18	12.5	1,348	76	857,711
27	45402	288	118	2.45	4.4	1,638	95	472,040
28	58401	262	85	3.08	2.8	1,517	49	397,689
29	10107	204	76	2.69	2.0	1,848	19	376,207
30	13601	413	160	2.58	3.8	1,133	34	467,512
31	20403	344	204	1.69	2.9	1,938	103	666,737
32	55002	744	209	3.56	5.7	748	55	556,641
33	54701	297	114	2.61	4.5	1,112	38	330,096
34	41602	700	218	3.21	0.6	839	68	586,978
35	59002	316	108	2.93	6.1	1,168	49	368,609
36	56504	259	112	2.30	8.9	1,984	107	512,950
37	14403	264	83	3.17	1.4	2,580	109	680,967
38	45302	350	171	2.05	2.9	1,216	57	425,125
39	12705	228	47	4.85	6.1	589	8	134,182
40	29702	592	151	3.91	9.0	837	68	495,287
41	24003	455	232	1.96	15.1	1,128	6	513,291
42	40603	362	192	1.88	11.1	1,293	59	467,898
43	15001	221	94	2.36	3.8	1,387	42	306,168
44	26602	645	221	2.92	3.2	685	13	441,931
45	56803	280	152	1.84	12.8	1,261	62	352,532
46	21901	165	46	3.59	0.1	2,575	74	423,773
47	27101	193	69	2.79	2.2	1,833	46	353,264
48	64304	289	131	2.21	5.4	1,406	39	405,887
49	46701	695	248	2.80	4.9	677	26	470,293
50	45602	308	233	1.32	5.1	1,626	65	501,189
51	11402	176	153	1.15	6.6	2,487	29	438,818
52	47704	213	110	1.94	2.0	1,388	70	296,122
53	21206	148	75	1.97	7.4	2,479	27	367,787
54	57403	180	75	2.40	3.0	1,475	38	265,249
55	40602	207	96	2.15	3.2	2,415	82	500,311
56	41901	690	271	2.55	2.0	708	27	488,571
57	22003	481	342	1.41	8.6	1,401	62	674,202
58	59401	214	110	1.94	5.4	1,783	83	382,123
59	15704	297	186	1.60	5.8	1,294	53	384,255
60	44903	186	137	1.36	10.3	1,751	4	326,086
61	12802	162	31	5.21	4.3	738	8	119,900
62	12301	219	95	2.31	5.0	1,467	42	320,821
63	44203	134	75	1.79	4.1	1,873	22	250,900

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 January 2020 and December 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 666,942 CMI.

In total, the NEWPORT 50-01 circuit had 94 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (53); equipment failure (24); animal contacts (10); other (3); vehicles (2); Improper Design (1); nothing found (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, three fuses were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a section of single-phase was resourced.
- In 2020, a Proactive Circuit Analysis was performed with several minor remediations implemented.
- In 2021, six additional fuses will be installed.
- 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 January 2020 and December 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, the GREEN PARK 24-01 circuit had 72 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (36); equipment failure (21); animal contacts (7); nothing found (5); vehicles (2); contact or dig in (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 2021, a single-phase recloser will be installed.
- In 2021, seven additional fuses will be installed.
- In 2022, full circuit trimming will be performed.
- 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.
- In 2023, a substation upgrade will be performed.

03 Circuit 20601 -- GREENWOOD 06-01

Performance Analysis

The GREENWOOD 06-01 circuit experienced two outages of over 100,000 CMI between January 2020 and December 2020.

On November 1, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 924 customers for up to 575 minutes resulting in 308,063 CMI.

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, the GREENWOOD 06-01 circuit had 56 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (29); equipment failure (14); animal contacts (9); nothing found (3); 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, a section of two-phase conductor was upgraded to three-phase.
- In 2020, an existing recloser was replaced with a Smart Grid device.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, additional fusing will be installed at six locations.
- In 2021, additional single-phase ties will be evaluated.
- In 2021, full circuit trimming will be performed.

04 Circuit 22602 -- KIMBLES 26-02

Performance Analysis

The KIMBLES 26-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On November 17, 2020, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 4,168 customers for up to 239 minutes resulting in 560,955 CMI.

In total, the KIMBLES 26-02 circuit had 45 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (18); tree related (16); equipment failure (6); nothing found (4); other (1).

Remedial Actions

- In 2021, additional animal guarding will be installed.
- In 2021, a new tie line will be constructed.
- In 2021, an additional Smart Grid device will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2021, numerous porcelain cutouts will be replaced.
- In 2022, additional single-phase reclosers will be installed.

05 Circuit 20402 -- ASHFIELD 04-02

Performance Analysis

The ASHFIELD 04-02 circuit experienced three outages of over 100,000 CMI between January 2020 and December 2020.

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.

On November 1, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 275 customers for up to 1,056 minutes resulting in 290,356 CMI.

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.

In total, the ASHFIELD 04-02 circuit had 56 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (22); animal contacts (20); equipment failure (9); vehicles (3); 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 2021, hazard tree removal will be performed.
- In 2021, a four-mile section of single-phase will be upgraded to three-phase and relocated to a more accessible location.
- In 2021, an additional Smart Grid device will be installed.
- In 2021, a section of single-phase will be evaluated for relocation.
- In 2021, additional fusing will be installed at five locations.
- In 2021, a three-phase tie will be evaluated.
- In 2021, additional line relocations and single-phase reclosers will be evaluated for this circuit.

06 Circuit 56501 -- ROCKVILLE 65-01

Performance Analysis

The ROCKVILLE 65-01 circuit experienced two outages of over 100,000 CMI between January 2020 and December 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.

On October 17, 2020, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 5,002 customers for up to 316 minutes resulting in 1,254,262 CMI.

In total, the ROCKVILLE 65-01 circuit had 38 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (23); animal contacts (7); equipment failure (7); 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, ten new single-phase reclosers were installed and will have protection settings optimized in 2021.
- In 2020, three new Smart Grid devices were evaluated and will be installed in 2023.
- In 2021, a new substation and three-phase reconductoring will be evaluated.
- In 2021, a section of line will be re-sourced.
- In 2021, an additional Smart Grid device will be installed.
- In 2021, an additional tie line will be installed.

07 Circuit 50503 -- MECHANICSBURG 05-03

Performance Analysis

The MECHANICSBURG 05-03 circuit experienced three outages of over 100,000 CMI between January 2020 and December 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 214,695 CMI.

On June 11, 2020, an equipment failure occurred on an overhead conductor causing a temporary open point to be interrupted. 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 or pole arm causing a temporary open point to be interrupted. This outage affected 1,888 customers for up to 517 minutes resulting in 320,004 CMI.

In total, the MECHANICSBURG 05-03 circuit had 18 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (8); equipment failure (4); tree related (3); contact or dig in (1); other (1); 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 2021, full circuit trimming will be performed.
- In 2021, additional animal guarding will be installed.
- In 2021, reconductoring will be evaluated.

08 Circuit 11506 -- FREEMANSBURG 15-06

Performance Analysis

The FREEMANSBURG 15-06 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the FREEMANSBURG 15-06 circuit had 58 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (30); equipment failure (15); nothing found (6); animal contacts (5); vehicles (2).

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 2021, six additional single-phase reclosers will be installed.
- In 2021, additional fusing will be installed.
- In 2021, 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 2022, 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 January 2020 and December 2020.

In total, the BEAR GAP 02-01 circuit had 103 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (63); animal contacts (19); equipment failure (11); nothing found (8); other (1); vehicles (1).

Remedial Actions

- In 2019, additional fusing was installed at eight locations.
- In 2020, a single-phase recloser was replaced.
- In 2020, additional fusing was installed at four locations.
- In 2020, full circuit trimming was performed.
- In 2020, a section of existing conductor was relocated and reconductored.
- In 2021, six single-phase reclosers will be installed.
- In 2021, a single-phase recloser will be replaced.
- In 2022, a section of conductor in a heavily wooded area will be undergrounded.

10 Circuit 46001 -- BERWICK 60-01

Performance Analysis

The BERWICK 60-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On October 26, 2020, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,362 customers for up to 1,854 minutes resulting in 2,020,159 CMI.

In total, the BERWICK 60-01 circuit had 58 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (31); equipment failure (12); animal contacts (9); nothing found (3); vehicles (2); other (1).

Remedial Actions

- In 2021, a section of difficult-to-access to conductor will be relocated and customers transferred to another circuit.
- In 2021, the section of conductor that experienced the large failure in 2020 will be reconductored.
- In 2021, an alternate feed will be evaluated for the customers who experienced the large outage in 2020.
- In 2022, full circuit trimming be performed.

11 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

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

In total, the GREEN PARK 24-02 circuit had 73 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (42); equipment failure (15); animal contacts (12); contact or dig in (1); nothing found (1); other (1); vehicles (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 was performed, several future remediations were identified as a result.
- In 2020, additional animal guarding was installed.
- In 2020, additional fusing was installed.
- In 2021, an additional section of single-phase will be relocated overhead.
- In 2021, a new line and terminal and three-phase tie will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2021, additional reconductoring and relocation will be evaluated for six sections of line.
- In 2021, one section of single-phase will be relocated to underground.
- In 2021, additional animal guarding will be installed.
- In 2021, one section of single-phase will be reconductored.
- In 2021, expanded trimming right-of-way will be sought for this circuit.
- 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.
- In 2023, a substation upgrade will be performed.

12 Circuit 61304 -- EARL 13-04

Performance Analysis

The EARL 13-04 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the EARL 13-04 circuit had 19 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (9); equipment failure (7); nothing found (1); tree related (1); vehicles (1).

Remedial Actions

- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2020, an additional single-phase fuse was installed.
- 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, a complete substation rebuild will occur.
- In 2021, a new line and terminal will be constructed on an adjacent circuit, increasing tie capabilities.
- In 2022, four additional single-phase reclosers 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 January 2020 and December 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, the RENOVO 67-02 circuit had 56 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (30); animal contacts (12); equipment failure (6); nothing found (6); Improper Operation (1); vehicles (1).

Remedial Actions

- In 2021, a battery energy storage system will be installed.
- In 2021, two single-phase reclosers will be installed.
- In 2022, two substation transformers will be replaced.
- In 2023, full circuit trimming will be performed.

14 Circuit 47502 -- NEW COLUMBIA 75-02

Performance Analysis

The NEW COLUMBIA 75-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the NEW COLUMBIA 75-02 circuit had 31 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (12); tree related (12); animal contacts (3); nothing found (3); vehicles (1).

Remedial Actions

- In 2020, multiple porcelain cutouts were replaced.
- In 2021, a three-phase recloser will be evaluated.
- In 2021, two substation transformers will be replaced.
- In 2022, two single-phase reclosers will be installed and a section of the circuit will be reconfigured.

15 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

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

In total, the SULLIVAN TRAIL 58-01 circuit had 66 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (25); equipment failure (17); animal contacts (15); nothing found (4); vehicles (3); other (2).

Remedial Actions

- 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.

16 Circuit 27301 -- PARRISH 73-01

Performance Analysis

The PARRISH 73-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the PARRISH 73-01 circuit had 17 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (8); equipment failure (5); nothing found (2); other (1); tree related (1).

Remedial Actions

- In 2019, a three-phase tie was constructed to the PARRISH 73-03.
- In 2021, a drone patrol was conducted with several minor remediations identified for 2021.
- In 2021, an additional Smart Grid device will be evaluated for this circuit.
- In 2021, additional single-phase reclosers will be evaluated for this circuit.
- In 2021, additional fusing will be evaluated for this circuit.

17 Circuit 52403 -- GREEN PARK 24-03

Performance Analysis

The GREEN PARK 24-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the GREEN PARK 24-03 circuit had 63 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (33); equipment failure (18); animal contacts (7); contact or dig in (2); nothing found (2); 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 2021, a section of single-phase will be relocated underground.
- In 2021, four single-phase reclosers will be installed.
- In 2021, additional fusing will be evaluated.
- In 2021, an additional sectionalizing device will be evaluated.
- In 2022, full circuit trimming will be performed.
- In 2023, a substation upgrade will be performed.

18 Circuit 28102 -- TWIN LAKES 81-02

Performance Analysis

The TWIN LAKES 81-02 circuit experienced two outages of over 100,000 CMI between January 2020 and December 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, the TWIN LAKES 81-02 circuit had 78 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (42); animal contacts (20); equipment failure (15); nothing found (1).

Remedial Actions

- In 2020, additional fusing was installed at multiple locations.
- In 2020, six transformers were replaced.
- In 2020, full circuit trimming was performed.
- In 2020, a Smart Grid device was replaced.
- In 2020, dissimilar metal connections will be remediated at four locations.
- In 2021, additional animal guarding will be installed.
- In 2021, two additional single-phase reclosers will be installed with more being evaluated.
- In 2021, multiple porcelain cutouts will be replaced.

19 Circuit 24901 -- WHITE HAVEN 49-01

Performance Analysis

The WHITE HAVEN 49-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the WHITE HAVEN 49-01 circuit had 62 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (27); equipment failure (17); 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 was be performed. As a result, six fuses will be installed in 2021.
- In 2021, five new reclosers will be evaluated.
- In 2021, a section of single-phase will be evaluated for reconductoring.
- In 201, extended two sections of single-phase line will be evaluated.
- In 2022, a three-phase extension will be constructed.
- In 2022, a new Smart Grid device will be installed.

20 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the DALMATIA 36-01 circuit had 32 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (23); animal contacts (6); equipment failure (3).

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, full circuit trimming was performed.
- In 2020, additional fusing was installed.
- In 2021, additional fusing will be installed.
- In 2021, a single-phase recloser will be relocated.
- In 2022, a section of single-phase will be relocated.

21 Circuit 22905 -- HARWOOD 29-05

Performance Analysis

The HARWOOD 29-05 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the HARWOOD 29-05 circuit had 17 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (13); animal contacts (1); contact or dig in (1); nothing found (1); tree related (1).

Remedial Actions

- In 2020, full circuit trimming was performed.
- 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 was performed with several minor remediations performed as a result.

22 Circuit 14501 -- SCHOENECK 45-01

Performance Analysis

The SCHOENECK 45-01 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the SCHOENECK 45-01 circuit had 21 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (11); animal contacts (4); equipment failure (4); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2020, additional fusing was installed at two locations.
- In 2020, the protection scheme for this circuit was optimized.
- In 2020, hot spot trimming will be performed.
- In 2021, additional single-phase reclosers will be installed at five locations on this circuit.
- In 2021, full circuit trimming will be performed.
- In 2021, additional animal guarding will be installed.

23 Circuit 10107 -- ALLENTOWN 01-07

Performance Analysis

The ALLENTOWN 01-07 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On August 24, 2020, during a period of heavy rain, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 675 customers for up to 3 minutes resulting in 128,234 CMI.

In total, the ALLENTOWN 01-07 circuit had 19 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (9); other (3); tree related (3); animal contacts (2); nothing found (2).

Remedial Actions

- In 2021, seven poles will be replaced on this circuit.
- In 2021, several cutouts and insulators will be replaced.
- In 2021, additional fusing will be installed.
- In 2022, full circuit trimming will be performed.

24 Circuit 11303 -- EMMAUS 13-03

Performance Analysis

The EMMAUS 13-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On November 1, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 594 customers for up to 227 minutes resulting in 134,600 CMI.

In total, the EMMAUS 13-03 circuit had 47 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (15); animal contacts (14); equipment failure (12); other (2); vehicles (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2020, six additional locations received fusing.
- In 2021, a single-phase recloser will be installed.
- In 2021, a section of difficult-to-access conductor will be relocated.
- In 2021, full circuit trimming will be performed.
- In 2022, seven additional single-phase reclosers will be installed.

25 Circuit 13606 -- RICHLAND 36-06

Performance Analysis

The RICHLAND 36-06 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the RICHLAND 36-06 circuit had 28 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (14); animal contacts (8); equipment failure (6).

Remedial Actions

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

26 Circuit 13704 -- SCHNECKSVILLE 37-04

Performance Analysis

The SCHNECKSVILLE 37-04 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the SCHNECKSVILLE 37-04 circuit had 43 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (16); tree related (13); equipment failure (8); vehicles (5); nothing found (1).

Remedial Actions

- In 2020, the protection scheme for this circuit will be optimized.
- In 2020, additional fusing was installed at five locations.
- In 2021, four additional single-phase reclosers will be installed.
- In 2021, additional fusing will be installed.
- In 2022, additional single-phase reclosers will be installed.
- In 2023, full circuit trimming will be performed.

27 Circuit 45902 -- AUBURN 59-02

Performance Analysis

The AUBURN 59-02 circuit experienced three outages of over 100,000 CMI between January 2020 and December 2020.

On August 2, 2020, during a period of heavy rain, a tree contacted an overhead conductor causing a temporary open point to be interrupted. 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 a temporary open point to be interrupted. 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, the AUBURN 59-02 circuit had 76 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (50); animal contacts (9); equipment failure (9); 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.
- 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 2020, hazard tree removal was performed.
- In 2021, additional fusing will be installed.
- In 2023, the AUBURN substation will be configured to be remotely transferrable.
- In 2023, a section of this circuit will be transferred to a new line.

28 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the WEST BLOOMSBURG 54-02 circuit had 95 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (64); animal contacts (15); equipment failure (9); nothing found (3); other (2); Improper Operation (1); vehicles (1).

Remedial Actions

- In 2021, three single-phase reclosers will be installed.
- In 2021, undergrounding will be evaluated for a section of this circuit.
- In 2021, hot spot trimming will be evaluated for this circuit.
- In 2022, five single-phase reclosers will be installed.
- In 2022, full circuit trimming will be performed.

29 Circuit 58401 -- MOUNT ROCK 84-01

Performance Analysis

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

In total, the MOUNT ROCK 84-01 circuit had 49 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (16); tree related (15); animal contacts (13); vehicles (4); nothing found (1).

Remedial Actions

- In 2021, a section of underground conductor will be evaluated for replacement.
- In 2021, additional single-phase reclosers will be evaluated.
- In 2021, a new three-phase sectionalizing device will be evaluated.
- In 2022, 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 January 2020 and December 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, the RICHLAND 36-01 circuit had 34 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (13); animal contacts (10); equipment failure (7); vehicles (2); nothing found (1); other (1).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2020, additional fusing was installed.
- In 2020, two dissimilar metal connections were remediated.
- In 2021, additional single-phase reclosers will be installed.
- In 2021, additional fusing will be installed.
- In 2021, full circuit trimming will be performed.
- In 2021, flood mitigation options will be evaluated for the substation.

31 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the ASHFIELD 04-03 circuit had 103 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (58); animal contacts (15); equipment failure (14); 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 2021, single-phase ties will be evaluated for this circuit.
- In 2021, three additional single-phase reclosers will be installed on this circuit.

32 Circuit 55002 -- NEWPORT 50-02

Performance Analysis

The NEWPORT 50-02 circuit experienced two outages of over 100,000 CMI between January 2020 and December 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, the NEWPORT 50-02 circuit had 55 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (36); equipment failure (11); 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, four locations were animal guarded.
- In 2021, a section of single-phase will be reconductored.

- In 2021, additional animal guarding will be installed.
- In 2021, an additional single-phase recloser will be installed.
- In 2021, relocating or storm-hardening a section of conductor to underground will be evaluated.
- In 2021, a new three-phase tie will be evaluated.

33 Circuit 14403 -- SO SLATINGTON 44-03

Performance Analysis

The SO SLATINGTON 44-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the SO SLATINGTON 44-03 circuit had 109 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (47); equipment failure (33); animal contacts (12); nothing found (8); vehicles (8); other (1).

Remedial Actions

- In 2020, additional fusing was installed.
- In 2020, an additional single-phase reclosers was installed.
- In 2021, additional fusing will be installed at multiple locations.
- In 2021, three additional single-phase recloser will be installed.
- In 2021, a section of conductor will be extended.
- In 2022, full circuit trimming will be performed.

34 Circuit 54701 -- NEW BLOOMFIELD 47-01

Performance Analysis

The NEW BLOOMFIELD 47-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the NEW BLOOMFIELD 47-01 circuit had 38 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (21); animal contacts (6); equipment failure (5); vehicles (3); contact or dig in (2); nothing found (1).

Remedial Actions

- In 2019, a protection coordination study was conducted, as a result several changes were applied.
- In 2020, four single-phase reclosers were installed.
- In 2020, two single-phase fuses were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a drone patrol and Proactive Circuit Analysis were performed with several minor remediations implemented.
- In 2022, a new Smart Grid device will be installed.
- In 2022, 7 single-phase reclosers will be installed.
- In 2022, additional single-phase reclosers will be evaluated.

35 Circuit 41602 -- CLEVELAND 16-02

Performance Analysis

The CLEVELAND 16-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the CLEVELAND 16-02 circuit had 68 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (40); animal contacts (13); equipment failure (12); nothing found (2); contact or dig in (1).

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 was performed.
- In 2020, multiple cross arms and transformer cutouts were replaced as the result of the Proactive Circuit Analysis.
- 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.

36 Circuit 59002 -- MIFFLINTOWN 90-02

Performance Analysis

The MIFFLINTOWN 90-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On March 3, 2020, during a period of strong wind, a vehicle contacted a pole or pole arm 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, the MIFFLINTOWN 90-02 circuit had 49 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (19); tree related (18); animal contacts (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, an additional single-phase recloser will be installed.
- In 2021, full circuit trimming will be performed.
- In 2021, a recloser will be evaluated for replacement and modification to single-phase tripping operation.

37 Circuit 56504 -- ROCKVILLE 65-04

Performance Analysis

The ROCKVILLE 65-04 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the ROCKVILLE 65-04 circuit had 107 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (64); animal contacts (23); equipment failure (15); nothing found (3); contact or dig in (1); other (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, seven single-phase sectionalizing devices were installed.

- In 2021, additional animal guards will be installed.
- In 2021, additional fusing will be installed.
- In 2022, a section of single-phase will be relocated underground.
- In 2022, five additional single-phase recloser will be installed.

38 Circuit 45302 -- WEST BERWICK 53-02

Performance Analysis

The WEST BERWICK 53-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On October 10, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 466 customers for up to 463 minutes resulting in 161,729 CMI.

In total, the WEST BERWICK 53-02 circuit had 57 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (26); animal contacts (15); equipment failure (11); nothing found (4); vehicles (1).

Remedial Actions

- In 2021, a section of difficult-to-access conductor will be relocated.
- In 2022, a section of conductor will be relocated and refed.
- In 2022, full circuit trimming will be performed.
- In 2023, a section of difficult-to-access conductor will be relocated.

39 Circuit 12705 -- MACUNGIE 27-05

Performance Analysis

The MACUNGIE 27-05 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the MACUNGIE 27-05 circuit had 8 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (6); animal contacts (1); tree related (1).

Remedial Actions

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

40 Circuit 29702 -- ANGELS 91-02

Performance Analysis

The ANGELS 91-02 circuit experienced two outages of over 100,000 CMI between January 2020 and December 2020.

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.

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.

In total, the ANGELS 91-02 circuit had 68 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (39); animal contacts (14); equipment failure (13); nothing found (2).

Remedial Actions

- In 2020, several poles and cross arms were replaced.
- In 2020, an existing recloser was replaced.
- In 2020, hot spot trimming was performed.
- In 2020, five new single-phase recloser were installed.
- In 2020, additional fusing was installed.
- In 2021, multiple porcelain cutouts will be replaced.
- In 2021, full circuit trimming will be performed.
- In 2022, additional single-phase reclosers will be installed.

41 Circuit 24003 -- WILKES-BARRE 40-03

Performance Analysis

The WILKES-BARRE 40-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the WILKES-BARRE 40-03 circuit had 6 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (2); equipment failure (2); other (1); tree related (1).

Remedial Actions

- In 2020, a Proactive Circuit Review was performed with eight minor remediations identified as a result. These will be performed in 2021.
- In 2021, three additional sectionalizing devices will be evaluated.
- In 2021, undergrounding will be evaluated for a section of conductor.

42 Circuit 40603 -- PINE GROVE 06-03

Performance Analysis

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

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

In total, the PINE GROVE 06-03 circuit had 59 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (18); animal contacts (15); equipment failure (12); nothing found (8); vehicles (3); other (2); contact or dig in (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 was transferred to an adjacent circuit.
- In 2021, a single-phase recloser will be replaced.
- In 2021, three poles will be replaced.
- In 2022, full circuit trimming will be performed.

43 Circuit 15001 -- BLUE MOUNTAIN 50-01

Performance Analysis

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

In total, the BLUE MOUNTAIN 50-01 circuit had 42 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (20); equipment failure (11); animal contacts (9); 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 2021, additional fusing will be installed.
- In 2021, three additional single-phase reclosers will be installed.
- In 2021, full circuit trimming will be performed.
- In 2022, five additional single-phase reclosers will be installed.

44 Circuit 56803 -- BENVENUE 68-03

Performance Analysis

The BENVENUE 68-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the BENVENUE 68-03 circuit had 62 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (32); equipment failure (14); animal contacts (11); vehicles (3); nothing found (2).

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 2021, an additional sectionalizing device will be evaluated.
- In 2021, an additional single-phase recloser will be evaluated,
- In 2022, five additional single-phase sectionalizing devices will be installed.

45 Circuit 26602 -- BROOKSIDE 66-02

Performance Analysis

The BROOKSIDE 66-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the BROOKSIDE 66-02 circuit had 13 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (6); animal contacts (3); equipment failure (3); 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 were remediated.
- In 2021, additional fusing and single-phase reclosers will be evaluated.
- In 2021, a new tie line will be constructed.
- In 2021, numerous porcelain cutouts will be replaced.
- In 2021, additional animal guarding will be installed.
- 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.

46 Circuit 21901 -- HUMBOLDT 19-01

Performance Analysis

The HUMBOLDT 19-01 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the HUMBOLDT 19-01 circuit had 74 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (41); equipment failure (15); animal contacts (12); nothing found (5); 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 2021, additional sectionalizing will be evaluated.
- In 2021, full circuit trimming will be performed.
- In 2021, single-phase ties will be evaluated for this circuit.

47 Circuit 64304 -- LINCOLN 43-04

Performance Analysis

The LINCOLN 43-04 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the LINCOLN 43-04 circuit had 39 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (21); animal contacts (7); equipment failure (7); vehicles (3); other (1).

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 2020, a multiphase infrared scan was completed. No corrective actions were required.
- In 2021, numerous ash trees will be removed near this circuit.
- In 2021, eight additional single-phase reclosers will be installed.
- In 2021, a section of difficult-to-access single-phase will be relocated.
- In 2021, a section of single-phase will be resourced to a more reliable source.
- In 2021, full circuit trimming will be performed.

48 Circuit 27101 -- GREENFIELD 71-01

Performance Analysis

The GREENFIELD 71-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On December 18, 2020, during a period of extreme temperatures, an equipment failure occurred on an overhead splice causing a circuit breaker to trip to lockout. This outage affected 1,826 customers for up to 231 minutes resulting in 200,316 CMI.

In total, the GREENFIELD 71-01 circuit had 46 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (16); tree related (16); animal contacts (11); nothing found (2); Improper Operation (1).

Remedial Actions

- In 2021, full circuit trimming will be performed.
- In 2021, eight additional single-phase reclosers will be installed.
- In 2021, additional animal guarding will be evaluated.
- In 2021, the protection settings on this circuit will be evaluated.

49 Circuit 46701 -- RENOVO 67-01

Performance Analysis

The RENOVO 67-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On July 26, 2020, an improper operation occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 681 customers for up to 547 minutes resulting in 317,959 CMI.

In total, the RENOVO 67-01 circuit had 26 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (20); equipment failure (3); animal contacts (2); Improper Operation (1).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2021, full circuit trimming will be performed.
- In 2021, a new single-phase recloser will be evaluated.
- In 2021, a Proactive Circuit Review will be performed.

50 Circuit 45602 -- WOOLRICH 56-02

Performance Analysis

The WOOLRICH 56-02 circuit experienced two outages of over 100,000 CMI between January 2020 and December 2020.

On November 1, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a transformer to be interrupted. This outage affected 261 customers for up to 1,228 minutes resulting in 174,881 CMI.

On February 27, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 362 customers for up to 302 minutes resulting in 109,324 CMI.

In total, the WOOLRICH 56-02 circuit had 65 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (37); animal contacts (13); equipment failure (10); nothing found (4); contact or dig in (1).

Remedial Actions

- In 2021, additional single-phase reclosers will be evaluated for this circuit.
- In 2021, a tie line will be evaluated for this circuit.
- In 2022, a section of difficult-to-access conductor will be reconductored and relocated.
- In 2023, full circuit trimming will be performed.

51 Circuit 47704 -- BLOOMSBURG 77-04

Performance Analysis

The BLOOMSBURG 77-04 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the BLOOMSBURG 77-04 circuit had 70 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (40); equipment failure (15); animal contacts (11); nothing found (2); other (2).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2021, two single-phase reclosers will be installed.
- In 2021, a section of line will be reconductored.
- In 2021, an additional single-phase recloser will be evaluated.
- In 2021, the protection setting on a three-phase device will be evaluated and optimized.
- In 2022, a section of conductor in a heavily wooded area will be undergrounded.

52 Circuit 11402 -- FARMERSVILLE 14-02

Performance Analysis

The FARMERSVILLE 14-02 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

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

In total, the FARMERSVILLE 14-02 circuit had 29 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (12); equipment failure (7); tree related (7); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, three 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 2021, additional animal guarding will be installed.
- In 2022, full circuit trimming will be performed.

53 Circuit 21206 -- EAST CARBONDALE 12-06

Performance Analysis

The EAST CARBONDALE 12-06 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the EAST CARBONDALE 12-06 circuit had 27 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (12); equipment failure (7); animal contacts (5); nothing found (1); other (1); vehicles (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 was performed.
- In 2021, multiple porcelain cutouts will be replaced.
- In 2021, additional animal guarding will be installed.
- In 2021, a section of this circuit will be re-sourced, and additional sectionalizing will be installed.
- In 2022, additional single-phase reclosers will be installed.

54 Circuit 57403 -- SPANGLER 74-03

Performance Analysis

The SPANGLER 74-03 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the SPANGLER 74-03 circuit had 38 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (22); animal contacts (10); equipment failure (3); nothing found (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, three additional fuses were installed.
- In 2020, the coordination settings for this circuit were optimized.
- In 2020, one hundred hazard trees were removed from this circuit.
- In 2021, two sections of single-phase will be evaluated for expanded trimming rights.
- In 2021, additional fusing will be installed.
- In 2021, full circuit trimming will be performed.
- In 2021, constructing a tie between two single-phase underground loops will be evaluated.
- In 2021, a section of single-phase will be evaluated for re-sourcing.

55 Circuit 40602 -- PINE GROVE 06-02

Performance Analysis

The PINE GROVE 06-02 circuit experienced two outages of over 100,000 CMI between January 2020 and December 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, the PINE GROVE 06-02 circuit had 82 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (41); animal contacts (19); equipment failure (14); nothing found (4); other (3); 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 was reconductored to three-phase, and the protection scheme will be upgraded.
- In 2021, full circuit trimming will be performed.

- In 2022, a section of difficult-to-access single-phase will be relocated.

56 Circuit 41901 -- REED 19-01

Performance Analysis

The REED 19-01 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the REED 19-01 circuit had 27 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (13); equipment failure (8); animal contacts (5); other (1).

Remedial Actions

- In 2020, additional fusing was installed at two locations with two more to be performed in 2021.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2020, multiple poles were replaced with more to be performed in 2021.
- In 2020, dissimilar metal connections were remediated at two locations.
- In 2021, full circuit trimming will be performed.
- In 2021, reconfiguring a portion of this circuit will be evaluated.

57 Circuit 22003 -- BOHEMIA 20-03

Performance Analysis

The BOHEMIA 20-03 circuit experienced two outages of over 100,000 CMI between January 2020 and December 2020.

On October 8, 2020, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 567 customers for up to 440 minutes resulting in 249,485 CMI.

On June 3, 2020, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 567 customers for up to 516 minutes resulting in 292,572 CMI.

In total, the BOHEMIA 20-03 circuit had 62 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (26); animal contacts (21); equipment failure (9); nothing found (6).

Remedial Actions

- In 2021, a new tie line will be constructed.
- In 2021, two additional Smart Grid devices will be installed.
- In 2021, additional single-phase reclosers will be evaluated.
- In 2023, full circuit trimming will be performed.

58 Circuit 59401 -- RICHFIELD 94-01

Performance Analysis

The RICHFIELD 94-01 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the RICHFIELD 94-01 circuit had 83 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (33); equipment failure (27); animal contacts (16); 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 2021.
- In 2021, a section of three-phase conductor will be evaluated for cross-arm replacement.
- In 2021, full circuit trimming will be performed.
- In 2021, three additional fuses will be installed.
- In 2021, additional fusing will be evaluated.
- In 2021, additional single-phase reclosers will be evaluated.
- In 2021, an existing recloser will be evaluated for replacement.
- In 2021, a section of single-phase will be evaluated for re-sourcing.

59 Circuit 15704 -- TANNERSVILLE 57-04

Performance Analysis

The TANNERSVILLE 57-04 circuit experienced one outage of over 100,000 CMI between January 2020 and December 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, the TANNERSVILLE 57-04 circuit had 53 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (22); animal contacts (18); equipment failure (10); nothing found (2); vehicles (1).

Remedial Actions

- In 2019, full circuit trimming was performed.
- In 2020, a recloser was replaced on this circuit.
- In 2020, additional single-phase reclosers will be evaluated for this circuit.
- In 2020, several dissimilar metal connections were remediated.
- In 2021, additional animal guarding will be installed.
- In 2021, additional single-phase reclosers will be evaluated.
- In 2022, full circuit trimming will be performed.
- In 2022, additional storm hardening will be installed.

60 Circuit 44903 -- SCOTT 49-03

Performance Analysis

The SCOTT 49-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On July 3, 2020, during a period of heavy rain, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,745 customers for up to 281 minutes resulting in 285,765 CMI.

In total, the SCOTT 49-03 circuit had 4 outages between January 2020 and December 2020, with the causes breaking down as follows: animal contacts (1); equipment failure (1); tree related (1); vehicles (1).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2021, a section of this line will be made more accessible.
- In 2021, several poles will be upgraded to a larger class.

61 Circuit 12802 -- MICKLEYS 28-02

Performance Analysis

The MICKLEYS 28-02 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the MICKLEYS 28-02 circuit had 8 outages between January 2020 and December 2020, with the causes breaking down as follows: equipment failure (6); nothing found (2).

Remedial Actions

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

62 Circuit 12301 -- LANARK 23-01

Performance Analysis

The LANARK 23-01 circuit experienced no outages of over 100,000 CMI between January 2020 and December 2020.

In total, the LANARK 23-01 circuit had 42 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (18); animal contacts (9); equipment failure (9); vehicles (3); contact or dig in (2); nothing found (1).

Remedial Actions

- In 2020, hot spot trimming was performed.
- In 2021, additional animal guarding was installed.
- In 2021, two single-phase reclosers will be installed.
- In 2022, full circuit trimming will be performed.
- In 2022, two single-phase reclosers will be installed.

63 Circuit 44203 -- POINT 42-03

Performance Analysis

The POINT 42-03 circuit experienced one outage of over 100,000 CMI between January 2020 and December 2020.

On September 9, 2020, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,875 customers for up to 217 minutes resulting in 187,370 CMI.

In total, the POINT 42-03 circuit had 22 outages between January 2020 and December 2020, with the causes breaking down as follows: tree related (9); animal contacts (6); equipment failure (6); nothing found (1).

Remedial Actions

- In 2020, additional fusing was installed.
- In 2021, relocating a sectionalizing device and constructing a tie will be evaluated.
- In 2021, two additional single-phase reclosers will be evaluated for this circuit.
- In 2022, full circuit trimming will be performed.

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	3,918	18.8%	55,368	4.6%	3,246,630	2.0%
Contact / Dig-In	183	0.9%	23,246	1.9%	1,140,267	0.7%
Directed by Non-PPL Authority	72	0.3%	10,991	0.9%	911,458	0.5%
Equipment Failures	5,223	25.0%	370,770	30.6%	32,645,494	19.6%
Improper Design	2	0.0%	295	0.0%	22,885	0.0%
Improper Installation	4	0.0%	1,799	0.1%	85,944	0.1%
Improper Operation	13	0.1%	6,021	0.5%	1,019,615	0.6%
Nothing Found	1,013	4.9%	55,483	4.6%	4,021,673	2.4%
Other Controllable	88	0.4%	23,973	2.0%	418,660	0.3%
Other Non-Control	210	1.0%	27,799	2.3%	3,424,408	2.1%
Other Public	30	0.1%	6,267	0.5%	246,400	0.1%
Tree Related	9,353	44.8%	509,559	42.0%	108,127,529	65.0%
Unknown	1	0.0%	426	0.0%	613,423	0.4%
Vehicles	767	3.7%	120,139	9.9%	10,490,216	6.3%
Total	**20,877**	**100.0%**	**1,212,136**	**100.0%**	**166,414,603**	**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, 55% of customer interruptions, and 72% 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 81% of the cases of trouble, 83% of the customer interruptions and 91% 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 37% of the cases of trouble, 47% of the customer interruptions and 45% 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	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of structures)	686	174	174	686	686
Transmission arm replacements (# of arms)	56	23	23	56	56
Transmission air break switch inspections (# of switches)	5	0	0	5	5
Transmission surge arrester installations (# of sets)	1,500	462	500	1,500	1,538
Transmission structure inspections (# of activities)	18,241	4,393	4,644	18,241	18,492
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	43	49	844	844
Transmission reclearing (# of miles) 69 kV	1584	189	282	1,584	1,584
Transmission reclearing (# of miles) 138 kV	91	10	10	91	91
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	1,102	57	34	1,102	1,086
Circuit breakers (# of activities)	98	90	34	98	86
Substation inspections (# of activities)	2,281	516	440	2,281	2,258
Transformer maintenance (# of activities)	1,410	1,156	48	1,410	328

Inspection & Maintenance Goals/Objectives	Annual Budget	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	1,294	878	224	1,294	1,240
C-truss distribution poles (# of poles)	3,888	1,568	1,568	4,030	4,030
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	22,787	22,787	67,988	67,988
Distribution line inspections (miles)	3,288	0	0	3,288	3,288
Group re-lamping (# of lamps)	24,100	6,045	0	24,100	8,687
Test sections of underground distribution cable	N/A	N/A	117	N/A	608
Distribution tree trimming (# of miles)	5,089	1,341	904	5,089	5,069
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	323	81	36	324
LTN vault inspections (# of)	356	356	89	81	356
LTN network protector overhauls (# of)	85	85	21	12	84
LTN reverse power trip testing (# of)	36	36	9	12	36

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		4th Quarter		Year-to-date	
	2020 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	5,927	1,471	1,710	5,927	6,755
Vegetation Management	36,213	7,708	7,018	36,213	37,424
Customer Response	61,834	14,084	13,420	61,834	66,102
Reliability Maintenance	33,865	7,858	6,161	33,865	28,669
System Upgrade	7,235	985	362	7,235	5,013
Customer Service/Accounts	113,140	31,060	21,394	113,140	80,790
Others	38,045	9,197	21,386	38,045	54,908
Total O&M Expenses	**296,258**	**72,364**	**71,451**	**296,258**	**279,661**

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		4th Quarter		Year-to-date	
	2020 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	95,015	23,328	21,988	95,015	92,097
System Upgrade	337,320	76,995	68,047	337,320	331,634
Reliability & Maintenance	567,236	152,573	157,928	567,236	573,184
Customer Response	26,857	5,028	11,106	26,857	35,376
Other	22,667	4,291	3,779	22,667	11,021
Total	**1,049,095**	**262,215**	**262,848**	**1,049,095**	**1,043,313**

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

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 4th quarter of 2020, 102 corrective work orders were created with the following breakdown by priority.

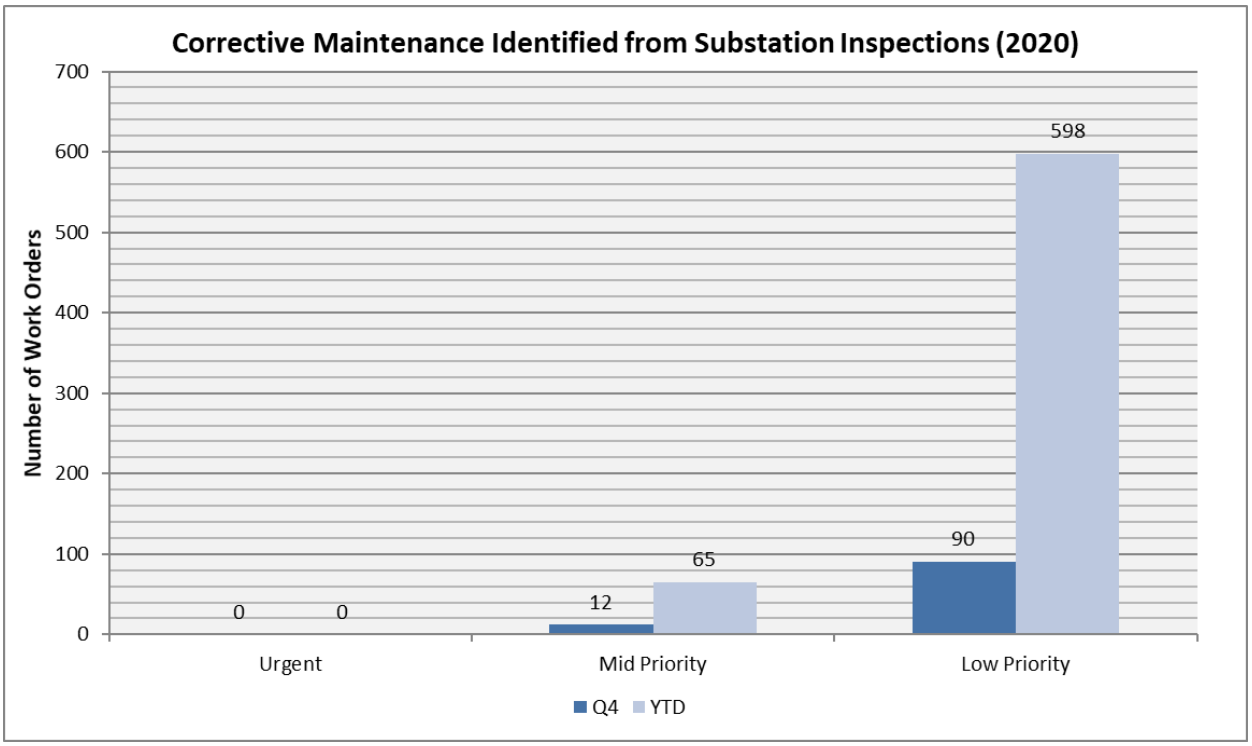

Figure 1: Corrective Maintenance Work Orders by Priority Level for 4th Quarter and Year-to-Date 2020

(b) The Amount Spent on Substation Inspections

During the 4th quarter of 2020, PPL Electric Utilities spent approximately $132,000 on substation inspections.

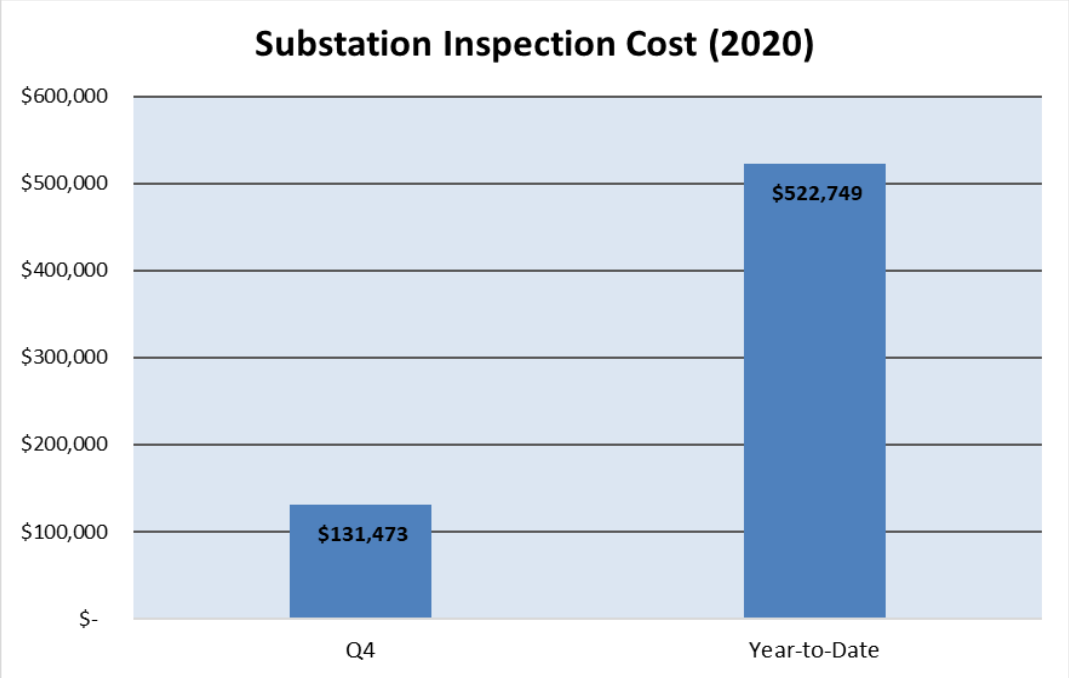

Figure 2: Substation Inspection Costs for 4th Quarter and Year-to-Date 2020.

(c) The Amount Spent on Vegetation Management

Please refer to Section 7 for vegetation management expenses for the 4th 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 4th quarter and year-to-date. During the 4th quarter of 2020, PPL Electric Utilities avoided a projected 354,000 CMI.

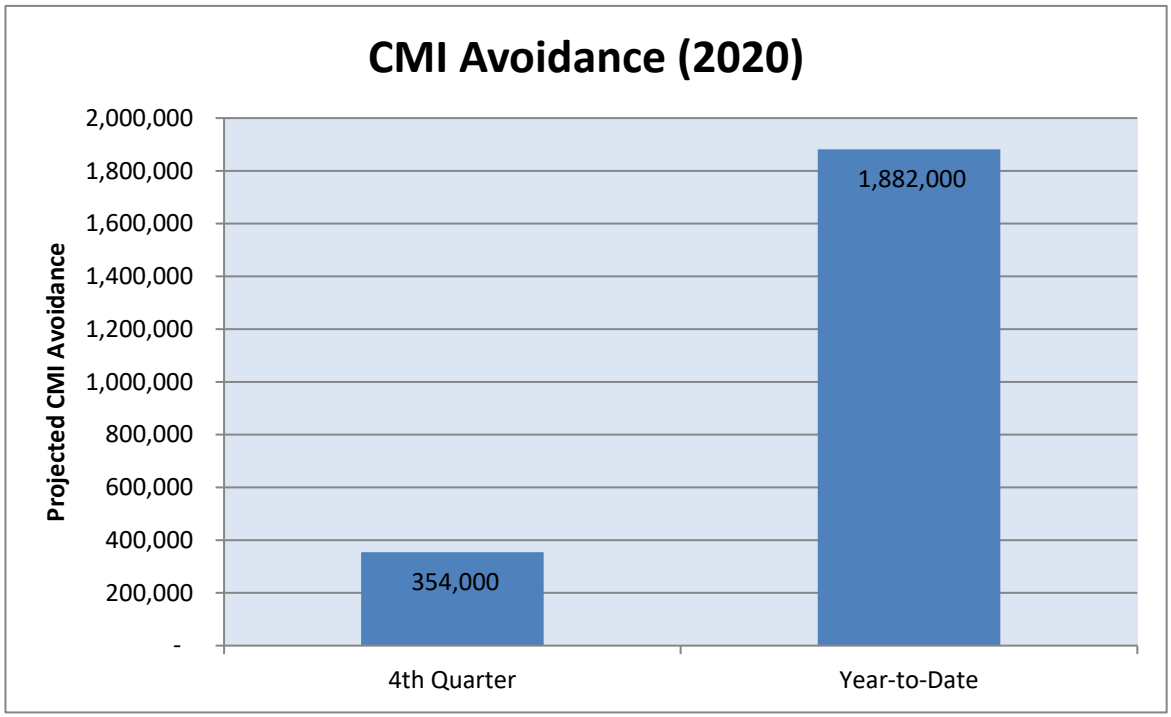

Figure 3: Projected CMI Avoidance Due to Substation Inspections for 4th Quarter and Year-to-Date 2020

(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 4th quarter of 2020, the Company interrupted approximately 17,000 customers for a total of 170,000 CMI. The figures below show these results for the number of customers interrupted and CMI experienced, respectively.

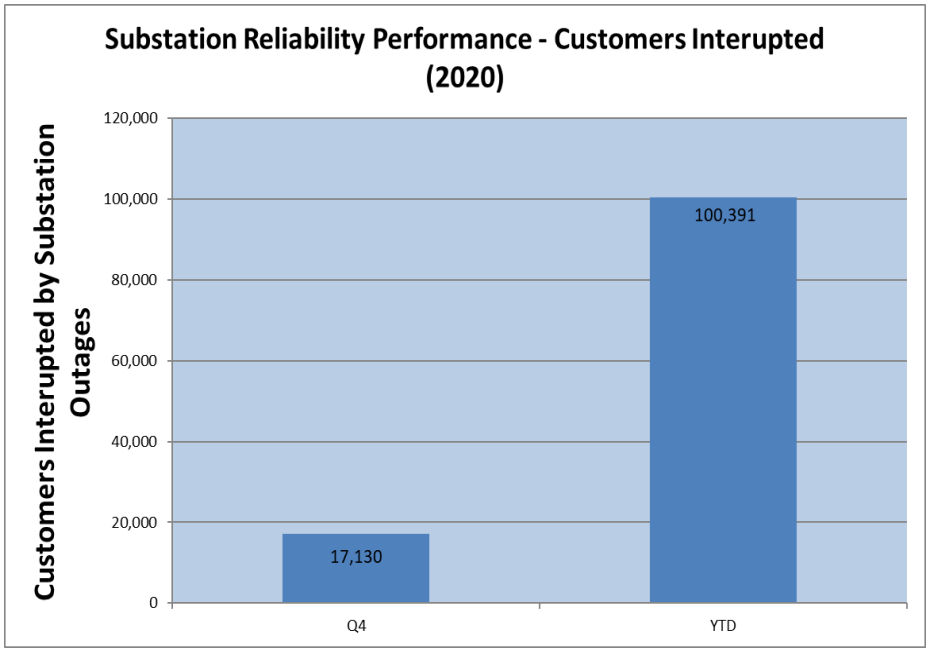

Figure 4: Substation Customers Interrupted for 4th Quarter and Year-to-Date 2020

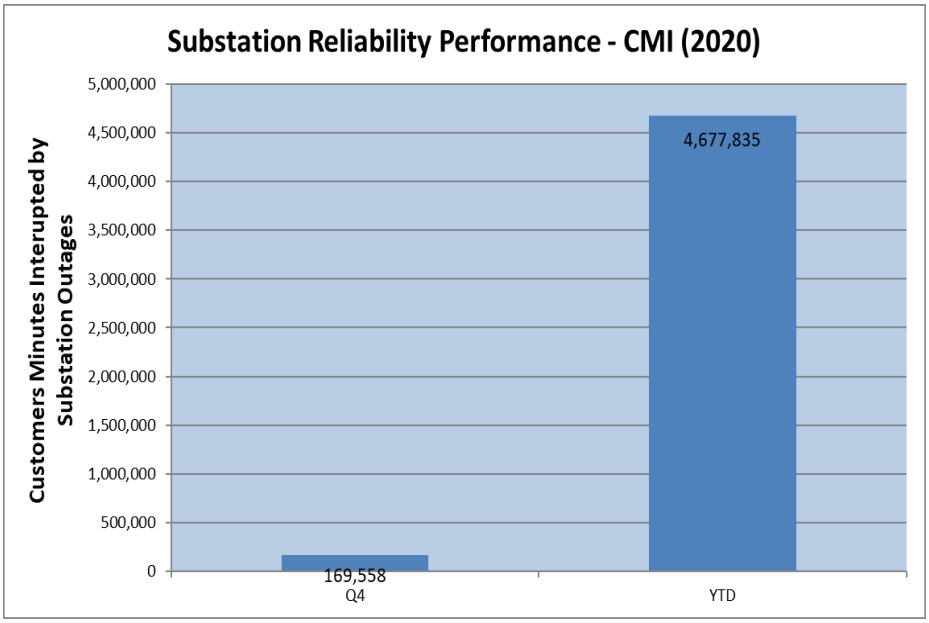

Figure 5: Substation Customer Minutes of Interruption for 4th Quarter and Year-to-Date 2020

(f) Substation SAIFI Contribution

Overall, substation outages contributed approximately 6% of the total SAIFI experienced by PPL Electric customers in the 4th 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.

	4th 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	61
Journeyman Lineman	173
Journeyman Lineman-Trainee	12
Helper	16
Groundhand	2
Troubleman	53
T&D Total	**317**
Electrical	
Elect Leaders-UG	2
Elect Leaders-Net	10
Elect Leaders-Sub	21
Journeyman Elect-UG	9
Journeyman Elect-Net	27
Journeyman Elect-Sub	54
Electrical Total	**123**
Overall Total	**440**

Appendix A

PPL Electric Utilities Corporation

Worst Performing Circuit Definition

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.

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.