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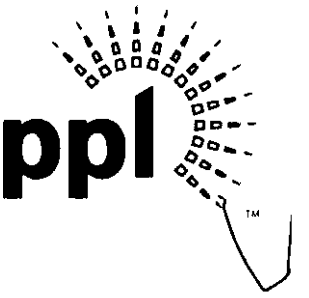


FEDERAL EXPRESS

July 31, 2019

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 June 30, 2019
Docket No. M-2016-2522508

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation ("PPL Electric") is an original of PPL Electric's Quarterly Reliability Report for the Period Ended June 30, 2019. Also enclosed in a sealed envelope, is a copy of the report containing competitively sensitive and proprietary information. The Company hereby requests that the Commission treat that information, and the report containing the information, as **PRIVILEGED** and **CONFIDENTIAL**. 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 July 31, 2019, which is the date it was deposited with an overnight express delivery service as shown on the delivery receipt attached to the mailing envelope.

In addition, please date and time-stamp the enclosed extra copy of this letter and return it to me in the envelope provided.

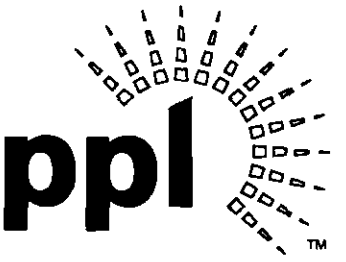
If you have any questions regarding this document, please call me or B. Kathryn Frazier, PPL Electric's Regulatory Affairs Manager at (610) 774-3372.

Very truly yours,

Kimberly A. Klock

Enclosures

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



PPL Electric Utilities

PPL Electric Utilities Corporation

Quarterly Reliability Report

to the

Pennsylvania Public Utility Commission

RECEIVED
JUL 31 2019
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

July 2019

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 second quarter of 2019.

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 June 30, 2019.

SAIFI (Benchmark = 0.98; Rolling 12-month Std. = 1.18)	0.86
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	152
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	131
MAIFI	5.9
Average Number of Customers Served[1]	1,425,182
Number of Sustained Customer Interruptions (Trouble Cases)	20,845
Number of Customers Affected[2]	1,229,907
Customer Minutes of Interruptions (CMI)	186,927,142
Number of Customer Momentary Interruptions	8,422,817

During the second quarter, there were no (0) PUC major events, four (4) PUC reportable event, and three (3) other storms that required the opening of one or more area emergency centers to manage restoration efforts.

Approximately 47,000 of PPL Electric's customer interruptions in the four quarters ending June 30, 2019 were the result of forced outages due to UGI gas leaks.

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[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.

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	43401	3016	625	4.8	22.8	977	42	2,947,090
2	46301	2393	740	3.2	10.1	1,050	59	2,512,864
3	45501	1744	704	2.5	20.0	1,422	34	2,479,596
4	55001	1742	306	5.7	47.2	1,281	162	2,231,588
5	43402	2122	799	2.7	12.8	1,034	56	2,194,505
6	44301	1019	304	3.3	7.3	2,031	99	2,068,602
7	40201	1240	354	3.5	14.9	1,663	100	2,062,112
8	45602	1161	346	3.4	16.6	1,619	56	1,879,417
9	42701	1065	264	4.0	4.5	1,469	119	1,565,138
10	43202	1314	289	4.5	19.0	1,149	69	1,509,775
11	47704	1074	195	5.5	7.3	1,376	68	1,477,685
12	28602	761	370	2.1	1.2	1,938	39	1,474,851
13	43201	1331	531	2.5	12.1	958	42	1,275,545
14	40602	540	164	3.3	4.8	2,288	58	1,235,838
15	46302	1111	346	3.2	3.9	1,084	83	1,204,201
16	59002	475	174	2.7	9.0	2,243	83	1,065,053
17	46206	583	525	1.1	1.5	1,819	47	1,060,031
18	45002	544	263	2.1	15.1	1,944	69	1,058,198
19	59202	614	214	2.9	22.0	1,699	80	1,043,042
20	46004	490	240	2.0	9.8	2,060	61	1,009,078
21	56803	794	358	2.2	7.4	1,257	57	997,502
22	45302	810	292	2.8	9.9	1,212	55	981,116
23	41602	1097	265	4.1	13.3	840	74	921,532
24	11804	792	611	1.3	8.8	1,128	27	893,693

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	47001	359	195	1.8	6.6	2,487	65	892,419
26	41401	720	190	3.8	20.0	1,229	50	884,834
27	40101	413	98	4.2	16.3	2,131	59	880,032
28	54701	788	163	4.8	27.3	1,101	57	867,782
29	45402	533	488	1.1	21.3	1,623	88	865,762
30	45502	1410	361	3.9	18.6	613	33	864,538
31	53901	650	238	2.7	49.0	1,330	63	864,048
32	46001	361	311	1.2	5.0	2,340	66	845,357
33	21705	300	468	0.6	4.5	2,778	27	833,123
34	52402	495	150	3.3	8.6	1,660	86	822,503
35	56802	533	167	3.2	7.0	1,532	68	815,954
36	48302	479	255	1.9	10.8	1,661	49	795,747
37	26601	582	189	3.1	6.4	1,322	39	769,226
38	26703	407	243	1.7	2.8	1,886	62	768,525
39	42802	646	314	2.1	9.8	1,172	23	757,551
40	20403	393	189	2.1	7.7	1,916	65	752,163
41	10904	428	156	2.7	1.6	1,750	83	748,631
42	17802	387	194	2.0	22.8	1,921	71	743,977
43	56501	300	248	1.2	14.5	2,385	42	714,682
44	47402	307	126	2.4	7.0	2,259	32	693,380
45	56504	345	253	1.4	13.8	1,979	80	683,128
46	21502	186	403	0.5	10.9	3,677	10	682,951
47	52403	536	119	4.5	10.4	1,241	75	665,010
48	12402	1218	421	2.9	12.5	546	36	664,914
49	44502	755	279	2.7	9.8	871	58	657,936
50	47002	329	261	1.3	3.5	1,992	66	655,504
51	61101	501	153	3.3	3.2	1,296	31	649,550
52	44802	436	362	1.2	7.7	1,484	36	647,329
53	63501	336	239	1.4	41.6	1,905	68	640,344
54	14103	294	211	1.4	6.8	2,162	67	635,331
55	26001	443	203	2.2	10.5	1,432	68	634,876
56	59101	372	110	3.4	19.1	1,704	59	633,769
57	43102	637	481	1.3	7.5	984	28	627,215
58	55002	835	201	4.2	17.8	746	65	622,755
59	53601	560	208	2.7	10.0	1,111	56	622,400
60	28301	272	176	1.5	8.4	2,283	106	621,141
61	46802	323	216	1.5	7.3	1,916	93	619,349
62	22404	564	118	4.8	1.8	1,094	13	616,646
63	67502	306	120	2.6	24.2	1,991	34	609,827

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

01 Circuit 43401 -- BENTON 34-01

Performance Analysis

The BENTON 34-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On August 13, 2018, during a period of heavy rain, a tree contacted an overhead component causing an interruption. This outage affected 508 customers for up to 481 minutes resulting in 100,560 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 972 customers for up to 5,114 minutes resulting in 2,407,429 CMI.

In total, the BENTON 34-01 circuit had 42 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (28); equipment failure (8); animal contacts (3); nothing found (3).

Remedial Actions

- In 2018, a section of difficult-to-access conductor was relocated.
- In 2018, an additional sectionalizing device was installed.
- In 2019, an additional single-phase recloser will be installed.
- In 2019, an additional Smart Grid device will be installed.
- In 2019, relocation will be evaluated for two sections of difficult-to-access conductor.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, additional Smart Grid devices will be evaluated for this circuit.
- In 2019, additional sectionalizing will be evaluated for two sections of single-phase conductor.
- In 2020, full circuit trimming will be performed.

02 Circuit 46301 -- ROHRSBURG 63-01

Performance Analysis

The ROHRSBURG 63-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 14, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,052 customers for up to 4,937 minutes resulting in 2,242,417 CMI.

In total, the ROHRSBURG 63-01 circuit had 59 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (29); equipment failure (14); animal contacts (6); nothing found (5); other (3); vehicles (2).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, full circuit trimming will be performed.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.
- In 2020, two additional single-phase reclosers will be installed.

03 Circuit 45501 -- DERRY 55-01

Performance Analysis

The DERRY 55-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,415 customers for up to 3,799 minutes resulting in 2,174,287 CMI.

In total, the DERRY 55-01 circuit had 34 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (19); animal contacts (5); equipment failure (5); other (2); contact or dig in (1); nothing found (1); vehicles (1).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.
- In 2019, an additional single-phase recloser will be evaluated.

04 Circuit 55001 -- NEWPORT 50-01

Performance Analysis

The NEWPORT 50-01 circuit experienced seven outages of over 100,000 CMI between July 2018 and June 2019.

On November 16, 2018, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 324 customers for up to 1,474 minutes resulting in 228,901 CMI.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 211 customers for up to 968 minutes resulting in 142,146 CMI.

On March 3, 2019, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 325 customers for up to 427 minutes resulting in 122,821 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 258 customers for up to 633 minutes resulting in 137,520 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 449 customers for up to 227 minutes resulting in 101,104 CMI.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead splice causing a temporary open point to be interrupted. This outage affected 126 customers for up to 1,214 minutes resulting in 149,985 CMI.

On May 30, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 403 customers for up to 839 minutes resulting in 337,573 CMI.

In total, the NEWPORT 50-01 circuit had 162 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (111); equipment failure (29); animal contacts (12); nothing found (5); vehicles (3); other (2).

Remedial Actions

- In 2019, a Smart Grid device was installed.
- In 2019, a battery demonstration energy storage system was installed to study reliability benefits and voltage control.
- In 2019, a substation conversion will be completed.
- In 2019, protection coordination will be evaluated.
- In 2019, a new single-phase tie will be evaluated.
- In 2019, single-phase sectionalizing will be installed.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2020, full circuit tree trimming will be performed.

05 Circuit 43402 -- BENTON 34-02

Performance Analysis

The BENTON 34-02 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On October 2, 2018, during a period of strong wind, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 180 customers for up to 617 minutes resulting in 107,477 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,041 customers for up to 30 minutes resulting in 1,096,131 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 146 customers for up to 1,080 minutes resulting in 157,680 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 83 customers for up to 3,496 minutes resulting in 163,157 CMI.

In total, the BENTON 34-02 circuit had 56 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (40); equipment failure (10); animal contacts (3); *nothing found* (2); *other* (1).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, a section of difficult-to-access single-phase conductor will be relocated.
- In 2019, full circuit trimming will be performed.
- In 2019, a section of single-phase will be evaluated for re-sourcing.

06 Circuit 44301 -- BEAVERTOWN 43-01

Performance Analysis

The BEAVERTOWN 43-01 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,034 customers for up to 407 minutes resulting in 827,838 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 474 customers for up to 2,416 minutes resulting in 468,909 CMI.

On May 3, 2019, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 2,021 customers for up to 67 minutes resulting in 135,407 CMI.

On May 23, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 470 customers for up to 321 minutes resulting in 143,535 CMI.

In total, the BEAVERTOWN 43-01 circuit had 99 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (63); equipment failure (21); nothing found (7); animal contacts (6); other (2).

Remedial Actions

- In 2019, a section of difficult-to-access single-phase will be relocated.
- In 2019, additional fusing will be installed on this circuit.
- In 2019, 40 or more poles will be replaced.
- In 2019, a section of three-phase will be evaluated for relocation.
- In 2019, a tie to the BEAVERTOWN 43-02 will be evaluated.
- In 2019, an additional Smart Grid device and tie will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2021, a new tie line will be constructed.

07 Circuit 40201 -- BEAR GAP 02-01

Performance Analysis

The BEAR GAP 02-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 109 customers for up to 2,499 minutes resulting in 204,668 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 1,337 customers for up to 3,997 minutes resulting in 1,263,476 CMI.

In total, the BEAR GAP 02-01 circuit had 100 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (62); equipment failure (21); animal contacts (10); nothing found (7).

Remedial Actions

- In 2019, additional fusing will be installed at eight locations.
- In 2019, additional hazard tree removal will be performed.
- In 2019, an additional single-phase tie will be evaluated.
- In 2019, additional single-phase reclosers will be evaluated.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.
- In 2019, an additional single-phase tie to the REED 19-03 will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2020, a section of existing conductor will be relocated and reconductored.

08 Circuit 45602 -- WOOLRICH 56-02

Performance Analysis

The WOOLRICH 56-02 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On July 25, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 426 customers for up to 447 minutes resulting in 164,004 CMI.

On August 7, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 703 customers for up to 1,036 minutes resulting in 728,226 CMI.

On September 21, 2018, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 983 customers for up to 348 minutes resulting in 253,174 CMI.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 983 customers for up to 1,474 minutes resulting in 372,932 CMI.

In total, the WOOLRICH 56-02 circuit had 56 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (31); animal contacts (11); equipment failure (9); nothing found (5).

Remedial Actions

- In 2019, an additional Smart Grid device was installed.
- In 2019, additional animal guarding will be installed.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, an additional single-phase sectionalizing device will be evaluated.
- In 2019, a tie to the WOOLRICH 56-01 will be evaluated.

09 Circuit 42701 -- AUGUSTAVILLE 27-01

Performance Analysis

The AUGUSTAVILLE 27-01 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On July 24, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 159 customers for up to 1,176 minutes resulting in 114,667 CMI.

On April 14, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 56 customers for up to 2,327 minutes resulting in 109,762 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 191 customers for up to 2,484 minutes resulting in 402,902 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 143 customers for up to 2,504 minutes resulting in 148,007 CMI.

In total, the AUGUSTAVILLE 27-01 circuit had 119 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (80); equipment failure (19); animal contacts (9); nothing found (6); other (3); vehicles (2).

Remedial Actions

- In 2018, an Expanded Operational Review was performed. Additional fusing was installed as a result.
- In 2019, two additional single-phase reclosers were installed.
- In 2019, an additional Smart Grid device was installed.
- In 2019, full circuit trimming will be performed.
- In 2019, a section of multi-phase conductor will be replaced.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.
- In 2019, a section of single-phase will be evaluated for relocation.
- In 2020, a section of difficult-to-access conductor will be removed.
- In 2020, an additional Smart Grid device will be installed.

10 Circuit 43202 -- MILLVILLE 32-02

Performance Analysis

The MILLVILLE 32-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,149 customers for up to 4,425 minutes resulting in 1,055,792 CMI.

On April 20, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,148 customers for up to 407 minutes resulting in 107,392 CMI.

In total, the MILLVILLE 32-02 circuit had 69 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (42); equipment failure (19); animal contacts (3); nothing found (3); vehicles (2).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, two single-phase reclosers will be installed.
- In 2019, additional fusing will be added at multiple locations.
- In 2020, a section of difficult-to-access three-phase will be relocated.

11 Circuit 47704 -- BLOOMSBURG 77-04

Performance Analysis

The BLOOMSBURG 77-04 circuit experienced five outages of over 100,000 CMI between July 2018 and June 2019.

On September 9, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 403 customers for up to 571 minutes resulting in 229,710 CMI.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 93 customers for up to 1,693 minutes resulting in 123,351 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 156 customers for up to 2,524 minutes resulting in 268,364 CMI.

On April 15, 2019, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 404 customers for up to 448 minutes resulting in 180,874 CMI.

On June 29, 2019, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,518 customers for up to 377 minutes resulting in 119,490 CMI.

In total, the BLOOMSBURG 77-04 circuit had 68 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (39); equipment failure (19); nothing found (6); animal contacts (2); other (1); vehicles (1).

Remedial Actions

- In 2018, the circuit breaker was replaced.
- In 2019, line reconfiguration will be performed on a section of single-phase line.
- In 2019, two sections of difficult-to-access conductor will be evaluated for relocation.
- In 2019, construction of a new substation will be evaluated.
- In 2019, a section of conductor will be evaluated for receiving tree cable or undergrounding.
- In 2020, full circuit trimming will be performed.

12 Circuit 28602 -- BLYTHEBURN 86-02

Performance Analysis

The BLYTHEBURN 86-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 769 customers for up to 2,201 minutes resulting in 860,351 CMI.

In total, the BLYTHEBURN 86-02 circuit had 39 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (22); equipment failure (7); other (5); animal contacts (4); vehicles (1).

Remedial Actions

- In 2018, a three-phase recloser was installed as part of the Smart Grid program.
- In 2018, multiple porcelain cutout fuses were replaced.
- In 2018, a single-phase tap fuse was installed.
- In 2019, full circuit trimming was performed.
- In 2019, an additional single-phase recloser was installed.
- In 2019, two additional switches will be installed.
- In 2019, a substation conversion will be evaluated.
- In 2019, a tie line to the BLYTHEBURN 86-04 will be evaluated.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, an additional Smart Grid device will be evaluated.
- In 2019, the use of Hendrix tree cable will be evaluated.
- In 2019, undergrounding will be evaluated for a heavily wooded section of this circuit.
- In 2020, an additional Smart Grid device will be installed.
- In 2020, a section of difficult-to-access single-phase will be relocated.

13 Circuit 43201 -- MILLVILLE 32-01

Performance Analysis

The MILLVILLE 32-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 44 customers for up to 2,467 minutes resulting in 102,788 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 696 customers for up to 2,619 minutes resulting in 798,882 CMI.

In total, the MILLVILLE 32-01 circuit had 42 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (21); equipment failure (10); animal contacts (6); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, relocating two sections of difficult-to-access single-phase conductor will be evaluated.
- In 2019, additional single-phase reclosers will be evaluated.

14 Circuit 40602 -- PINE GROVE 06-02

Performance Analysis

The PINE GROVE 06-02 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On August 1, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 415 customers for up to 1,093 minutes resulting in 254,054 CMI.

On October 17, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 416 customers for up to 318 minutes resulting in 103,421 CMI.

On December 21, 2018, a vehicle contacted a pole causing a motor operated switch to be interrupted. This outage affected 1,875 customers for up to 413 minutes resulting in 192,541 CMI.

In total, the PINE GROVE 06-02 circuit had 58 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (33); equipment failure (15); nothing found (4); vehicles (3); animal contacts (2); other (1).

Remedial Actions

- In 2019, an additional Smart Grid device was installed.
- In 2019, two single-phase reclosers will be installed.
- In 2019, two poles will be replaced.
- In 2019, ten additional locations will receive fusing.
- In 2020, an additional Smart Grid device will be installed.
- In 2020, a section of single-phase line will be reconductored to three-phase, and the protection scheme will be upgraded.

- In 2021, full circuit trimming will be performed.

15 Circuit 46302 -- ROHRSBURG 63-02

Performance Analysis

The ROHRSBURG 63-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 316 customers for up to 28 minutes resulting in 426,891 CMI.

In total, the ROHRSBURG 63-02 circuit had 83 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (54); equipment failure (16); nothing found (7); animal contacts (5); other (1).

Remedial Actions

- In 2018, an existing three-phase recloser was converted to single-phase operation.
- In 2018, an Expanded Operation Review was performed with 35 minor remediations performed.
- In 2018, hot spot trimming was performed.
- In 2019, an additional single-phase recloser was installed.
- In 2019, an additional Smart Grid device will be installed.
- In 2019, full circuit trimming will be performed.
- In 2019, additional fusing will be evaluated.
- In 2019, additional trimming right-of-way will be sought in areas with high tree outage concentrations.
- In 2019, several sections of difficult-to-access conductor will be evaluated for relocation.
- In 2019, the trim cycle length will be re-evaluated for this circuit.

16 Circuit 59002 -- MIFFLINTOWN 90-02

Performance Analysis

The MIFFLINTOWN 90-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On August 8, 2018, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 289 customers for up to 411 minutes resulting in 118,672 CMI.

On June 12, 2019, during a period of heavy rain, an unidentified issue occurred with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 2,246 customers for up to 409 minutes resulting in 516,381 CMI.

In total, the MIFFLINTOWN 90-02 circuit had 83 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (44); equipment failure (27); nothing found (6); animal contacts (4); other (1); vehicles (1).

Remedial Actions

- In 2018, single-phase sectionalizing was installed.
- In 2019, a single-phase tie will be evaluated.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2019, a three-phase tie will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2020, a new line and terminal at Mifflintown sub will be installed.

17 Circuit 46206 -- DANVILLE 62-06

Performance Analysis

The DANVILLE 62-06 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On July 25, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 111 customers for up to 1,392 minutes resulting in 104,877 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 90 customers for up to 1,551 minutes resulting in 126,853 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 83 customers for up to 2,665 minutes resulting in 179,905 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 74 customers for up to 3,775 minutes resulting in 196,434 CMI.

In total, the DANVILLE 62-06 circuit had 47 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (30); equipment failure (8); animal contacts (4); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2018, a one-mile section of difficult-to-access conductor was relocated.
- In 2018, hot spot trimming was performed.
- In 2019, two additional single-phase reclosers will be installed.
- In 2019, a section of single-phase conductor will be rebuilt to underground.

- In 2019, a tie to the DANVILLE 62-04 will be constructed.
- In 2019, a section of single-phase conductor will be re-sourced.
- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, the trim cycle for this circuit will be re-evaluated.
- In 2019, a new distribution river crossing will be evaluated.

18 Circuit 45002 -- LIMESTONE 50-02

Performance Analysis

The LIMESTONE 50-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,519 customers for up to 2,706 minutes resulting in 360,644 CMI.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 146 customers for up to 2,830 minutes resulting in 113,275 CMI.

In total, the LIMESTONE 50-02 circuit had 69 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (47); equipment failure (9); animal contacts (6); nothing found (3); other (2); vehicles (2).

Remedial Actions

- In 2019, a section of difficult-to-access conductor was relocated.
- In 2019, additional fusing will be installed.
- In 2019 and 2020, ten poles will be replaced.
- In 2019, a new Smart Grid device will be installed.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, a new tie line for this circuit will be evaluated.
- In 2020, multiple porcelain cutouts will be replaced.
- In 2021, a section of difficult-to-access conductor will be relocated.

19 Circuit 59202 -- THOMPSONTOWN 92-02

Performance Analysis

The THOMPSONTOWN 92-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 888 customers for up to 239 minutes resulting in 212,232 CMI.

On April 27, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 922 customers for up to 1,587 minutes resulting in 171,928 CMI.

In total, the THOMPSONTOWN 92-02 circuit had 80 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (57); equipment failure (16); nothing found (4); animal contacts (2); vehicles (1).

Remedial Actions

- In 2019, single-phase sectionalizing will be installed.
- In 2019, a Smart Grid device was installed.
- In 2019, a sectionalizing single-phase device will be installed.
- In 2019, a section of inaccessible conductor will be relocated.
- In 2019, additional single-phase fusing will be evaluated.
- In 2019, three single-phase ties will be evaluated.
- In 2019, a Smart Grid device will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2020, a three-phase protective device will be upgraded to a Smart Grid device.

20 Circuit 46004 -- BERWICK 60-04

Performance Analysis

The BERWICK 60-04 circuit experienced four outages of over 100,000 CMI between July 2018 and June 2019.

On August 13, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 338 customers for up to 395 minutes resulting in 122,934 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 60 customers for up to 2,313 minutes resulting in 136,656 CMI.

On April 15, 2019, during a period of strong wind, an equipment failure occurred on an overhead lightning protector causing a recloser to trip to lockout. This outage affected 116 customers for up to 3,822 minutes resulting in 139,121 CMI.

On May 31, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 361 customers for up to 805 minutes resulting in 260,346 CMI.

In total, the BERWICK 60-04 circuit had 61 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (30); equipment failure (23); animal contacts (3); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2019, an additional single-phase recloser was installed.
- In 2019, full circuit trimming will be performed.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2019, a new three-phase tie will be evaluated.

21 Circuit 56803 -- BENVENUE 68-03

Performance Analysis

The BENVENUE 68-03 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 651 customers for up to 2,302 minutes resulting in 232,455 CMI.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 143 customers for up to 1,740 minutes resulting in 205,539 CMI.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 124 customers for up to 994 minutes resulting in 123,288 CMI.

In total, the BENVENUE 68-03 circuit had 57 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (34); equipment failure (13); animal contacts (7); nothing found (2); other (1).

Remedial Actions

- In 2019, two single-phase sectionalizing devices were installed.
- In 2019, additional single-phase sectionalizing devices will be installed.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2019, single-phase ties will be evaluated.
- In 2020, full circuit trimming will be performed.

22 Circuit 45302 -- WEST BERWICK 53-02

Performance Analysis

The WEST BERWICK 53-02 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 589 customers for up to 783 minutes resulting in 318,387 CMI.

On May 7, 2019, a tree contacted an overhead conductor causing an interruption. This outage affected 1,211 customers for up to 352 minutes resulting in 161,433 CMI.

On May 29, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 118 customers for up to 884 minutes resulting in 104,271 CMI.

In total, the WEST BERWICK 53-02 circuit had 55 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (35); equipment failure (13); animal contacts (4); nothing found (3).

Remedial Actions

- In 2019, a recloser was replaced with a telemetric triple-single operation recloser.
- In 2019, a tie to the BERWICK 60-02 will be evaluated.
- In 2019, several sections of single-phase will be evaluated for reconductoring.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.

23 Circuit 41602 -- CLEVELAND 16-02

Performance Analysis

The CLEVELAND 16-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 87 customers for up to 3,561 minutes resulting in 124,961 CMI.

On April 15, 2019, during a period of strong wind, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 189 customers for up to 1,080 minutes resulting in 203,976 CMI.

In total, the CLEVELAND 16-02 circuit had 74 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (51); equipment failure (12); animal contacts (7); nothing found (4).

Remedial Actions

- In 2018 and 2019, hazard tree removal was performed.
- In 2019, an existing recloser was upgraded to a Smart Grid device.
- In 2019, an additional Smart Grid device will be installed.
- In 2019, a new single-phase recloser will be installed.
- In 2019, additional single-phase reclosers will be evaluated.
- In 2019, aerial and Hendrix cable will be evaluated for sections of this circuit.
- In 2020, the CLEVELAND substation will be rebuilt.

- In 2020, an Expanded Operational Review will be performed.

24 Circuit 11804 -- FRANCONIA 18-04

Performance Analysis

The FRANCONIA 18-04 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On May 29, 2019, during a period of strong wind, an equipment failure occurred on an overhead conductor. This outage affected 963 customers for up to 1,297 minutes resulting in 812,710 CMI.

In total, the FRANCONIA 18-04 circuit had 27 outages between July 2018 and June 2019, with the causes breaking down as follows: equipment failure (8); tree related (7); animal contacts (5); nothing found (3); contact or dig in (2); vehicles (2).

Remedial Actions

- In 2019, two additional single-phase reclosers will be evaluated.
- In 2019, an existing recloser will be evaluated for replacement.
- In 2019, additional fusing will be evaluated.
- In 2019, a new tie line device will be evaluated.
- In 2020, full circuit trimming will be performed.

25 Circuit 47001 -- HUGHESVILLE 70-01

Performance Analysis

The HUGHESVILLE 70-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On July 14, 2018, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 826 customers for up to 339 minutes resulting in 214,237 CMI.

In total, the HUGHESVILLE 70-01 circuit had 65 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (34); equipment failure (16); animal contacts (8); other (3); nothing found (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2019, additional fusing was installed.
- In 2019, additional animal guarding was installed.
- In 2019, several porcelain cutouts were replaced with polymer.
- In 2019, an additional single-phase recloser was installed.
- In 2019, a section of difficult-to-access conductor was relocated.
- In 2019, an additional single-phase recloser will be installed.
- In 2019, a section of difficult-to-access conductor will be relocated.

- In 2019, an additional Smart Grid device will be installed.
- In 2020, two additional single-phase reclosers will be installed.
- In 2020, a section of difficult-to-access conductor will be relocated.
- In 2020, an additional Smart Grid device will be installed.

26 Circuit 41401 -- HUMMELS WHARF 14-01

Performance Analysis

The HUMMELS WHARF 14-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 69 customers for up to 1,757 minutes resulting in 121,183 CMI.

On June 26, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 1,229 customers for up to 535 minutes resulting in 386,704 CMI.

In total, the HUMMELS WHARF 14-01 circuit had 50 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (28); equipment failure (16); animal contacts (3); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2019, an Expanded Operational Review will be performed.
- In 2019, a section of difficult-to-access single-phase will be evaluated for relocation.
- In 2019, an existing device will be evaluated for relocation.
- In 2020, a section of difficult-to-access single-phase will be relocated.

27 Circuit 40101 -- HUNTER 01-01

Performance Analysis

The HUNTER 01-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On November 10, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,113 customers for up to 220 minutes resulting in 212,073 CMI.

In total, the HUNTER 01-01 circuit had 59 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (38); equipment failure (14); animal contacts (4); nothing found (3).

Remedial Actions

- In 2019, an additional single-phase recloser was installed.
- In 2019, additional fusing will be installed at four locations.
- In 2019, several porcelain cutouts will be replaced.
- In 2019, full circuit trimming will be performed.
- In 2019, additional Smart Grid devices will be evaluated.
- In 2019, a substation rebuild will be evaluated.

28 Circuit 54701 -- NEW BLOOMFIELD 47-01

Performance Analysis

The NEW BLOOMFIELD 47-01 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On November 16, 2018, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 479 customers for up to 529 minutes resulting in 207,206 CMI.

On April 27, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,091 customers for up to 448 minutes resulting in 141,099 CMI.

On May 29, 2019, during a period of heavy rain, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 473 customers for up to 228 minutes resulting in 107,962 CMI.

In total, the NEW BLOOMFIELD 47-01 circuit had 57 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (37); equipment failure (13); animal contacts (4); vehicles (2); nothing found (1).

Remedial Actions

- In 2019, a protection coordination study will be conducted.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2019, a new single-phase tie will be evaluated.
- In 2019, an additional Smart Grid device will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2021, a single-phase tie will be constructed.

29 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of lightning, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 137 customers for up to 3,899 minutes resulting in 157,902 CMI.

In total, the WEST BLOOMSBURG 54-02 circuit had 88 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (61); equipment failure (19); animal contacts (4); nothing found (4).

Remedial Actions

- In 2018, hot spot trimming was performed.
- In 2018, numerous porcelain cutouts were replaced with polymer cutouts.
- In 2018, several additional locations received animal guarding.
- In 2019, three sections of difficult-to-access conductor will be evaluated for relocation.
- In 2019, a new single-phase tie will be evaluated.
- In 2019, additional single-phase reclosers will be evaluated.
- In 2020, a section of difficult-to-access single-phase will be relocated.

30 Circuit 45502 -- DERRY 55-02

Performance Analysis

The DERRY 55-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 615 customers for up to 2,696 minutes resulting in 458,286 CMI.

In total, the DERRY 55-02 circuit had 33 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (19); animal contacts (6); equipment failure (4); nothing found (4).

Remedial Actions

- In 2019, resourcing several sections of single-phase conductor will be evaluated.
- In 2019, a single-phase recloser will be evaluated.
- In 2020, an Expanded Operational Review will be performed.
- In 2020, multiple porcelain cutouts will be replaced.

31 Circuit 53901 -- HALIFAX 39-01

Performance Analysis

The HALIFAX 39-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 574 customers for up to 924 minutes resulting in 328,968 CMI.

In total, the HALIFAX 39-01 circuit had 63 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (45); equipment failure (13); animal contacts (3); nothing found (2).

Remedial Actions

- In 2019, additional single-phase sectionalizing was installed.
- In 2019, animal guarding will be installed at multiple locations.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2019, a single-phase tie will be evaluated.
- In 2019, relocating a section of difficult-to-access single-phase conductor will be evaluated.
- In 2019, a Smart Grid device will be evaluated.

32 Circuit 46001 -- BERWICK 60-01

Performance Analysis

The BERWICK 60-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 176 customers for up to 3,631 minutes resulting in 354,287 CMI.

In total, the BERWICK 60-01 circuit had 66 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (36); equipment failure (21); nothing found (6); vehicles (2); animal contacts (1).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, extending a section of three-phase conductor will be evaluated.
- In 2019, an additional Smart Grid device will be evaluated.
- In 2019, additional single-phase sectionalizing will be evaluated at two locations.
- In 2019, a section of single-phase conductor will be evaluated for re-sourcing.

33 Circuit 21705 -- SUBURBAN YARD #2 17-05

Performance Analysis

The SUBURBAN YARD#2 17-05 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 599 customers for up to 876 minutes resulting in 361,903 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 716 customers for up to 646 minutes resulting in 377,293 CMI.

In total, the SUBURBAN YARD #2 17-05 circuit had 27 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (15); animal contacts (5); equipment failure (5); nothing found (2).

Remedial Actions

- In 2019, a new tie line will be evaluated.
- In 2020, additional fusing will be installed at 10 locations.
- In 2020, additional sectionalizing will be added to this circuit.

34 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

The GREEN PARK 24-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 253 customers for up to 917 minutes resulting in 180,194 CMI.

In total, the GREEN PARK 24-02 circuit had 86 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (49); equipment failure (22); nothing found (7); animal contacts (5); other (2); vehicles (1).

Remedial Actions

- In 2018, hazard tree removal was performed.
- In 2018, numerous single-phase fuses were installed.
- In 2018, a section of three-phase conductor was replaced.
- In 2019, additional animal guarding was installed.
- In 2019, multiple sections of conductor will be relocated.
- In 2019, a second transmission source to the distribution substation will be constructed.
- In 2019, a single-phase sectionalizing device was installed.
- In 2019, an additional sectionalizing device will be installed.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2019, coordination of protective devices will be reviewed.
- In 2019, a three-phase tie will be evaluated.
- In 2019, relocation of a section of difficult-to-access single-phase will be evaluated.
- In 2020, two sections of difficult-to-access conductor will be relocated.
- In 2021, two sections of single-phase will be re-sourced.

35 Circuit 56802 -- BENVENUE 68-02

Performance Analysis

The BENVENUE 68-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On July 25, 2018, during a period of heavy rain, the circuit was taken out of service at the direction of a non-PPL authority. This outage affected 50 customers for up to 2,366 minutes resulting in 115,918 CMI.

In total, the BENVENUE 68-02 circuit had 68 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (49); equipment failure (10); animal contacts (5); nothing found (3); other (1).

Remedial Actions

- In 2018 and 2019, single-phase sectionalizing was installed.
- In 2019, additional single-phase sectionalizing will be evaluated.
- In 2019, the protection settings on this circuit were optimized.

36 Circuit 48302 -- ORWIGSBURG 83-02

Performance Analysis

The ORWIGSBURG 83-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On February 21, 2019, during a period of ice/sleet/snow, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 772 customers for up to 233 minutes resulting in 273,335 CMI.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead splice causing a load break fuse to operate. This outage affected 105 customers for up to 1,827 minutes resulting in 132,137 CMI.

In total, the ORWIGSBURG 83-02 circuit had 49 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (25); equipment failure (16); animal contacts (5); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2019, two additional single-phase reclosers were installed.
- In 2019, additional fusing will be installed.
- In 2019, aerial or Hendrix tree cable will be evaluated for a heavily wooded section of single-phase conductor.
- In 2019, reconductoring a section of single-phase conductor will be evaluated.
- In 2020, full circuit trimming will be performed.

37 Circuit 26601 -- BROOKSIDE 66-01

Performance Analysis

The BROOKSIDE 66-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On May 19, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,765 customers for up to 240 minutes resulting in 369,758 CMI.

On May 19, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 573 customers for up to 682 minutes resulting in 122,101 CMI.

In total, the BROOKSIDE 66-01 circuit had 39 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (27); equipment failure (8); animal contacts (2); nothing found (1); other (1).

Remedial Actions

- In 2018, fusing was installed at five locations.
- In 2018, 21 poles were replaced.
- In 2018, addition animal guarding was installed.
- In 2019, a single-phase recloser will be installed.
- In 2019, several porcelain cutouts will be replaced with polymer.
- In 2019, reconductoring several sections of single-phase will be evaluated.
- In 2019, additional sectionalizing will be evaluated.
- In 2019, a new tie line will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2020, an additional Smart Grid device will be installed.

38 Circuit 26703 -- HEMLOCK FARMS 67-03

Performance Analysis

The HEMLOCK FARMS 67-03 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On February 24, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 823 customers for up to 2,602 minutes resulting in 436,304 CMI.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,796 customers for up to 141 minutes resulting in 253,236 CMI.

In total, the HEMLOCK FARMS 67-03 circuit had 62 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (23); equipment failure (21); animal contacts (14); nothing found (4).

Remedial Actions

- In 2019, five single-phase reclosers were installed.
- In 2019, an additional Smart Grid device was installed.
- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, 27 overhead transformers will be replaced.
- In 2019, several sections of single-phase will be reconfigured and extended.
- In 2020, full circuit trimming will be performed.

39 Circuit 42802 -- SELINSGROVE 28-02

Performance Analysis

The SELINSGROVE 28-02 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On July 24, 2018, during a period of heavy rain, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,180 customers for up to 112 minutes resulting in 111,901 CMI.

On June 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 829 customers for up to 128 minutes resulting in 425,460 CMI.

On June 29, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 149 customers for up to 1,682 minutes resulting in 115,288 CMI.

In total, the SELINSGROVE 28-02 circuit had 23 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (13); equipment failure (4); nothing found (4); animal contacts (2).

Remedial Actions

- In 2018, full circuit trimming was performed.
- In 2019, additional fusing will be evaluated.
- In 2019, relocating a section of difficult-to-access single-phase conductor will be evaluated.

40 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On September 25, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 454 customers for up to 405 minutes resulting in 172,510 CMI.

On October 23, 2018, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 1,422 customers for up to 257 minutes resulting in 114,663 CMI.

In total, the ASHFIELD 04-03 circuit had 65 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (39); equipment failure (12); animal contacts (11); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2018, an Expanded Operational Review was performed.
- In 2018, approximately 20 cross arms were replaced.
- In 2019, an additional Smart Grid device was installed.
- In 2019, an additional single-phase recloser was installed.
- In 2019, full circuit trimming was performed.
- In 2019, a section of difficult-to-access conductor will be relocated.
- In 2019, two miles of three-phase line will be reconductored.
- In 2019, additional fusing will be added at 18 locations.

41 Circuit 10904 -- COOPERSBURG 09-04

Performance Analysis

The COOPERSBURG 09-04 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On July 25, 2018, during a period of heavy rain, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 664 customers for up to 652 minutes resulting in 201,212 CMI.

On August 14, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,131 customers for up to 644 minutes resulting in 113,670 CMI.

In total, the COOPERSBURG 09-04 circuit had 83 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (39); equipment failure (19); animal contacts (18); nothing found (3); other (2); vehicles (2).

Remedial Actions

- In 2019, hazard trimming will be evaluated.
- In 2019, reconductoring several spans of single-phase line with Hendrix cable will be evaluated.
- In 2019, additional animal guarding will be installed.
- In 2019, two single-phase reclosers will be installed.
- In 2019, 12 fuses will be installed.
- In 2019, relocating a section of difficult-to-access conductor will be evaluated.
- In 2019, an additional single-phase recloser will be evaluated.
- In 2020, an additional single-phase recloser will be installed.
- In 2021, full circuit tree trimming will be performed.

42 Circuit 17802 -- GILBERT 78-02

Performance Analysis

The GILBERT 78-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On August 4, 2018, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 612 customers for up to 198 minutes resulting in 152,947 CMI.

On February 25, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,451 customers for up to 295 minutes resulting in 191,997 CMI.

In total, the GILBERT 78-02 circuit had 71 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (36); equipment failure (25); animal contacts (6); nothing found (4).

Remedial Actions

- In 2018, hot spot tree trimming was performed.
- In 2018, additional animal guarding was installed.
- In 2019, 150 porcelain cutouts were replaced with polymer cutouts.
- In 2019, voltage regulators were installed.
- In 2019, several single-phase reclosers were installed.
- In 2019, additional animal guarding will be installed.
- In 2019, a section of difficult-to-access single-phase conductor will be relocated.
- In 2019, an additional sectionalizing device will be evaluated for this circuit.
- In 2019, the addition of a new reliability substation will be evaluated.
- In 2020, approximately 40 poles will be replaced.
- In 2020, an existing recloser will be upgraded.
- In 2020, several sections of difficult-to-access conductor will be relocated.
- In 2020, an existing recloser will be replaced with a Smart Grid device.

43 Circuit 56501 -- ROCKVILLE 65-01

Performance Analysis

The ROCKVILLE 65-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On July 21, 2018, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,043 customers for up to 214 minutes resulting in 222,159 CMI.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,029 customers for up to 301 minutes resulting in 305,766 CMI.

In total, the ROCKVILLE 65-01 circuit had 42 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (25); equipment failure (9); animal contacts (6); nothing found (1); other (1).

Remedial Actions

- In 2018, infrared scanning was performed. As a result, several minor repairs were completed.
- In 2018, an additional single-phase fuse was installed.
- In 2018, an existing recloser was upgraded.
- In 2018 through 2019, full circuit tree trimming was performed.
- In 2019, a new substation will be evaluated to reduce load on this circuit.
- In 2019, voltage support devices will be installed to increase tie capability.
- In 2019, a single-phase tie with remote operability will be evaluated.
- In 2019, an existing recloser was upgraded to a Smart Grid device.
- In 2020, an additional Smart Grid device will be installed.
- In 2020, an additional tie point will be added.

44 Circuit 47402 -- PENNS 74-02

Performance Analysis

The PENNS 74-02 circuit experienced three outages of over 100,000 CMI between July 2018 and June 2019.

On July 24, 2018, during a period of heavy rain, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 2,238 customers for up to 111 minutes resulting in 248,418 CMI.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 167 customers for up to 1,058 minutes resulting in 156,443 CMI.

On June 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 161 customers for up to 1,246 minutes resulting in 101,434 CMI.

In total, the PENNS 74-02 circuit had 32 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (21); equipment failure (7); animal contacts (3); nothing found (1).

Remedial Actions

- In 2019, an Expanded Operational Review will be performed.
- In 2019, three sections of difficult-to-access single-phase conductor will be evaluated for relocation.
- In 2021, full circuit trimming will be performed.

45 Circuit 56504 -- ROCKVILLE 65-04

Performance Analysis

The ROCKVILLE 65-04 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the ROCKVILLE 65-04 circuit had 80 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (54); equipment failure (13); animal contacts (8); other (3); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2018, several single-phase sectionalizing devices were installed.
- In 2018, a section of single-phase covered conductor was installed.
- In 2019, multiple single-phase sectionalizing devices will be installed.
- In 2019, a single-phase tie will be evaluated.

46 Circuit 21502 -- CEDAR AVENUE 15-02

Performance Analysis

The CEDAR AVENUE 15-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 895 customers for up to 866 minutes resulting in 591,386 CMI.

In total, the CEDAR AVENUE 15-02 circuit had 10 outages between July 2018 and June 2019, with the causes breaking down as follows: equipment failure (4); tree related (4); other (2).

Remedial Actions

- In 2019, splitting the circuit will be evaluated.
- In 2020, additional fusing will be installed.
- In 2022, full circuit trimming will be performed.

47 Circuit 52403 -- GREEN PARK 24-03

Performance Analysis

The GREEN PARK 24-03 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On September 21, 2018, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 1,110 customers for up to 184 minutes resulting in 115,416 CMI.

In total, the GREEN PARK 24-03 circuit had 75 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (45); equipment failure (18); nothing found (6); animal contacts (5); vehicles (1).

Remedial Actions

- In 2018, multiple single-phase sectionalizing devices were installed.
- In 2019, a single-phase sectionalizing device was installed.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2019, an inaccessible section of single-phase will be relocated.
- In 2020, an inaccessible section of single-phase will be relocated.

48 Circuit 12402 -- MILFORD 24-02

Performance Analysis

The MILFORD 24-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On May 29, 2019, during a period of strong wind, a tree contacted an underground conductor causing a recloser to trip to lockout. This outage affected 545 customers for up to 1,377 minutes resulting in 530,065 CMI.

In total, the MILFORD 24-02 circuit had 36 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (22); equipment failure (8); animal contacts (2); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2019, full circuit tree trimming will be performed.
- In 2019, additional single-phase reclosers will be evaluated.
- In 2019, additional fusing will be evaluated.
- In 2019, a new three-phase recloser will be evaluated.
- In 2019, a new tie line will be evaluated.

49 Circuit 44502 -- HAMILTON 45-02

Performance Analysis

The HAMILTON 45-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 154 customers for up to 2,531 minutes resulting in 154,661 CMI.

In total, the HAMILTON 45-02 circuit had 58 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (43); equipment failure (9); nothing found (4); animal contacts (2).

Remedial Actions

- In 2018, an Expanded Operational Review was performed with several cross-arms and cutouts replaced as a result.
- In 2019, hazard tree removal was performed.
- In 2019, an existing pole will be relocated.
- In 2019, a section of single-phase conductor will be evaluated for reconfiguration.
- In 2020, full circuit trimming will be performed.

50 Circuit 47002 -- HUGHESVILLE 70-02

Performance Analysis

The HUGHESVILLE 70-02 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the HUGHESVILLE 70-02 circuit had 66 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (46); equipment failure (12); animal contacts (3); nothing found (2); vehicles (2); other (1).

Remedial Actions

- In 2018, full circuit trimming was performed.
- In 2019, additional animal guarding will be installed.
- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, a section of three-phase conductor will be evaluated for undergrounding.
- In 2019, additional single-phase reclosers will be evaluated for this circuit.
- In 2019, additional fusing will be evaluated for this circuit.
- In 2020, an existing recloser will be upgraded to a Smart Grid device.

51 Circuit 61101 -- BERKS 11-01

Performance Analysis

The BERKS 11-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On November 24, 2018, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 199 customers for up to 611 minutes resulting in 102,478 CMI.

On May 19, 2019, during a period of lightning, an unidentified issue occurred with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,293 customers for up to 440 minutes resulting in 211,801 CMI.

In total, the BERKS 11-01 circuit had 31 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (15); equipment failure (7); animal contacts (4); vehicles (3); nothing found (1); other (1).

Remedial Actions

- In 2019, a single-phase sectionalizing device will be installed.
- In 2019, a three-phase sectionalizing device was upgraded in capability.
- In 2019, multiple single-phase sectionalizing devices will be evaluated.

52 Circuit 44802 -- EAST DANVILLE 48-02

Performance Analysis

The EAST DANVILLE 48-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 446 customers for up to 1,176 minutes resulting in 452,822 CMI.

In total, the EAST DANVILLE 48-02 circuit had 36 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (22); equipment failure (8); nothing found (5); animal contacts (1).

Remedial Actions

- In 2019, multiple porcelain cutouts will be replaced.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.
- In 2019, a new line that would split the circuit will be evaluated.
- In 2019, a new single-phase recloser will be evaluated.
- In 2022, a new tie line will be constructed.

53 Circuit 63501 -- HEIDELBERG 35-01

Performance Analysis

The HEIDELBERG 35-01 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the HEIDELBERG 35-01 circuit had 68 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (41); equipment failure (15); animal contacts (5); nothing found (3); vehicles (3); other (1).

Remedial Actions

- In 2019, full circuit trimming will be performed.
- In 2019, resourcing several sections of single-phase conductor will be evaluated.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2021, a new line and terminal will be constructed in Heidelberg substation.
- In 2021, a difficult-to-access section of single-phase conductor will be relocated.

54 Circuit 14103 -- TRUMBAUERSVILLE 41-03

Performance Analysis

The TRUMBAUERSVILLE 41-03 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On May 29, 2019, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 290 customers for up to 1,227 minutes resulting in 332,712 CMI.

In total, the TRUMBAUERSVILLE 41-03 circuit had 67 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (43); equipment failure (9); animal contacts (8); nothing found (4); vehicles (2); other (1).

Remedial Actions

- In 2019, replacing an existing recloser will be evaluated.
- In 2019, additional single-phase reclosers will be evaluated.
- In 2019, additional fusing will be evaluated.
- In 2019, a tie line to the RIDGE ROAD 70-01 will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2021, a new tie line will be constructed.

55 Circuit 26001 -- WEST DAMASCUS 60-01

Performance Analysis

The WEST DAMASCUS 60-01 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the WEST DAMASCUS 60-01 circuit had 68 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (34); equipment failure (20); nothing found (7); animal contacts (6); contact or dig in (1).

Remedial Actions

- In 2018, animal guarding was installed at several locations.
- In 2019, 10 single-phase reclosers were installed.
- In 2019, 40 cross arms were replaced.
- In 2019, additional animal guarding will be installed.
- In 2019, an additional Smart Grid device will be installed.
- In 2019, a new substation will be evaluated.
- In 2019, several sections of single-phase will be evaluated for extension and re-location.
- In 2021, a section of three-phase line will be reconductored.
- In 2021, a section of three-phase line will be relocated.
- In 2021, new voltage regulators will be installed.
- In 2021, seven devices will be upgraded to remote operability.
- In 2021, an automated single-phase tie will be constructed.

56 Circuit 59101 -- WALKER 91-01

Performance Analysis

The WALKER 91-01 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On December 16, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,900 customers for up to 453 minutes resulting in 157,984 CMI.

On April 15, 2019, during a period of heavy rain, a tree contacted an overhead conductor. This outage affected 661 customers for up to 221 minutes resulting in 146,213 CMI.

In total, the WALKER 91-01 circuit had 59 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (38); equipment failure (15); nothing found (2); other (2); animal contacts (1); vehicles (1).

Remedial Actions

- In 2019, multiple single-phase sectionalizing devices will be installed.
- In 2019, full circuit tree trimming will be performed.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2019, additional line extensions will be evaluated.

57 Circuit 43102 -- SOUTH MILTON 31-02

Performance Analysis

The SOUTH MILTON 31-02 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On April 15, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 959 customers for up to 2,819 minutes resulting in 487,233 CMI.

In total, the SOUTH MILTON 31-02 circuit had 28 outages between July 2018 and June 2019, with the causes breaking down as follows: equipment failure (13); tree related (10); animal contacts (3); nothing found (1); other (1).

Remedial Actions

- In 2019, full circuit trimming will be performed.
- In 2019, a section of difficult-to-access single-phase conductor will be evaluated for relocation.
- In 2020, a new single-phase recloser will be installed.

58 Circuit 55002 -- NEWPORT 50-02

Performance Analysis

The NEWPORT 50-02 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the NEWPORT 50-02 circuit had 65 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (48); equipment failure (9); animal contacts (4); nothing found (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2019, a new line and terminal at the NEWPORT substation was constructed.
- In 2019, additional single-phase sectionalizing devices will be evaluated.
- In 2019, two single-phase ties will be evaluated.

59 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the DALMATIA 36-01 circuit had 56 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (39); equipment failure (10); nothing found (3); animal contacts (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2018, a single-phase sectionalizing device was installed.
- In 2019, a single-phase sectionalizing device was installed.
- In 2019, two single-phase ties will be evaluated.
- In 2019, relocating a section of difficult-to-access conductor will be evaluated.
- In 2020, full circuit tree trimming will be performed.

60 Circuit 28301 -- NEWFOUNDLAND 83-01

Performance Analysis

The NEWFOUNDLAND 83-01 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On February 25, 2019, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 358 customers for up to 365 minutes resulting in 130,637 CMI.

In total, the NEWFOUNDLAND 83-01 circuit had 106 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (62); equipment failure (23); animal contacts (10); nothing found (7); other (4).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2019, 20 porcelain cutouts will be replaced.
- In 2019, 10 new transforms will be installed.
- In 2019, additional animal guarding will be installed.
- In 2019, a section of single-phase will be reconductored.
- In 2019, a three-phase recloser will be converted to single-phase operation.
- In 2019, a section of three-phase will be reconductored.
- In 2019, a new line and terminal will be constructed.
- In 2019, two new single-phase reclosers will be installed.
- In 2019, a two-phase line extension will be evaluated.
- In 2019, additional fusing will be evaluated for this circuit.
- In 2019, hazard tree removal will be evaluated.
- In 2020, an additional Smart Grid device will be installed.
- In 2021, a new single-phase tie will be constructed.

61 Circuit 46802 -- HEPBURN 68-02

Performance Analysis

The HEPBURN 68-02 circuit experienced no outages of over 100,000 CMI between July 2018 and June 2019.

In total, the HEPBURN 68-02 circuit had 93 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (58); equipment failure (21); animal contacts (7); nothing found (4); contact or dig in (2); vehicles (1).

Remedial Actions

- In 2019, two additional single-phase reclosers were installed.
- In 2019, a new recloser was installed.
- In 2019, full circuit trimming will be performed.
- In 2019, an additional single-phase recloser will be evaluated.
- In 2019, a section of difficult-to-access single-phase will be evaluated for relocation.
- In 2019, a substation upgrade will be performed, and the getaway will be replaced.
- In 2020, a new Smart Grid device will be installed.

62 Circuit 22404 -- MORGAN 24-04

Performance Analysis

The MORGAN 24-04 circuit experienced one outage of over 100,000 CMI between July 2018 and June 2019.

On May 19, 2019, during a period of heavy rain, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,081 customers for up to 84 minutes resulting in 504,328 CMI.

In total, the MORGAN 24-04 circuit had 13 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (5); equipment failure (4); animal contacts (2); Improper Design (1); other (1).

Remedial Actions

- In 2018, full circuit trimming was performed.
- In 2019, a new Smart Grid device will be evaluated.
- In 2020, additional fusing will be installed.

63 Circuit 67502 -- WEST WILLOW 75-02

Performance Analysis

The WEST WILLOW 75-02 circuit experienced two outages of over 100,000 CMI between July 2018 and June 2019.

On November 13, 2018, during a period of heavy rain, a vehicle contacted a pole causing a recloser to trip to lockout. This outage affected 876 customers for up to 520 minutes resulting in 103,982 CMI.

On December 20, 2018, during a period of heavy rain, an equipment failure occurred on an overhead lightning protector causing a recloser to trip to lockout. This outage affected 880 customers for up to 306 minutes resulting in 268,901 CMI.

In total, the WEST WILLOW 75-02 circuit had 34 outages between July 2018 and June 2019, with the causes breaking down as follows: tree related (15); equipment failure (10); animal contacts (3); vehicles (3); nothing found (2); other (1).

Remedial Actions

- In 2019, multiple single-phase sectionalizing devices were installed.
- In 2019, additional single-phase sectionalizing devices will be installed.
- In 2019, multiple porcelain cutouts will be replaced with polymer cutouts.
- In 2019, a section of difficult-to-access single-phase conductor will be relocated.
- In 2019, a single-phase tie will be evaluated.
- In 2019, resourcing a section of single-phase conductor will be investigated.

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	2,691	12.9%	41,761	3.4%	2,739,143	1.5%
Contact / Dig-In	151	0.7%	9,210	0.7%	718,471	0.4%
Directed by Non-PPL Authority	67	0.3%	7,597	0.6%	404,112	0.2%
Equipment Failures	6,470	31.0%	373,332	30.4%	36,754,616	19.7%
Improper Design	5	0.0%	5,142	0.4%	92,515	0.0%
Improper Installation	3	0.0%	569	0.0%	68,836	0.0%
Improper Operation	5	0.0%	5,551	0.5%	42,962	0.0%
Nothing Found	1,075	5.2%	56,664	4.6%	3,913,252	2.1%
Other Controllable	96	0.5%	15,773	1.3%	813,529	0.4%
Other Non Control	258	1.2%	17,944	1.5%	1,853,940	1.0%
Other Public	43	0.2%	9,881	0.8%	816,745	0.4%
Tree Related	9,172	44.0%	545,617	44.4%	127,380,608	68.1%
Unknown	-	0.0%	-	0.0%	-	0.0%
Vehicles	744	3.6%	94,113	7.7%	9,210,934	4.9%
Forced Due to UGI Gas Leaks	74	0.4%	46,753	3.8%	2,117,478	1.1%
Total	**20,854**	**100.0%**	**1,229,907**	**100.0%**	**186,927,141**	**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 56% of cases, 61% of customer interruptions, and 79% of CMI.

Tree Related: As of 2013, PPL Electric has implemented a more aggressive trimming strategy.

Animals: Animals accounted for approximately 13% 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 75% 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. All PPL Electric substations have received animal guarding.

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 46% of the cases of trouble, 49% of the customer interruptions and 59% 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	2nd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of structures)	661	200	262	255	353
Transmission arm replacements (# of arms)	20	4	21	11	29
Transmission air break switch inspections (# of switches)	N/A	2	2	4	4
Transmission surge arrester installations (# of sets)	N/A	224	224	228	228
Transmission structure inspections (# of activities)	37,069	28,062	28,062	37,069	37,069
Transmission tree side trim-Bulk Power (linear feet)	N/A				
Transmission herbicide-Bulk Power (# of acres)	N/A				
Transmission reclearing (# of miles) BES Only	654	170	235	232	400
Transmission reclearing (# of miles) 69 kV	1,581	412	494	559	614
Transmission reclearing (# of miles) 138 kV	196	51	101	85	114
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	456	64	38	490	475
Circuit breakers (# of activities)	95	6	156	8	240
Substation inspections (# of activities)	775	372	370	1,057	1,064
Transformer maintenance (# of activities)	41	5	60	8	96

Inspection & Maintenance Goals/Objectives	Annual Budget	2nd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	3,418	1,020	770	2,104	1,567
C-truss distribution poles (# of poles)	1,182	817	752	1,199	1,134
Capacitor (MVAR added)[3]	0	0	4	0	11
OCR Replacements (# of)	31	16	14	38	31
Distribution pole inspections (# of poles)	90,000	5,469	5,469	12,017	12,017
Distribution line inspections (hours)	10,459	870	316	2,713	2,394
Group re-lamping (# of lamps)	13,434	5,098	2,575	5,098	2,575
Test sections of underground distribution cable	N/A	391	391	572	572
Distribution tree trimming (# of miles)	5,967	1,594	1,578	2,920	2,901
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)	448	112	122	244	354
LTN vault inspections (# of)	345	150	142	271	338
LTN network protector overhauls (# of)	92	23	13	46	27
LTN reverse power trip testing (# of)	33	8	5	16	13

[3] *In 2019 Q1, the line items for C-truss poles and capacitors were inadvertently transposed.*

*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	2nd Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	1,578	1,666	3,129	3,268
Vegetation Management	14,087	10,516	22,730	19,635
Customer Response	14,951	21,140	26,698	38,395
Reliability Maintenance	11,405	7,057	19,744	14,599
System Upgrade	2,823	2,150	5,920	3,941
Customer Service/Accounts	25,234	19,931	51,086	43,628
Others	7,935	9,981	14,685	30,546
Total O&M Expenses	**78,013**	**72,441**	**143,993**	**154,012**

*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	2nd Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	21,193	19,488	40,516	40,851
System Upgrade	126,050	121,785	285,128	236,494
Reliability & Maintenance	123,542	125,577	229,897	212,272
Customer Response	4,546	10,879	7,886	20,492
Other	4,339	4,108	8,352	6,585
Total	**279,670**	**281,837**	**571,779**	**516,694**

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

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

During the second quarter of 2019, 196 corrective work orders were created with the following breakdown by priority.

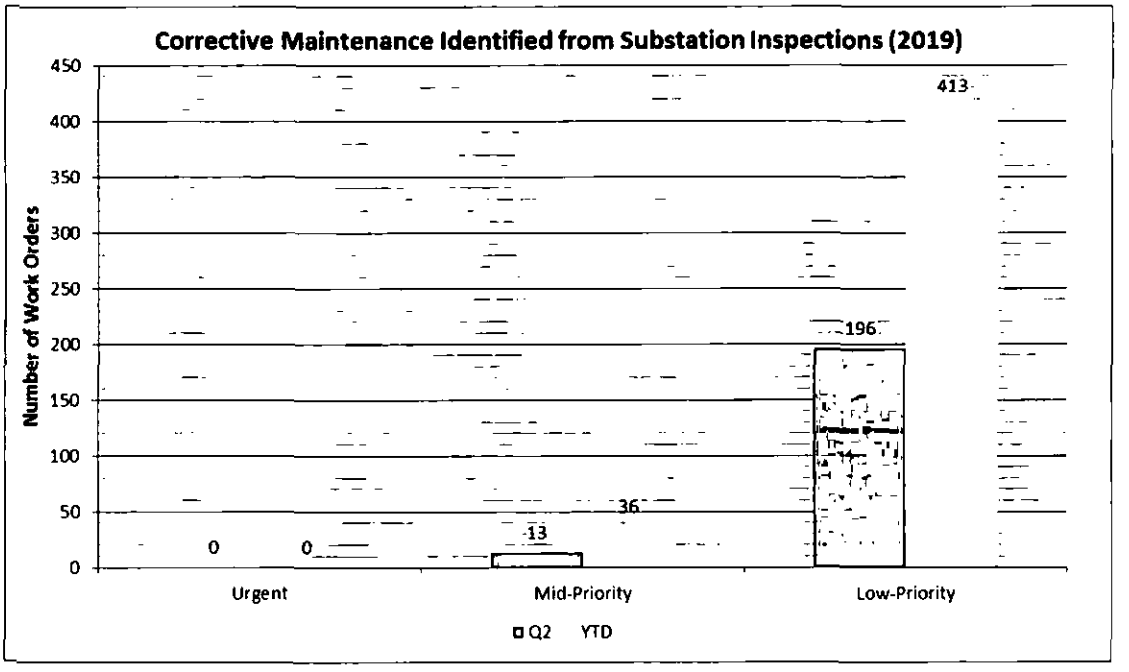

Figure 1: Corrective Maintenance Work Orders by Priority Level for second quarter and year-to-date 2019

(b) The Amount Spent on Substation Inspections

During the second quarter of 2019, PPL Electric spent approximately $134,000 on substation inspections.

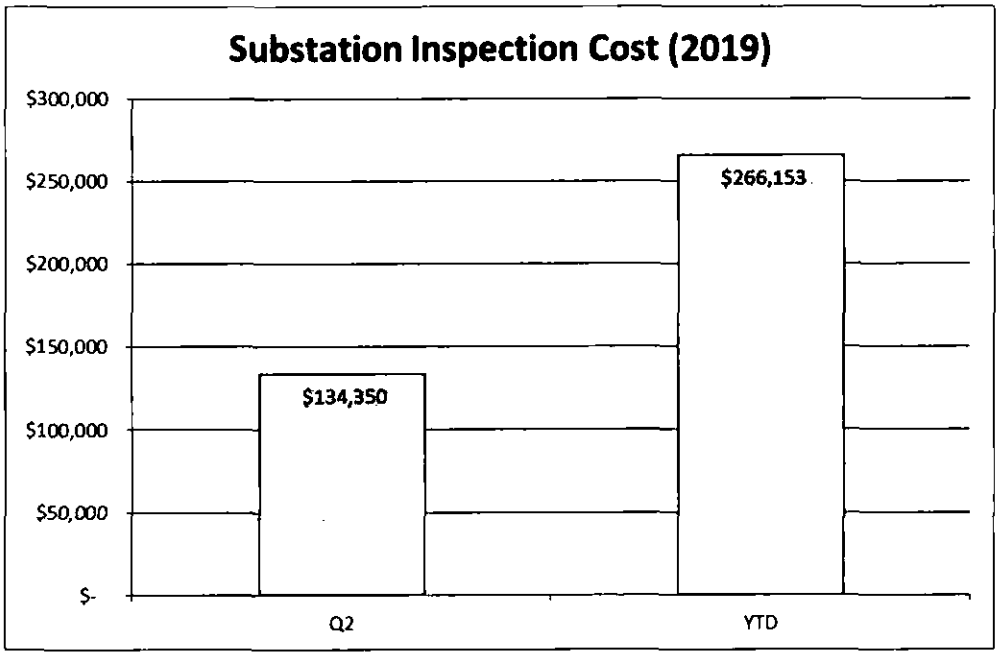

Figure 2: Substation Inspection Costs for second quarter and year-to-date 2019.

(c) The Amount Spent on Vegetation Management

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

(d) The Projected CMI Avoidance Due to Substation Inspections

The figure below shows the amount of CMI avoidance that PPL Electric has estimated for the second quarter and year-to-date. During second quarter of 2019, PPL Electric avoided a projected 388,000 CMI.

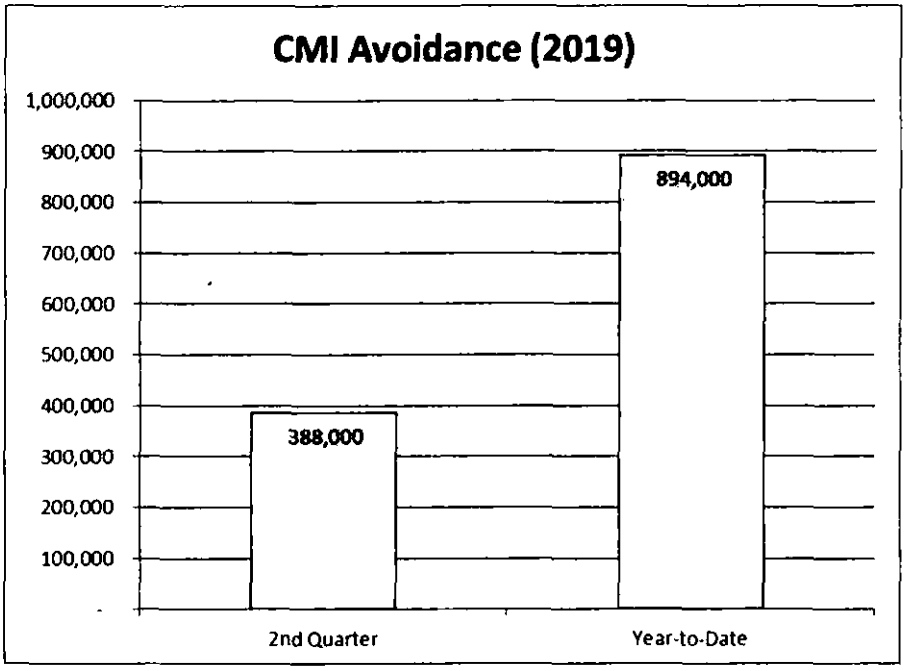

Figure 3: CMI Avoidance Due to Inspections for second quarter and year-to-date 2019

(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 second quarter of 2019, the Company interrupted about 12,369 customers for a total of approximately 360,435CMI. The figures below show these results for the number of customers interrupted and CMI experienced, respectively.

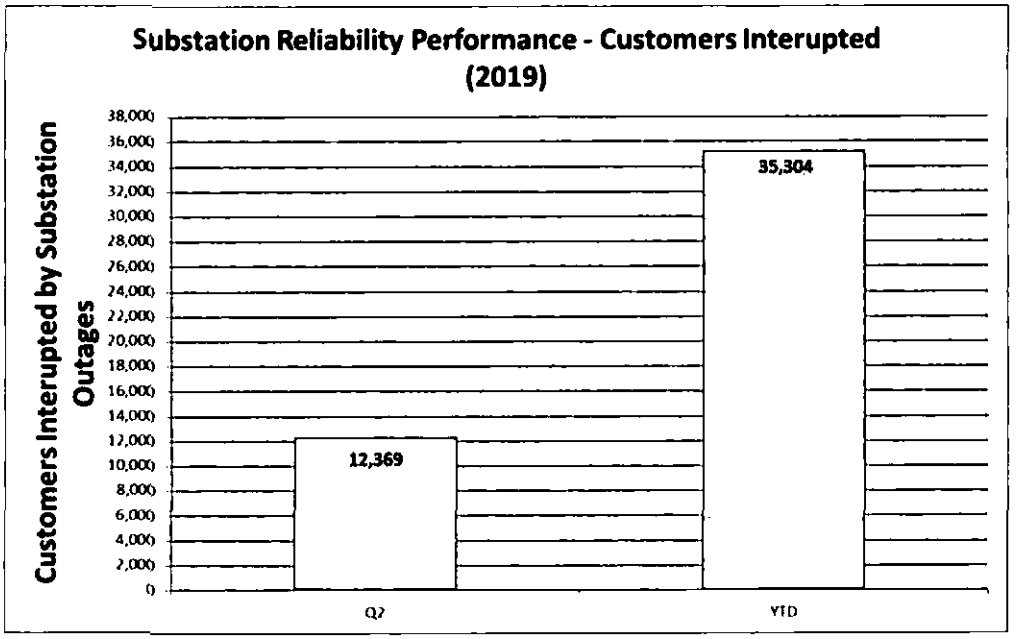

Figure 4: Substation Customers Interrupted for second quarter and year-to-date 2019

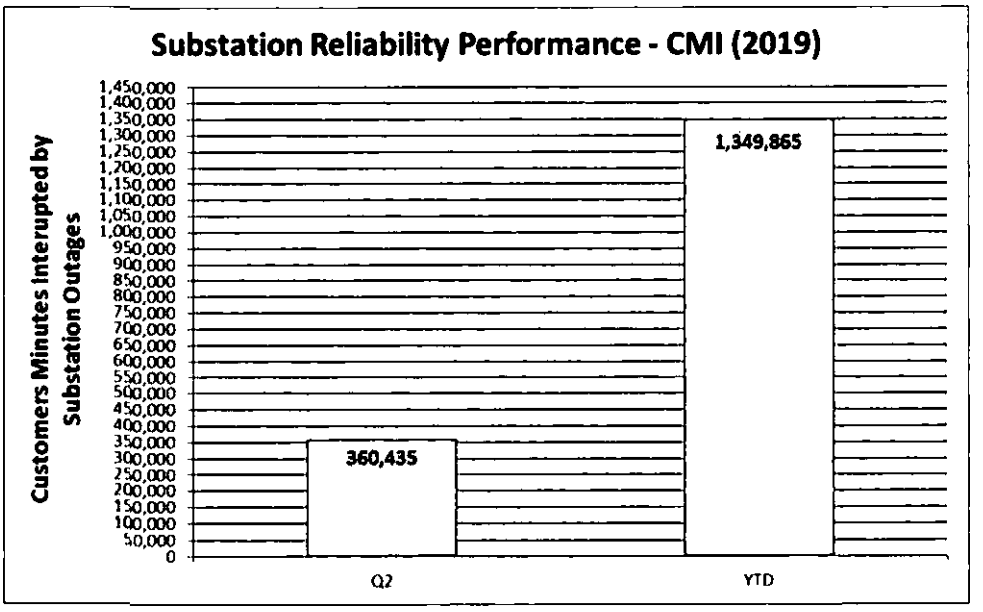

Figure 5: Substation Customer Minutes of Interruption for second quarter and year-to-date 2019

(f) Substation SAIFI Contribution

Overall, substation outages contributed approximately 2% of the total SAIFI experienced by PPL Electric customers in the second quarter of 2019. Historically, PPL Electric 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 has the capability of remotely monitoring its distribution substations through SCADA installations and through 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. All distribution substations have this functionality.

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 in order 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(T&D)	
Lineman Leader	64
Journeyman Lineman	205
Journeyman Lineman-Trainee	24
Helper	5
Groundhand	2
Troubleman	51
T&D Total	**351**
Electrical	
Elect Leaders-UG	2
Elect Leaders-Net	9
Elect Leaders-Sub	23
Journeyman Elect-UG	11
Journeyman Elect-Net	32
Journeyman Elect-Sub	67
Journeyman Elect Trainee-UG	0
Journeyman Elect Trainee-Net	0
Journeyman Elect Trainee-Sub	0
Helper	0
Laborer-Network	0
Laborer-Substation	0
Electrical Total	**144**
Overall Total	**495**

Appendix A

PPL Electric Utilities Corporation

Worst Performing Circuit Definition / Comparison under old and new Circuit Performance Index (CPI) formulas.

PPL Electric uses total Customer Minutes Interrupted (CMI) during the previous four quarters to define the worst performing circuits on its system. Major events and pre-arranged outages are excluded. This ranking system was put in place as of the second quarter of 2013, for the following reasons:

- It focuses remediation efforts where they will have the greatest customer impact. Small pockets of customers with multiple interruptions are addressed under the CEMI (Customers Experiencing Multiple Interruptions) program, which is adequately funded to remediate these smaller customer groups.
- It identifies the circuits contributing the most to system SAIDI.
- It is simple and transparent, therefore allowing WPCs to be identified and remediated on a short timetable.

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.

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.

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.

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