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FEDERAL EXPRESS

January 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 December 31, 2018
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 December 31, 2018. 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 January 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.

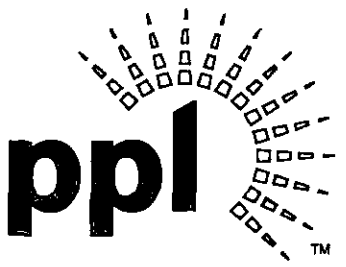
Very truly yours,

Kimberly A. Klock / MHB

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

-

January 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 fourth quarter of 2018.

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

The following table provides data for the 12 months ending December 31, 2018.

SAIFI (Benchmark = 0.98; Rolling 12-month Std. = 1.18)	0.84
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	168
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	141
MAIFI[1]	7.2
Average Number of Customers Served[2]	1,422,558
Number of Sustained Customer Interruptions (Trouble Cases)	21,007
Number of Customers Affected[3]	1,201,596
Customer Minutes of Interruptions (CMI)	201,484,665
Number of Customer Momentary Interruptions	10,198,199

During the fourth quarter, there were no (0) PUC major events, one (1) PUC reportable event, and five (5) other storms that required the opening of one or more area emergency centers to manage restoration efforts. The PUC reportable storm of May 15 approached major event status, with 8.6% of the customer base interrupted. At over 1,500 trouble cases, this was a top 15 all-time storm as measured by cases. Had this event been excludable, the reliability index values would have been 0.76 for SAIFI; 115 for CAIDI; and 87 for SAIDI.

Additionally, approximately 55,000 of PPL Electric's customer interruptions in 2018 were the result of forced outages due to UGI gas leaks. This is a 200% increase over the prior three-year average.

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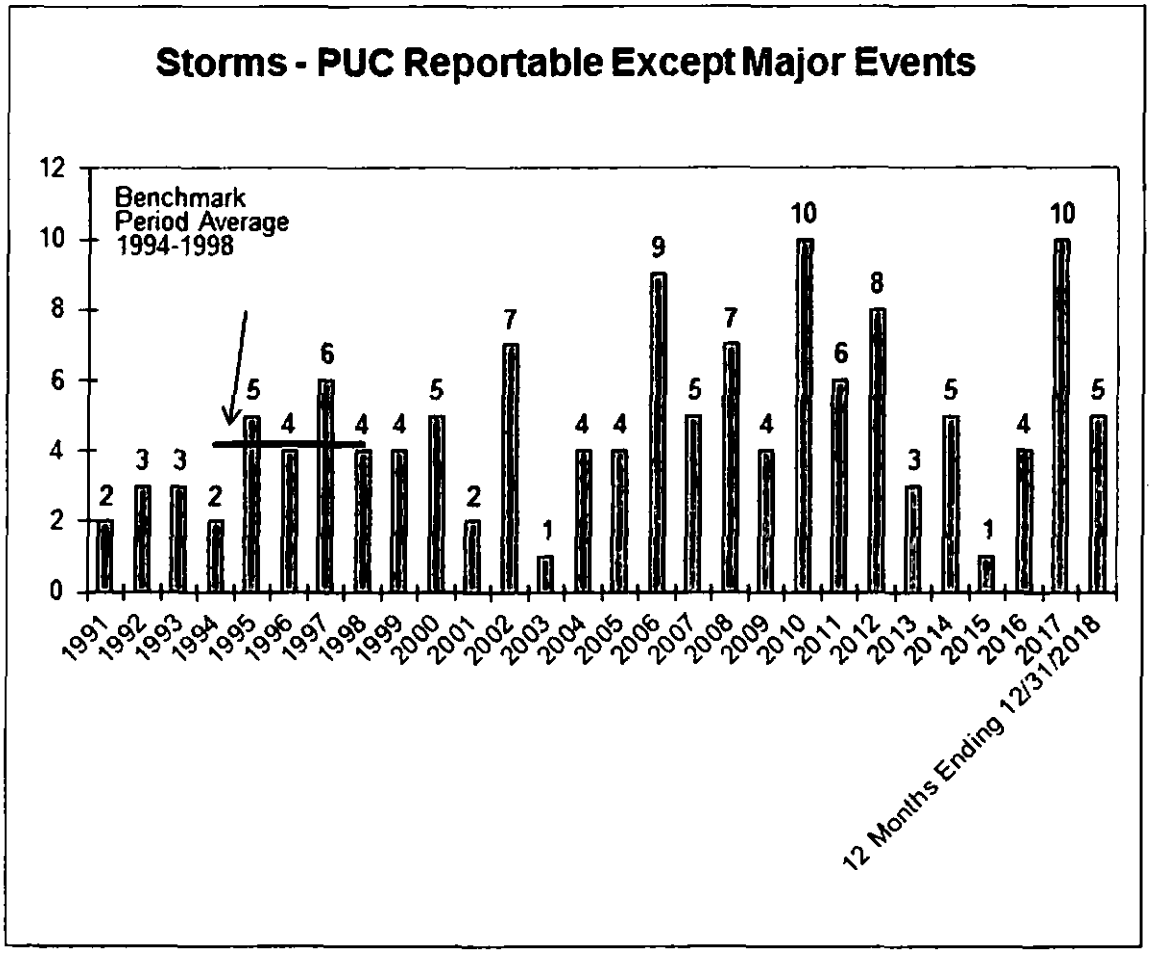
[1] MAIFI data is obtained at the substation breaker level and at certain reclosers. Because PPL Electric is enhancing its ability to identify momentaries, this metric is expected to increase in the near term.

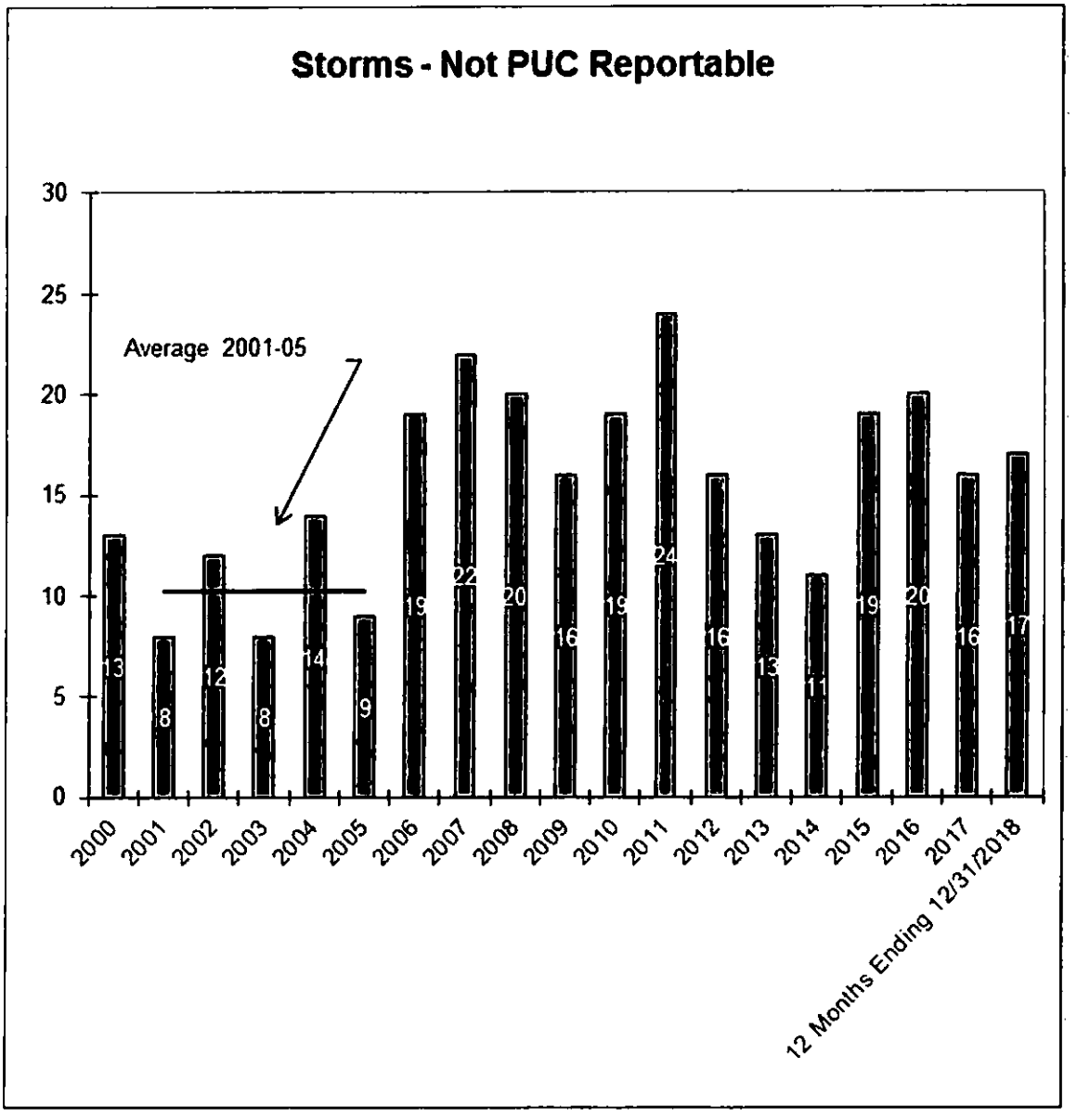
[2] PPL Electric calculates the annual indices using customers served at the end of period. This is consistent with the method used to calculate PPL Electric's benchmarks.

[3] 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.

During the 12-month reporting period, there was one (1) PUC major events and five (5) PUC-reportable storms other than major events.



In addition, there were seventeen (17) storms that were not reportable, but which did require the opening of one or more area emergency centers to manage restoration efforts.



*3) **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	26401	2407	1295	1.9	44.9	2,177	128	5,239,640
2	15601	2938	1631	1.8	29.1	1,099	43	3,229,209
3	23401	1847	571	3.2	12.0	1,712	81	3,161,763
4	16402	2250	704	3.2	16.0	1,270	87	2,857,783
5	17802	1454	654	2.2	37.0	1,925	74	2,798,718
6	15604	1984	939	2.1	27.8	1,369	71	2,716,297
7	46302	2314	598	3.9	6.0	1,083	93	2,506,451
8	26402	1939	1369	1.4	19.0	1,079	42	2,092,252
9	16504	862	315	2.7	11.5	2,210	44	1,905,330
10	28602	973	425	2.3	3.1	1,933	33	1,881,107
11	18502	915	536	1.7	14.7	1,837	100	1,680,272
12	56501	691	249	2.8	6.4	2,395	53	1,655,433
13	17902	1483	713	2.1	7.7	1,012	35	1,500,311
14	20402	788	294	2.7	8.0	1,887	33	1,486,955
15	15704	1134	875	1.3	28.5	1,279	51	1,450,670
16	16801	854	348	2.4	10.9	1,638	61	1,398,284
17	45602	864	362	2.4	13.1	1,616	53	1,395,438
18	23902	942	453	2.1	34.1	1,464	53	1,378,726
19	16802	1489	1137	1.3	21.2	870	47	1,295,116
20	53602	2072	143	14.5	97.0	607	143	1,257,774
21	45302	1028	536	1.9	10.5	1,212	50	1,246,031
22	22001	779	384	2.0	13.8	1,575	85	1,226,706
23	17801	558	260	2.1	37.5	2,147	53	1,198,357
24	21203	962	300	3.2	13.1	1,232	42	1,185,288

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	22003	840	412	2.0	8.3	1,387	65	1,164,604
26	47704	842	222	3.8	11.1	1,369	69	1,152,298
27	24901	496	276	1.8	5.5	2,268	54	1,125,561
28	23403	622	280	2.2	7.5	1,800	45	1,119,499
29	43401	1125	296	3.8	31.6	990	61	1,113,837
30	25801	609	203	3.0	7.3	1,820	52	1,107,988
31	24603	700	437	1.6	16.6	1,571	57	1,100,463
32	45303	793	655	1.2	12.7	1,339	50	1,061,676
33	47001	419	173	2.4	7.0	2,495	84	1,044,522
34	26601	780	456	1.7	3.1	1,326	37	1,034,078
35	15702	633	476	1.3	13.4	1,613	32	1,020,613
36	22805	432	193	2.2	7.0	2,328	14	1,006,468
37	46206	530	452	1.2	3.5	1,824	59	966,794
38	52402	569	171	3.3	18.7	1,661	96	945,276
39	22002	1118	492	2.3	42.9	836	24	934,806
40	40602	382	207	1.8	3.9	2,287	53	873,357
41	28301	382	231	1.7	4.9	2,276	103	870,418
42	40201	524	356	1.5	14.3	1,659	102	868,545
43	45402	526	233	2.3	25.8	1,634	74	860,292
44	24703	538	310	1.7	6.5	1,589	25	855,189
45	20403	441	124	3.6	13.2	1,913	68	843,482
46	45002	426	205	2.1	9.8	1,952	62	831,636
47	28805	699	391	1.8	5.2	1,180	35	824,616
48	44902	491	355	1.4	54.7	1,633	37	802,169
49	26604	318	189	1.7	8.1	2,432	61	773,122
50	54001	687	418	1.6	6.2	1,122	39	770,520
51	25402	415	276	1.5	21.1	1,809	47	751,295
52	20601	511	445	1.1	27.6	1,469	28	750,052
53	56801	451	157	2.9	13.6	1,653	62	746,141
54	16501	1074	523	2.1	11.5	680	18	730,606
55	13704	463	139	3.3	15.5	1,565	39	724,914
56	26001	498	502	1.0	18.4	1,419	76	706,248
57	42701	501	138	3.6	7.4	1,466	48	690,786
58	53601	628	188	3.3	8.9	1,098	58	689,544
59	17901	887	412	2.1	15.4	734	22	650,882
60	41802	1234	319	3.9	28.6	526	40	649,248
61	18501	446	205	2.2	13.8	1,436	53	640,155
62	67502	327	121	2.7	24.1	1,952	28	638,035
63	27901	547	149	3.7	13.0	1,143	30	625,449

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

01 Circuit 26401 -- INDIAN ORCHARD 64-01

Performance Analysis

The INDIAN ORCHARD 64-01 circuit experienced more than ten outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,116 customers for up to 5,499 minutes resulting in 1,155,857 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 37 customers for up to 4,350 minutes resulting in 155,397 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 79 customers resulting in 285,976 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 122 customers for up to 4,352 minutes resulting in 453,133 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 78 customers for up to 1,511 minutes resulting in 117,830 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 38 customers resulting in 235,113 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 47 customers resulting in 147,054 CMI.

On May 15, 2018, during a period of heavy rain, a tree contacted an overhead switch causing a recloser to trip to lockout. This outage affected 64 customers resulting in 260,250 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a transformer to be interrupted. This outage affected 92 customers resulting in 261,790 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 274 customers for up to 5,143 minutes resulting in 1,073,188 CMI.

On May 17, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 52 customers for up to 2,806 minutes resulting in 111,673 CMI.

In total, the INDIAN ORCHARD 64-01 circuit had 128 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (89); equipment failure (14); animal contacts (13); nothing found (8); other (3); vehicles (1).

Remedial Actions

- In 2018, ten locations received animal guarding; additional animal guarding will be installed in 2019.
- In 2019, several sections of difficult-to-access single-phase line will be relocated.
- In 2019, full circuit trimming will be performed.
- In 2019, hazard tree removal will be performed.
- In 2019, Hendrix cable will be evaluated for a section of conductor.
- In 2019, two additional single-phase reclosers will be evaluated.

02 Circuit 15601 -- NO STROUDSBURG 56-01

Performance Analysis

The NO STROUDSBURG 56-01 circuit experienced eight outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 114 customers for up to 1,452 minutes resulting in 157,002 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 195 customers for up to 2,542 minutes resulting in 495,102 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 52 customers resulting in 163,277 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 36 customers resulting in 100,505 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 133 customers for up to 2,998 minutes resulting in 381,319 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted a pole or pole arm causing a load break disconnect switch to be interrupted. This outage affected 39 customers resulting in 170,091 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 438 customers for up to 4,486 minutes resulting in 1,432,740 CMI.

On August 18, 2018, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 430 customers for up to 21 minutes resulting in 102,584 CMI.

In total, the NO STROUDSBURG 56-01 circuit had 43 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (26); animal contacts (9); equipment failure (4); nothing found (3); vehicles (1).

Remedial Actions

- In 2018, additional animal guarding was installed at several locations.
- In 2018, additional single-phase fusing was installed.
- In 2018, several capacitor banks were upgraded.
- In 2020, several sectionalizing devices will be replaced or upgraded.
- In 2020, an additional recloser will be installed on this circuit.
- In 2021, a section of difficult-to-access single-phase will be relocated.
- In 2021, full circuit trimming will be performed.

03 Circuit 23401 -- HONESDALE 34-01

Performance Analysis

The HONESDALE 34-01 circuit experienced seven outages of over 100,000 CMI between January 2018 and December 2018.

On May 4, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 745 customers for up to 346 minutes resulting in 257,576 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 887 customers for up to 752 minutes resulting in 640,096 CMI.

On May 15, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 384 customers for up to 1,775 minutes resulting in 654,276 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 387 customers for up to 2,423 minutes resulting in 435,651 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 59 customers for up to 3,450 minutes resulting in 166,478 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 113 customers for up to 2,263 minutes resulting in 146,298 CMI.

On May 17, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 78 customers for up to 1,689 minutes resulting in 131,695 CMI.

In total, the HONESDALE 34-01 circuit had 81 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (55); animal contacts (10); equipment failure (9); nothing found (7).

Remedial Actions

- In 2018, additional single-phase fusing was installed.
- In 2018, animal guarding was installed at several locations.
- In 2018, several capacitor banks were upgraded.
- In 2019, several sectionalizing devices will be replaced or upgraded.
- In 2019, an additional load break disconnect switch will be installed.
- In 2019, a section of conductor will be relocated to underground.
- In 2019, an additional tie line to EAST CARBONDALE 01 will be built.
- In 2019, a new reliability substation will be sited.
- In 2019, two sections of difficult-to-access single-phase will be relocated.
- In 2019, full circuit trimming will be performed.
- In 2019, additional animal guarding will be installed.
- In 2021, a single-phase recloser will be installed on this circuit.

04 Circuit 16402 -- MOUNT POCONO 64-02

Performance Analysis

The MOUNT POCONO 64-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 897 customers for up to 2,599 minutes resulting in 1,438,140 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an air break to be interrupted. This outage affected 110 customers resulting in 307,004 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 26 customers resulting in 114,773 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 70 customers for up to 4,260 minutes resulting in 298,200 CMI.

In total, the MOUNT POCONO 64-02 circuit had 87 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (70); equipment failure (8); animal contacts (5); nothing found (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2018, the substation cross yard ties were replaced.
- In 2018, animal guarding was installed.
- In 2019, additional single-phase fusing will be installed at multiple locations.
- In 2020, a section of difficult-to-access single-phase will be relocated.
- In 2020, a section of single-phase will be reconductored with protective cable.
- In 2020, several sections of three-phase will be relocated.
- In 2020, an additional Smart Grid device will be added.
- In 2021, two single-phase ties with single-phase Smart Grid devices will be added.
- In 2021, full circuit trimming will be performed.

05 Circuit 17802 -- GILBERT 78-02

Performance Analysis

The GILBERT 78-02 circuit experienced seven outages of over 100,000 CMI between January 2018 and December 2018.

On January 12, 2018, during a period of strong wind, a tree contacted an overhead splice causing a recloser to trip to lockout. This outage affected 235 customers for up to 658 minutes resulting in 110,869 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,466 customers for up to 750 minutes resulting in 879,183 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead fuse causing a recloser to trip to lockout. This outage affected 173 customers for up to 2,357 minutes resulting in 226,188 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 233 customers for up to 3,613 minutes resulting in 727,252 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 73 customers for up to 3,405 minutes resulting in 248,534 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 60 customers for up to 1,880 minutes resulting in 112,783 CMI.

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 153,606 CMI.

In total, the GILBERT 78-02 circuit had 74 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (42); equipment failure (19); animal contacts (8); nothing found (5).

Remedial Actions

- In 2018, hot spot tree trimming was performed.
- In 2018, additional animal guarding was installed.
- In 2018, numerous porcelain cutouts were replaced with polymer cutouts. More will be replaced in 2019 and 2020.
- In 2019, additional animal guarding will be installed.
- In 2019, a section of difficult-to-access single-phase conductor will be relocated.
- In 2019, 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 non-telemetered device will be replaced with a telemetered device.

06 Circuit 15604 -- NO STROUDSBURG 56-04

Performance Analysis

The NO STROUDSBURG 56-04 circuit experienced eight outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 36 customers for up to 4,220 minutes resulting in 149,596 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead component causing a recloser to trip to lockout. This outage affected 549 customers for up to 3,957 minutes resulting in 140,724 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an underground conductor causing a recloser to trip to lockout. This outage affected 53 customers for up to 3,865 minutes resulting in 204,828 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 28 customers resulting in 131,768 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 26 customers resulting in 113,890 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 530 customers for up to 2,678 minutes resulting in 1,255,063 CMI.

On May 17, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 129 customers for up to 1,164 minutes resulting in 139,806 CMI.

On May 17, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 113 customers for up to 1,441 minutes resulting in 149,593 CMI.

In total, the NO STROUDSBURG 56-04 circuit had 71 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (38); equipment failure (20); animal contacts (9); vehicles (2); nothing found (1); other (1).

Remedial Actions

- In 2018, additional animal guarding was installed. More will be done in 2019.
- In 2019, hazard tree removal will be performed.
- In 2020, a new single-phase tie line will be constructed for this circuit.
- In 2020, a section of single-phase conductor will be relocated and reconductored.
- In 2020, a section of single-phase conductor will be extended and re-sourced.
- In 2021, full circuit trimming will be performed.

07 Circuit 46302 -- ROHRSBURG 63-02

Performance Analysis

The ROHRSBURG 63-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 149 customers for up to 1,647 minutes resulting in 245,403 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 321 customers for up to 3,227 minutes resulting in 617,175 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 192 customers for up to 2,703 minutes resulting in 379,937 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 404 customers for up to 1,839 minutes resulting in 585,341 CMI.

In total, the ROHRSBURG 63-02 circuit had 93 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (69); equipment failure (10); animal contacts (7); nothing found (6); 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, 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.
- In 2019, full circuit trimming will be performed.

08 Circuit 26402 -- INDIAN ORCHARD 64-02

Performance Analysis

The INDIAN ORCHARD 64-02 circuit experienced five outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 186 customers for up to 1,288 minutes resulting in 239,422 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 41 customers for up to 3,302 minutes resulting in 135,365 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 54 customers for up to 5,540 minutes resulting in 177,886 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 160 customers for up to 5,679 minutes resulting in 420,795 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 160 customers for up to 4,859 minutes resulting in 777,360 CMI.

In total, the INDIAN ORCHARD 64-02 circuit had 42 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (30); nothing found (4); animal contacts (3); equipment failure (3); other (1); vehicles (1).

Remedial Actions

- In 2019, a section of difficult-to-access single-phase conductor will be relocated and evaluated for resourcing.
- In 2019, a new Smart Grid device will be installed.
- In 2019, hazard tree removal will be performed.
- In 2019, full circuit trimming will be performed.
- In 2021, a loop feed and additional fusing will be installed for a section of this circuit.

09 Circuit 16504 -- STROUDSBURG 65-04

Performance Analysis

The STROUDSBURG 65-04 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of lightning, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,326 customers for up to 957 minutes resulting in 407,639 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 421 customers for up to 3,435 minutes resulting in 1,117,105 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 68 customers for up to 2,446 minutes resulting in 166,281 CMI.

In total, the STROUDSBURG 65-04 circuit had 44 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (19); equipment failure (16); animal contacts (4); nothing found (3); vehicles (2).

Remedial Actions

- In 2018, full circuit tree trimming was performed.
- In 2018, an existing sectionalizing device was upgraded to a Smart Grid device.
- In 2018, additional single-phase fusing was installed.
- In 2018, additional animal guarding was installed.
- In 2019, a section of conductor will be re-sourced and receive additional fusing.

- In 2019, an existing sectionalizing device will be upgraded to a Smart Grid device.
- In 2020, an additional Smart Grid device will be added to this circuit.

10 Circuit 28602 -- BLYTHEBURN 86-02

Performance Analysis

The BLYTHEBURN 86-02 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On March 23, 2018, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 767 customers for up to 263 minutes resulting in 201,721 CMI.

On April 4, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 385 customers for up to 1,349 minutes resulting in 384,816 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,934 customers for up to 2,932 minutes resulting in 1,176,216 CMI.

In total, the BLYTHEBURN 86-02 circuit had 33 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (17); equipment failure (10); animal contacts (3); vehicles (2); nothing found (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, three 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, full circuit trimming will be performed.
- In 2019, an Expanded Operational Review will be performed.
- In 2020, an additional Smart Grid device will be installed.

11 Circuit 18502 -- CANADENSIS 85-02

Performance Analysis

The CANADENSIS 85-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 90 customers for up to 2,656 minutes resulting in 238,953 CMI.

On May 15, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a temporary open point to be interrupted. This outage affected 71 customers for up to 2,637 minutes resulting in 187,227 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 58 customers for up to 2,860 minutes resulting in 165,868 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 43 customers for up to 2,795 minutes resulting in 120,175 CMI.

In total, the CANADENSIS 85-02 circuit had 100 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (58); equipment failure (22); animal contacts (18); nothing found (2).

Remedial Actions

- In 2020, additional animal guarding will be installed.
- In 2020, multiple single-phase ties will be constructed.
- In 2020, several sections of line will be reconductored.
- In 2020, five additional Smart Grid devices will be installed.
- In 2020, additional sectionalizing devices will be installed.
- In 2020, a section of three-phase conductor will be extended to feed several single-phase taps.
- In 2021, a substation conversion will be performed.
- In 2021, full circuit trimming will be performed.

12 Circuit 56501 -- ROCKVILLE 65-01

Performance Analysis

The ROCKVILLE 65-01 circuit experienced five outages of over 100,000 CMI between January 2018 and December 2018.

On January 3, 2018, an equipment failure occurred on an underground conductor causing a circuit breaker to trip to lockout. This outage affected 2,375 customers for up to 215 minutes resulting in 414,106 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor. This outage affected 642 customers for up to 1,643 minutes resulting in 352,397 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead switch causing a recloser to trip to lockout. This outage affected 642 customers for up to 364 minutes resulting in 231,548 CMI.

On May 15, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 795 customers for up to 596 minutes resulting in 229,380 CMI.

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 222,930 CMI.

In total, the ROCKVILLE 65-01 circuit had 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (28); animal contacts (13); equipment failure (10); nothing found (1); vehicles (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 through 2019, full circuit tree trimming will be performed.
- In 2018, an existing recloser was upgraded.
- In 2019, a new substation will be evaluated to reduce load on this circuit.
- In 2020, an additional Smart Grid device will be installed on this circuit.
- In 2020, an additional tie point will be added to this circuit.

13 Circuit 17902 -- BARTONSVILLE 79-02

Performance Analysis

The BARTONSVILLE 79-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 415 customers for up to 1,611 minutes resulting in 531,985 CMI.

On May 15, 2018, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing a load break fuse to operate. This outage affected 42 customers resulting in 128,025 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 105 customers resulting in 281,293 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 96 customers resulting in 255,405 CMI.

In total, the BARTONSVILLE 79-02 circuit had 35 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (19); equipment failure (9); animal contacts (6); other (1).

Remedial Actions

- In 2018, full circuit tree trimming was performed.
- In 2019, additional animal guarding will be installed.
- In 2020, a section of difficult-to-access conductor will be relocated.
- In 2020, a single-phase tie to TANNERSVILLE 57-01 will be built.

14 Circuit 20402 -- ASHFIELD 04-02

Performance Analysis

The ASHFIELD 04-02 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,886 customers for up to 1,081 minutes resulting in 1,309,814 CMI.

In total, the ASHFIELD 04-02 circuit had 33 outages between January 2018 and December 2018, with the causes breaking down as follows: equipment failure (16); tree related (9); animal contacts (6); nothing found (1); vehicles (1).

Remedial Actions

- In 2018, an existing three-phase recloser was reprogrammed to single-phase operation.
- In 2018, 36 porcelain cutouts were replaced.
- In 2018, two additional Smart Grid devices were added to this circuit.
- In 2018, five additional fuses were added to this circuit, and further fusing will be evaluated.
- In 2018, an Expanded Operation Review was performed, with three cross-arms replaced as a result.
- In 2019, a section of difficult-to-access conductor will be reconfigured.

15 Circuit 15704 -- TANNERSVILLE 57-04

Performance Analysis

The TANNERSVILLE 57-04 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 647 customers for up to 1,739 minutes resulting in 1,060,903 CMI.

In total, the TANNERSVILLE 57-04 circuit had 51 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (34); animal contacts (8); equipment failure (4); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2018, an additional sectionalizing device was installed.
- In 2018, a capacitor bank was upgraded.
- In 2019, full circuit tree trimming will be performed.
- In 2020, additional animal guarding will be installed on this circuit.
- In 2020, a section of difficult-to-access conductor will be relocated.
- In 2020, a section of single-phase will be evaluated for reconductoring.
- In 2021 a single-phase tie to the LONG POND 08-01 will be constructed.

16 Circuit 16801 -- WAGNERS 68-01

Performance Analysis

The WAGNERS 68-01 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On April 4, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 253 customers resulting in 108,790 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,461 customers for up to 381 minutes resulting in 350,479 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 269 customers for up to 1,386 minutes resulting in 372,586 CMI.

In total, the WAGNERS 68-01 circuit had 61 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (47); equipment failure (10); animal contacts (2); nothing found (2).

Remedial Actions

- In 2018, additional animal guarding was installed. More will installed thorugh 2020.
- In 2018, multiple capacitor banks were upgraded.
- In 2019, a new voltage regulating device will be installed.
- In 2020, a single-phase tie will be constructed for this circuit.
- In 2020, a section of single-phase will be reconductored and have several new Smart Grid devices installed.
- In 2020, a single-phase tie will be constructed, and several new Smart Grid devices installed.

17 Circuit 45602 -- WOOLRICH 56-02

Performance Analysis

The WOOLRICH 56-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On March 1, 2018, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 427 customers for up to 288 minutes resulting in 111,144 CMI.

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 164,430 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 727,794 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.

In total, the WOOLRICH 56-02 circuit had 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (25); equipment failure (12); animal contacts (11); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2018, a line inspection of a difficult-to-access section of conductor was performed. As a result, several minor items were identified and will be remediated.
- In 2019, additional animal guarding will be installed.
- In 2019, a tie to the WOOLRICH 56-01 or the LOCK HAVEN 65-06 will be evaluated.
- In 2019, non-wire backup solutions will be evaluated for this circuit.

18 Circuit 23902 -- EFFORT MOUNTAIN 39-02

Performance Analysis

The EFFORT MOUNTAIN 39-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On January 13, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 725 customers for up to 454 minutes resulting in 168,016 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break disconnect switch to be interrupted. This outage affected 194 customers for up to 1,523 minutes resulting in 283,786 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 147 customers for up to 2,902 minutes resulting in 391,046 CMI.

On October 29, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 224 customers for up to 639 minutes resulting in 137,911 CMI.

In total, the EFFORT MOUNTAIN 39-02 circuit had 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (35); equipment failure (11); animal contacts (5); nothing found (1); vehicles (1).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2018, several porcelain cut-outs were replaced with polymer.
- In 2019, hazard tree removal will be performed.
- In 2019, a section of single-phase will be extended and another section will be split.
- In 2019, full circuit trimming will be performed.

- In 2020, a section of two-phase conductor will be extended.

19 Circuit 16802 -- WAGNERS 68-02

Performance Analysis

The WAGNERS 68-02 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 156 customers for up to 3,014 minutes resulting in 429,819 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 80 customers for up to 1,500 minutes resulting in 107,118 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 84 customers for up to 4,196 minutes resulting in 329,662 CMI.

In total, the WAGNERS 68-02 circuit had 47 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (38); equipment failure (7); animal contacts (1); nothing found (1).

Remedial Actions

- In 2018, an existing sectionalizing device was upgraded to a Smart Grid device.
- In 2018, additional animal guarding was installed.
- In 2021, several sections of single-phase will be reconductored.
- In 2021, two single-phase ties will be constructed.

20 Circuit 53602 -- DALMATIA 36-02

Performance Analysis

The DALMATIA 36-02 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 354 customers for up to 16 minutes resulting in 285,442 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 178 customers for up to 1,132 minutes resulting in 154,096 CMI.

In total, the DALMATIA 36-02 circuit had 143 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (86); equipment failure (26); nothing found (16); animal contacts (7); vehicles (4); other (3); contact or dig in (1).

Remedial Actions

- In 2018, right-of-way was expanded for a section of this circuit to allow for more effective tree trimming.
- In 2018, the MEISERVILLE substation was built to provide load support for this circuit and reduce outage exposure.
- In 2018, two single-phase fuses were installed.
- In 2018, infrared scanning was performed.
- In 2018 through 2019, full circuit tree trimming will be performed.
- In 2019, a section of single-phase line will be relocated and re-sourced.

21 Circuit 45302 -- WEST BERWICK 53-02

Performance Analysis

The WEST BERWICK 53-02 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead switch causing a recloser to trip to lockout. This outage affected 319 customers for up to 1,427 minutes resulting in 450,101 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 123 customers resulting in 198,828 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 119 customers for up to 1,059 minutes resulting in 125,969 CMI.

On May 22, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 434 customers for up to 608 minutes resulting in 140,866 CMI.

In total, the WEST BERWICK 53-02 circuit had 50 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (34); equipment failure (10); nothing found (5); animal contacts (1).

Remedial Actions

- In 2019, a tie to the BERWICK 60-02 will be evaluated.
- In 2019, hazard tree removal will be evaluated.
- In 2019, a section of difficult-to-access conductor will be evaluated for relocation.

22 Circuit 22001 -- BOHEMIA 20-01

Performance Analysis

The BOHEMIA 20-01 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 54 customers for up to 3,066 minutes resulting in 165,547 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 162 customers for up to 2,649 minutes resulting in 428,980 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 54 customers for up to 4,502 minutes resulting in 243,063 CMI.

In total, the BOHEMIA 20-01 circuit had 85 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (34); animal contacts (22); equipment failure (15); nothing found (13); other (1).

Remedial Actions

- In 2018, ten locations received animal guarding; the remainder of the circuit will be patrolled for additional animal guarding opportunities.
- In 2018, full circuit trimming was performed.
- In 2018 an existing recloser was reprogrammed for single-phase operation.
- In 2019, several sections of difficult-to-access single-phase line will be evaluated for relocation.
- In 2019, an existing recloser will be evaluated for replacement.
- In 2019, six locations will receive fusing.
- In 2019, reconductoring a section of single-phase to three-phase will be evaluated.
- In 2021, three sections of difficult-to-access single-phase will be relocated and reconductored.
- In 2021, a section of single-phase will be extended.

23 Circuit 17801 -- GILBERT 78-01

Performance Analysis

The GILBERT 78-01 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,499 customers for up to 21 minutes resulting in 364,257 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 122 customers for up to 1,320 minutes resulting in 160,983 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 127 customers for up to 1,200 minutes resulting in 152,393 CMI.

In total, the GILBERT 78-01 circuit had 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (29); equipment failure (13); animal contacts (6); vehicles (3); nothing found (2).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2018, multiple porcelain cut-outs were replaced with polymer.
- In 2019, a single-phase tie line will be evaluated.
- In 2019, a difficult-to-access section of single-phase conductor will be relocated.
- In 2019, several reclosers will be programmed to triple-single operation.
- In 2019, a new line and terminal will be constructed.
- In 2019, an existing non-telemetered recloser will be upgraded to telemetered.
- In 2020, a single-phase tie line will be constructed, including additional Smart Grid devices.
- In 2021, full circuit trimming will be performed.

24 Circuit 21203 -- EAST CARBONDALE 12-03

Performance Analysis

The EAST CARBONDALE 12-03 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 3, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 884 customers for up to 29 minutes resulting in 160,153 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 886 customers for up to 615 minutes resulting in 528,092 CMI.

In total, the EAST CARBONDALE 12-03 circuit had 42 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (22); equipment failure (11); animal contacts (7); nothing found (1); other (1).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2018, several porcelain cutouts were replaced with polymer.
- In 2019, several sections of single-phase will be evaluated for extension and reconductoring.
- In 2019, full circuit tree trimming will be performed.
- In 2019, an additional sectionalizing switch will be evaluated for this circuit.
- In 2020, over 100 porcelain cutouts will be replaced with polymer.
- In 2020, additional animal guarding will be installed.

25 Circuit 22003 -- BOHEMIA 20-03

Performance Analysis

The BOHEMIA 20-03 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 169 customers for up to 2,801 minutes resulting in 473,203 CMI.

On May 18, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 549 customers for up to 533 minutes resulting in 275,701 CMI.

On June 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 565 customers for up to 254 minutes resulting in 105,064 CMI.

In total, the BOHEMIA 20-03 circuit had 65 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (32); equipment failure (15); animal contacts (12); nothing found (6).

Remedial Actions

- In 2018, an existing capacitor was upgraded.
- In 2018, full circuit trimming was performed.
- In 2019, additional animal guarding will be installed at several locations.

- In 2019 a section of difficult-to-access single-phase conductor will be relocated.
- In 2019, 10 locations will receive fusing.
- In 2019, an additional recloser will be added to the circuit.
- In 2019, an existing recloser will be replaced.
- In 2019, additional sectionalizing switches will be added to the circuit.
- In 2019, hazard tree removal will be evaluated.
- In 2020, a three-phase tie line to the TWIN LAKES 81-02 will be constructed
- In 2021, a section of single-phase will be reconductored.

26 Circuit 47704 -- BLOOMSBURG 77-04

Performance Analysis

The BLOOMSBURG 77-04 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On April 4, 2018, during a period of strong wind, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,373 customers for up to 103 minutes resulting in 138,691 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 155 customers for up to 2,804 minutes resulting in 138,292 CMI.

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 229,855 CMI.

In total, the BLOOMSBURG 77-04 circuit had 69 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (39); equipment failure (16); animal contacts (6); nothing found (5); vehicles (2); other (1).

Remedial Actions

- In 2017, hazard tree removal was performed.
- 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 2020, full circuit trimming will be performed.

27 Circuit 24901 -- WHITE HAVEN 49-01

Performance Analysis

The WHITE HAVEN 49-01 circuit experienced five outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 66 customers for up to 1,969 minutes resulting in 115,951 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 103 customers for up to 1,273 minutes resulting in 122,369 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 152 customers for up to 662 minutes resulting in 199,542 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 180 customers for up to 1,370 minutes resulting in 246,580 CMI.

On May 16, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 142 customers for up to 1,557 minutes resulting in 129,819 CMI.

In total, the WHITE HAVEN 49-01 circuit had 54 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (24); equipment failure (18); animal contacts (7); nothing found (2); vehicles (2); other (1).

Remedial Actions

- In 2018, an existing switch was upgraded to a Smart Grid device.
- In 2018, animal guarding was installed at four locations.
- In 2018, additional fusing was installed at fifteen locations.
- In 2020, a section of three-phase line will be reconfigured.
- In 2020, a section of three-phase line will be extended and made more accessible.
- In 2020, full circuit trimming will be performed.

28 Circuit 23403 -- HONESDALE 34-03

Performance Analysis

The HONESDALE 34-03 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,795 customers for up to 120 minutes resulting in 415,362 CMI.

On May 15, 2018, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 597 customers for up to 195 minutes resulting in 116,295 CMI.

On May 15, 2018, 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 1,563 minutes resulting in 109,064 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 97 customers for up to 2,837 minutes resulting in 275,189 CMI.

In total, the HONESDALE 34-03 circuit had 45 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (28); animal contacts (5); equipment failure (5); vehicles (4); nothing found (2); other (1).

Remedial Actions

- In 2019, additional animal guarding will be installed at 15 locations.
- In 2019, installation of a new set of disconnect switches will be evaluated.
- In 2020, full circuit trimming will be performed.
- In 2020, an existing hydraulic recloser will be relocated and upgraded to a Smart Grid device.
- In 2020, an additional Smart Grid device will be installed.
- In 2021, a section of single-phase conductor will be relocated.

29 Circuit 43401 -- BENTON 34-01

Performance Analysis

The BENTON 34-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On April 4, 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 97 customers for up to 1,173 minutes resulting in 105,807 CMI.

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.

In total, the BENTON 34-01 circuit had 61 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (39); equipment failure (10); nothing found (8); animal contacts (4).

Remedial Actions

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

30 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 392 customers for up to 745 minutes resulting in 286,585 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 246 customers for up to 516 minutes resulting in 126,876 CMI.

In total, the SULLIVAN TRAIL 58-01 circuit had 52 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (29); equipment failure (13); animal contacts (5); other (3); nothing found (1); vehicles (1).

Remedial Actions

- In 2018, an Expanded Operational Review was performed. As a result, six cross arms were replaced, and three additional minor repairs were completed.
- In 2019, additional fusing will be evaluated for this circuit.
- In 2019, two single-phase ties will be evaluated for this circuit.
- In 2019, additional single-phase reclosers will be evaluated for this circuit.
- In 2021, full circuit trimming will be performed.

31 Circuit 24603 -- VARDEN 46-03

Performance Analysis

The VARDEN 46-03 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 195 customers for up to 5,891 minutes resulting in 648,225 CMI.

In total, the VARDEN 46-03 circuit had 57 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (34); animal contacts (10); equipment failure (10); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2019, a single-phase tie line will be built.
- In 2019, three sections of difficult-to-access single-phase conductor will be relocated.
- In 2019, a tie line to the EAST CARBONDALE 12-01 will be constructed.
- In 2019, full circuit trimming will be performed.
- In 2019, additional animal guarding will be installed.
- In 2020, 21 porcelain cutouts will be replaced with polymer cutouts.

32 Circuit 45303 -- WEST BERWICK 53-03

Performance Analysis

The WEST BERWICK 53-03 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted a pole or pole arm causing a load break fuse to operate. This outage affected 63 customers for up to 3,011 minutes resulting in 124,681 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 117 customers for up to 2,780 minutes resulting in 317,868 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 55 customers for up to 3,084 minutes resulting in 128,192 CMI.

In total, the WEST BERWICK 53-03 circuit had 50 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (36); nothing found (5); animal contacts (3); equipment failure (3); other (2); vehicles (1).

Remedial Actions

- In 2018, hazard tree removal was performed on this circuit.
- In 2019, additional fusing will be installed.
- In 2019, an additional switch will be installed on this circuit.
- In 2019, three difficult-to-access locations will be evaluated for relocation.
- In 2020, full circuit trimming will be performed.

33 Circuit 47001 -- HUGHESVILLE 70-01

Performance Analysis

The HUGHESVILLE 70-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 2, 2018, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 1,102 customers for up to 546 minutes resulting in 120,981 CMI.

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 214,817 CMI.

In total, the HUGHESVILLE 70-01 circuit had 84 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (47); animal contacts (13); equipment failure (13); nothing found (5); vehicles (3); other (2); contact or dig in (1).

Remedial Actions

- In 2019, four sections of difficult-to-access conductor will be relocated.
- In 2019, additional fusing will be installed.
- In 2019, additional sectionalizing devices will be evaluated for this circuit.
- In 2020, an additional Smart Grid device will be ainstalled.

34 Circuit 26601 -- BROOKSIDE 66-01

Performance Analysis

The BROOKSIDE 66-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 854 customers for up to 1,265 minutes resulting in 671,660 CMI.

In total, the BROOKSIDE 66-01 circuit had 37 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (27); animal contacts (4); equipment failure (4); 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 on this circuit.
- In 2019, several porcelain cutouts will be replaced with polymer.
- In 2019, the addition of a three-phase tie will be evaluated.
- In 2019, the addition of several single-phase reclosers will be evaluated.
- In 2019, reconductoring several sections of single-phase will be evaluated.
- In 2020, full circuit trimming will be performed.

35 Circuit 15702 -- TANNERSVILLE 57-02

Performance Analysis

The TANNERSVILLE 57-02 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 824 customers for up to 985 minutes resulting in 811,640 CMI.

In total, the TANNERSVILLE 57-02 circuit had 32 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (11); animal contacts (9); equipment failure (8); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2018, the circuit protection settings were reviewed.
- In 2019, new load break disconnect switch will be installed.
- In 2019, a new three-phase tie to BARTONSVILLE 79-03 will be constructed.
- In 2022, a new substation, CRANBERRY CREEK, will be constructed.

36 Circuit 22805 -- HAUTO 28-05

Performance Analysis

The HAUTO 28-05 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On June 14, 2018, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 4,727 customers for up to 1,353 minutes resulting in 934,520 CMI.

In total, the HAUTO 28-05 circuit had 14 outages between January 2018 and December 2018, with the causes breaking down as follows: equipment failure (5); vehicles (3); nothing found (2); tree related (2); animal contacts (1); other (1).

Remedial Actions

- In 2018, an existing Smart Grid device was replaced.
- In 2018, a drone patrol identified several minor items, which were remediated.
- In 2018, an Expanded Operation Review was performed.
- In 2018, six additional fuses were installed.
- In 2019, additional disconnect switches will be installed on this circuit.
- In 2019, a section of difficult-to-access conductor will be evaluated for reconfiguration.
- In 2020, full circuit trimming will be performed.

37 Circuit 46206 -- DANVILLE 62-06

Performance Analysis

The DANVILLE 62-06 circuit experienced four outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 112 customers for up to 1,226 minutes resulting in 115,292 CMI.

On May 15, 2018, 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 1,548 minutes resulting in 111,618 CMI.

On June 18, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 425 customers for up to 264 minutes resulting in 112,008 CMI.

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 106,636 CMI.

In total, the DANVILLE 62-06 circuit had 59 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (36); equipment failure (11); animal contacts (6); nothing found (4); 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, the trim cycle for this circuit will be re-evaluated.

- In 2019, a new distribution river crossing will be evaluated.
- In 2019, a tie to the DANVILLE 62-04 will be constructed.

38 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

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

On May 15, 2018, 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 1,563 minutes resulting in 245,836 CMI.

In total, the GREEN PARK 24-02 circuit had 96 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (49); equipment failure (28); nothing found (8); animal contacts (7); other (2); vehicles (2).

Remedial Actions

- In 2018, over 1000 hazard trees were removed.
- In 2018, over 70 single-phase fuses were installed.
- In 2018, a section of three-phase conductor was replaced.
- In 2019, six sections of conductor will be relocated.
- In 2019, a second transmission source into the distribution substation will be constructed.
- In 2019, an additional sectionalizer will be installed.
- In 2019, additional animal guarding will be evaluated.
- In 2020, two sections of difficult-to-access conductor will be relocated.

39 Circuit 22002 -- BOHEMIA 20-02

Performance Analysis

The BOHEMIA 20-02 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 208 customers for up to 1,971 minutes resulting in 414,128 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 628 customers for up to 1,967 minutes resulting in 299,409 CMI.

On July 14, 2018, an equipment failure occurred on an underground conductor causing a recloser to trip to lockout. This outage affected 590 customers for up to 237 minutes resulting in 101,058 CMI.

In total, the BOHEMIA 20-02 circuit had 24 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (13); animal contacts (5); equipment failure (3); nothing found (2); vehicles (1).

Remedial Actions

- In 2018, the protection settings for a section of single-phase line were reviewed and optimized.
- In 2018, three locations received animal guarding.
- In 2019, 13 additional animal guards will be installed.
- In 2019, several devices will be replaced at an underground residential development.
- In 2019, several sections of underground cable will be replaced.
- In 2019, several sections of single-phase will be evaluated for relocation.
- In 2019, a section of single-phase will be evaluated for reconductoring
- In 2020, two new Smart Grid devices will be installed.
- In 2021, an additional singe-phase recloser will be installed.

40 Circuit 40602 -- PINE GROVE 06-02

Performance Analysis

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

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 254,995 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 made contact with 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 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (27); equipment failure (14); animal contacts (5); nothing found (3); vehicles (3); other (1).

Remedial Actions

- In 2019, eight additional locations will receive fusing.
- In 2019, an additional Smart Grid device will be installed on this circuit.
- In 2020, an additional Smart Grid device will be installed on this circuit.
- In 2020, a section of single-phase line will be reconfigured.
- In 2021, full circuit trimming will be performed.

41 Circuit 28301 -- NEWFOUNDLAND 83-01

Performance Analysis

The NEWFOUNDLAND 83-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On April 4, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 883 customers for up to 394 minutes resulting in 190,214 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 360 customers for up to 379 minutes resulting in 136,231 CMI.

In total, the NEWFOUNDLAND 83-01 circuit had 103 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (60); animal contacts (16); equipment failure (16); nothing found (6); other (3); vehicles (2).

Remedial Actions

- In 2018, 24 animal guards were installed
- In 2019, a section of single-phase will be reconductored.
- In 2019, a section of three-phase will be reconductored.
- In 2019, a two-phase line extension will be evaluated.
- In 2019, a new single-phase tie will be built.
- In 2019, a new line and terminal will be constructed.
- In 2020, an additional Smart Grid device will be installed on this circuit.

42 Circuit 40201 -- BEAR GAP 02-01

Performance Analysis

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

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 79 customers for up to 1,491 minutes resulting in 117,733 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 109 customers for up to 1,330 minutes resulting in 144,877 CMI.

In total, the BEAR GAP 02-01 circuit had 102 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (64); equipment failure (17); nothing found (11); animal contacts (9); vehicles (1).

Remedial Actions

- In 2017, an Expanded Operational Review was performed on this circuit. Several items were identified and remediated, including a pole replacement and 13 cross arm replacements.
- In 2019, additional fusing will be installed on this circuit.
- In 2020, full circuit trimming will be performed.
- In 2020, a section of existing conductor will be relocated and reconductored.

43 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 72 customers for up to 1,489 minutes resulting in 102,644 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 88 customers for up to 1,335 minutes resulting in 117,429 CMI.

In total, the WEST BLOOMSBURG 54-02 circuit had 74 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (49); equipment failure (15); animal contacts (5); nothing found (5).

Remedial Actions

- In 2018, hot spot trimming was performed on this circuit.
- In 2018, 28 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 2020, a section of difficult-to-access single-phase will be relocated.

44 Circuit 24703 -- FREELAND 47-03

Performance Analysis

The FREELAND 47-03 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On April 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,030 customers for up to 562 minutes resulting in 578,324 CMI.

In total, the FREELAND 47-03 circuit had 25 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (17); equipment failure (6); animal contacts (1); vehicles (1).

Remedial Actions

- In 2018, additional fusing was installed on this circuit.
- In 2019, a tie to the SAINT JOHNS 30-02 will be evaluated.
- In 2019, several spans of single-phase conductor will be rebuilt to three-phase and reconfiguration will be performed.

45 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

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 68 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (30); equipment failure (18); animal contacts (11); other (3); vehicles (3); nothing found (2); contact or dig in (1).

Remedial Actions

- In 2018, an Expanded Operational Review was performed on this circuit.
- In 2018, approximately 20 cross arms were replaced on this circuit.
- In 2019, full circuit trimming will be performed.
- In 2019, a section of difficult-to-access conductor will be relocated.

- In 2019, two miles of single-phase line will be reconductored.
- In 2019, additional fusing will be added at 14 locations.

46 Circuit 45002 -- LIMESTONE 50-02

Performance Analysis

The LIMESTONE 50-02 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On January 3, 2018, during a period of extreme temperatures, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,441 customers for up to 456 minutes resulting in 422,378 CMI.

On May 22, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,374 customers for up to 106 minutes resulting in 145,326 CMI.

In total, the LIMESTONE 50-02 circuit had 62 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (32); animal contacts (15); equipment failure (10); other (3); nothing found (2).

Remedial Actions

- In 2018, an infrared scan was performed; several minor items were identified and remediated.
- In 2018, a section of difficult-to-access conductor was relocated.
- In 2018, hot spot tree trimming was performed.
- In 2018, additional animal guarding was installed.
- In 2018, three additional fuses were installed.
- In 2019, a new tie line for this circuit will be evaluated.
- In 2019, several sections of difficult-to-access conductor will be evaluated for relocation.
- In 2019, a new Smart Grid device will be added to this circuit.
- In 2019, an Expanded Operational Review will be performed.

47 Circuit 28805 -- LAKEVILLE 88-05

Performance Analysis

The LAKEVILLE 88-05 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 402 customers for up to 1,819 minutes resulting in 637,210 CMI.

In total, the LAKEVILLE 88-05 circuit had 35 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (13); animal contacts (12); equipment failure (9); vehicles (1).

Remedial Actions

- In 2018, full circuit trimming was performed.
- In 2018, the protection settings for four sections of single-phase were reviewed and optimized.
- In 2019, a two-phase tie will be evaluated.
- In 2019, 20 animal guards will be installed.
- In 2020, a single-phase tie will be constructed.
- In 2020, a section of line will be re-sourced and divided into sections.

48 Circuit 44902 -- SCOTT 49-02

Performance Analysis

The SCOTT 49-02 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 87 customers for up to 1,845 minutes resulting in 160,466 CMI.

On May 15, 2018, 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 1,590 minutes resulting in 147,804 CMI.

On July 22, 2018, during a period of heavy rain, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 735 customers for up to 597 minutes resulting in 322,744 CMI.

In total, the SCOTT 49-02 circuit had 37 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (24); equipment failure (7); animal contacts (2); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2019, two sections of difficult-to-access three-phase conductor will be evaluated for relocation.
- In 2019, additional fusing will be installed.
- In 2019, an Expanded Operational Review will be performed.
- In 2019, an existing device will be upgraded to a Smart Grid device.

49 Circuit 26604 -- BROOKSIDE 66-04

Performance Analysis

The BROOKSIDE 66-04 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On March 10, 2018, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a temporary open point to be interrupted. This outage affected 726 customers for up to 237 minutes resulting in 138,015 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 119 customers for up to 1,180 minutes resulting in 140,328 CMI.

In total, the BROOKSIDE 66-04 circuit had 61 outages between January 2018 and December 2018, with the causes breaking down as follows: equipment failure (23); tree related (23); animal contacts (5); other (4); nothing found (3); vehicles (3).

Remedial Actions

- In 2018, a motor operated air break was replaced with a recloser as part of the Smart Grid Program.
- In 2018, 105 poles were replaced.
- In 2018, a set of Smart fault indicators was installed.
- In 2018, several additional locations received animal guarding.
- In 2019, three fuses will be installed.
- In 2019, numerous porcelain cutouts will be replaced with polymer cutouts.
- In 2019, 25 additional locations will receive animal guarding.
- In 2019, a section of single-phase will be reconductored.
- In 2019, a section of single-phase will be extended and re-sourced.
- In 2020, full circuit trimming will be performed.
- In 2021, a section of single-phase will be extended and re-sourced.
- In 2021, a tie to BROOKSIDE 66-02 will be constructed.
- In 2021, a new line and terminal will be constructed for this circuit.

50 Circuit 54001 -- SHERMANSDALE 40-01

Performance Analysis

The SHERMANSDALE 40-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 488 customers for up to 548 minutes resulting in 267,204 CMI.

On May 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 158 customers for up to 1,172 minutes resulting in 132,312 CMI.

In total, the SHERMANSDALE 40-01 circuit had 39 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (22); equipment failure (12); animal contacts (2); nothing found (2); vehicles (1).

Remedial Actions

- In 2018, triple-single operation was enabled on an existing recloser.
- In 2018, three additional single-phase fuses were installed, and the coordination scheme improved.
- In 2019, an Expanded Operational Review will be performed.
- In 2021, full circuit trimming will be performed.

51 Circuit 25402 -- LAKE HARMONY 54-02

Performance Analysis

The LAKE HARMONY 54-02 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On April 16, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 808 customers for up to 427 minutes resulting in 281,329 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 96 customers for up to 3,059 minutes resulting in 178,945 CMI.

In total, the LAKE HARMONY 54-02 circuit had 47 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (29); equipment failure (14); animal contacts (3); nothing found (1).

Remedial Actions

- In 2018, a three-phase tie to the LONG POND 08-02 was constructed.
- In 2019, full circuit trimming will be performed.
- In 2019, an Expanded Operational Review will be performed.

52 Circuit 20601 -- GREENWOOD 06-01

Performance Analysis

The GREENWOOD 06-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 455 customers for up to 1,071 minutes resulting in 475,600 CMI.

On June 13, 2018, a vehicle contact occurred causing a recloser to trip to lockout. This outage affected 455 customers for up to 301 minutes resulting in 136,955 CMI.

In total, the GREENWOOD 06-01 circuit had 28 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (10); equipment failure (8); animal contacts (6); vehicles (3); other (1).

Remedial Actions

- In 2018, an additional switch was installed.
- In 2019, two spans of conductor will be evaluated for reconductoring.
- In 2019, a full circuit drone inspection will be conducted.
- In 2019, additional fusing will be installed at 12 locations.
- In 2019, a new substation will be evaluated.
- In 2020, full circuit trimming will be performed.

53 Circuit 56801 -- BENVENUE 68-01

Performance Analysis

The BENVENUE 68-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an unknown component causing a recloser to trip to lockout. This outage affected 114 customers for up to 1,114 minutes resulting in 126,920 CMI.

In total, the BENVENUE 68-01 circuit had 62 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (34); equipment failure (14); animal contacts (9); nothing found (3); vehicles (2).

Remedial Actions

- In 2018, the circuit breaker relays were upgraded.
- In 2018, the circuit breaker was replaced.
- In 2019, hazard tree removal will be evaluated.

- In 2019, additional single-phase ties will be evaluated for this circuit.
- In 2019, single-phase fusing will be evaluated for several locations.
- In 2019, an Expanded Operational Review will be performed.

54 Circuit 16501 -- STROUDSBURG 65-01

Performance Analysis

The STROUDSBURG 65-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead switch causing a load break fuse to operate. This outage affected 163 customers for up to 3,290 minutes resulting in 536,266 CMI.

In total, the STROUDSBURG 65-01 circuit had 18 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (9); equipment failure (5); animal contacts (3); other (1).

Remedial Actions

- In 2018, additional animal guarding was installed.
- In 2018, a sectionalizing device was upgraded.
- In 2018, full circuit tree trimming was performed.
- In 2020, a three-phase tie to the STROUDSBURG 65-03 will be constructed.

55 Circuit 13704 -- SCHNECKSVILLE 37-04

Performance Analysis

The SCHNECKSVILLE 37-04 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On April 2, 2018, during a period of ice/sleet/snow, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 485 customers for up to 288 minutes resulting in 129,336 CMI.

On April 16, 2018, 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 340 minutes resulting in 200,006 CMI.

On August 9, 2018, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 652 customers for up to 554 minutes resulting in 205,164 CMI.

In total, the SCHNECKSVILLE 37-04 circuit had 39 outages between January 2018 and December 2018, with the causes breaking down as follows: equipment failure (11); tree related (11); animal contacts (10); nothing found (4); vehicles (3).

Remedial Actions

- In 2019, full circuit trimming will be performed.
- In 2019, hazard tree removal will be performed.
- In 2019, additional fusing and disconnect switches will be installed on this circuit.
- In 2019, an additional Smart Grid device will be evaluated for this circuit.
- In 2019, additional single-phase reclosers will be evaluated for this circuit.

56 Circuit 26001 -- WEST DAMASCUS 60-01

Performance Analysis

The WEST DAMASCUS 60-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 239 customers for up to 1,275 minutes resulting in 274,834 CMI.

In total, the WEST DAMASCUS 60-01 circuit had 76 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (37); equipment failure (21); animal contacts (13); nothing found (4); contact or dig in (1).

Remedial Actions

- In 2018, animal guarding was installed at three locations.
- In 2019, a new reliability substation will be evaluated.
- In 2019, a tie line to the TINKER 44-01 will be evaluated.
- In 2019, six additional locations will receive animal guarding.
- In 2019, a section of single-phase will be evaluated for extension and re-sourcing.
- In 2019, an additional Smart Grid device will be installed.
- In 2020, a section of difficult-to-access conductor will be relocated.

57 Circuit 42701 -- AUGUSTAVILLE 27-01

Performance Analysis

The AUGUSTAVILLE 27-01 circuit experienced three outages of over 100,000 CMI between January 2018 and December 2018.

On March 23, 2018, an equipment failure occurred on an overhead conductor causing a temporary open point to be interrupted. This outage affected 838 customers for up to 244 minutes resulting in 154,686 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 923 customers for up to 278 minutes resulting in 160,944 CMI.

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.

In total, the AUGUSTAVILLE 27-01 circuit had 48 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (32); equipment failure (7); vehicles (3); animals (1); other (5).

Remedial Actions

- In 2018, an Expanded Operational Review was performed. Additional fusing was installed as a result.
- 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 2020, two additional Smart Grid devices will be installed on this circuit.
- In 2020, a section of difficult-to-access conductor will be removed.

58 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On February 26, 2018, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 322 customers for up to 396 minutes resulting in 127,267 CMI.

In total, the DALMATIA 36-01 circuit had 58 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (39); equipment failure (10); animal contacts (4); nothing found (2); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2018, a section of single-phase conductor that no longer serves customers was removed.
- In 2019, a tie to the HUNTER 01-01 will be evaluated.
- In 2019, an Expanded Operational Review will be conducted.
- In 2020, an existing three-phase recloser will be replaced with a Smart Grid recloser with single-phase trip operability.
- In 2020, full circuit trimming will be performed.

59 Circuit 17901 -- BARTONSVILLE 79-01

Performance Analysis

The BARTONSVILLE 79-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 128 customers for up to 2,559 minutes resulting in 327,491 CMI.

In total, the BARTONSVILLE 79-01 circuit had 22 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (14); animal contacts (4); equipment failure (2); other (1); vehicles (1).

Remedial Actions

- In 2018, full circuit trimming was performed.
- In 2019, hazard tree removal will be evaluated.
- In 2019, additional animal guarding will be installed.
- In 2019, relocating a section of difficult-to-access single-phase will be evaluated.

60 Circuit 41802 -- GOWEN CITY 18-02

Performance Analysis

The GOWEN CITY 18-02 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On April 16, 2018, during a period of strong wind, an unidentified issue occurred with a pole or pole arm causing a recloser to trip to lockout. This outage affected 508 customers for up to 384 minutes resulting in 194,828 CMI.

On October 8, 2018, an animal interfered with an overhead switch causing a circuit breaker to trip to lockout. This outage affected 523 customers for up to 385 minutes resulting in 193,721 CMI.

In total, the GOWEN CITY 18-02 circuit had 40 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (25); nothing found (6); equipment failure (4); animal contacts (3); other (2).

Remedial Actions

- In 2018, an Expanded Operational Review was completed. Five minor remediations were performed in 2018, and five more are scheduled for 2019.
- In 2019, a substation conversion will be evaluated.

- In 2019, a single-phase tie to the HUNTER 01-01 will be evaluated.
- In 2019, a tie to the GOWEN CITY 18-01 will be evaluated.
- In 2020, an existing recloser will be replaced.
- In 2021, the substation will be upgraded.

61 Circuit 18501 -- CANADENSIS 85-01

Performance Analysis

The CANADENSIS 85-01 circuit experienced two outages of over 100,000 CMI between January 2018 and December 2018.

On January 13, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 179 customers for up to 695 minutes resulting in 124,328 CMI.

On May 15, 2018, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 66 customers for up to 2,705 minutes resulting in 178,480 CMI.

In total, the CANADENSIS 85-01 circuit had 53 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (30); equipment failure (12); animal contacts (6); nothing found (5).

Remedial Actions

- In 2019, hazard tree removal will be evaluated.
- In 2019, additional animal guarding will be installed.
- In 2019, a recloser will be upgraded to a Smart Grid device.
- In 2020, full circuit trimming will be performed.
- In 2020, a new tie will be constructed to the CANADENSIS 85-02.
- In 2021, the substation will be upgraded.

62 Circuit 67502 -- WEST WILLOW 75-02

Performance Analysis

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

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 animal interfered with 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 28 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (10); equipment failure (9); animal contacts (4); nothing found (2); vehicles (2); other (1).

Remedial Actions

- In 2019, 19 additional fuses will be installed.
- In 2019, ten porcelain cutouts will be replaced with polymer.
- In 2019, an additional recloser will be installed on this circuit.
- In 2019, a three-phase tie to the WEST WILLOW 75-01 will be evaluated.
- In 2019, a three-phase tie to the BUCK 08-01 will be evaluated.
- In 2019, a single-phase tie will be evaluated.

63 Circuit 27901 -- BEAR CREEK 79-01

Performance Analysis

The BEAR CREEK 79-01 circuit experienced one outage of over 100,000 CMI between January 2018 and December 2018.

On June 13, 2018, during a period of strong wind, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 1,538 customers for up to 416 minutes resulting in 457,641 CMI.

In total, the BEAR CREEK 79-01 circuit had 30 outages between January 2018 and December 2018, with the causes breaking down as follows: tree related (16); equipment failure (8); animal contacts (2); nothing found (2); contact or dig in (1); other (1).

Remedial Actions

- In 2018, the existing recloser that caused the June outage was replaced.
- In 2019, full circuit trimming will be performed.
- In 2019, the installation of additional switches will be evaluated for this circuit.

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

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

Cause Description	Trouble Cases	Percent of Trouble Cases	Customer Interruptions	Percent of Customer Interruptions	Customer Minutes	Percent of Customer Minutes
Animals	3,471	16.5%	43,753	3.6%	3,402,832	1.7%
Contact / Dig-In	134	0.6%	11,217	0.9%	791,683	0.4%
Directed by Non-PPL Authority	83	0.4%	16,638	1.4%	742,020	0.4%
Equipment Failures	6,261	29.8%	385,942	32.1%	38,801,710	19.3%
Improper Design	4	0.0%	5,111	0.4%	92,220	0.0%
Improper Installation	3	0.0%	544	0.0%	69,065	0.0%
Improper Operation	3	0.0%	5,469	0.5%	37,839	0.0%
Nothing Found	1,249	5.9%	61,367	5.1%	6,137,603	3.0%
Other Controllable	122	0.6%	15,717	1.3%	707,000	0.4%
Other Non Control	278	1.3%	8,608	1.3%	1,497,964	0.7%
Other Public	34	0.2%	7,381	0.6%	508,035	0.3%
Tree Related	8,510	40.5%	482,939	40.2%	136,103,186	67.6%
Unknown	-	0.0%	-	0.0%	-	0.0%
Vehicles	783	3.7%	101,481	8.4%	10,109,399	5.0%
Forced due to UGI gas leaks	72	0.3%	55,429	4.6%	2,484,108	1.2%
Total	21,007	100.0%	1,201,596	100.0%	201,484,664	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 53% of cases, 59% of customer interruptions, and 79% of CMI.

Tree Related: PPL Electric has recently increased funding to more aggressively address outside of the right-of-way danger trees. For trees within the right-of-way, PPL Electric has implemented a more aggressive trimming strategy.

Animals: Animals accounted for approximately 17% 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. Service interruptions due to vehicles are on the rise as a result of an increasing number of drivers and vehicles on the road. 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 45% of the cases of trouble, 51% of the customer interruptions and 61% of the customer minutes attributed to equipment failure were weather-related and, as such, are not considered to be strong indicators of equipment condition or performance.

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

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

Inspection & Maintenance Goals/Objectives	Annual Budget	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of structures)	559	238	186	559	525
Transmission arm replacements (# of arms)	144	51	104	144	205
Transmission air break switch inspections (# of switches)	0	0	1	0	4
Transmission surge arrester installations (# of sets)	0	0	0	0	0
Transmission structure inspections (# of activities)	28,882	7,220	8,820	28,882	27,455
Transmission tree side trim-Bulk Power (linear feet)	N/A				
Transmission herbicide-Bulk Power (# of acres)	N/A				
Transmission reclearing (# of miles) BES Only	913	229	212	913	913
Transmission reclearing (# of miles) 69 kV	1,550	388	559	1,550	1,550
Transmission reclearing (# of miles) 138 kV	89	22	24	89	89
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	673	53	52	673	674
Circuit breakers (# of activities)	639	121	107	639	590
Substation inspections (# of activities)	1,797	372	391	1,797	1,804
Transformer maintenance (# of activities)	175	44	37	175	127

Inspection & Maintenance Goals/Objectives	Annual Budget	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	3,490	682	437	3,490	2,735
C-truss distribution poles (# of poles)	5,094	1,780	1,740	5,094	5,054
Capacitor (MVAR added)	0	0	6	0	35
OCR Replacements (# of)	40	0	0	30	34
Distribution pole inspections (# of poles)	70,338	18,526	18,241	70,338	70,053
Distribution line inspections (hours)	9,742	1,004	2,886	9,742	7,227
Group re-lamping (# of lamps)	12,112	4,800	800	12,112	11,947
Test sections of underground distribution cable	N/A	224	224	863	863
Distribution tree trimming (# of miles)	4,500	1,185	1,501	4,500	4,100
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)	300	88	133	300	439
LTN vault inspections (# of)	637	119	185	637	901
LTN network protector overhauls (# of)	65	13	22	65	75
LTN reverse power trip testing (# of)	23	6	10	23	33

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

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

Activity	4th Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	1,896	1,646	7,475	6,463
Vegetation Management	12,715	17,165	46,843	42,125
Customer Response	12,750	13,499	51,177	72,268
Reliability Maintenance	8,635	7,160	36,629	28,732
System Upgrade	2,758	4,445	10,350	12,061
Customer Service/Accounts	33,449	28,690	124,863	112,639
Others	8,105	17,722	31,376	51,359
Total O&M Expenses	**80,308**	**90,329**	**308,713**	**325,648**

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

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

Activity	4th Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	22,004	22,078	88,127	89,398
System Upgrade	118,786	165,825	582,816	607,626
Reliability & Maintenance	127,671	118,909	474,068	434,121
Customer Response	3,815	3,603	15,710	43,562
Other	9,163	11,847	24,056	23,105
Total	**281,439**	**322,263**	**1,184,778**	**1,197,812**

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 fourth quarter of 2018, 149 corrective work orders were created with the following breakdown by priority.

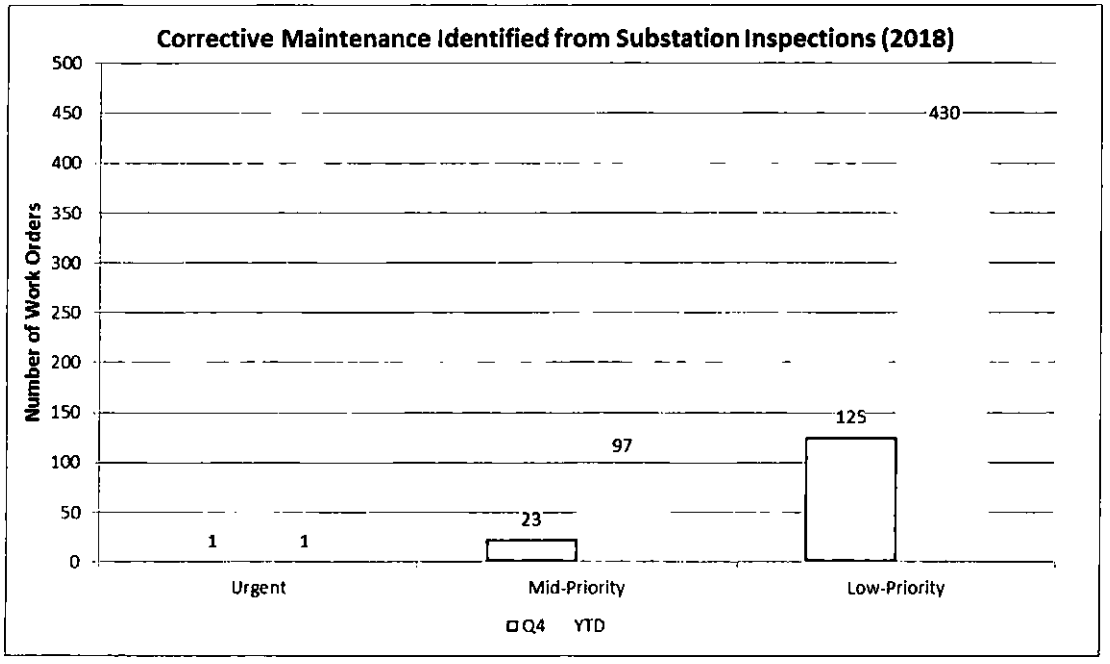


Figure 1: Corrective Maintenance Work Orders by Priority Level for fourth quarter and year-to-date 2018

(b) The Amount Spent on Substation Inspections

During the fourth quarter of 2018, PPL Electric spent approximately $117,000 on substation inspections.

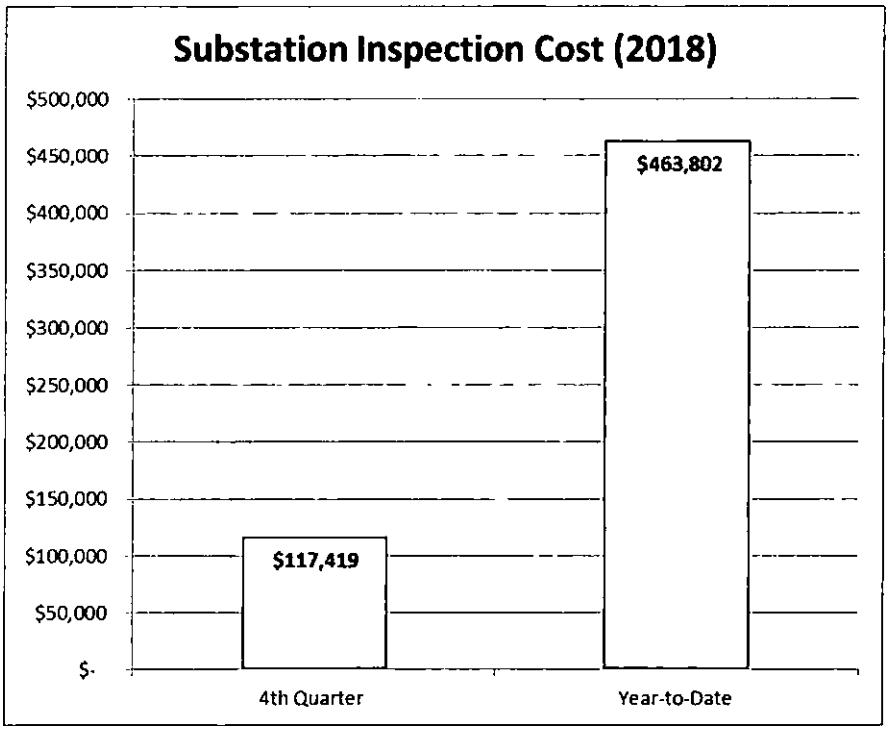


Figure 2: Substation Inspection Costs for fourth quarter and year-to-date 2018.

(c) The Amount Spent on Vegetation Management

Please refer to Section 7 for vegetation management expenses, for the fourth 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 fourth quarter and year-to-date. During fourth quarter of 2018, PPL Electric avoided a projected 352,000 CMI.

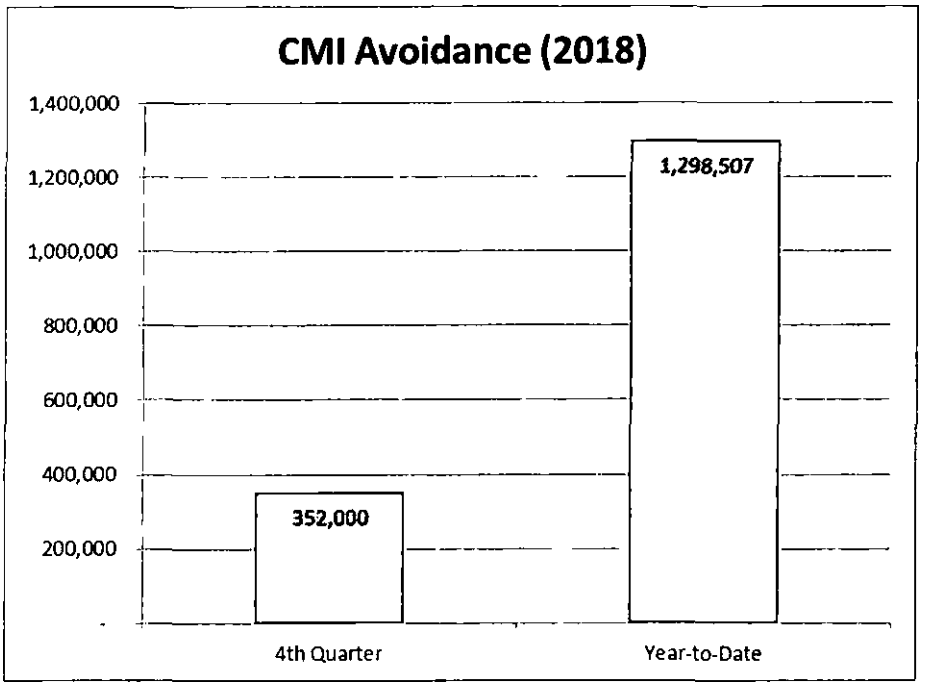


Figure 3: CMI Avoidance Due to Inspections for fourth quarter and year-to-date 2018

(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 fourth quarter of 2018, the Company interrupted about 7,158 customers for a total of approximately 84,716 CMI. The figures below show these results for the number of customers interrupted and CMI experienced, respectively.

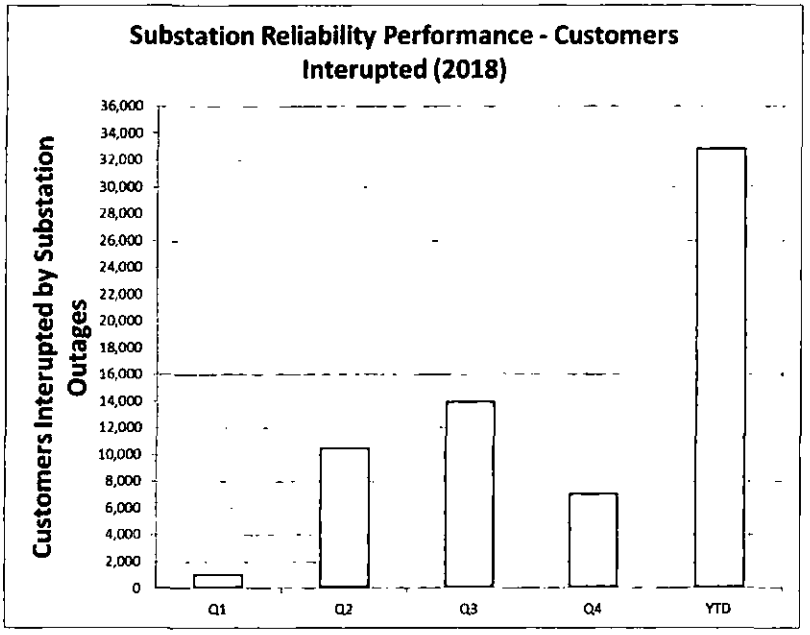


Figure 4: Substation Customers Interrupted for fourth quarter and year-to-date 2018

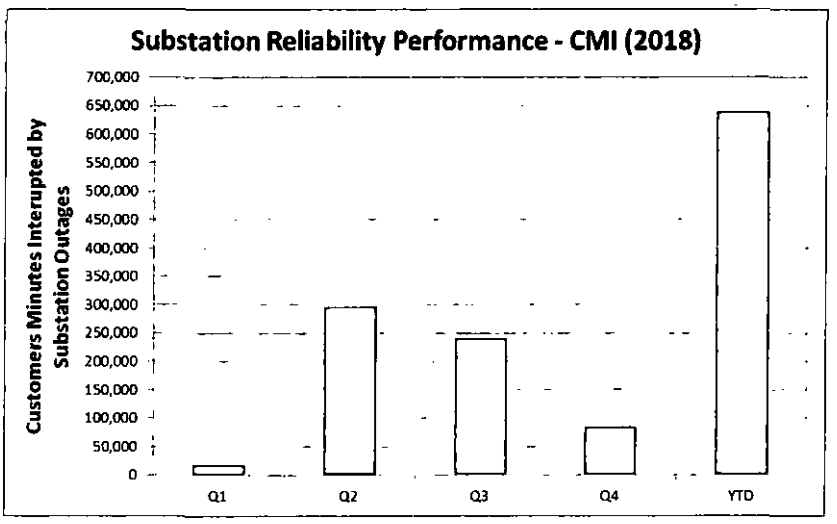


Figure 5: Substation Customer Minutes of Interruption for fourth quarter and year-to-date 2018

(f) Substation SAIFI Contribution

Overall, substation outages contributed approximately 3% of the total SAIFI experienced by PPL Electric customers in the fourth quarter of 2018. 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. The table below shows the number of distribution substations that have this functionality.

	4th Quarter	Year-to-Date
Substations with Remote Monitoring	354	354
Total Number of Substations	356	356

PPL Electric has launched a project to install smart relaying onto all 12kV circuit breakers at its distribution substations. These relays will allow the Company to quickly perform automated switching for lesser system impact during an outage event, and better-estimate fault locations for quicker system restoration. By 2022, the Company expects all 12kV circuit breakers to have these functionalities 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	56
Journeyman Lineman	218
Journeyman Lineman-Trainee	29
Helper	5
Groundhand	2
Troubleman	51
T&D Total	**361**
Electrical	
Elect Leaders-UG	2
Elect Leaders-Net	10
Elect Leaders-Sub	20
Journeyman Elect-UG	13
Journeyman Elect-Net	32
Journeyman Elect-Sub	70
Journeyman Elect Trainee-UG	0
Journeyman Elect Trainee-Net	0
Journeyman Elect Trainee-Sub	1
Helper	0
Laborer-Network	0
Laborer-Substation	0
Electrical Total	**148**
Overall Total	**509**

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.

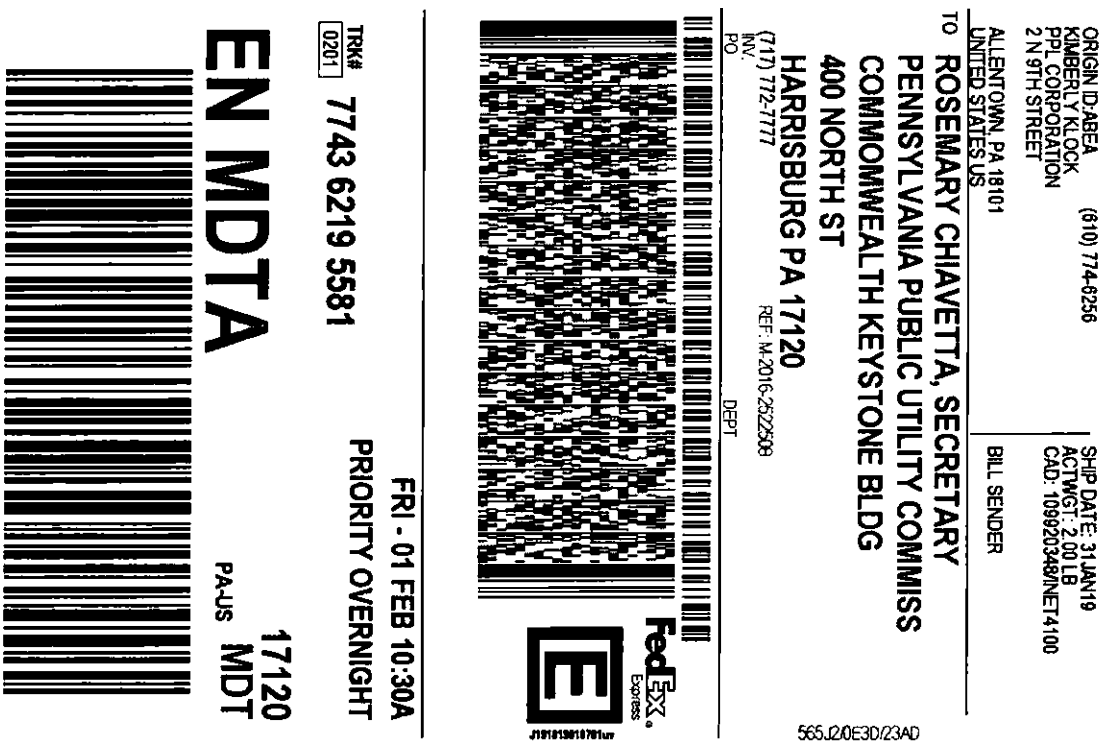
Appendix B

Electrical

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

Appendix B

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



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3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.