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FEDERAL EXPRESS

October 31, 2016

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

Re: PPL Electric Utilities Corporation
Quarterly Reliability Report for the
Period Ended September 30, 2016
Docket No. ~~L-00030161~~ 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 September 30, 2016. 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 October 31, 2016, 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.

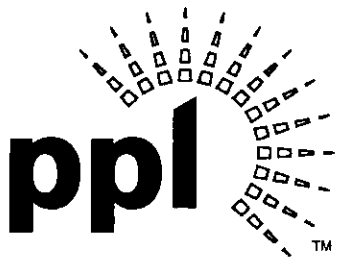
Very truly yours,

Kimberly A. Klock

Kimberly A. Klock

Enclosures

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



PPL Electric Utilities

M-2016-2522508

PPL Electric Utilities Corporation

Quarterly Reliability Report

to the

Pennsylvania Public Utility Commission

November 2016

*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.***

There were no major events during the third quarter of 2016.

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

The following table provides data for the 12 months ending September 30, 2016.

SAIFI (Benchmark = 0.98; Rolling 12-month Std. = 1.18)	0.80
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	119
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	95
MAIFI[1]	6.8
Average Number of Customers Served[2]	1,409,292
Number of Sustained Customer Interruptions (Trouble Cases)	17,756
Number of Customers Affected[3]	1,120,611
Customer Minutes of Interruptions (CMI)	133,771,976
Number of Customer Momentary Interruptions	9,556,285

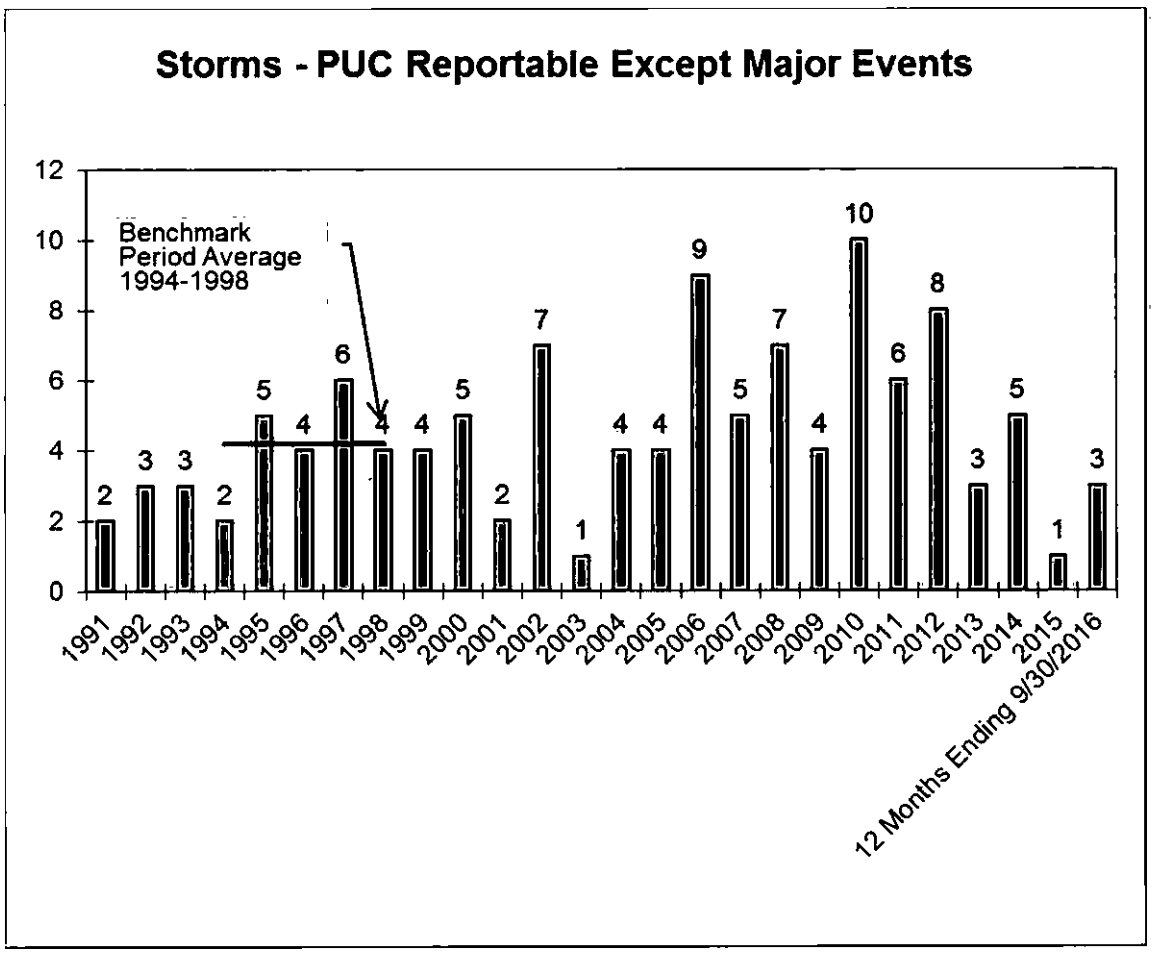
During the third quarter, there were no (0) PUC major events, one (1) PUC reportable storm, and nine (9) other storms that required the opening of one or more area emergency centers to manage restoration efforts.

[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.

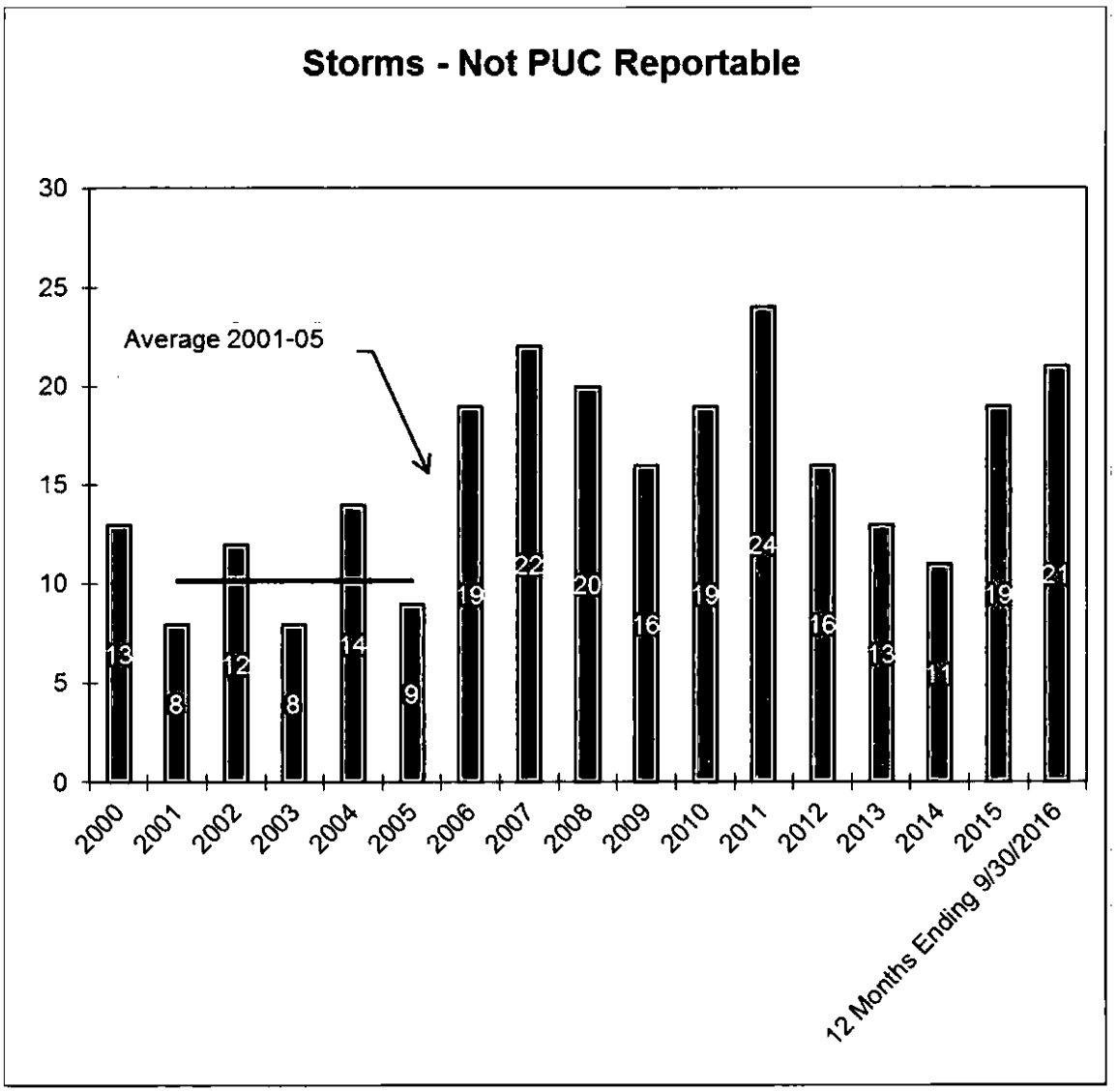
[2] PPL Electric calculates the annual indices using customers served at the end of period. This is consistent with the method used to calculate PPL Electric's benchmarks.

[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.

Specifically, during the 12-month reporting period, there were no (0) PUC major events and three (3) PUC-reportable storms (≥2,500 customers interrupted for ≥6 hours) other than major events.



In addition, there were twenty-one (21) 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	44703	742	536	1.4	18.1	1,790	33	1,327,723
2	46702	935	337	2.8	12.8	1,272	41	1,189,595
3	13101	482	189	2.6	12.5	2,261	50	1,089,440
4	46903	713	156	4.6	16.2	1,428	22	1,018,038
5	12601	450	161	2.8	4.6	2,173	43	978,064
6	52402	566	178	3.2	3.2	1,671	62	945,459
7	60903	704	205	3.4	0.0	1,270	9	893,876
8	22601	827	344	2.4	11.2	1,069	57	884,221
9	64201	456	114	4.0	14.7	1,852	27	843,916
10	10903	482	194	2.5	11.0	1,717	35	826,766
11	46004	391	244	1.6	19.8	2,076	45	811,132
12	50106	363	283	1.3	5.9	2,232	16	809,748
13	29502	1026	139	7.4	7.2	787	38	807,776
14	40602	354	136	2.6	3.8	2,278	34	806,531
15	65202	279	95	2.9	0.2	2,803	8	782,252
16	26702	757	196	3.9	15.9	1,026	32	776,232
17	61801	475	153	3.1	15.7	1,606	24	762,818
18	18502	418	117	3.6	15.7	1,822	87	762,157
19	42401	1046	148	7.0	1.4	726	20	759,276
20	28301	332	136	2.4	19.4	2,272	116	753,278
21	46001	319	165	1.9	2.4	2,352	36	750,770
22	65603	304	148	2.0	17.0	2,457	58	747,529
23	45402	459	195	2.4	25.7	1,628	62	746,476
24	28804	689	313	2.2	14.5	1,083	45	746,200
25	46206	414	237	1.7	33.5	1,796	48	743,735

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
26	16102	336	347	1.0	5.0	2,120	27	713,108
27	12701	454	170	2.7	5.9	1,536	64	698,009
28	24602	443	174	2.6	4.7	1,511	55	670,094
29	25801	366	121	3.0	5.3	1,818	50	664,976
30	52403	521	177	3.0	11.1	1,255	42	654,034
31	20403	340	84	4.0	19.0	1,899	45	646,075
32	20401	635	254	2.5	14.4	1,004	30	637,534
33	52401	481	150	3.2	4.4	1,320	58	634,927
34	11502	252	114	2.2	1.3	2,465	21	622,374
35	25402	359	267	1.3	22.2	1,722	49	617,609
36	28801	454	273	1.7	9.0	1,336	52	607,001
37	14403	237	119	2.0	7.7	2,550	53	603,733
38	11506	455	127	3.6	5.6	1,303	47	593,177
39	56801	360	123	2.9	15.7	1,636	44	589,114
40	44901	954	252	3.8	5.0	612	10	583,708
41	44902	323	172	1.9	24.2	1,771	27	571,760
42	58402	362	209	1.7	13.1	1,548	29	560,695
43	47102	2869	108	26.7	3.2	192	4	550,771
44	11303	341	99	3.5	4.7	1,606	47	547,714
45	27403	218	99	2.2	12.6	2,439	12	530,869
46	63304	284	128	2.2	3.7	1,815	10	516,351
47	26002	418	186	2.3	19.2	1,217	47	509,107
48	28803	388	218	1.8	11.6	1,308	49	507,726
49	44904	634	121	5.2	6.4	800	16	506,853
50	12605	254	195	1.3	7.3	1,966	25	500,120
51	29501	461	144	3.2	6.2	1,079	36	497,722
52	46504	254	111	2.3	2.2	1,938	41	491,763
53	26401	225	113	2.0	36.6	2,182	88	490,262
54	16402	390	189	2.1	18.4	1,245	66	485,662
55	13103	191	92	2.1	5.0	2,488	8	476,325
56	26001	338	220	1.5	10.3	1,400	63	473,454
57	43401	477	210	2.3	7.7	993	39	473,442
58	10206	367	147	2.5	2.1	1,258	6	461,538
59	12301	351	118	3.0	8.5	1,303	75	457,579
60	41801	548	453	1.2	1.0	833	21	456,792
61	42601	212	140	1.5	14.3	2,148	21	455,785
62	23002	220	150	1.5	16.1	2,066	22	453,743

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

01 Circuit 44703 -- MUNCY 47-03

Performance Analysis

The MUNCY 47-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On September 18, 2016, during a period of strong wind, a tree made contact with a pole or pole arm. This outage affected 627 customers for up to 2,041 minutes resulting in 808,663 CMI.

On September 18, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 395 customers for up to 2,136 minutes resulting in 312,129 CMI.

In total, the MUNCY 47-03 circuit had 33 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (21); equipment failure (6); animal contacts (3); other (2); nothing found (1).

Remedial Actions

- In 2016, Fault Isolation and System Restoration (FISR) was activated on this circuit.
- In 2016, an expanded operational review was performed on this circuit.
- In 2016, full circuit trimming will be performed on this circuit.
- In 2016, additional fusing is being evaluated for this circuit.
- In 2016, a tie will be evaluated to the MUNCY 47-01.
- In 2017, three existing vacuum reclosers currently operating as switches will be reconfigured to operate as automated reclosers.

02 Circuit 46702 -- RENOVO 67-02

Performance Analysis

The RENOVO 67-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On July 31, 2016, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 613 customers for up to 1,231 minutes resulting in 411,655 CMI.

On August 13, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 849 customers for up to 1,652 minutes resulting in 495,705 CMI.

In total, the RENOVO 67-02 circuit had 41 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (27); animal contacts (5); nothing found (5); equipment failure (3); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, relocating a section of three phase conductor that is susceptible to tree outages will be evaluated.
- In 2016, hot spot tree trimming will be performed.
- In 2017, an existing recloser will be upgraded to a Smart Grid device.
- In 2017, a solid blade disconnect will be installed.
- In 2017, additional fusing will be installed on this circuit.
- In 2018, full circuit trimming will be performed on this circuit.

03 Circuit 13101 -- NORTHAMPTON 31-01

Performance Analysis

The NORTHAMPTON 31-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On February 25, 2016, during a period of strong wind, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,470 customers for up to 167 minutes resulting in 245,254 CMI.

On March 7, 2016, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,250 customers for up to 413 minutes resulting in 591,390 CMI.

In total, the NORTHAMPTON 31-01 circuit had 50 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (19); animal contacts (16); tree related (14); other (1).

Remedial Actions

- In 2016, two reclosers were replaced with a communicating device.
- In 2016, FISR was activated on this circuit.
- In 2016, an expanded operational review was completed and identified two new locations to install single-phase reclosers, which will break up a long single phase tap.
- In 2016, full circuit trimming was performed.
- In 2016, additional animal guarding will be installed on this circuit.
- In 2016, several fusing installations will be completed, to include three phase locations
- In 2017, an additional single-phase recloser will be installed.

04 Circuit 46903 -- MONTGOMERY 69-03

Performance Analysis

The MONTGOMERY 69-03 circuit experienced four outages of over 100,000 CMI between October 2015 and September 2016.

On February 28, 2016, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 501 customers for up to 700 minutes resulting in 278,205 CMI.

On August 1, 2016, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,421 customers for up to 685 minutes resulting in 223,414 CMI.

On September 13, 2016, an animal interfered with a substation component causing a circuit breaker to trip to lockout. This outage affected 1,418 customers for up to 98 minutes resulting in 138,978 CMI.

On September 18, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,419 customers for up to 1,309 minutes resulting in 252,218 CMI.

In total, the MONTGOMERY 69-03 circuit had 22 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (10); animal contacts (7); equipment failure (4); vehicles (1).

Remedial Actions

- In 2015, full circuit trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, concrete barriers will be added to protect the substation from vehicle hits.
- In 2016, the MONTGOMERY substation was animal guarded.
- In 2016, eight additional locations will receive fusing.
- In 2016, a tie to the ALLENWOOD 30-01 is being evaluated.
- In 2020, a tie to a new substation at GREAT STREAM will be constructed.

05 Circuit 12601 -- MACADA 26-01

Performance Analysis

The MACADA 26-01 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On June 15, 2016, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 761 customers for up to 133 minutes resulting in 100,748 CMI.

On July 25, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 436 customers for up to 637 minutes resulting in 277,579 CMI.

On July 25, 2016, during a period of lightning, a tree made contact with a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,729 customers for up to 719 minutes resulting in 357,749 CMI.

In total, the MACADA 26-01 circuit had 43 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (19); tree related (14); equipment failure (7); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2015, full circuit trimming was performed.
- In 2016, additional animal guarding locations will be identified.
- In 2016, additional Smart Grid devices will be evaluated.
- In 2017, two additional automated reclosers will be installed as part of the Smart Grid Initiative.

06 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

The GREEN PARK 24-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On September 18, 2016, during a period of heavy rain, an equipment failure occurred on an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,672 customers for up to 341 minutes resulting in 570,168 CMI.

In total, the GREEN PARK 24-02 circuit had 62 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (30); equipment failure (19); animal contacts (8); nothing found (2); vehicles (2); other (1).

Remedial Actions

- In 2016, full-circuit trimming was performed.
- In 2016, an expanded operational review line patrol was conducted.
- In 2016, fusing control logic was analyzed and adjusted.
- In 2016, one smart grid device was installed.
- In 2016, a section of difficult-to-access three-phase was moved to a more accessible location.
- In 2016, a foot patrol of the circuit was conducted.
- In 2016, the transmission line associated with the outage was patrolled by helicopter.
- In 2017, four Smart Grid devices are planned for installation.
- In 2019, the transmission line associated with the outage will be evaluated for a double line rebuild.

07 Circuit 60903 -- DONEGAL 09-03

Performance Analysis

The DONEGAL 09-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On August 16, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,746 customers for up to 180 minutes resulting in 234,669 CMI.

On August 16, 2016, during a period of lightning, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,241 customers for up to 616 minutes resulting in 613,267 CMI.

In total, the DONEGAL 09-03 circuit had 9 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (5); equipment failure (4).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, all capacitors were inspected and one failed control was replaced.
- In 2016, an expanded operational review was performed on this circuit.
- In 2016, additional fusing will be evaluated for this circuit.
- In 2016, a section of difficult-to-access three phase conductor will be evaluated for relocation.
- In 2017, full circuit trimming will be performed.

08 Circuit 22601 -- KIMBLES 26-01

Performance Analysis

The KIMBLES 26-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 447 customers for up to 1,722 minutes resulting in 769,327 CMI.

In total, the KIMBLES 26-01 circuit had 57 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (19); animal contacts (17); equipment failure (12); nothing found (4); other (4); contact or dig in (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming will be performed.
- In 2016, a load break disconnect switch will be installed.
- In 2016, several additional locations will be animal guarded.

09 Circuit 64201 -- KINZER 42-01

Performance Analysis

The KINZER 42-01 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On December 27, 2015, during a period of heavy rain, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 771 customers for up to 223 minutes resulting in 103,855 CMI.

On January 28, 2016, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 770 customers for up to 444 minutes resulting in 133,752 CMI.

On July 23, 2016, 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 837 customers for up to 864 minutes resulting in 224,164 CMI.

In total, the KINZER 42-01 circuit had 27 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (12); vehicles (6); tree related (5); animal contacts (2); nothing found (1); other (1).

Remedial Actions

- In 2015, a recloser was replaced with an automated vacuum recloser with additional animal guarding.
- In 2015, a tie line was built between the KINZER 42-01 line and the KINZER 42-02.
- In 2016, a new sectionalizing device was installed on this circuit.
- In 2016, FISR was activated on this circuit.
- In 2016, a voltage regulator was replaced on this circuit.
- In 2016, single-phase fuses were added at multiple locations.
- In 2017, a manual switch will be replaced with an automated vacuum recloser as part of the Smart Grid Initiative.
- In 2017, a non-automated hydraulic recloser will be replaced with an automated model on this circuit.
- In 2017, the feasibility of re-routing a section of single fuse conductor will be evaluated.

10 Circuit 10903 -- COOPERSBURG 09-03

Performance Analysis

The COOPERSBURG 09-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On March 28, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 211 customers for up to 1,106 minutes resulting in 167,107 CMI.

On August 12, 2016, during a period of heavy rain, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 2,135 customers for up to 262 minutes resulting in 399,098 CMI.

In total, the COOPERSBURG 09-03 circuit had 35 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (12); animal contacts (10); equipment failure (9); vehicles (3); nothing found (1).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, single-phase fusing will be installed.
- In 2016, three locations will receive three-phase fusing or disconnect switch installations.
- In 2017, relocating four spans of overhead line and an underground rebuild will be investigated.
- In 2018, a new Smart Grid device will be installed on this circuit.

11 Circuit 46004 -- BERWICK 60-04

Performance Analysis

The BERWICK 60-04 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On April 30, 2016, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 1,102 customers for up to 192 minutes resulting in 171,743 CMI.

On May 8, 2016, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,115 customers for up to 364 minutes resulting in 405,860 CMI.

In total, the BERWICK 60-04 circuit had 45 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (23); equipment failure (11); nothing found (5); animal contacts (4); other (1); vehicles (1).

Remedial Actions

- In 2016, an infrared scan was completed.
- In 2016, FISR was activated on this circuit.
- In 2016, the circuit breaker will be replaced.
- In 2016, single-phase fusing will be evaluated.
- In 2016, building a tie line between the BERWICK 60-04 and the BERWICK 60-02 will be evaluated.
- In 2018, fill circuit trimming will be performed.

12 Circuit 50106 -- HARRISBURG 69 KV LINE 01-06

Performance Analysis

The HARRISBURG 69 KV LINE 01-06 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,217 customers for up to 622 minutes resulting in 742,143 CMI.

In total, the HARRISBURG 69 KV LINE 01-06 circuit had 16 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (6); animal contacts (3); nothing found (3); tree related (3); other (1).

Remedial Actions

- In 2016, two hot line clamps were replaced.
- In 2016, a manual airbreak was replaced with a communicating device as part of the Smart Grid initiative.
- In 2016, the circuit was infrared scanned.
- In 2017, full circuit tree trimming will be performed.
- In 2017, an expanded operational review will be conducted on this circuit.

13 Circuit 29502 -- LEDGEDALE 95-02

Performance Analysis

The LEDGEDALE 95-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of heavy rain, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,944 customers for up to 134 minutes resulting in 202,789 CMI.

On October 29, 2015, during a period of heavy rain, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,941 customers for up to 386 minutes resulting in 402,133 CMI.

In total, the LEDGEDALE 95-02 circuit had 38 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (20); animal contacts (6); nothing found (5); equipment failure (4); other (3).

Remedial Actions

- In 2016, multiple recloser controllers were upgraded with new controls.
- In 2016, FISR was activated on this circuit.
- In 2016, additional tap fusing will be installed at several locations.
- In 2016, additional animal guarding locations are being evaluated.
- In 2017, full circuit tree trimming will be performed.
- In 2018, a tie will be automated to improve reliability.

14 Circuit 40602 -- PINE GROVE 06-02

Performance Analysis

The PINE GROVE 06-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On June 16, 2016, an animal interfered with a substation component causing a circuit breaker to trip to lockout. This outage affected 2,279 customers for up to 157 minutes resulting in 318,038 CMI.

In total, the PINE GROVE 06-02 circuit had 34 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (14); animal contacts (9); equipment failure (6); vehicles (3); nothing found (1); other (1).

Remedial Actions

- In 2015, a tie line between the PINE GROVE 06-02 and PINE GROVE 06-05 circuits was installed.
- In 2015, two three-phase automated reclosers were installed.
- In 2015, multiple locations had fuses installed.
- In 2016, full circuit tree trimming was performed.
- In 2016, additional single phase fusing was installed on this circuit.
- In 2016, single-phase fusing was installed at three locations.
- In 2016, FISR was activated on this circuit.
- In 2016, upgrading the substation will be evaluated.
- In 2016, installing an additional recloser will be evaluated.
- In 2016, building a tie to the PINE GROVE-01 will be evaluated.
- In 2016, the underground stretch passing under I-81 will be replaced.
- In 2016, additional hazard tree removal will be performed.
- In 2016, concrete barriers will be installed as protection around the substation.
- In 2017, the substation will have animal guarding installed.
- In 2017, a section of copper conductor will be upgraded.

15 Circuit 65202 -- PRINCE 52-02

Performance Analysis

The PRINCE 52-02 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On November 13, 2015, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,804 customers for up to 170 minutes resulting in 275,967 CMI.

On November 14, 2015, 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 2,804 customers for up to 135 minutes resulting in 310,003 CMI.

On June 7, 2016, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 2,526 customers for up to 110 minutes resulting in 178,504 CMI.

In total, the PRINCE 52-02 circuit had 8 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (5); animal contacts (2); nothing found (1).

Remedial Actions

- In 2015, animal guarding was added at several locations.
- In 2016, all three-phase line protection schemes were evaluated.
- In 2016, the PRINCE 52-02 circuit breaker will be replaced.
- In 2016, single-phase fuses were added at multiple locations.
- In 2016, animal guarding was upgraded on a manual switch.
- In 2016, an expanded operational review was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, five manual switches will be replaced with automated vacuum reclosers as part of the Smart Grid Initiative.
- In 2016, a tie line will be built between the PRINCE 52-02 line and the ENGLESIDE 26-06.
- In 2017, one manual switch will be replaced with an automated vacuum recloser, and one automated vacuum recloser will be added as part of the Smart Grid Initiative.

16 Circuit 26702 -- HEMLOCK FARMS 67-02

Performance Analysis

The HEMLOCK FARMS 67-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On August 13, 2016, during a period of lightning, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 290 customers for up to 793 minutes resulting in 184,405 CMI.

On August 15, 2016, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 2,917 customers for up to 140 minutes resulting in 408,380 CMI.

In total, the HEMLOCK FARMS 67-02 circuit had 32 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (16); equipment failure (9); tree related (3); nothing found (2); other (2).

Remedial Actions

- In 2015, series fusing was installed on this circuit.
- In 2016, an expanded operational review was performed.
- In 2016, a breaker will be replaced at the transmission substation source.
- In 2017, an automated tie device will be installed.

17 Circuit 61801 -- E ELIZABETHTOWN 18-01

Performance Analysis

The E ELIZABETHTOWN 18-01 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On January 25, 2016, an equipment failure occurred on an overhead splice causing a circuit breaker to trip to lockout. This outage affected 744 customers for up to 479 minutes resulting in 203,691 CMI.

On April 2, 2016, during a period of strong wind, a tree made contact with an underground conductor causing an interruption. This outage affected 201 customers for up to 2,296 minutes resulting in 311,471 CMI.

On August 16, 2016, an equipment failure occurred on a pole or pole arm. This outage affected 954 customers for up to 126 minutes resulting in 120,204 CMI.

In total, the E ELIZABETHTOWN 18-01 circuit had 24 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (8); animal contacts (6); tree related (6); vehicles (2); nothing found (1); other (1).

Remedial Actions

- In 2015, all aluminum crimps on copper conductor were replaced on three-phase lines.
- In 2016, single-phase fuses were added at multiple locations.
- In 2016, FISR was activated on this circuit.
- In 2016, an additional manual switch was installed.
- In 2016, a tie line was built between EAST ELIZABETHTOWN 18-01 and RHEEMS 60-01 lines.
- In 2016, one manual switch was replaced with an automated vacuum recloser at part of the Smart Grid Initiative. Another manual switch will be replaced in 2017.
- In 2016, an additional sectionalizing device will be installed in a heavily wooded area.
- In 2016, a section of single-phase line will be evaluated for re-sourcing.
- In 2016, a new sectionalizing device will be installed near the substation.
- In 2017, additional single-phase fusing will be added at multiple locations.
- In 2018-2019, 1.5 miles of copper conductor will be reconductored.

18 Circuit 18502 -- CANADENSIS 85-02

Performance Analysis

The CANADENSIS 85-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,279 customers for up to 2,313 minutes resulting in 170,034 CMI.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 296 customers for up to 676 minutes resulting in 200,051 CMI.

In total, the CANADENSIS 85-02 circuit had 87 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (41); equipment failure (16); animal contacts (14); nothing found (12); vehicles (3); other (1).

Remedial Actions

- In 2016, additional switches and fault indicators were installed.
- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming was performed.
- In 2016, an expanded operational review will be performed.
- In 2016, two sections of single-phase will be relocated to more accessible locations.

19 Circuit 42401 -- GIRARD MANOR 24-01

Performance Analysis

The GIRARD MANOR 24-01 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of heavy rain, an unidentified issue occurred with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 727 customers for up to 196 minutes resulting in 142,492 CMI.

On October 28, 2015, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,072 customers for up to 1,090 minutes resulting in 435,964 CMI.

On May 21, 2016, during a period of heavy rain, a vehicle made contact with a pole causing a circuit breaker to trip to lockout. This outage affected 2,487 customers for up to 480 minutes resulting in 116,435 CMI.

In total, the GIRARD MANOR 24-01 circuit had 20 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (7); animal contacts (5); equipment failure (3); other (3); nothing found (1); vehicles (1).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2015, three-phase fusing was installed in one location.
- In 2016, FISR was activated on this circuit.
- In 2016, an expanded operational review was performed.
- In 2016, additional single phase fusing was installed on this circuit.
- In 2016, an existing sectionalizing device will be automated as part of the Smart Grid Initiative.
- In 2016, a full substation rebuild will be performed.
- In 2016, hazard tree trimming will be performed.
- In 2016, an additional Smart Grid device will be evaluated for installation in 2018.
- In 2018, a new manual switch will be installed on a section of three-phase line to improve sectionalizing capabilities.

20 Circuit 28301 -- NEWFOUNDLAND 83-01

Performance Analysis

The NEWFOUNDLAND 83-01 circuit experienced no outages of over 100,000 CMI between October 2015 and September 2016.

In total, the NEWFOUNDLAND 83-01 circuit had 116 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (70); animal contacts (18); equipment failure (18); nothing found (5); other (4); contact or dig in (1).

Remedial Actions

- In 2015, series fusing was installed.
- In 2016, FISR was activated on this circuit.
- In 2016, a Smart Grid recloser was installed.
- In 2016, a single phase recloser was installed.
- In 2016, single-phase fusing was installed at two locations.
- In 2016, additional animal guarding will be evaluated.
- In 2016, an opportunity for relocating and reconductoring single phase to increase accessibility was identified and will be evaluated.
- In 2017, full circuit tree trimming will be performed.

21 Circuit 46001 -- BERWICK 60-01

Performance Analysis

The BERWICK 60-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On December 30, 2015, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 949 customers for up to 546 minutes resulting in 262,392 CMI.

On August 28, 2016, a vehicle made contact with a pole causing a circuit breaker to trip to lockout. This outage affected 2,077 customers for up to 254 minutes resulting in 161,458 CMI.

In total, the BERWICK 60-01 circuit had 36 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (14); equipment failure (9); animal contacts (6); vehicles (4); nothing found (3).

Remedial Actions

- In 2015, a new remotely operable sectionalizing device was added and a hydraulic switch was replaced with a recloser.
- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming was performed.
- In 2016, a tie line to the BERWICK 60-03 will be evaluated.
- In 2016, a new single phase recloser will be added.
- In 2016, the circuit breaker for this feeder will be replaced.
- In 2016, a tie line to the SALEM line will be evaluated.
- In 2017, a hydraulic recloser will be replaced with a triple-single recloser.
- In 2017, a section of difficult-to-access conductor will be relocated.
- In 2017, two new remotely operable sectionalizing devices will be added to this circuit.

22 Circuit 65603 -- QUARRYVILLE 56-03

Performance Analysis

The QUARRYVILLE 56-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On June 8, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,028 customers for up to 152 minutes resulting in 112,311 CMI.

On July 23, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,075 customers for up to 777 minutes resulting in 302,718 CMI.

In total, the QUARRYVILLE 56-03 circuit had 58 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (30); equipment failure (19); vehicles (4); animal contacts (3); nothing found (1); other (1).

Remedial Actions

- In 2015, all aluminum crimps on copper conductor were replaced on three-phase lines.
- In 2015, improvements were made to several distribution capacitors to improve voltage regulation.
- In 2016, a single-phase fuse was added to this circuit.
- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming will be performed.
- In 2016, three locations received single-phase fuses.
- In 2016, additional underground cable testing and curing will be performed.
- In 2016, an additional switch will be installed on this circuit.
- In 2017, four new Smart Grid devices will be installed on this circuit.

- In 2017, a Smart Grid device will be replaced.
- In 2017, a manual switch and a recloser will be replaced with automated vacuum reclosers as part of the Smart Grid Initiative.
- In 2017, a new line and terminal will be constructed.

23 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On July 25, 2016, during a period of strong wind, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 530 customers for up to 839 minutes resulting in 444,564 CMI.

In total, the WEST BLOOMSBURG 54-02 circuit had 62 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (36); equipment failure (12); nothing found (7); animal contacts (3); other (3); vehicles (1).

Remedial Actions

- In 2015, additional fusing was added to this circuit.
- In 2016, FISR was activated on this circuit.
- In 2016, full circuit trimming and hazard tree removal was performed on this circuit.
- In 2016, infrared scanning was performed on this circuit.
- In 2017, a section of difficult-to-access conductor will be relocated to a more accessible location.

24 Circuit 28804 -- LAKEVILLE 88-04

Performance Analysis

The LAKEVILLE 88-04 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 153 customers for up to 797 minutes resulting in 121,876 CMI.

In total, the LAKEVILLE 88-04 circuit had 45 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (26); animal contacts (11); equipment failure (3); nothing found (3); other (2).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, hot spot trimming will be performed.
- In 2016, the addition of a single-phase sectionalizing device is being evaluated.
- In 2016, additional animal guarding will be installed.

25 Circuit 46206 -- DANVILLE 62-06

Performance Analysis

The DANVILLE 62-06 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On February 26, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 305 customers for up to 540 minutes resulting in 164,517 CMI.

In total, the DANVILLE 62-06 circuit had 48 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (32); animal contacts (6); equipment failure (5); nothing found (3); other (2).

Remedial Actions

- In 2016, the protection settings on this circuit are being evaluated.
- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming will be performed.
- In 2016, additional hazard tree removal will be performed on this circuit.
- In 2016, a triple-single recloser will be installed.
- In 2016, an additional Smart Grid device will be installed.
- In 2016, the addition of a reliability substation will be investigated.
- In 2016, a tie line between the DANVILLE 62-06 and DANVILLE 62-02 circuits, on the transmission crossing, will be evaluated.

26 Circuit 16102 -- BINGEN 61-02

Performance Analysis

The BINGEN 61-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On February 24, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 598 customers for up to 1,026 minutes resulting in 529,864 CMI.

In total, the BINGEN 61-02 circuit had 27 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (12); equipment failure (8); animal contacts (4); nothing found (2); contact or dig in (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, fusing will be installed at five locations.
- In 2016, two switches will be evaluated for upgrade to protective devices.
- In 2016, fusing or disconnect switches will be evaluated for two three-phase locations.
- In 2016, a project to transfer customers on a long single-phase radial tap to the BINGEN 61-01 will be investigated.
- In 2017, an automated normally open switch will be installed as part of the Smart Grid Initiative.

27 Circuit 12701 -- MACUNGIE 27-01

Performance Analysis

The MACUNGIE 27-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,534 customers for up to 261 minutes resulting in 201,862 CMI.

In total, the MACUNGIE 27-01 circuit had 64 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (34); animal contacts (12); equipment failure (12); nothing found (4); other (1); vehicles (1).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, a new reliability substation was built in Zionsville to split the MACUNGIE 27-01 and reduce customer outage exposure. Additional remote sectionalizing devices will also be installed.
- In 2016, a Smart Grid device was installed on this circuit.
- In 2016, several poles that had multiple vehicle strikes will be evaluated for relocation.
- In 2016, additional fusing will be installed.
- In 2016, an additional single-phase recloser or single-phase enabled three-phase recloser will be investigated.
- In 2018, a section of three-phase conductor will be relocated to a more accessible location.

28 Circuit 24602 -- VARDEN 46-02

Performance Analysis

The VARDEN 46-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On November 19, 2015, a vehicle contact occurred causing a recloser to trip to lockout. This outage affected 2,099 customers for up to 105 minutes resulting in 168,665 CMI.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a load break fuse to operate. This outage affected 53 customers for up to 2,321 minutes resulting in 122,999 CMI.

In total, the VARDEN 46-02 circuit had 55 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (18); animal contacts (11); equipment failure (11); nothing found (7); other (4); vehicles (4).

Remedial Actions

- In 2015, two sectionalizing devices with remote operational capability were installed as part of the Smart Grid Initiative.
- In 2015 and 2016, single-phase fuses were added in multiple locations.
- In 2015, a three-phase disconnect switch was added.
- In 2015 and 2016, multi-phase fusing was added.
- In 2016, FISR was activated on this circuit.
- In 2016, a section of single-phase line will be relocated to a more accessible location.
- In 2016, an expanded operational review was performed.
- In 2017, a sectionalizing device with remote operational capability will be installed as part of the Smart Grid Initiative.

- In 2017, animal guarding will be installed at one location.

29 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On December 29, 2015, during a period of ice/sleet/snow, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 633 customers for up to 333 minutes resulting in 210,789 CMI.

On June 13, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 1,674 customers for up to 421 minutes resulting in 157,956 CMI.

In total, the SULLIVAN TRAIL 58-01 circuit had 50 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (22); animal contacts (12); equipment failure (11); other (2); vehicles (2); nothing found (1).

Remedial Actions

- In 2016, full circuit tree trimming was performed.
- In 2016, additional single phase fusing was added at several locations.
- In 2016, hazard tree removal was performed on this circuit.
- In 2016, FISR was activated on this circuit.
- In 2016, a three-phase solid-blade disconnect switch was installed.
- In 2016, a new sectionalizing device with remote operational capability was installed on this circuit as part of the Smart Grid initiative.
- In 2016, a manual switch will be replaced with a sectionalizing device with remote operational capability as part of the Smart Grid Initiative.
- In 2017, a three-phase solid-blade disconnect switch installation is being evaluated for this circuit.
- In 2018, two reclosers on this circuit will be automated.
- In 2018, additional fault indicators will be installed on this circuit.

30 Circuit 52403 -- GREEN PARK 24-03

Performance Analysis

The GREEN PARK 24-03 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On September 18, 2016, an equipment failure occurred on an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,256 customers for up to 342 minutes resulting in 429,552 CMI.

In total, the GREEN PARK 24-03 circuit had 42 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (22); equipment failure (12); animal contacts (4); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2015, an expanded operational review patrol was conducted, and in 2016, replacements were made from expanded operational review identified work.
- In 2016, an infrared scan was conducted.
- In 2016, two smart grid devices were installed.
- In 2016, additional fusing will be evaluated.
- In 2016, moving a section of difficult-to-access single-phase will be evaluated.
- In 2016, the transmission line associated with the outage was patrolled by helicopter.
- In 2019, the transmission line associated with the outage will go through a double line rebuild.

31 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On February 24, 2016, during a period of heavy rain, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,857 customers for up to 720 minutes resulting in 339,456 CMI.

In total, the ASHFIELD 04-03 circuit had 45 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (16); tree related (15); nothing found (5); animal contacts (4); vehicles (3); other (2).

Remedial Actions

- In 2015, single-phase fusing was installed at multiple locations.
- In 2016, a framing issue was remediated.
- In 2016, FISR was activated on this circuit.
- In 2016, concrete barriers will be added to protect the substation from vehicle strikes.
- In 2016, feeding a long span of radial single-phase line from a different source will be evaluated.
- In 2017, single-phase fusing will be installed at multiple locations.
- In 2017, three-phase fusing will be installed at one location.

32 Circuit 20401 -- ASHFIELD 04-01

Performance Analysis

The ASHFIELD 04-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 962 customers for up to 558 minutes resulting in 485,589 CMI.

In total, the ASHFIELD 04-01 circuit had 30 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (12); tree related (11); equipment failure (5); nothing found (1); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming was performed.
- In 2016, a tie line will be evaluated for the ASHFIELD 04-01.
- In 2016, concrete security barriers will be added to the ASHFIELD substation.
- In 2016, additional fusing will be evaluated for this circuit.
- In 2017, ten additional single-phase fuses will be installed.
- In 2017, a recloser will be installed as part of the Smart Grid Initiative.
- In 2018, a single-phase recloser will be relocated and a fuse installed.
- In 2018, a fuse will be replaced with a recloser.

33 Circuit 52401 -- GREEN PARK 24-01

Performance Analysis

The GREEN PARK 24-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On September 18, 2016, during a period of heavy rain, an equipment failure occurred on an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,321 customers for up to 347 minutes resulting in 325,466 CMI.

In total, the GREEN PARK 24-01 circuit had 58 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (37); equipment failure (13); animal contacts (7); nothing found (1).

Remedial Actions

- In 2016, an infrared scan was conducted.
- In 2016, an expanded operational review patrol was conducted.
- In 2016, as a result of the expanded operational review patrol, several switches, cross-arms and arrestors were replaced.
- In 2016, a recloser was replaced for improved protection coordination.
- In 2016, the transmission line associated with the outage was patrolled by helicopter.
- In 2016, additional fusing will be evaluated.
- In 2017, a full-circuit tree trimming will be performed.
- In 2019, the transmission line associated with the outage will be evaluated for a double line rebuild.

34 Circuit 11502 -- FREEMANSBURG 15-02

Performance Analysis

The FREEMANSBURG 15-02 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On July 18, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,694 customers for up to 256 minutes resulting in 116,336 CMI.

On July 18, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,177 customers for up to 255 minutes resulting in 176,641 CMI.

On July 18, 2016, during a period of heavy rain, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,279 customers for up to 174 minutes resulting in 222,111 CMI.

In total, the FREEMANSBURG 15-02 circuit had 21 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (7); equipment failure (6); tree related (5); nothing found (2); vehicles (1).

Remedial Actions

- In 2016, an expanded operational review was performed.
- In 2016, FISR has been activated.
- In 2016, converting an automated switch to an automated recloser will be investigated.
- In 2017, several single phase fuses will be installed.

35 Circuit 25402 -- LAKE HARMONY 54-02

Performance Analysis

The LAKE HARMONY 54-02 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On February 24, 2016, during a period of strong wind, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 908 customers for up to 361 minutes resulting in 279,133 CMI.

On February 24, 2016, during a period of strong wind, a tree made contact with an overhead splice causing a recloser to trip to lockout. This outage affected 182 customers for up to 855 minutes resulting in 155,473 CMI.

In total, the LAKE HARMONY 54-02 circuit had 49 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (20); equipment failure (14); animal contacts (10); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2015, an expanded operational review was conducted with various minor items remediated.
- In 2016, protection settings were reviewed and modified for improved coordination.
- In 2016, FISR was activated on this circuit.
- In 2016, additional hot spot trimming will be performed on this circuit.
- In 2016, an additional tie line will be evaluated.
- In 2017, a Smart Grid device will be added to this circuit.
- In 2018, full circuit tree trimming will be performed.

36 Circuit 28801 -- LAKEVILLE 88-01

Performance Analysis

The LAKEVILLE 88-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 698 customers for up to 195 minutes resulting in 135,823 CMI.

In total, the LAKEVILLE 88-01 circuit had 52 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (29); animal contacts (13); equipment failure (6); nothing found (4).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, full circuit tree trimming will be performed.
- In 2016, a single-phase sectionalizing device installation will be evaluated.
- In 2017, a three-phase recloser will be installed as part of the Smart Grid Initiative.
- In 2017, additional animal guarding will be investigated.

37 Circuit 14403 -- SO SLATINGTON 44-03

Performance Analysis

The SO SLATINGTON 44-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of heavy rain, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 637 customers for up to 165 minutes resulting in 105,410 CMI.

On March 28, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 888 customers for up to 472 minutes resulting in 148,561 CMI.

In total, the SO SLATINGTON 44-03 circuit had 53 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (21); equipment failure (13); animal contacts (9); nothing found (5); vehicles (3); other (2).

Remedial Actions

- In 2015, a single-phase tap was reviewed and a broken cross arm was repaired.
- In 2015, several spans of conductor having excess slack were repaired to prevent the conductors from coming together due to wind.
- In 2015, additional fuses and solid blade disconnects were installed.
- In 2015, a line inspection was performed and a number of minor improvements were identified and remediated.
- In 2016, additional fusing will be installed.
- In 2016, hotspot tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, two large single-phase taps will be reviewed for improved sectionalizing capability.
- In 2018, a job to complete line extensions at two single-phase locations will be completed.
- In 2018, full circuit tree trimming will be performed.
- In 2018, two sections of difficult-to-access conductor will be relocated to more accessible locations.

38 Circuit 11506 -- FREEMANSBURG 15-06

Performance Analysis

The FREEMANSBURG 15-06 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On July 18, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,301 customers for up to 195 minutes resulting in 252,615 CMI.

In total, the FREEMANSBURG 15-06 circuit had 47 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (20); equipment failure (11); animal contacts (9); nothing found (6); other (1).

Remedial Actions

- In 2016, a job to close in and reconductor a section of single phase line will be investigated.
- In 2017, several single phase fuses will be installed.
- In 2017, a project to install a single phase recloser and extend a section of single phase line will be completed.
- In 2018, full circuit trimming will be performed.

39 Circuit 56801 -- BENVENUE 68-01

Performance Analysis

The BENVENUE 68-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On December 3, 2015, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 917 customers for up to 269 minutes resulting in 227,791 CMI.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a load break fuse to operate. This outage affected 1,635 customers for up to 913 minutes resulting in 196,860 CMI.

In total, the BENVENUE 68-01 circuit had 44 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (25); animal contacts (12); equipment failure (6); vehicles (1).

Remedial Actions

- In 2015, several cross-arms were replaced.
- In 2016, a new recloser was installed as part of the Smart Grid initiative.
- In 2016, full circuit tree trimming will be perfoemed.
- In 2016, fusing will be investigated at multiple locations.
- In 2016, additional animal guarding will be evaluated.
- In 2016, installation of a single-phase recloser and fusing of downstream taps will be evaluated.
- In 2017, a communicating vacuum recloser will be installed and single-phase tripping will be enabled.
- In 2017, two additional communicating devices will be installed as part of the Smart Grid initiative.
- In 2017, several transformer cutouts will be replaced.

40 Circuit 44901 -- SCOTT 49-01

Performance Analysis

The SCOTT 49-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of strong wind, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 407 customers for up to 186 minutes resulting in 150,850 CMI.

On July 25, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 408 customers for up to 662 minutes resulting in 256,115 CMI.

In total, the SCOTT 49-01 circuit had 10 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (4); contact or dig in (3); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, a section of three-phase conductor was replaced.
- In 2016, a section of difficult-to-access conductor was relocated.
- In 2017, full circuit trimming will be performed.

41 Circuit 44902 -- SCOTT 49-02

Performance Analysis

The SCOTT 49-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of strong wind, an unidentified issue occurred with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,710 customers for up to 149 minutes resulting in 255,987 CMI.

In total, the SCOTT 49-02 circuit had 27 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (16); other (5); animal contacts (2); contact or dig in (2); equipment failure (1); nothing found (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, a motor operated switch will be evaluated for replacement with a Smart Grid device.
- In 2016, reconductoring will be evaluated for a section of three-phase line.
- In 2017, full circuit trimming will be performed.
- In 2017, an existing manual recloser will be upgraded to a telemetric recloser.

42 Circuit 58402 -- MOUNT ROCK 84-02

Performance Analysis

The MOUNT ROCK 84-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 2, 2016, during a period of strong wind, a tree made contact with a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,547 customers for up to 1,013 minutes resulting in 340,157 CMI.

In total, the MOUNT ROCK 84-02 circuit had 29 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (11); animal contacts (7); equipment failure (6); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2016, infrared scanning was performed.
- In 2016, hot spot tree trimming was performed on this circuit.
- In 2016, additional fusing was installed on this circuit.
- In 2016, full circuit tree trimming will be performed on this circuit.
- In 2016, additional fusing will be evaluated for this circuit.

43 Circuit 47102 -- MARLIN 71-02

Performance Analysis

The MARLIN 71-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On May 18, 2016, an unidentified issue occurred with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 4,992 customers for up to 112 minutes resulting in 540,480 CMI.

In total, the MARLIN 71-02 circuit had 4 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (1); equipment failure (1); nothing found (1); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, additional single-phase fusing will be evaluated for multiple locations.
- In 2016, additional three-phase fusing will be evaluated for one location.
- In 2017, an additional Smart Grid device will be installed on this circuit.

44 Circuit 11303 -- EMMAUS 13-03

Performance Analysis

The EMMAUS 13-03 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On August 12, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 574 customers for up to 901 minutes resulting in 272,357 CMI.

In total, the EMMAUS 13-03 circuit had 47 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (16); animal contacts (11); equipment failure (11); vehicles (5); nothing found (4).

Remedial Actions

- In 2016, an expanded operational review was performed.
- In 2017, full circuit trimming will be performed.
- In 2017, several single phase fuses will be installed.

45 Circuit 27403 -- KEYSER AVENUE 74-03

Performance Analysis

The KEYSER AVENUE 74-03 circuit experienced three outages of over 100,000 CMI between October 2015 and September 2016.

On October 12, 2015, a vehicle contact occurred causing a recloser to trip to lockout. This outage affected 1,203 customers for up to 245 minutes resulting in 113,611 CMI.

On October 29, 2015, during a period of strong wind, an unidentified issue occurred with an overhead switch causing a recloser to trip to lockout. This outage affected 1,203 customers for up to 125 minutes resulting in 124,872 CMI.

On February 24, 2016, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 666 customers for up to 210 minutes resulting in 139,700 CMI.

In total, the KEYSER AVENUE 74-03 circuit had 12 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (6); nothing found (2); other (2); animal contacts (1); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, additional fusing opportunities will be installed.
- In 2016, an automated recloser will be installed to operate as a tie point.
- In 2017, an additional automated recloser will be installed.
- In 2018, an automated recloser will be installed to operate as a tie point.
- In 2018, a tie line between the CEDAR AVENUE 15-01 and KEYSER AVENUE 74-03 circuits will be completed.
- In 2019, full circuit tree trimming will be performed.

46 Circuit 63304 -- GREENLAND 33-04

Performance Analysis

The GREENLAND 33-04 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On May 29, 2016, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 2,644 customers for up to 279 minutes resulting in 397,091 CMI.

In total, the GREENLAND 33-04 circuit had 10 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (7); animal contacts (1); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2016, a new tie line was installed between the GREENLAND 33-04 and the GREENLAND 33-01 lines.
- In 2016, FISR was activated on this circuit.
- In 2016, the GREENLAND 33-04 getaway was replaced.
- In 2016, an additional manual switch was installed.
- In 2016, a new Smart Grid device was added to this circuit.
- In 2016, additional single-phase fuses will be installed at several locations.
- In 2017, one more Smart Grid device will be added, while one existing device will be upgraded to a Smart Grid device.
- In 2018, full circuit tree trimming will be performed.

47 Circuit 26002 -- WEST DAMASCUS 60-02

Performance Analysis

The WEST DAMASCUS 60-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On September 24, 2016, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 763 customers for up to 771 minutes resulting in 169,854 CMI.

In total, the WEST DAMASCUS 60-02 circuit had 47 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (24); equipment failure (8); animal contacts (6); nothing found (6); vehicles (2); other (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, full circuit trimming was performed.
- In 2016, additional voltage regulators are being evaluated.

48 Circuit 28803 -- LAKEVILLE 88-03

Performance Analysis

The LAKEVILLE 88-03 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On March 28, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 688 customers for up to 299 minutes resulting in 205,257 CMI.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 687 customers for up to 993 minutes resulting in 142,539 CMI.

In total, the LAKEVILLE 88-03 circuit had 49 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (21); animal contacts (13); equipment failure (9); nothing found (5); other (1).

Remedial Actions

- In 2016, thirty-six porcelain transformer fuse cutouts were replaced.
- In 2016, FISR was activated on this circuit.
- In 2016, an additional disconnect switch will be installed.
- In 2017, full circuit tree trimming will be performed.
- In 2017, an automated three-phase recloser will be installed.

49 Circuit 44904 -- SCOTT 49-04

Performance Analysis

The SCOTT 49-04 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,043 customers for up to 763 minutes resulting in 429,978 CMI.

In total, the SCOTT 49-04 circuit had 16 outages between October 2015 and September 2016, with the causes breaking down as follows: other (5); animal contacts (3); equipment failure (2); nothing found (2); tree related (2); vehicles (2).

Remedial Actions

- In 2015, load was transferred to the BLOOMSBURG 77-06.
- In 2015, the underground getaway for this circuit was replaced with a new overhead getaway.
- In 2016, FISR was activated on this circuit.
- In 2016, a section of aging three-phase conductor was replaced.
- In 2017, additional three phase fusing will be installed on this circuit.
- In 2017, an additional Smart Grid device will be evaluated for this circuit.
- In 2018, full circuit tree trimming will be performed.

50 Circuit 12605 -- MACADA 26-05

Performance Analysis

The MACADA 26-05 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On July 25, 2016, during a period of lightning, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,967 customers for up to 381 minutes resulting in 440,816 CMI.

In total, the MACADA 26-05 circuit had 25 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (9); equipment failure (6); tree related (6); nothing found (2); other (2).

Remedial Actions

- In 2015, an expanded operational review was performed.
- In 2017, three manual switches will be upgraded to automated switches as part of the Smart Grid Initiative.
- In 2017, several three phase and single phase fuses will be installed.
- In 2017, full circuit trimming will be performed.

51 Circuit 29501 -- LEDGEDALE 95-01

Performance Analysis

The LEDGEDALE 95-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,864 customers for up to 394 minutes resulting in 327,156 CMI.

In total, the LEDGEDALE 95-01 circuit had 36 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (16); animal contacts (9); equipment failure (7); nothing found (3); contact or dig in (1).

Remedial Actions

- In 2016, additional fusing will be evaluated at several locations.
- In 2016, a breaker was replaced at the transmission sub source.
- In 2017, full circuit trimming will be performed.

52 Circuit 46504 -- LOCK HAVEN 65-04

Performance Analysis

The LOCK HAVEN 65-04 circuit experienced no outages of over 100,000 CMI between October 2015 and September 2016.

In total, the LOCK HAVEN 65-04 circuit had 41 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (24); animal contacts (8); equipment failure (5); nothing found (4).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, hot spot tree trimming was performed.
- In 2016, additional single-phase load break disconnects are being evaluated for this circuit.
- In 2017, an additional Smart Grid device will be installed on this circuit.
- In 2017, full circuit trimming will be performed.

53 Circuit 26401 -- INDIAN ORCHARD 64-01

Performance Analysis

The INDIAN ORCHARD 64-01 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 507 customers for up to 292 minutes resulting in 109,768 CMI.

In total, the INDIAN ORCHARD 64-01 circuit had 88 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (39); animal contacts (26); equipment failure (13); nothing found (7); other (2); vehicles (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, full substation animal guarding was completed.
- In 2016, one additional animal guarding location was identified.
- In 2018, full circuit tree trimming will be performed.

54 Circuit 16402 -- MOUNT POCONO 64-02

Performance Analysis

The MOUNT POCONO 64-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On April 3, 2016, 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 142 customers for up to 1,608 minutes resulting in 106,402 CMI.

In total, the MOUNT POCONO 64-02 circuit had 66 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (43); equipment failure (13); animal contacts (6); nothing found (2); vehicles (2).

Remedial Actions

- In 2015, an expanded operational review was performed.
- In 2016, a section of difficult-to-access line was relocated to a more accessible location, and reconductored.
- In 2016, FISR was activated on this circuit.
- In 2016, a section of line was reconductored to remove copper conductor.
- In 2016, full circuit tree trimming will be performed.
- In 2016, three load break disconnects and fault indicators were installed.
- In 2016, the installation of a new single-phase recloser is being evaluated.
- In 2016, relocating a long single phase tap to eliminate a difficult-to-access section is being investigated.

55 Circuit 13103 -- NORTHAMPTON 31-03

Performance Analysis

The NORTHAMPTON 31-03 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On January 23, 2016, during a period of ice/sleet/snow, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,845 customers for up to 245 minutes resulting in 378,868 CMI.

In total, the NORTHAMPTON 31-03 circuit had eight outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (3); contact or dig in (2); nothing found (1); tree related (1); vehicles (1).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, additional fusing will be installed at several locations.
- In 2016, additional Smart Grid devices will be evaluated for this circuit.
- In 2017, a tie line will be constructed to the NORTHAMPTON 31-02, and two additional Smart Grid devices will be added.

56 Circuit 26001 -- WEST DAMASCUS 60-01

Performance Analysis

The WEST DAMASCUS 60-01 circuit experienced no outages of over 100,000 CMI between October 2015 and September 2016.

In total, the WEST DAMASCUS 60-01 circuit had 63 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (23); equipment failure (16); animal contacts (13); nothing found (6); other (4); contact or dig in (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, hot spot tree trimming was performed.
- In 2016, additional fusing will be added at several locations.
- In 2017, full circuit tree trimming will be performed.
- In 2017, a new manual switch will be installed on a section of single and three-phase line to improve sectionalizing capabilities.
- In 2018, several cross arms, switches, and lightning arrestors will be replaced.

57 Circuit 43401 -- BENTON 34-01

Performance Analysis

The BENTON 34-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, an equipment failure occurred on an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 989 customers for up to 160 minutes resulting in 157,607 CMI.

On April 3, 2016, during a period of strong wind, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 622 customers for up to 338 minutes resulting in 209,962 CMI.

In total, the BENTON 34-01 circuit had 39 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (15); equipment failure (9); animal contacts (7); nothing found (5); vehicles (2); other (1).

Remedial Actions

- In 2015, an expanded operational review was performed.
- In 2015, full circuit trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, a new section of single phase conductor will be evaluated to relocate a section of difficult-to-access conductor.
- In 2016, an existing device will be evaluated for replacement with a recloser.

58 Circuit 10206 -- ALLENTOWN 02-06

Performance Analysis

The ALLENTOWN 02-06 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On June 29, 2016, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,261 customers for up to 168 minutes resulting in 108,661 CMI.

On July 18, 2016, during a period of strong wind, an animal interfered with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,265 customers for up to 317 minutes resulting in 296,499 CMI.

In total, the ALLENTOWN 02-06 circuit had 6 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (5); animal contacts (1).

Remedial Actions

- In 2016, installation of a three phase recloser or load break disconnect switch will be evaluated.
- In 2016, replacing an existing manual switch with an automated device will be evaluated.
- In 2017, an expanded operational review will be performed.
- In 2018, full circuit trimming will be performed.

59 Circuit 12301 -- LANARK 23-01

Performance Analysis

The LANARK 23-01 circuit experienced no outages of over 100,000 CMI between October 2015 and September 2016.

In total, the LANARK 23-01 circuit had 75 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (40); animal contacts (13); equipment failure (12); nothing found (7); vehicles (2); other (1).

Remedial Actions

- In 2015, an expanded operational review was performed.
- In 2016, FISR was activated on this circuit.
- In 2017, full circuit trimming will be performed.
- In 2017, several single phase fuses will be installed.

60 Circuit 41801 -- GOWEN CITY 18-01

Performance Analysis

The GOWEN CITY 18-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On February 16, 2016, 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 389 customers for up to 550 minutes resulting in 159,239 CMI.

On February 24, 2016, during a period of heavy rain, a tree made contact with an overhead switch causing a recloser to trip to lockout. This outage affected 387 customers for up to 1,547 minutes resulting in 184,411 CMI.

In total, the GOWEN CITY 18-01 circuit had 21 outages between October 2015 and September 2016, with the causes breaking down as follows: animal contacts (7); tree related (7); equipment failure (4); contact or dig in (1); other (1); vehicles (1).

Remedial Actions

- In 2016, full circuit tree trimming was performed.
- In 2016, FISR was activated on this circuit.
- In 2016, a non-communicating sectionalizing device was replaced with an automated vacuum recloser as part of the Smart Grid Initiative.
- In 2016, a recloser was replaced.
- In 2016, cross arms and poles were replaced at multiple locations.
- In 2016, single-phase fusing will be installed at multiple locations.

61 Circuit 42601 -- TUSCARORA 26-01

Performance Analysis

The TUSCARORA 26-01 circuit experienced two outages of over 100,000 CMI between October 2015 and September 2016.

On October 28, 2015, during a period of strong wind, an unidentified issue occurred with a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 2,163 customers for up to 429 minutes resulting in 286,122 CMI.

On February 24, 2016, during a period of strong wind, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 598 customers for up to 1,415 minutes resulting in 114,933 CMI.

In total, the TUSCARORA 26-01 circuit had 21 outages between October 2015 and September 2016, with the causes breaking down as follows: equipment failure (11); tree related (5); animal contacts (3); other (2).

Remedial Actions

- In 2015, SCADA was installed at the substation.
- In 2016, an existing disconnect switch was automated as part of the Smart Grid Initiative.
- In 2016, FISR was activated on this circuit.
- In 2016, single-phase fusing will be installed at 11 locations.
- In 2018, full circuit tree trimming will be performed.

62 Circuit 23002 -- SAINT JOHNS 30-02

Performance Analysis

The SAINT JOHNS 30-02 circuit experienced one outage of over 100,000 CMI between October 2015 and September 2016.

On July 14, 2016, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 1,020 customers for up to 433 minutes resulting in 270,763 CMI.

In total, the SAINT JOHNS 30-02 circuit had 22 outages between October 2015 and September 2016, with the causes breaking down as follows: tree related (10); equipment failure (5); animal contacts (3); vehicles (2); nothing found (1); other (1).

Remedial Actions

- In 2016, FISR was activated on this circuit.
- In 2016, additional solid blade disconnects were installed.
- In 2016, full circuit tree trimming was performed.
- In 2016, this circuit will be patrolled to identify additional locations susceptible to conductor damage.
- In 2016, a new line and terminal from the FREELAND substation will reduce the load on this circuit.
- In 2017, an expanded operational review will be performed.

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

The following table shows a breakdown of service interruption causes for the 12 months ended at the current quarter. PPL Electric's maintenance programs focus on corrective actions to address controllable service interruptions (e.g., trees and equipment failure).

Cause Description	Trouble Cases	Percent of Trouble Cases	Customer Interruptions	Percent of Customer Interruptions	Customer Minutes	Percent of Customer Minutes
Animals	4,095	23.1%	59,657	5.3%	4,205,299	3.1%
Contact / Dig-In	150	0.8%	20,470	1.8%	1,118,412	0.8%
Directed by Non-PPL Authority	235	1.3%	23,301	2.1%	2,246,861	1.7%
Equipment Failures	5,108	28.8%	347,753	31.0%	34,370,473	25.7%
Improper Design	-	0.0%	-	0.0%	-	0.0%
Improper Installation	3	0.0%	1,354	0.1%	92,905	0.1%
Improper Operation	4	0.0%	2,713	0.2%	99,456	0.1%
Nothing Found	1,219	6.9%	71,215	6.4%	5,150,976	3.9%
Other Controllable	110	0.6%	12,974	1.2%	537,815	0.4%
Other Non Control	270	1.5%	50,433	4.5%	4,963,617	3.7%
Other Public	67	0.4%	10,196	0.9%	1,159,877	0.9%
Tree Related	5,754	32.4%	383,508	34.2%	66,882,935	50.0%
Unknown	1	0.0%	1,240	0.1%	118,383	0.1%
Vehicles	740	4.2%	135,797	12.1%	12,824,967	9.6%
Total	**17,756**	**100.0%**	**1,120,611**	**100.0%**	**133,771,976**	**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 43% of cases, 49% of customer interruptions, and 63% 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. We are in year four of a five year cycle for the new standard.

Animals: Animals accounted for approximately 23% 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 80% 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 substations are scheduled to be animal guarded by 2017.

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 40% of the cases of trouble, 37% of the customer interruptions and 44% of the customer minutes attributed to equipment failure were weather-related and, as such, are not considered to be strong indicators of equipment condition or performance.

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

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

Inspection & Maintenance Goals/Objectives	Annual Budget	3rd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of poles)	195	12	12	32	32
Transmission arm replacements (# of sets)	150	26	26	46	46
Transmission air break switch inspections (# of switches)	8	6	6	8	8
Transmission lightning arrester installations (# of sets)	1,716	613	648	1,716	1,860
Transmission structure inspections (# of structures)	1,862	795	775	1,578	1,654
Transmission tree side trim-Bulk Power (linear feet)	N/A	N/A			
Transmission herbicide-Bulk Power (# of acres)	N/A	N/A			
Transmission reclearing (# of miles) BES Only	326	0	2	326	323
Transmission reclearing (# of miles) 69 kV	769	206	104	509	734
Transmission reclearing (# of miles) 138 kV	59	16	15	51	55
Transmission danger tree removals-Bulk Power (# of trees)	N/A	N/A			
Substation					
Substation batteries (# of activities)	654	128	128	611	620
Circuit breakers (# of activities)	579	130	62	451	446
Substation inspections (# of activities)	4,545	1073	1082	3,494	3,508
Transformer maintenance (# of activities)	1,430	359	36	1,098	707

Inspection & Maintenance Goals/Objectives	Annual Budget	3rd Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	1,424	424	450	1,097	1,178
C-truss distribution poles (# of poles)	4,600	1,473	1,396	2,857	2,780
Capacitor (MVAR added)[4]	401	300	336	310	354
OCR Replacements (# of)	99	3	3	99	94
Distribution pole inspections (# of poles)	68,237	28,319	27,531	44,041	43,253
Distribution line inspections (hours)	12,944	1,275	1,325	8,511	7,473
Group re-lamping (# of lamps)	16,151	5,850	8,318	13,500	14,630
Test sections of underground distribution cable	N/A	298	298	734	734
Distribution tree trimming (# of miles)	6,458	1,633	1,104	4,793	4,623
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)	553	125	41	469	367
LTN vault inspections (# of)	821	232	229	668	653
LTN network protector overhauls (# of)	91	28	5	70	48
LTN reverse power trip testing (# of)	51	4	6	39	38

[4] Details of the program have been altered to address voltage remediation issues on the capacitors resulting in a projected higher volume of work to be completed.

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

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

Activity	3rd Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	1,641	1,779	4,648	5,332
Vegetation Management	16,491	12,430	42,815	42,462
Customer Response	20,154	17,488	50,277	48,770
Reliability Maintenance	12,346	10,341	37,482	33,018
System Upgrade	745	1,202	2,115	4,796
Customer Service/Accounts	37,023	35,155	95,117	92,357
Others	10,855	10,248	32,151	33,965
Total O&M Expenses	**99,255**	**88,643**	**264,606**	**260,700**

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

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

Activity	3rd Quarter		Year-to-date	
	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	23,099	18,613	67,964	57,408
System Upgrade	132,124	193,012	394,047	388,278
Reliability & Maintenance	107,821	120,453	329,856	298,689
Customer Response	4,493	2,662	8,934	8,862
Other	6,294	6,039	19,588	18,413
Total	**273,832**	**340,778**	**820,389**	**771,651**

9) ***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	65
Journeyman Lineman	231
Journeyman Lineman-Trainee	28
Helper	0
Groundhand	6
Troubleman	54
T&D Total	**384**
Electrical	
Elect Leaders-UG	4
Elect Leaders-Net	11
Elect Leaders-Sub	23
Journeyman Elect-UG	18
Journeyman Elect-Net	31
Journeyman Elect-Sub	58
Journeyman Elect Trainee-UG	3
Journeyman Elect Trainee-Net	3
Journeyman Elect Trainee-Sub	22
Helper	0
Laborer-Network	0
Laborer-Substation	0
Electrical Total	**173**
Overall Total	**557**

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, initiative, 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, initiative, judgment, and experience to produce a quality job. • Performs all direct duties of the Journeyman Electrician when not acting as a leader.
Helper - Substation - Network - Underground	• Performs manual labor at any work location including those areas containing non-exposed energized electrical equipment, and to prepare the employee for entrance into the Apprenticeship Program.
Laborer - Substation - Network - Underground	• Performs manual labor and assists employees in higher job classifications.
Journeyman Electrician - Substation - Network - Underground	• Normally under limited supervision performs and is responsible for work associated with, but not limited to, PPL Electric facilities involving the highest degree of skill in construction and maintenance work associated with substations, LTN or underground distribution and transmission. • Uses microprocessor based equipment for troubleshooting and revising relay logic and its control systems related to the Field Services electrical discipline.

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

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