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E-FILE

May 18, 2022

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

Re: PPL Electric Utilities Corporation
Quarterly Reliability Report for the
Period Ended December 31, 2021 - CORRECTED
Docket No. M-2016-2522508

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation ("PPL Electric" or "the Company") is an original of PPL Electric's **CORRECTED,** non-confidential version of the Quarterly Reliability Report for the Period Ended December 31, 2021 ("Quarterly Reliability Report"). The Company respectfully requests that its original Quarterly Reliability Report for the fourth quarter of 2021, filed on January 31, 2022 pursuant to the Commission's regulations at 52 Pa. Code § 57.195(d), be removed from the docket to avoid any confusion.

The following corrections have been made in the instant filing:

- **Reliability Indices Table on Page 3** –

  1. The 2021 figure for Number of Sustained Customer Service Interruptions (Trouble Cases) has been corrected from 24,241 to 24,242; and
  2. The 2021 figure for Number of Customers Affected has been corrected from 1,308,569 to 1,309,328.

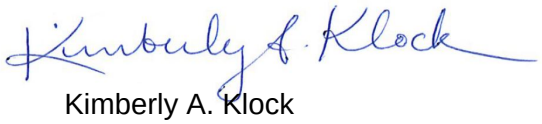
- **Outage Causes Table on Page 46** –

  1. In the Improper Design row, Trouble Cases has been corrected from 0 to 1, Customer Interruptions has been corrected from 0 to 759, and Percent of Customer Interruptions has been corrected from 0.0% to 0.1%;
  2. In the Tree Related row, Percent of Customer Interruptions has been corrected from 54.4% to 54.3%; and
  2. In the Total row, Trouble Cases has been corrected from 24,241 to 24,242 and Customer Interruptions has been corrected from 1,308,569 to 1,309,328.

A proprietary and confidential version of this corrected report has also been filed with the Commission on this date via overnight delivery.

If you have any questions regarding this document, please call me or Nikki Jones, PPL Electric's Director of Public Affairs, at (717) 603-4029.

Respectfully submitted,



Kimberly A. Klock

Enclosures

cc via email: Darryl Lawrence, Esquire
Steven Gray, Esquire
Mr. Daniel Searfoorce
Mr. Harry Bidelspach

PPL Electric Utilities Corporation

Quarterly Reliability Report

to the

Pennsylvania Public Utility Commission

January 2022

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

No major events occurred during the fourth quarter of 2021.

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

The following table provides data for the 12 months ending December 31, 2021.

SAIFI	BM 0.98	0.91
	STD 1.18	0.91
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	BM 145	187
	STD 174	187
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	BM 142	170
	STD 205	170
MAIFI		2.6
Average Number of Customers Served [1]		1,445,611
Number of Sustained Customer Interruptions (Trouble Cases)		24,242
Number of Customers Affected [2]		1,309,328
Customer Minutes of Interruptions (CMI)		245,413,282
Number of Customer Momentary Interruptions		3,817,912

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

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

During the fourth quarter, there were no (0) PUC major events, three (3) PUC reportable events, and seven (7) other storms that required the opening of one or more area emergency centers to manage restoration efforts. 2021 set records for: the most PUC Storms; most total storms; and most non-excludable storm cases, customers, and minutes.

Year	Non Reportable Storms	PUC Major Events	PUC Storms	Total Storms	PUC Storm Cases	PUC Storm CI	PUC Storm CMI
2002	12	1	7	20	3,787	448,916	99,462,247
2003	8	4	1	13	998	82,650	14,689,512
2004	14		4	18	2,882	302,418	97,539,670
2005	9	1	4	14	2,088	203,184	41,309,452
2006	19		9	28	5,067	547,811	148,541,051
2007	22	1	5	28	3,973	427,012	98,060,819
2008	20		7	27	3,952	443,305	137,727,147
2009	16		4	20	2,692	257,598	52,777,061
2010	19		10	29	4,239	410,544	103,813,180
2011	24	3	6	33	3,327	382,914	111,501,018
2012	16	1	8	25	2,690	365,386	113,548,058
2013	13		3	16	1,112	127,021	26,326,830
2014	11		5	16	3,250	294,917	132,991,117
2015	19		1	20	1,015	167,931	28,418,978
2016	20		4	24	2,696	266,922	54,674,446
2017	16		10	26	3,000	258,504	71,286,608
2018	17	1	5	23	3,952	305,482	110,654,537
2019	16		10	26	5,339	409,578	131,734,085
2020	19		8	27	6,446	460,988	98,853,825
2021	27		15	42	10,230	616,913	177,625,959

PPL Electric's fourth quarter reliability performance for SAIFI and SAIDI was within the PUC standard, with SAIFI also within the PUC benchmark. PUC CAIDI was outside of both standard and benchmark values due to the increased storm frequency and intensity experienced in 2021. Smart Grid technology and automation benefit SAIFI and SAIDI but have a negative impact on CAIDI. While PUC CAIDI is elevated, IEEE CAIDI, which is normalized for weather performance, is only mildly above 2nd quartile among large utility performance nationally.

Because weather has a significant impact to volatility in reliability metrics, PPL Electric's IEEE Metrics are shown below. The IEEE 1366 standard is a widely used methodology that allows for weather normalized performance evaluation that better reflects system performance during non-major storm events. The table below lists PPL Electric's IEEE performance metrics compared to the 2020 performance quartiles for large utilities nationally, as issued by the IEEE annual reliability survey[3]. This survey comprises some 100 utilities serving 85 million customers across the country.

	IEEE CAIDI	IEEE SAIFI	IEEE SAIDI
2018	112	0.74	82.5
2019	113	0.66	74.3
2020	99	0.69	68.6
Rolling 12 Months Ending 12/31/2021	124	0.68	85
IEEE First Quartile Ceiling	98	0.82	84
IEEE Second Quartile Ceiling	108	1.06	103

[3] Quartile cutoffs are expected to be revised upward for 2021.

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	47704	938	158	5.93	3.3	1,389	100	1,303,487
2	55001	539	269	2.0	4.2	1,310	48	706,767
3	29402	615	128	4.82	1.0	1,645	52	1,013,027
4	20403	653	185	3.53	6.9	1,959	98	1,279,538
5	45602	604	196	3.09	3.9	1,632	66	986,000
6	56504	525	200	2.63	13.1	1,992	110	575,803
7	26001	1019	399	2.56	4.4	1,423	94	1,451,185
8	45302	1068	195	5.49	9.0	686	67	732,694
9	45902	460	157	2.93	7.9	1,350	87	622,173
10	45402	524	224	2.34	4.4	1,642	136	860,503
11	43401	663	193	3.44	6.8	993	72	659,208
12	40101	378	190	1.99	6.0	2,155	61	816,307
13	53601	448	132	3.40	0.8	1,116	45	500,623
14	26604	302	106	2.86	5.4	2,421	96	731,697
15	45303	385	127	3.03	3.4	1,350	38	520,038
16	20601	625	314	1.99	23.6	1,472	71	920,374
17	17802	318	147	2.16	4.6	1,951	96	620,456
18	56802	391	162	2.41	3.6	1,529	79	597,854
19	26401	275	137	2.01	19.3	2,219	122	610,676
20	15001	365	162	2.25	2.1	1,389	52	507,548
21	21901	331	235	1.41	1.6	2,600	93	862,827
22	53901	354	123	2.87	6.7	1,329	53	471,167
23	46001	280	145	1.93	0.4	2,363	66	662,716
24	52402	280	113	2.47	3.4	1,696	98	476,023

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	47002	416	290	1.44	2.1	2,009	96	837,016
26	46302	571	261	2.19	1.7	1,089	82	622,847
27	47001	245	136	1.80	1.0	2,512	104	616,302
28	51502	320	205	1.56	4.2	1,932	12	619,369
29	28602	260	123	2.11	2.4	1,945	63	506,085
30	45002	368	200	1.84	2.0	1,449	60	533,387
31	18502	224	62	3.63	11.6	1,873	111	421,296
32	11506	285	111	2.57	3.3	1,302	68	371,840
33	46504	224	116	1.94	3.0	1,926	45	432,247
34	55408	264	91	2.90	1.9	1,173	17	309,746
35	21206	242	159	1.53	1.2	2,473	20	599,377
36	22003	345	182	1.89	5.8	1,399	55	483,502
37	16005	716	371	1.93	1.0	1,128	32	808,158
38	46004	493	451	1.09	4.0	2,065	39	1,019,057
39	29501	312	127	2.46	0.2	1,088	50	340,296
40	25801	286	184	1.56	2.3	1,833	66	524,667
41	43201	569	242	2.35	2.6	977	75	556,168
42	17803	296	181	1.63	6.2	1,635	52	484,893
43	52401	268	127	2.11	0.5	1,307	69	350,718
44	54701	262	108	2.43	0.6	1,126	40	295,938
45	16402	204	111	1.84	2.9	1,277	59	260,723
46	55103	217	72	3.02	0.0	1,086	18	236,163
47	10601	223	124	1.79	0.5	1,730	64	386,198
48	58101	222	65	3.40	4.3	876	14	195,348
49	42401	492	170	2.90	2.7	716	58	352,654
50	44802	471	380	1.24	0.4	1,609	46	758,058
51	46506	278	184	1.51	3.6	1,676	54	467,251
52	56803	267	133	2.01	1.7	1,280	67	341,923
53	46802	231	159	1.45	2.8	1,949	80	451,837
54	40502	202	108	1.88	3.6	1,957	76	395,701
55	10904	268	173	1.55	4.2	1,757	119	471,745
56	18001	604	425	1.42	0.3	1,226	37	741,587
57	43701	520	273	1.91	0.8	993	20	516,445
58	40901	220	160	1.38	1.9	1,945	51	429,752
59	21203	288	265	1.09	1.1	1,244	44	359,227
60	22405	199	99	2.01	1.3	1,742	24	348,121
61	29503	354	193	1.84	1.6	1,139	41	403,765
62	12301	178	63	2.81	4.4	1,473	53	262,809
63	27504	229	79	2.89	0.6	881	15	202,559

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

01 Circuit 47704 -- BLOOMSBURG 77-04

Performance Analysis

The BLOOMSBURG 77-04 circuit experienced six outages of over 100,000 CMI between January 2021 and December 2021.

On April 1, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 1,391 customers for up to 191 minutes resulting in 110,888 CMI.

On September 15, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 277 customers for up to 525 minutes resulting in 109,719 CMI.

On October 28, 2021, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a temporary open point to be interrupted. This outage affected 268 customers for up to 1,690 minutes resulting in 137,560 CMI.

On November 26, 2021, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 206 customers for up to 681 minutes resulting in 140,286 CMI.

On December 2, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 407 customers for up to 406 minutes resulting in 165,237 CMI.

On July 12, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 253 customers for up to 538 minutes resulting in 122,232 CMI.

In total, the BLOOMSBURG 77-04 circuit had 100 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (57); equipment failure (23); animal contacts (11); nothing found (4); other (4); vehicles (1).

Remedial Actions

- In 2021, two single-phase reclosers were installed.
- In 2022, a section of line will be reconductored.
- In 2022, a section of single-phase conductor will be relocated.
- In 2022, additional fusing will be installed.
- In 2022, additional sectionalizing capability will be added to this circuit.
- In 2022, five single-phase reclosers will be installed.

- In 2022, a section of conductor in a heavily wooded area will be undergrounded.

02 Circuit 55001 -- NEWPORT 50-01

Performance Analysis

The NEWPORT 50-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On November 26, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 226 customers for up to 454 minutes resulting in 102,389 CMI.

On October 26, 2021, an equipment failure occurred on an overhead splice causing a temporary open point to be interrupted. This outage affected 995 customers for up to 415 minutes resulting in 195,976 CMI.

In total, the NEWPORT 50-01 circuit had 122 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (74); equipment failure (30); animal contacts (8); vehicles (4); nothing found (3); other (3).

Remedial Actions

- In 2020, three single-phase reclosers were installed.
- In 2020, three fuses were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a section of single-phase was resourced.
- In 2020, a Proactive Circuit Analysis was performed with several minor remediations implemented.
- In 2021, an additional single-phase recloser was installed.
- In 2021, three additional fuses were installed.
- In 2022, a section of three-phase conductor in a heavily wooded area will be relocated.
- In 2022, two fuses will be installed.
- In 2022, a section of single-phase will be reconductored.
- In 2023, an additional three-phase sectionalizing device will be installed.
- In 2023, a section of single-phase will be resourced.
- In 2024, a section of single-phase will be reconductored.

03 Circuit 29402 -- BELTZVILLE 69/12 KV 94-02

Performance Analysis

The BELTZVILLE 69/12 KV 94-02 circuit experienced four outages of over 100,000 CMI between January 2021 and December 2021.

On October 26, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 424 customers for up to 278 minutes resulting in 100,579 CMI.

On November 12, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 468 customers for up to 246 minutes resulting in 109,671 CMI.

On July 2, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 895 customers for up to 143 minutes resulting in 127,993 CMI.

On July 3, 2021, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,384 customers for up to 284 minutes resulting in 310,228 CMI.

In total, the BELTZVILLE 69/12 KV 94-02 circuit had 52 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (23); animal contacts (11); equipment failure (11); vehicles (5); nothing found (2).

Remedial Actions

- In 2021, two dissimilar metal connections were remediated on three-phase reclosers.
- In 2022, a three-phase tie to the WEISSPORT 27503 line will be evaluated.
- In 2022, additional fusing will be added at eight locations.
- In 2022, two reclosers will be installed to split a tap into separate branches.
- In 2022, a Proactive Circuit Analysis will be performed.
- In 2023, full circuit trimming will be performed.
- In 2024, a section of difficult-to-access three-phase conductor will be relocated.

04 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On July 12, 2021, a vehicle contacted a pole causing a recloser to trip to lockout. This outage affected 1,892 customers for up to 187 minutes resulting in 146,345 CMI.

On September 14, 2021, an unidentified issue occurred with an overhead switch causing a recloser to trip to lockout. This outage affected 2,651 customers for up to 331 minutes resulting in 770,391 CMI.

In total, the ASHFIELD 04-03 circuit had 98 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (62); equipment failure (18); animal contacts (6); nothing found (6); vehicles (5); other (1).

Remedial Actions

- In 2020, additional hot spot trimming was performed.
- In 2020, two and one-half miles of three-phase conductor was rebuilt.
- In 2020, a section of difficult-to-access single-phase was relocated.
- In 2021, three additional single-phase reclosers were installed on this circuit.
- In 2021, an existing recloser was upgraded to a Smart Grid device.
- In 2022, single-phase ties will be evaluated for this circuit.
- In 2022, a section of difficult-to-access conductor will be relocated.
- In 2022, a three-phase tie to the GREENWOOD 20601 will be evaluated.
- In 2022, four additional single-phase reclosers will be installed.
- In 2023, a section of single-phase will be extended.

05 Circuit 45602 -- WOOLRICH 56-02

Performance Analysis

The WOOLRICH 56-02 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On July 11, 2021, during a period of heavy rain, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,632 customers for up to 546 minutes resulting in 485,715 CMI.

On November 1, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a transformer to be interrupted. This outage affected 261 customers for up to 1,228 minutes resulting in 174,881 CMI.

In total, the WOOLRICH 56-02 circuit had 66 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (46); equipment failure (10); animal contacts (7); vehicles (2); nothing found (1).

Remedial Actions

- In 2021, additional animal guarding was installed, with more to be done in 2022.
- In 2022, additional fusing will be installed.
- In 2022, a section of difficult-to-access three-phase will be evaluated for relocation.

06 Circuit 56504 -- ROCKVILLE 65-04

Performance Analysis

The ROCKVILLE 65-04 circuit experienced three outages of over 100,000 CMI between January 2021 and December 2021.

On April 23, 2021, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,393 customers for up to 377 minutes resulting in 240,231 CMI.

On August 10, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 163 customers for up to 767 minutes resulting in 105,669 CMI.

On September 7, 2021, a tree contacted an overhead conductor causing an interruption. This outage affected 338 customers for up to 363 minutes resulting in 122,440 CMI.

In total, the ROCKVILLE 65-04 circuit had 110 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (75); animal contacts (14); equipment failure (11); other (6); vehicles (3); nothing found (1).

Remedial Actions

- In 2020, eight fuses were installed.
- In 2020, 150 hazard trees were removed.
- In 2020, seven single-phase sectionalizing devices were installed.
- In 2021, one fuse was installed.
- In 2021, a section of line was reconfigured to improve reliability.
- In 2022, additional animal guards will be installed.
- In 2022, additional fusing will be installed.
- In 2022, a section of single-phase resourcing will be evaluated.
- In 2022, a section of single-phase will be relocated underground.
- In 2022, full circuit trimming will be performed.
- In 2022, three single-phase reclosers will be installed
- In 2023, two single-phase reclosers will be installed and protection settings will be optimized.

07 Circuit 26001 -- WEST DAMASCUS 60-01

Performance Analysis

The WEST DAMASCUS 60-01 circuit experienced three outages of over 100,000 CMI between January 2021 and December 2021.

On February 16, 2021, during a period of ice/sleet/snow, a tree contacted a pole or pole arm causing a sectionalizing device to be interrupted. This outage affected 384 customers for up to 543 minutes resulting in 167,308 CMI.

On July 7, 2021, during a period of lightning, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 435 customers for up to 1,329 minutes resulting in 458,643 CMI.

On June 21, 2021, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 473 customers for up to 330 minutes resulting in 154,426 CMI.

In total, the WEST DAMASCUS 60-01 circuit had 94 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (58); equipment failure (17); animal contacts (10); nothing found (7); vehicles (2).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2020, eight additional single-phase reclosers were installed.
- In 2020, full circuit trimming was performed.
- In 2021, a section of single-phase was reconductored.
- In 2021, numerous porcelain cutouts were replaced.
- In 2021, additional fusing was installed.
- In 2021, a Smart Grid device was replaced.
- In 2021, a section of difficult-to-access conductor was relocated.
- In 2022, additional animal guarding will be installed.
- In 2022, three additional single-phase reclosers with downstream fusing will be installed.
- In 2023, full circuit trimming will be performed.

08 Circuit 45302 -- WEST BERWICK 53-02

Performance Analysis

The WEST BERWICK 53-02 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On July 11, 2021, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 439 customers for up to 555 minutes resulting in 243,579 CMI.

On October 10, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 466 customers for up to 463 minutes resulting in 161,729 CMI.

In total, the WEST BERWICK 53-02 circuit had 67 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (46); equipment failure (9); animal contacts (5); nothing found (5); other (1); vehicles (1).

Remedial Actions

- In 2022, additional fusing will be installed.
- In 2022, two sections of difficult-to-access conductor will be relocated.
- In 2022, a section of difficult-to-access conductor will be resourced.
- In 2022, full circuit trimming will be performed.
- In 2023, a section of difficult-to-access conductor will be relocated.

09 Circuit 45902 -- AUBURN 59-02

Performance Analysis

The AUBURN 59-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the AUBURN 59-02 circuit had 87 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (58); equipment failure (14); animal contacts (9); nothing found (4); other (1); vehicles (1).

Remedial Actions

- In 2020, additional fusing was installed at several locations.
- In 2020, a dissimilar metal connection was remediated.
- In 2020, multiple cross arms were replaced.
- In 2020, multiple porcelain cutouts were replaced.
- In 2021, additional fusing was installed with more to be done in 2022.
- In 2022, nine single-phase reclosers will be installed.
- In 2022, additional hazard tree removal will be evaluated.
- In 2022, two sections of difficult-to-access conductor will be relocated.

- In 2023, the AUBURN substation will be configured to be remotely transferrable.
- In 2023, a section of this circuit will be transferred to a new line.
- In 2023, full circuit trimming will be performed.

10 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On September 14, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 127 customers for up to 866 minutes resulting in 100,631 CMI.

On August 1, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 274 customers for up to 631 minutes resulting in 161,148 CMI.

In total, the WEST BLOOMSBURG 54-02 circuit had 136 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (101); equipment failure (15); animal contacts (10); nothing found (6); other (2); vehicles (2).

Remedial Actions

- In 2021, fault indicators were installed on a section of this circuit and more will be evaluated.
- In 2021, three single-phase reclosers were installed.
- In 2022, additional fusing will be installed.
- In 2022, six single-phase reclosers will be installed.
- In 2022, full circuit trimming will be performed.

11 Circuit 43401 -- BENTON 34-01

Performance Analysis

The BENTON 34-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the BENTON 34-01 circuit had 72 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (55); equipment failure (8); animal contacts (3); nothing found (3); other (3).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2021, hazard tree removal was performed.
- In 2021, additional fusing was installed.
- In 2022, a section of difficult-to-access single-phase circuit will be relocated.
- In 2022, a single-phase tie will be evaluated for this circuit.
- In 2022, the protection settings for this circuit will be evaluated and optimized.
- In 2022, two single-phase reclosers will be installed.
- In 2022, additional fusing will be installed.
- In 2022, additional sectionalizing will be evaluated.

12 Circuit 40101 -- HUNTER 01-01

Performance Analysis

The HUNTER 01-01 circuit experienced three outages of over 100,000 CMI between January 2021 and December 2021.

On May 13, 2021, a vehicle contact caused a recloser to trip to lockout. This outage affected 679 customers for up to 191 minutes resulting in 129,689 CMI.

On June 29, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 680 customers for up to 219 minutes resulting in 148,437 CMI.

On August 29, 2021, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 681 customers for up to 363 minutes resulting in 222,560 CMI.

In total, the HUNTER 01-01 circuit had 61 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (41); equipment failure (12); animal contacts (6); nothing found (1); vehicles (1).

Remedial Actions

- In 2020, aerial cable was installed in a heavily wooded area.
- In 2021, additional animal guarding was installed.
- In 2021, a three-phase recloser was replaced.
- In 2022, a section of three-phase outside of the substation will be reconductored.
- In 2022, four single-phase reclosers will be installed.
- In 2022, a new tie line and three-phase sectionalizing device will be evaluated.
- In 2022, a three-phase sectionalizing device will be evaluated.
- In 2022, additional fusing will be installed at five locations.
- In 2024, full circuit trimming will be performed.

13 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On October 13, 2021, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 754 customers for up to 209 minutes resulting in 126,167 CMI.

In total, the DALMATIA 36-01 circuit had 45 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (18); equipment failure (13); nothing found (7); animal contacts (5); vehicles (2).

Remedial Actions

- In 2020, four additional fuses were installed.
- In 2020, one trip saver was installed.
- In 2020, full circuit trimming was performed.
- In 2021, a section of single-phase line was relocated.
- In 2022, a three-phase tie will be evaluated.
- In 2022, an additional single-phase recloser will be evaluated.

14 Circuit 26604 -- BROOKSIDE 66-04

Performance Analysis

The BROOKSIDE 66-04 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On July 7, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing an interruption. This outage affected 985 customers for up to 147 minutes resulting in 144,795 CMI.

On May 1, 2021, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 278 customers for up to 445 minutes resulting in 123,482 CMI.

In total, the BROOKSIDE 66-04 circuit had 96 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (63); animal contacts (12); equipment failure (12); nothing found (5); vehicles (3); other (1).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2021, additional animal guarding was installed.
- In 2021, hazard tree removal was performed.

- In 2022, additional fusing will be installed.
- In 2022, numerous porcelain cutouts will be replaced.
- In 2022, eight single-phase reclosers will be installed.
- In 2022, reconductoring will be evaluated for a section of conductor.
- In 2022, a tie line be evaluated.
- In 2023, three single-phase reclosers will be installed.

15 Circuit 45303 -- WEST BERWICK 53-03

Performance Analysis

The WEST BERWICK 53-03 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On September 14, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 745 customers for up to 718 minutes resulting in 103,265 CMI.

On August 19, 2021, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 2,275 customers for up to 413 minutes resulting in 308,830 CMI.

In total, the WEST BERWICK 53-03 circuit had 38 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (17); equipment failure (11); animal contacts (6); contact or dig in (1); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2022, additional animal guarding will be installed.
- In 2022, additional fusing will be installed.
- In 2022, a sectionalizing device will be upgraded to a protective device.
- In 2022, a section of difficult-to-access single-phase will be relocated to underground.
- In 2025, full circuit trimming will be performed.

16 Circuit 20601 -- GREENWOOD 06-01

Performance Analysis

The GREENWOOD 06-01 circuit experienced five outages of over 100,000 CMI between January 2021 and December 2021.

On July 11, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 458 customers for up to 259 minutes resulting in 118,278 CMI.

On September 14, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 58 customers for up to 659 minutes resulting in 154,097 CMI.

On February 16, 2021, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 307 customers for up to 478 minutes resulting in 146,742 CMI.

On September 14, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 989 customers for up to 1,153 minutes resulting in 202,467 CMI.

On November 1, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 924 customers for up to 575 minutes resulting in 308,063 CMI.

In total, the GREENWOOD 06-01 circuit had 71 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (38); equipment failure (15); animal contacts (13); nothing found (3); vehicles (2).

Remedial Actions

- In 2020, seven additional fuses were installed.
- In 2020, an adjacent circuit was reconductored to improve transfer capability.
- In 2020, two additional single-phase reclosers were installed.
- In 2020, an existing recloser was replaced with a Smart Grid device.
- In 2020, a section of two-phase conductor was upgraded to three-phase.
- In 2021, an additional single-phase recloser was installed.
- In 2021, additional fusing was installed at six locations.
- In 2021, full circuit trimming was performed.
- In 2021, two additional sectionalizing devices were installed.
- In 2022, a three-phase tie to the ASHFIELD 20403 will be evaluated.
- In 2022, additional single-phase ties will be evaluated.
- In 2023, a section of difficult-to-access single-phase will be relocated.
- In 2023, a section of difficult-to-access single-phase will be de-energized and customers will be transferred to an adjacent feeder.

17 Circuit 17802 -- GILBERT 78-02

Performance Analysis

The GILBERT 78-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On August 27, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 176 customers for up to 677 minutes resulting in 106,344 CMI.

In total, the GILBERT 78-02 circuit had 96 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (60); animal contacts (19); equipment failure (10); nothing found (3); vehicles (3); other (1).

Remedial Actions

- In 2021, hot spot trimming was completed.
- In 2021, four single-phase reclosers were installed.
- In 2021, a Smart Grid device was replaced.
- In 2021, a section of difficult-to-access conductor was relocated.
- In 2021, five transformers were replaced.
- In 2022, additional animal guarding will be installed.
- In 2022, two sections of difficult-to-access single-phase will be relocated.
- In 2022, a single-phase recloser will be installed.
- In 2022, full circuit trimming will be performed.

18 Circuit 56802 -- BENVENUE 68-02

Performance Analysis

The BENVENUE 68-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the BENVENUE 68-02 circuit had 79 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (55); equipment failure (16); animal contacts (5); nothing found (2); other (1).

Remedial Actions

- In 2020, seven sectionalizing devices were installed.
- In 2020, a section of single-phase line was resourced.
- In 2020, six additional single-phase reclosers were installed.
- In 2021, a single-phase recloser was installed.
- In 2022, additional fusing will be installed.
- In 2022, a section of single-phase will be relocated and reconfigured.
- In 2022, two single-phase reclosers will be installed.
- In 2022, full circuit trimming will be performed.

- In 2023, a section of three-phase will be reconductored.
- In 2023, a section of single-phase will be relocated to underground.

19 Circuit 26401 -- INDIAN ORCHARD 64-01

Performance Analysis

The INDIAN ORCHARD 64-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the INDIAN ORCHARD 64-01 circuit had 122 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (66); animal contacts (26); equipment failure (22); nothing found (6); other (1); vehicles (1).

Remedial Actions

- In 2021, three single-phase reclosers were installed.
- In 2021, additional animal guarding was installed.
- In 2022, additional animal guarding will be installed.
- In 2022, numerous porcelain cutouts will be replaced.
- In 2022, a section of conductor will be reconductoring and relocated.
- In 2022, additional fusing will be installed.
- In 2022 and 2023, six additional single-phase reclosers will be installed.

20 Circuit 15001 -- BLUE MOUNTAIN 50-01

Performance Analysis

The BLUE MOUNTAIN 50-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On September 2, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 253 customers for up to 680 minutes resulting in 171,948 CMI.

On December 12, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,273 customers for up to 168 minutes resulting in 185,128 CMI.

In total, the BLUE MOUNTAIN 50-01 circuit had 52 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (31); equipment failure (13); animal contacts (7); vehicles (1).

Remedial Actions

- In 2021, full circuit trimming was performed.
- In 2022, five additional single-phase reclosers will be installed.
- In 2022, additional animal guarding will be installed.
- In 2022, a section of single-phase will be replaced.

21 Circuit 21901 -- HUMBOLDT 19-01

Performance Analysis

The HUMBOLDT 19-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On September 15, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 328 customers for up to 1,422 minutes resulting in 258,567 CMI.

On September 14, 2021, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 370 customers for up to 1,054 minutes resulting in 154,562 CMI.

In total, the HUMBOLDT 19-01 circuit had 93 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (70); equipment failure (13); animal contacts (4); nothing found (3); vehicles (2); other (1).

Remedial Actions

- In 2021, full circuit trimming was performed, as well as removal of over 1,000 hazard trees.
- In 2022, additional fusing will be evaluated.
- In 2022, a single-phase tie opportunity to the GIRARD MANOR 24-01 will be evaluated.
- In 2022, single-phase fusing opportunities will be reviewed in conjunction with new reclosers.
- In 2023, eleven additional reclosers will be installed.

22 Circuit 53901 -- HALIFAX 39-01

Performance Analysis

The HALIFAX 39-01 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 19, 2021, during a period of strong wind, a tree contacted a pole or pole arm causing an interruption. This outage affected 693 customers for up to 658 minutes resulting in 179,554 CMI.

In total, the HALIFAX 39-01 circuit had 53 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (36); equipment failure (12); animal contacts (2); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, an additional fuse was installed.
- In 2020, three single-phase reclosers were installed.
- In 2020, additional animal guarding was installed at seven locations.
- In 2021, full circuit trimming was performed.
- In 2022, reconductoring at a river crossing will be evaluated.
- In 2022, additional fusing will be installed.
- In 2022, a single-phase recloser will be installed.
- In 2023, two single-phase reclosers will be installed.
- In 2024, a single-phase recloser will be installed.

23 Circuit 46001 -- BERWICK 60-01

Performance Analysis

The BERWICK 60-01 circuit experienced three outages of over 100,000 CMI between January 2021 and December 2021.

On October 26, 2021, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,362 customers for up to 1,854 minutes resulting in 2,020,159 CMI.

On July 11, 2021, during a period of heavy rain, an equipment failure occurred on an overhead splice causing a recloser to trip to lockout. This outage affected 941 customers for up to 203 minutes resulting in 190,637 CMI.

On June 14, 2021, during a period of heavy rain, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 937 customers for up to 225 minutes resulting in 187,513 CMI.

In total, the BERWICK 60-01 circuit had 66 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (42); equipment failure (12); nothing found (7); animal contacts (5).

Remedial Actions

- In 2022, an alternate feed will be evaluated for the customers who experienced the large outage in 2020, as well as potential reconductoring and line relocation.
- In 2022, additional fusing will be installed.
- In 2022, full circuit trimming will be performed.
- In 2022, an additional single-phase recloser will be installed.

24 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

The GREEN PARK 24-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 11, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 197 customers for up to 555 minutes resulting in 103,819 CMI.

In total, the GREEN PARK 24-02 circuit had 98 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (51); equipment failure (21); animal contacts (18); nothing found (4); vehicles (3); other (1).

Remedial Actions

- In 2021, a section of single-phase was relocated overhead.
- In 2021, 215 hazard trees were removed.
- In 2021, expanded trimming right-of-way was obtained for sections of this circuit.
- In 2021, a section of single-phase was relocated to underground.
- In 2021, one section of single-phase was reconductored.
- In 2022, a new battery storage installation will be installed.
- In 2022, an additional single-phase recloser will be installed.
- In 2022, additional animal guarding will be installed.
- In 2022, a section of single-phase will be relocated overhead.
- In 2022, full circuit trimming will be performed.
- In 2022, an additional section of single-phase will be reconductored.
- In 2022, a section of single-phase will be relocated.
- In 2022, two sections of single-phase will be re-sourced to reduce exposure.
- In 2022, additional sectionalizing devices will be evaluated.
- In 2024, a new line and terminal will be installed.
- In 2024, a three-phase tie will be installed.

25 Circuit 47002 -- HUGHESVILLE 70-02

Performance Analysis

The HUGHESVILLE 70-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the HUGHESVILLE 70-02 circuit had 96 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (65); equipment failure (16); animal contacts (7); nothing found (5); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2021, an additional sectionalizing device was installed.
- In 2021, a section of difficult-to-access conductor was relocated.
- In 2021, additional animal guarding was installed.
- In 2021, additional fusing was installed.
- In 2021, an additional single-phase recloser was installed.

26 Circuit 46302 -- ROHRSBURG 63-02

Performance Analysis

The ROHRSBURG 63-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the ROHRSBURG 63-02 circuit had 82 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (52); animal contacts (13); equipment failure (12); nothing found (3); contact or dig in (1); other (1).

Remedial Actions

- In 2021, a sectionalizing device was relocated.
- In 2021, additional fusing was installed.
- In 2021, a section of difficult-to-access conductor was relocated with another relocation scheduled for 2022.
- In 2022, additional animal guarding will be installed.
- In 2023, an additional single-phase recloser will be installed.

27 Circuit 47001 -- HUGHESVILLE 70-01

Performance Analysis

The HUGHESVILLE 70-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On August 13, 2021, during a period of strong wind, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 833 customers for up to 602 minutes resulting in 130,480 CMI.

On July 7, 2021, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 590 customers for up to 459 minutes resulting in 130,642 CMI.

In total, the HUGHESVILLE 70-01 circuit had 104 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (62); equipment failure (18); animal contacts (14); nothing found (8); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2021, addition fusing was installed.
- In 2021, several transformer cutouts were replaced.
- In 2021, a single-phase recloser was relocated.
- In 2022, voltage regulation will be installed.
- In 2022, additional single-phase reclosers will be installed.

28 Circuit 51502 -- SWATARA 15-02

Performance Analysis

The SWATARA 15-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On June 30, 2021, during a period of extreme temperatures, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 1,511 customers for up to 535 minutes resulting in 461,418 CMI.

In total, the SWATARA 15-02 circuit had 12 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (6); equipment failure (4); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2021, additional animal guarding was installed.
- In 2021, full circuit trimming was performed.
- In 2021, a new tie line and three-phase sectionalizing device were installed.

29 Circuit 28602 -- BLYTHEBURN 86-02

Performance Analysis

The BLYTHEBURN 86-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 27, 2021, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 294 customers for up to 737 minutes resulting in 117,617 CMI.

In total, the BLYTHEBURN 86-02 circuit had 63 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (41); equipment failure (9); animal contacts (8); other (2); vehicles (2); nothing found (1).

Remedial Actions

- In 2020, a section of three-phase was reconductored.
- In 2021, a section of three-phase was reconductored.
- In 2021, nine single-phase reclosers were installed.
- In 2022, a three-phase tie line will be evaluated.
- In 2022, a Proactive Circuit Analysis will be performed.
- In 2022, additional off-cycle hazard tree removal will be evaluated.
- In 2022, a three-phase tie will be evaluated for reconductoring.
- In 2022, a Substation upgrade will be upgraded.
- In 2024, full circuit trimming will be performed.

30 Circuit 45002 -- LIMESTONE 50-02

Performance Analysis

The LIMESTONE 50-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On August 14, 2021, during a period of lightning, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,013 customers for up to 184 minutes resulting in 185,865 CMI.

In total, the LIMESTONE 50-02 circuit had 60 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (39); equipment failure (13); animal contacts (6); vehicles (2).

Remedial Actions

- In 2021, part of this circuit was transferred to an adjacent circuit.
- In 2022, a section of difficult-to-access single-phase will be relocated.
- In 2022, additional fusing will be installed.
- In 2022, several poles will be replaced.

- In 2023, multiple porcelain cutouts will be replaced.

31 Circuit 18502 -- CANADENSIS 85-02

Performance Analysis

The CANADENSIS 85-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the CANADENSIS 85-02 circuit had 111 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (70); animal contacts (19); equipment failure (12); nothing found (3); other (3); vehicles (3); contact or dig in (1).

Remedial Actions

- In 2021, full circuit trimming was performed.
- In 2021, additional animal guarding was installed.
- In 2021, several Smart Grid devices received communications upgrades.
- In 2021, hazard tree removal was performed.
- In 2021, tree cable was installed in a section of heavily wooded conductor.
- In 2021, additional single-phase reclosers were installed.
- In 2021, two three-phase reclosers were installed.
- In 2021, an additional Smart Grid device was installed.
- In 2022, additional single-phase reclosers will be installed.
- In 2022, a section of three-phase will be relocated.
- In 2022, additional fusing will be installed.

32 Circuit 11506 -- FREEMANSBURG 15-06

Performance Analysis

The FREEMANSBURG 15-06 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On November 18, 2021, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 211 customers for up to 577 minutes resulting in 105,238 CMI.

In total, the FREEMANSBURG 15-06 circuit had 68 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (39); equipment failure (14); animal contacts (7); nothing found (5); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2020, a section of three-phase conductor was extended.
- In 2020, a Smart Grid device was replaced.
- In 2020, a switch at the substation was replaced.
- In 2021, seven additional single-phase reclosers were installed.
- In 2021, additional fusing was installed.

- In 2022, additional single-phase reclosers will be installed.
- In 2022, a section of this circuit will be reconfigured.
- In 2022, full circuit trimming will be performed.
- In 2022, additional fusing will be installed.
- In 2022, a section of single-phase will be evaluated for splitting.
- In 2024, the circuit will be split to reduce loading and improve reliability.

33 Circuit 46504 -- LOCK HAVEN 65-04

Performance Analysis

The LOCK HAVEN 65-04 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On January 28, 2021, a vehicle contacted a pole causing an interruption. This outage affected 264 customers for up to 431 minutes resulting in 110,665 CMI.

In total, the LOCK HAVEN 65-04 circuit had 45 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (34); animal contacts (4); equipment failure (4); other (2); vehicles (1).

Remedial Actions

- In 2021, additional animal guarding was installed.
- In 2022, a single-phase tie and additional Smart Grid devices will be evaluated.
- In 2022, a single-phase recloser will be evaluated.

34 Circuit 55408 -- SOUTH HERSHEY-H 54-08

Performance Analysis

The SOUTH HERSHEY-H 54-08 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On March 14, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,098 customers for up to 660 minutes resulting in 116,239 CMI.

In total, the SOUTH HERSHEY-H 54-08 circuit had 17 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (10); animal contacts (3); equipment failure (3); nothing found (1).

Remedial Actions

- In 2021, two additional fuses were installed.
- In 2022, a section of three-phase conductor will be evaluated for re-configuration.
- In 2024, full circuit trimming will be performed.
- In 2024, a three-phase sectionalizing device will be installed.

35 Circuit 21206 -- EAST CARBONDALE 12-06

Performance Analysis

The EAST CARBONDALE 12-06 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On December 4, 2021, a vehicle contacted a pole causing a recloser to trip to lockout. This outage affected 2,640 customers for up to 444 minutes resulting in 524,497 CMI.

In total, the EAST CARBONDALE 12-06 circuit had 20 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (8); equipment failure (5); animal contacts (3); other (2); vehicles (2).

Remedial Actions

- In 2021, full circuit trimming was performed.
- In 2021, a section of difficult-to-access conductor was relocated.
- In 2022, additional animal guarding will be installed.
- In 2022, three single-phase reclosers will be installed.
- In 2022, a section of conductor will be replaced.
- In 2022, numerous porcelain cutouts will be replaced.

36 Circuit 22003 -- BOHEMIA 20-03

Performance Analysis

The BOHEMIA 20-03 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On October 8, 2021, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 567 customers for up to 440 minutes resulting in 249,485 CMI.

On February 9, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 556 customers for up to 673 minutes resulting in 374,082 CMI.

In total, the BOHEMIA 20-03 circuit had 55 outages between January 2021 and December 2021, with the causes breaking down as follows: animal contacts (22); tree related (21); equipment failure (8); nothing found (3); other (1).

Remedial Actions

- In 2021, additional fusing was installed at three locations with two more planned.
- In 2021, an additional Smart Grid device was installed.
- In 2021, additional animal guarding was installed.
- In 2021, a Smart Grid device was upgraded.
- In 2021, additional fusing was installed.
- In 2022, six additional single-phase reclosers will be installed.
- In 2022, additional fusing will be installed.
- In 2022, two Smart Grid devices will be replaced.
- In 2022, a new tie line will be constructed.
- In 2023, full circuit trimming will be performed.

37 Circuit 16005 -- DORNEYVILLE 60-05

Performance Analysis

The DORNEYVILLE 60-05 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On May 26, 2021, during a period of strong wind, a tree contacted an overhead transformer causing a recloser to trip to lockout. This outage affected 146 customers for up to 1,410 minutes resulting in 205,732 CMI.

On May 26, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,128 customers for up to 1,604 minutes resulting in 334,522 CMI.

In total, the DORNEYVILLE 60-05 circuit had 32 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (19); equipment failure (7); animal contacts (4); nothing found (2).

Remedial Actions

- In 2020, full circuit trimming was performed.
- In 2021, additional fusing was installed.
- In 2022, three additional single-phase reclosers will be installed.
- In 2022, additional fusing will be installed.

38 Circuit 46004 -- BERWICK 60-04

Performance Analysis

The BERWICK 60-04 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On June 28, 2021, a vehicle contact caused a recloser to trip to lockout. This outage affected 1,174 customers for up to 839 minutes resulting in 837,918 CMI.

In total, the BERWICK 60-04 circuit had 39 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (25); equipment failure (7); animal contacts (4); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2022, additional three-phase ties will be evaluated.
- In 2022, a section of single-phase in a heavily wooded area will be evaluated for remediation.
- In 2022, three single-phase reclosers will be installed.
- In 2024, full circuit trimming will be performed.

39 Circuit 29501 -- LEDGEDALE 95-01

Performance Analysis

The LEDGEDALE 95-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the LEDGEDALE 95-01 circuit had 50 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (26); equipment failure (12); animal contacts (10); nothing found (2).

Remedial Actions

- In 2021, several poles were replaced.
- In 2021, two single-phase reclosers were installed.
- In 2021, a Smart Grid device was replaced.
- In 2022, two single-phase reclosers will be installed.
- In 2022, additional animal guarding will be installed.
- In 2022, a Smart Grid will be replaced.
- In 2023, full circuit trimming will be performed.

40 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 13, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 790 customers for up to 256 minutes resulting in 144,185 CMI.

In total, the SULLIVAN TRAIL 58-01 circuit had 66 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (40); equipment failure (12); animal contacts (8); other (3); nothing found (2); contact or dig in (1).

Remedial Actions

- In 2020, an off-cycle drone inspection was performed with several minor remediations performed as a result.
- In 2021, three additional single-phase reclosers were installed.
- In 2021, a section of three-phase was reconductored.
- In 2021, a section of three-phase conductor was extended.
- In 2021, full circuit trimming was performed.
- In 2022, a Proactive Circuit Analysis will be performed.
- In 2022, additional fusing and single-phase sectionalizing will be evaluated.
- In 2022, additional hazard tree removal will be evaluated.

41 Circuit 43201 -- MILLVILLE 32-01

Performance Analysis

The MILLVILLE 32-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the MILLVILLE 32-01 circuit had 75 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (54); equipment failure (8); nothing found (7); animal contacts (4); other (1); vehicles (1).

Remedial Actions

- In 2022, two sections of difficult-to-access conductor will be relocated.
- In 2022, additional single-phase reclosers will be installed.
- In 2023, a section of conductor will be relocated to underground.

42 Circuit 17803 -- GILBERT 78-03

Performance Analysis

The GILBERT 78-03 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On October 30, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 579 customers for up to 384 minutes resulting in 161,354 CMI.

On December 9, 2021, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a temporary open point to be interrupted. This outage affected 611 customers for up to 296 minutes resulting in 105,260 CMI.

In total, the GILBERT 78-03 circuit had 52 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (34); equipment failure (9); animal contacts (8); vehicles (1).

Remedial Actions

- In 2021, additional animal guarding was performed.
- In 2021, additional fusing was installed.
- In 2021, 10 poles were replaced.
- In 2021, several sections of conductor were relocated and reconductored.
- In 2021, numerous porcelain cutouts were replaced.
- In 2021, a drone inspection was performed with several minor remediations implemented.
- In 2022, full circuit trimming will be performed.
- In 2022, additional animal guarding will be installed.
- In 2022, five single-phase reclosers will be installed.

43 Circuit 52401 -- GREEN PARK 24-01

Performance Analysis

The GREEN PARK 24-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the GREEN PARK 24-01 circuit had 69 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (48); equipment failure (9); animal contacts (8); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2021, two additional fuses were installed.
- In 2021, a section of single-phase was reconductored.
- In 2022, protective device coordination will be reviewed.
- In 2022, seven fuses will be installed.
- In 2022, two sections of single-phase will be relocated.
- In 2022, additional sectionalizing devices will be evaluated.
- In 2022, an additional Smart Grid device will be installed.
- In 2023, full circuit trimming will be performed.
- In 2023, a battery storage solution will be installed.
- In 2024, a section of single-phase will be relocated to underground.
- In 2024, a section of single-phase will be relocated out of the right-of-way.

44 Circuit 54701 -- NEW BLOOMFIELD 47-01

Performance Analysis

The NEW BLOOMFIELD 47-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the NEW BLOOMFIELD 47-01 circuit had 40 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (24); animal contacts (8); equipment failure (5); vehicles (2); other (1).

Remedial Actions

- In 2020, two fuses were installed.
- In 2020, four single-phase reclosers were installed.
- In 2020, 4 single-phase fuses were installed.
- In 2020, full circuit trimming was performed.
- In 2020, a drone patrol and Proactive Circuit Analysis were performed with several minor remediations implemented.
- In 2021, additional hazard tree removal was performed.
- In 2022, an additional fuse will be installed.
- In 2022, a new Smart Grid device will be installed.
- In 2022, five single-phase reclosers will be installed.
- In 2023, two sections of single-phase will be relocated underground.

45 Circuit 16402 -- MOUNT POCONO 64-02

Performance Analysis

The MOUNT POCONO 64-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the MOUNT POCONO 64-02 circuit had 59 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (40); animal contacts (10); equipment failure (7); nothing found (1); vehicles (1).

Remedial Actions

- In 2021, full circuit trimming was performed.
- In 2021, several dissimilar metal connections were remediated.
- In 2021, an additional single-phase recloser was installed.
- In 2021, a Smart Grid device was replaced.
- In 2021, additional animal guarding was installed.
- In 2022, additional fusing will be installed.
- In 2022, four single-phase reclosers will be installed.
- In 2022, a section of difficult-to-access three-phase will be relocated.
- In 2022, additional animal guarding will be installed.

46 Circuit 55103 -- WERTZVILLE 51-03

Performance Analysis

The WERTZVILLE 51-03 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On October 15, 2021, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,006 customers for up to 134 minutes resulting in 133,868 CMI.

In total, the WERTZVILLE 51-03 circuit had 18 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (10); equipment failure (5); nothing found (3).

Remedial Actions

- In 2021, two single-phase reclosers were installed.
- In 2022, an additional single-phase recloser will be installed.
- In 2022, additional fusing will be installed.
- In 2024, a new tie line will be constructed.
- In 2024, full circuit trimming will be performed.

47 Circuit 10601 -- BLOOMING GLEN 06-01

Performance Analysis

The BLOOMING GLEN 06-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the BLOOMING GLEN 06-01 circuit had 64 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (43); equipment failure (10); animal contacts (7); nothing found (2); vehicles (2).

Remedial Actions

- In 2022, three additional single-phase reclosers will be installed.
- In 2022, a section of this circuit will be reconductored.
- In 2022, additional fusing will be installed at 10 locations.
- In 2022, a section of this circuit will be evaluated for relocation.

48 Circuit 58101 -- NEW KINGSTOWN 81-01

Performance Analysis

The NEW KINGSTOWN 81-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the NEW KINGSTOWN 81-01 circuit had 14 outages between January 2021 and December 2021, with the causes breaking down as follows: equipment failure (4); tree related (3); vehicles (3); other (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2021, a Proactive Circuit Analysis was completed, as a result a new tie line will be evaluated.
- In 2022, additional fusing will be installed.
- In 2022, a new tie line will be evaluated.
- In 2024, full circuit trimming will be performed.

49 Circuit 42401 -- GIRARD MANOR 24-01

Performance Analysis

The GIRARD MANOR 24-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the GIRARD MANOR 24-01 circuit had 58 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (42); equipment failure (6); animal contacts (4); nothing found (3); vehicles (3).

Remedial Actions

- In 2021, two additional fuses were installed.
- In 2021, four single-phase reclosers were installed.
- In 2021, full circuit trimming was performed.
- In 2022, the circuit breaker settings will be reviewed for coordination with downstream sectionalizer.
- In 2022, a single-phase tie opportunity will be evaluated.
- In 2022, additional single-phase fusing opportunities will be evaluated.

50 Circuit 44802 -- EAST DANVILLE 48-02

Performance Analysis

The EAST DANVILLE 48-02 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On September 15, 2021, a vehicle contact caused a circuit breaker to trip to lockout. This outage affected 1,200 customers for up to 1,040 minutes resulting in 526,629 CMI.

In total, the EAST DANVILLE 48-02 circuit had 46 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (23); equipment failure (11); animal contacts (4); nothing found (4); vehicles (3); other (1).

Remedial Actions

- In 2022, a section of difficult-to-access conductor will be relocated.
- In 2022, two single-phase reclosers will be installed.
- In 2023, full circuit trimming will be performed.

51 Circuit 46506 -- LOCK HAVEN 65-06

Performance Analysis

The LOCK HAVEN 65-06 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On October 9, 2021, an equipment failure occurred on a pole or pole arm causing an interruption. This outage affected 1,207 customers for up to 524 minutes resulting in 316,534 CMI.

In total, the LOCK HAVEN 65-06 circuit had 54 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (38); equipment failure (10); animal contacts (4); nothing found (1); vehicles (1).

Remedial Actions

- In 2021, two single-phase reclosers were installed.
- In 2021, additional fusing was installed.
- In 2021, several cutouts were replaced.
- In 2021, an additional sectionalizing device was installed.
- In 2022, additional animal guarding will be installed.
- In 2022, a section of difficult-to-access conductor will be relocated to underground.

52 Circuit 56803 -- BENVENUE 68-03

Performance Analysis

The BENVENUE 68-03 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On January 1, 2021, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 765 customers for up to 135 minutes resulting in 103,680 CMI.

In total, the BENVENUE 68-03 circuit had 67 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (44); equipment failure (9); animal contacts (8); nothing found (5); vehicles (1).

Remedial Actions

- In 2020, additional fusing was installed at five locations.
- In 2020, additional animal guarding was installed at five locations.
- In 2021, full circuit trimming was performed.
- In 2021, four additional single-phase sectionalizing devices were installed.
- In 2022, five additional single-phase sectionalizing devices will be installed.
- In 2023, a three-phase Smart Grid device will be installed.

53 Circuit 46802 -- HEPBURN 68-02

Performance Analysis

The HEPBURN 68-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the HEPBURN 68-02 circuit had 80 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (52); equipment failure (16); animal contacts (7); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2021, two additional reclosers were installed.
- In 2021, an additional Smart Grid device was installed.
- In 2022, additional animal guarding will be installed.
- In 2023, a section of difficult-to-access conductor will be relocated.
- In 2024, splitting an existing tap will be evaluated.

54 Circuit 40502 -- CRESSONA 05-02

Performance Analysis

The CRESSONA 05-02 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the CRESSONA 05-02 circuit had 76 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (38); animal contacts (21); equipment failure (11); nothing found (5); vehicles (1).

Remedial Actions

- In 2020, a three-phase sectionalizing device was replaced.
- In 2020, full circuit trimming was performed.
- In 2020, additional fusing was installed.
- In 2021, two single-phase reclosers were installed.
- In 2021, three poles were replaced.
- In 2022, four additional single-phase reclosers will be installed.
- In 2022, a section of difficult-to-access single-phase will be relocated.
- In 2022, additional pole replacement will be performed.
- In 2023, a section of this line will be transferred to a new line.

55 Circuit 10904 -- COOPERSBURG 09-04

Performance Analysis

The COOPERSBURG 09-04 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On December 12, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 627 customers for up to 255 minutes resulting in 116,296 CMI.

In total, the COOPERSBURG 09-04 circuit had 119 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (75); equipment failure (18); animal contacts (16); nothing found (8); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2021, full circuit trimming was performed.
- In 2022, four additional single-phase reclosers will be installed with more to be evaluated.
- In 2022, a section of difficult-to-access single-phase will be relocated.
- In 2022, a new single-phase tie will be evaluated.

56 Circuit 18001 -- ZIONSVILLE 80-01

Performance Analysis

The ZIONSVILLE 80-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On September 2, 2021, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 374 customers for up to 1,670 minutes resulting in 388,773 CMI.

On July 8, 2021, during a period of lightning, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 681 customers for up to 490 minutes resulting in 209,052 CMI.

In total, the ZIONSVILLE 80-01 circuit had 37 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (31); animal contacts (3); vehicles (2); other (1).

Remedial Actions

- In 2021, an additional single-phase reclosers was installed
- In 2022, additional fusing will be installed.
- In 2022, two additional single-phase reclosers will be installed.
- In 2022, an additional Smart Grid device will be evaluated.
- In 2024, full circuit trimming will be performed.

57 Circuit 43701 -- WILLIAMSPORT 37-01

Performance Analysis

The WILLIAMSPORT 37-01 circuit experienced two outages of over 100,000 CMI between January 2021 and December 2021.

On July 16, 2021, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 564 customers for up to 568 minutes resulting in 271,075 CMI.

On June 30, 2021, during a period of extreme temperatures, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 986 customers for up to 245 minutes resulting in 158,752 CMI.

In total, the WILLIAMSPORT 37-01 circuit had 20 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (8); equipment failure (6); animal contacts (5); nothing found (1).

Remedial Actions

- In 2020, additional animal guarding was installed.
- In 2021, the protection settings for this circuit were reviewed and optimized.
- In 2021, additional animal guarding was installed with more scheduled for 2022.

58 Circuit 40901 -- JERSEY SHORE 09-01

Performance Analysis

The JERSEY SHORE 09-01 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 13, 2021, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 558 customers for up to 341 minutes resulting in 107,156 CMI.

In total, the JERSEY SHORE 09-01 circuit had 51 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (36); equipment failure (8); animal contacts (3); nothing found (3); other (1).

Remedial Actions

- In 2021, hazard tree removal was performed.
- In 2021, a sectionalizing device was replaced.
- In 2021, additional animal guarding was installed.
- In 2022, a transformer cutout will be replaced.
- In 2022, a section of this line will be transferred to an adjacent circuit.
- In 2023, additional fusing will be installed.

59 Circuit 21203 -- EAST CARBONDALE 12-03

Performance Analysis

The EAST CARBONDALE 12-03 circuit experienced three outages of over 100,000 CMI between January 2021 and December 2021.

On February 16, 2021, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing an interruption. This outage affected 333 customers for up to 785 minutes resulting in 179,094 CMI.

On February 16, 2021, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 168 customers for up to 659 minutes resulting in 110,706 CMI.

On October 18, 2021, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 334 customers for up to 323 minutes resulting in 107,614 CMI.

In total, the EAST CARBONDALE 12-03 circuit had 44 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (23); equipment failure (10); animal contacts (8); nothing found (2); other (1).

Remedial Actions

- In 2021, a single-phase recloser was installed.
- In 2021, several cross-arms were replaced.
- In 2021, several dissimilar metal connections were remediated.
- In 2022, a section of single-phase will be extended.
- In 2022, additional animal guarding will be installed.
- In 2022, additional single-phase reclosers will be evaluated.
- In 2022, a section of this circuit will be transferred to an adjacent circuit.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, two sections of this line will be reconductored.

60 Circuit 22405 -- MORGAN 24-05

Performance Analysis

The MORGAN 24-05 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On October 16, 2021, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 444 customers for up to 1,602 minutes resulting in 102,410 CMI.

In total, the MORGAN 24-05 circuit had 24 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (8); equipment failure (7); animal contacts (3); nothing found (3); vehicles (2); other (1).

Remedial Actions

- In 2021, additional fault indicators were installed.
- In 2021, a recloser was replaced.
- In 2022, additional animal guarding will be installed.
- In 2022, hazard tree removal will be performed.
- In 2022, additional animal guarding will be installed.
- In 2022, additional fusing will be evaluated.
- In 2023, full circuit trimming will be performed.

61 Circuit 29503 -- LEDGEDALE 95-01

Performance Analysis

The LEDGEDALE 95-01 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On July 7, 2021, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 1,147 customers for up to 376 minutes resulting in 268,299 CMI.

In total, the LEDGEDALE 95-01 circuit had 41 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (30); equipment failure (7); nothing found (3); animal contacts (1).

Remedial Actions

- In 2021, a single-phase recloser was installed.
- In 2021, fusing was installed at seven locations.
- In 2022, additional animal guarding will be installed.
- In 2022, two single-phase reclosers with downstream fusing will be installed.
- In 2022, a section of underground conductor will be replaced.
- In 2023, full circuit trimming will be performed.

62 Circuit 12301 -- LANARK 23-01

Performance Analysis

The LANARK 23-01 circuit experienced no outages of over 100,000 CMI between January 2021 and December 2021.

In total, the LANARK 23-01 circuit had 53 outages between January 2021 and December 2021, with the causes breaking down as follows: tree related (26); equipment failure (11); animal contacts (8); vehicles (4); nothing found (3); other (1).

Remedial Actions

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

63 Circuit 27504 -- WEISSPORT 75-04

Performance Analysis

The WEISSPORT 75-04 circuit experienced one outage of over 100,000 CMI between January 2021 and December 2021.

On November 17, 2021, an equipment failure occurred on an overhead switch causing a circuit breaker to trip to lockout. This outage affected 1,516 customers for up to 104 minutes resulting in 157,027 CMI.

In total, the WEISSPORT 75-04 circuit had 15 outages between January 2021 and December 2021, with the causes breaking down as follows: equipment failure (4); tree related (4); animal contacts (3); other (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2021, a Smart Grid device was replaced.
- In 2021, two single-phase reclosers were installed.
- In 2021, additional fusing was installed.
- In 2021, a section of three-phase conductor was rebuilt.
- In 2022, a section of difficult-to-access conductor will be evaluated for relocation or reconductoring.
- In 2022, additional single-phase sectionalizing will be evaluated.
- In 2024, full circuit trimming will be performed.

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

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

Cause Description	Trouble Cases	Percent of Trouble Cases	Customer Interruptions	Percent of Customer Interruptions	Customer Minutes	Percent of Customer Minutes
Animals	3,345	13.8%	57,527	4.4%	3,624,274	1.5%
Contact / Dig-In	159	0.7%	11,508	0.9%	666,976	0.3%
Directed by Non-PPL Authority	64	0.3%	11,070	0.8%	721,796	0.3%
Equipment Failures	5,355	22.1%	288,310	22.0%	31,781,576	13.0%
Improper Design	1	0.0%	759	0.1%	15,901	0.0%
Improper Installation	1	0.0%	14	0.0%	1,776	0.0%
Improper Operation	4	0.0%	1,528	0.1%	11,181	0.0%
Nothing Found	1,046	4.3%	67,251	5.1%	7,359,267	3.0%
Other Controllable	90	0.4%	11,927	0.9%	742,458	0.3%
Other Non Control	287	1.2%	26,322	2.0%	2,382,276	1.0%
Other Public	32	0.1%	4,671	0.4%	545,158	0.2%
Tree Related	13,070	53.9%	711,409	54.3%	183,142,324	74.6%
Unknown	-	0.0%	-	0.0%	-	0.0%
Vehicles	788	3.3%	117,032	8.9%	14,418,320	5.9%
Total	**24,242**	**100.0%**	**1,309,328**	**100.0%**	**245,413,282**	**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 59% of cases, 62% of customer interruptions, and 81% of CMI.

Tree Related: Vegetation is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. For the current reporting period, approximately 86% of the cases of trouble, 86% of the customer interruptions and 94% of the customer minutes attributed to tree related outages were weather-related.

Animals: Animals accounted for approximately 14% 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 73% of the number of cases of trouble were 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, PPL Electric initiated distribution and substation animal guarding programs in 2009 to focus systematically on protecting existing facilities most at risk of incurring animal-caused interruptions. A complete effectiveness review of this strategy is being evaluated.

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

Equipment Failure: Equipment failure is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. However, approximately 40% of the cases of trouble, 42% of the customer interruptions and 54% of the customer minutes attributed to equipment failure were weather-related and, as such, are not considered to be strong indicators of equipment condition or performance.

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

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

Inspection & Maintenance Goals/Objectives	Annual Budget	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of poles)	86	8	8	86	86
Transmission arm replacements (# of arms)	29	1	1	29	29
Transmission air break switch inspections (# of switches)	0	0	0	0	0
Transmission surge arrester installations (# of sets)	445	0	0	445	445
Transmission structure inspections (# of activities)	12,564	4,266	4,266	15,870	15,870
Transmission tree side trim-Bulk Power (linear feet)	N/A				
Transmission herbicide-Bulk Power (# of acres)	N/A				
Transmission reclearing (# of miles) BES Only	539	26	21	539	534
Transmission reclearing (# of miles) 69 kV	998	300	267	998	965
Transmission reclearing (# of miles) 138 kV	80	40	26	80	84
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	285	3	2	285	284
Circuit breakers (# of activities)	396	6	0	396	405
Substation inspections (# of activities)	1,761	364	368	1,761	1,777
Transformer maintenance (# of activities)	494	10	10	494	567

Inspection & Maintenance Goals/Objectives	Annual Budget	4th Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	3,083	869	258	3,083	1,156
C-truss distribution poles (# of poles)	N/A	1,700	1,439	2,061	2,135
Capacitor (MVAR added)	0	0	0	0	0
OCR Replacements (# of)	1	0	0	1	3
Distribution pole inspections (# of poles)	74,500	49,012	41,437	61,684	57,118
Distribution line inspections (miles)	2,200	0	0	2,200	2,200
Group re-lamping (# of lamps)	16,140	0	0	16,140	6,178
Test sections of underground distribution cable	N/A	104	104	301	301
Distribution tree trimming (# of miles)	5,848	1,059	997	5,848	5,360
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)	616	154	156	616	486
LTN vault inspections (# of)	301	75	79	301	275
LTN network protector overhauls (# of)	55	14	13	55	52
LTN reverse power trip testing (# of)	27	7	2	27	17

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 which includes the work identified in response to Item (6).

Activity		4th Quarter		Year-to-date	
	2021 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
Provide Electric Service	6,239	1,560	2,527	6,239	8,269
Vegetation Management	36,696	7,906	9,397	36,696	35,595
Customer Response	61,140	14,063	14,493	61,140	73,762
Reliability Maintenance	25,438	5,483	5,748	25,438	27,628
System Upgrade	3,625	847	111	3,625	685
Customer Service/Accounts	119,095	28,845	35,256	119,095	98,792
Others	39,453	10,473	11,802	39,453	54,523
Total O&M Expenses	**291,687**	**69,177**	**79,333**	**291,687**	**299,253**

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 which includes transmission and distribution ("T&D") activities.

Activity		4th Quarter		Year-to-date	
	2021 Budget (000s)	Budget ($000)	Actual ($000)	Budget ($000)	Actual ($000)
New Service/Revenue	95,137	22,077	29,854	95,137	103,454
System Upgrade	188,825	56,741	36,974	188,825	181,858
Reliability & Maintenance	422,424	115,740	92,498	422,424	435,885
Customer Response	28,711	5,360	7,178	28,711	46,520
Other	22,271	3,921	7,704	22,271	14,527
Total	**757,367**	**22,077**	**29,854**	**757,367**	**782,245**

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

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

During the 4th quarter of 2021, 90 corrective work orders were created with the following breakdown by priority.

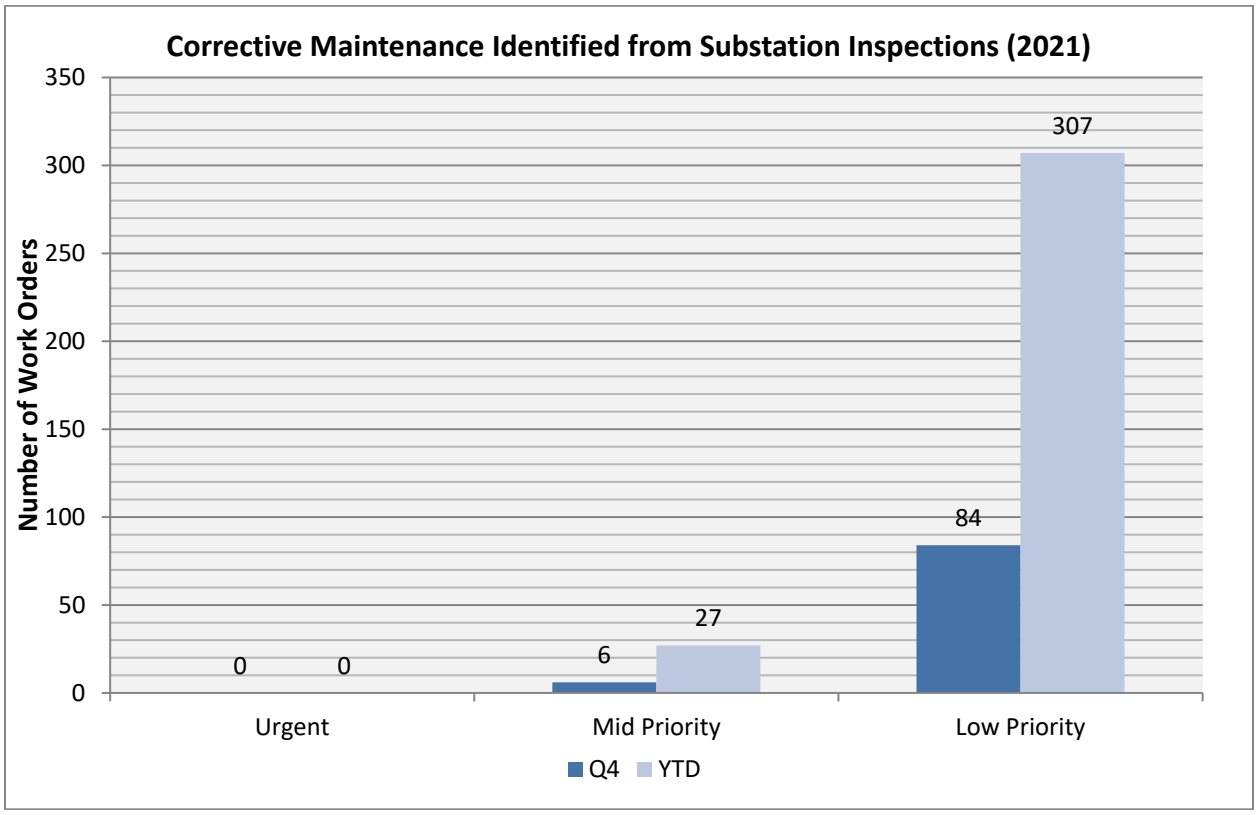


Figure 1: Corrective Maintenance Work Orders by Priority Level for 4th Quarter and Year-to-Date 2021

(b) The Amount Spent on Substation Inspections

During the 4th quarter of 2021, PPL Electric Utilities spent approximately $121,000 on substation inspections.

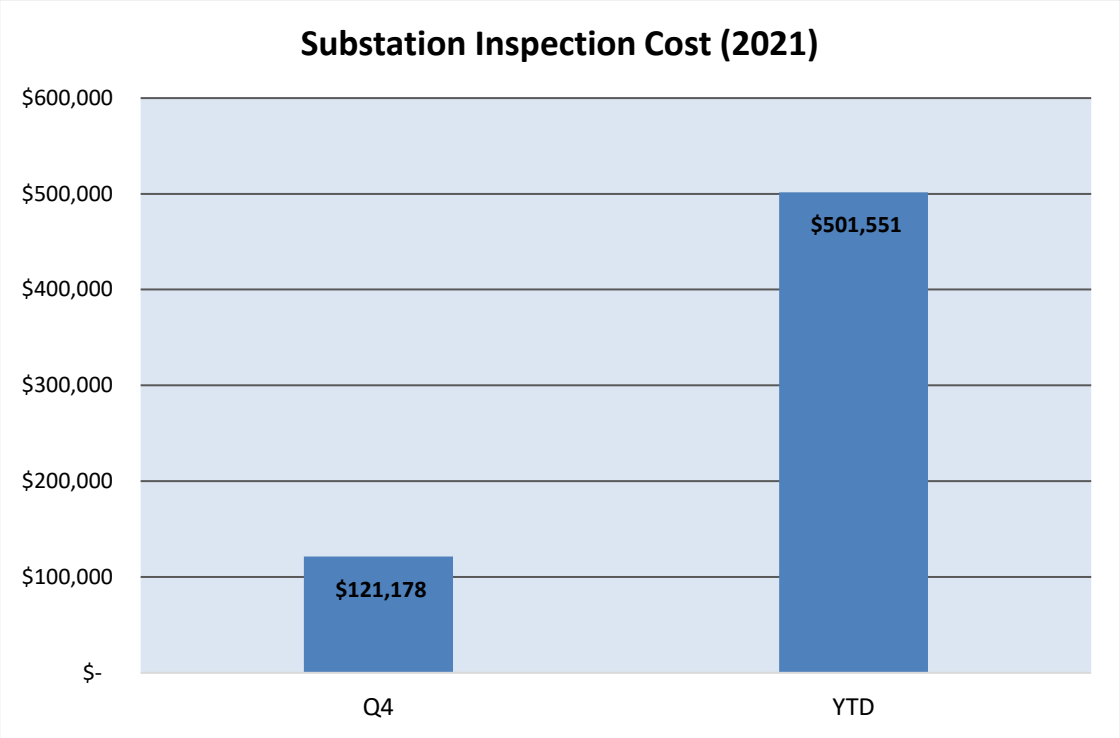


Figure 2: Substation Inspection Costs for 4th Quarter and Year-to-Date 2021.

(c) The Amount Spent on Vegetation Management

Please refer to Section 7 for vegetation management expenses for the 4th quarter and year-to-date 2021.

(d) The Projected CMI Avoidance Due to Substation Inspections

Figure 3 below shows the CMI avoidance that PPL Electric Utilities has estimated for the 4th quarter and year-to-date. During the 4th quarter of 2021, PPL Electric Utilities avoided a projected 126,000 CMI.

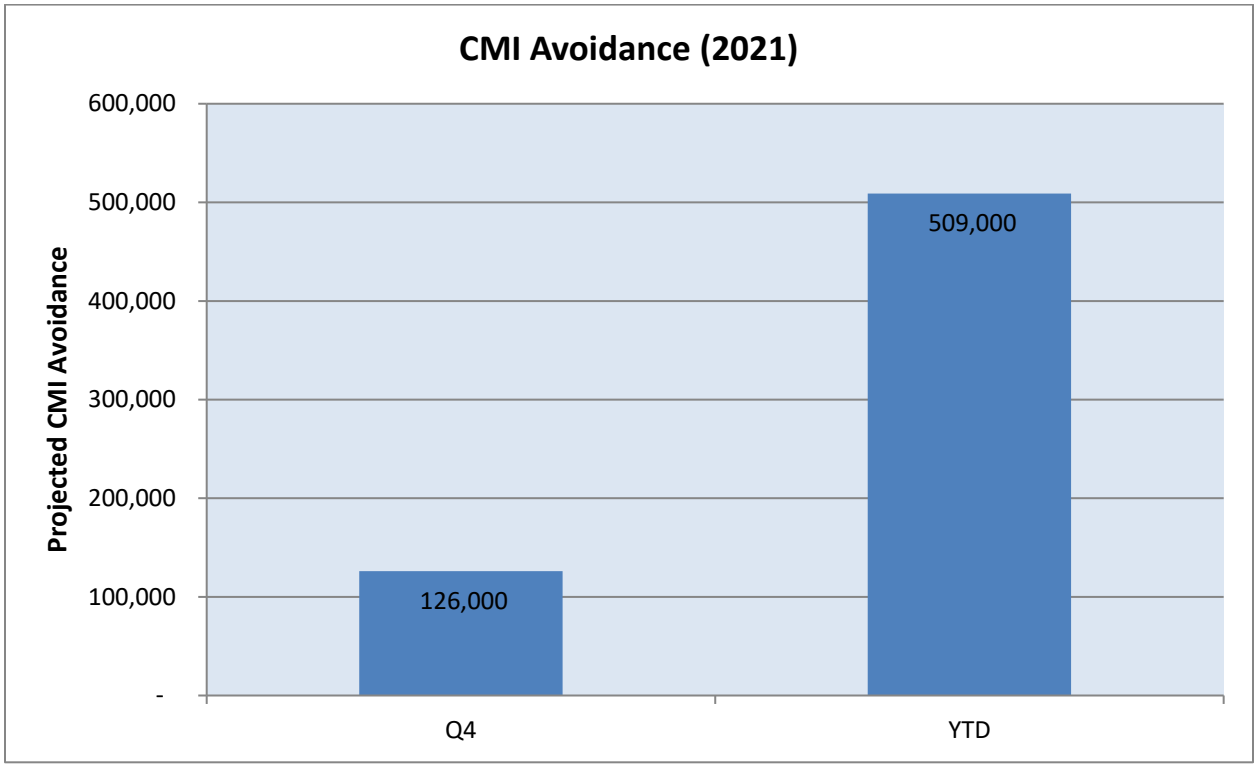


Figure 3: Projected CMI Avoidance Due to Substation Inspections for 4th Quarter and Year-to-Date 2021

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

In the past three years, distribution substations have contributed a small amount toward the reliability metrics. During the 4th quarter of 2021, the Company interrupted approximately 5,900 customers for a total of 96,000 CMI. The figures below show these results for the number of customers interrupted and CMI experienced, respectively.

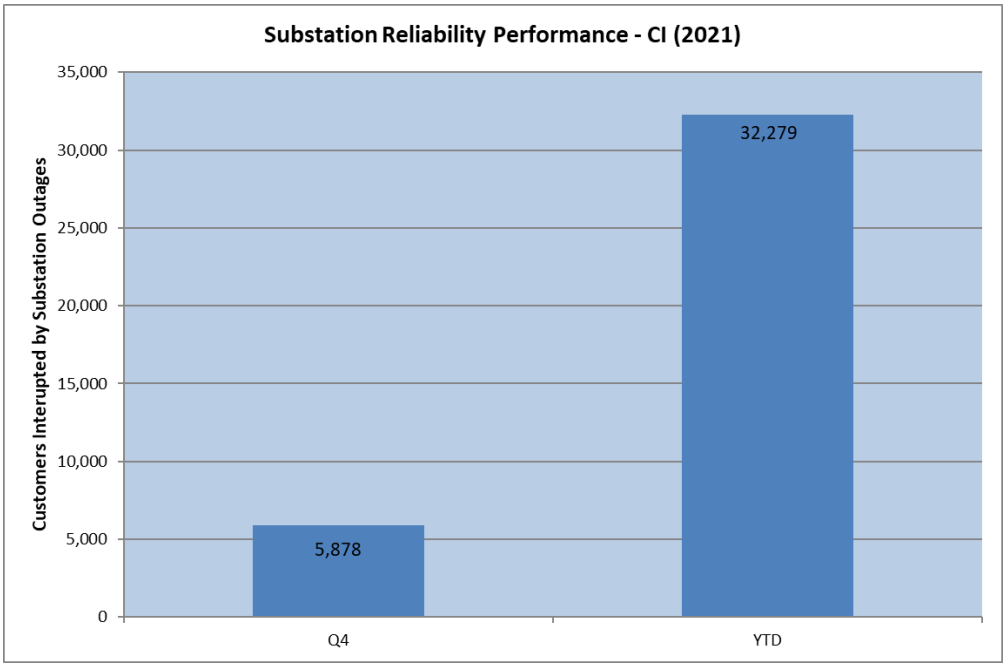


Figure 4: Substation Customers Interrupted for 4th Quarter and Year-to-Date 2021

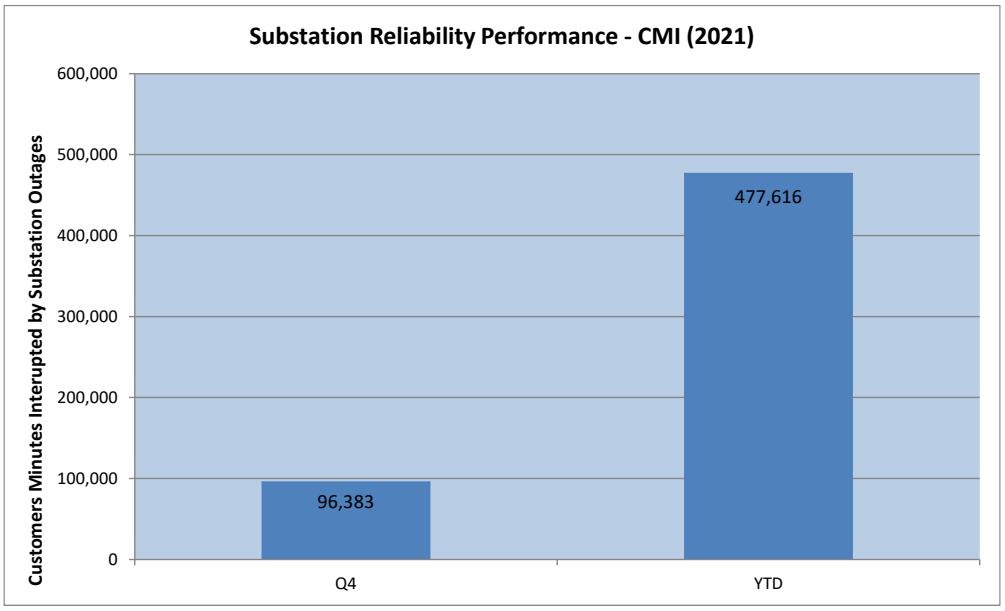


Figure 5: Substation Customer Minutes of Interruption for 4th Quarter and Year-to-Date 2021

(f) Substation SAIFI Contribution

Overall, substation outages contributed approximately 2.4% of the total SAIFI experienced by PPL Electric customers in the 4th quarter of 2021. Historically, PPL Electric Utilities has ranked in the first quartile for substation SAIFI performance on the Southeastern Electric Exchange (SEE) Survey and is on-track to maintain its ranking among other electric utilities.

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

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

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

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

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

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

Transmission and Distribution	
Lineman Leader	60
Journeyman Lineman	149
Journeyman Lineman-Trainee	54
Helper	38
Groundhand	0
Troubleman	51
T&D Total	**352**
Electrical	
Elect Leaders-UG	2
Elect Leaders-Net	8
Elect Leaders-Sub	20
Journeyman Elect-UG	9
Journeyman Elect-Net	28
Journeyman Elect-Sub	47
Electrical Total	**114**
Overall Total	**466**

Appendix A

PPL Electric Utilities Corporation

Worst Performing Circuit Definition

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

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

Appendix B

PPL Electric Utilities Corporation

Job Descriptions

Transmission and Distribution

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

Appendix B

Electrical

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

Appendix B

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