

Kimberly A. Klock
Assistant General Counsel

PPL
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.5696 Fax 610.774.4102
KKlock@pplweb.com



E-FILE

May 1, 2023

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 March 31, 2023
Docket No. M-2016-2522508**

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation ("PPL Electric") is the **NON-CONFIDENTIAL** version of PPL Electric's Quarterly Reliability Report for the Period Ended March 31, 2023. The report is being filed pursuant to 52 Pa. Code § 57.195(d).

Pursuant to 52 Pa. Code § 1.11, the enclosed document is to be deemed filed on May 1, 2023, which is the date it was filed electronically with the Commission's E-Filing System.

A proprietary and confidential version of this 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 Senior Director – Public and Regulatory Affairs, at (717) 603-4029.

Respectfully submitted,

A handwritten signature in blue ink that reads "Kimberly A. Klock". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Kimberly A. Klock

Enclosures

cc via email: Patrick Cicero, Esquire
NazAarah Sabree

Mr. Daniel Searfoorce
Mr. Harry Bidelspach



PPL Electric Utilities Corporation
Quarterly Reliability Report
to the
Pennsylvania Public Utility Commission

April 2023

- 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 first quarter of 2023.

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 March 31, 2023.

SAIFI	BM 0.98	0.79
	STD 1.18	0.79
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	BM 145	158
	STD 174	158
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	BM 142	125
	STD 205	125
MAIFI		.3
Average Number of Customers Served ¹		1,452,438
Number of Sustained Customer Interruptions (Trouble Cases)		22,410
Number of Customers Affected ²		1,152,372
Customer Minutes of Interruptions (CMI)		181,940,647
Number of Customer Momentary Interruptions		500,355

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 first quarter, there were no (0) PUC major events, three (3) PUC reportable events, and eight (8) other storms that required the opening of one or more area emergency centers to manage restoration efforts. Calendar year 2022 became the second highest storm count year behind only 2021. Calendar year 2022 was also the second highest year for storm cases, and the third highest year for storm customer interruptions.

For the rolling four quarters ending on 3/31/2023, storm impacts remain highly elevated by historical standards but appear to be trending downward from the 2021 peak.

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	0	4	18	2,882	302,418	97,539,670
2005	9	1	4	14	2,088	203,184	41,309,452
2006	19	0	9	28	5,067	547,811	148,541,051
2007	22	1	5	28	3,973	427,012	98,060,819
2008	20	0	7	27	3,952	443,305	137,727,147
2009	16	0	4	20	2,692	257,598	52,777,061
2010	19	0	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	0	3	16	1,112	127,021	26,326,830
2014	11	0	5	16	3,250	294,917	132,991,117
2015	19	0	1	20	1,015	167,931	28,418,978
2016	20	0	4	24	2,696	266,922	54,674,446
2017	16	0	10	26	3,000	258,504	71,286,608
2018	17	1	5	23	3,952	305,482	110,654,537
2019	16	0	10	26	5,339	409,578	131,734,085
2020	19	0	8	27	6,446	460,988	98,853,825
2021	27	0	15	42	10,230	616,913	177,625,959
2022	27	0	9	36	7,861	514,250	127,928,021
R4Q Ending 3/31/2023	29	0	9	38	6,952	447,865	107,229,382

PPL Electric’s first quarter reliability performance showed improvement in all areas versus the prior quarter. SAIFI and SAIDI were within the PUC standard and benchmark. CAIDI was within the PUC standard and 9% above the PUC benchmark value, largely attributable to ongoing elevated storm frequency and intensity. Smart Grid technology and automation benefit SAIFI and SAIDI but have a negative impact on CAIDI.

Because weather has a significant impact on 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 2021 performance quartiles for large utilities nationally, as issued by the IEEE annual reliability survey. This survey comprises some 100 utilities serving 85 million customers across the country.

PPL Electric was a top decile SAIFI performer in the 2021 IEEE survey, as well as a top quartile SAIDI performer. Additionally, PPL Electric’s IEEE SAIFI was the single best among the 25 large utilities participating in the survey. Large utilities are those serving one million or more customers.

	IEEE CAIDI	IEEE SAIFI	IEEE SAIDI
2019	113	0.66	74
2020	99	0.69	69
2021	124	0.68	85
2022	124	0.70	87
R4Q ending 3/31/2023	124	0.70	87
IEEE First Quartile Ceiling	103	0.88	100
IEEE Second Quartile Ceiling	117	1.09	139

3) Rolling 12-month reliability index values (SAIFI, CAIDI, SAIDI, CMI, and if available, MAIFI) and other pertinent information such as customers served, number of interruptions, customer minutes interrupted, number of lockouts, and so forth, for the worst performing 5% of the circuits in the system. An explanation of how the EDC defines its worst performing circuits shall be included.

The following table provides PUC reliability 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	26604	694	223	3.12	-	2,418	86	1,678,252
2	47002	506	188	2.69	0.79	2,021	85	1,023,013
3	26603	474	138	3.42	0.94	1,594	72	755,253
4	25501	483	161	3.00	0.68	1,689	62	816,568
5	23401	464	148	3.14	1.93	1,739	64	806,562
6	25801	513	243	2.12	0.31	1,836	79	942,748
7	16801	427	148	2.88	1.04	1,652	51	706,224
8	27102	644	174	3.69	1.10	896	51	576,836
9	56802	431	173	2.49	0.47	1,528	53	658,652
10	10904	361	133	2.71	0.66	1,734	134	626,321
11	24703	399	174	2.29	0.66	1,623	28	647,680
12	15001	313	91	3.43	-	1,393	49	435,695
13	22404	498	146	3.42	0.57	882	23	439,454
14	21203	448	187	2.40	0.70	1,257	40	563,070
15	22406	522	169	3.08	-	956	42	499,218
16	24401	370	136	2.72	-	1,258	46	465,912
17	53601	361	107	3.37	-	1,109	41	400,292
18	46001	308	167	1.85	0.75	2,358	46	725,470
19	10601	356	193	1.84	1.63	1,704	71	607,121
20	17902	359	114	3.16	0.43	1,005	41	361,019
21	40201	235	114	2.06	0.19	1,673	78	393,226
22	26704	330	118	2.80	0.61	934	49	308,164
23	46004	247	81	3.05	0.18	2,066	52	510,394
24	42701	296	124	2.40	-	1,466	66	434,477

WPC Rank	Feeder ID	SAIDI	CAIDI	SAIFI	MAIFI	Customers	Cases of Trouble	Customer Minutes Interrupted (CMI)
25	20403	309	196	1.58	0.97	1,957	81	604,689
26	23902	391	212	1.85	1.16	1,493	32	583,306
27	43201	381	132	2.89	-	954	50	363,585
28	41701	364	124	2.93	-	983	63	357,876
29	67801	269	166	1.62	0.81	2,155	26	580,706
30	17802	324	218	1.49	0.86	1,973	72	639,462
31	45602	237	109	2.18	1.00	2,444	69	578,076
32	46702	380	183	2.07	0.02	1,258	59	477,821
33	27101	252	110	2.30	0.60	1,835	75	463,241
34	29702	689	262	2.63	1.16	838	37	577,548
35	41602	290	86	3.39	0.19	844	55	244,899
36	53501	210	77	2.71	1.48	2,160	62	453,189
37	46206	237	89	2.65	0.46	1,219	32	288,796
38	58402	236	100	2.35	0.28	1,575	32	371,566
39	21601	348	250	1.39	0.26	1,728	41	601,103
40	26601	317	162	1.96	0.12	1,260	45	399,227
41	26401	247	179	1.38	0.01	2,235	85	552,535
42	52401	218	70	3.12	0.98	1,314	74	285,923
43	13601	711	408	1.74	0.16	1,135	42	806,884
44	16101	347	247	1.40	2.82	1,564	66	543,028
45	11003	436	157	2.79	1.99	722	17	315,063
46	46203	191	105	1.82	0.80	2,189	41	417,935
47	17002	209	59	3.55	1.15	1,080	40	225,421
48	52402	187	72	2.62	0.41	1,700	54	318,604
49	64801	204	78	2.62	0.04	1,514	50	308,867
50	53102	190	45	4.21	0.55	1,234	15	234,723
51	24502	380	211	1.80	0.15	1,118	30	424,323
52	65702	282	235	1.20	1.43	1,923	25	542,700
53	20401	417	288	1.45	1.27	1,312	53	546,498
54	14302	228	113	2.02	-	1,245	7	284,320
55	13606	308	231	1.33	0.01	1,645	34	505,862
56	56504	237	164	1.44	0.66	1,985	83	470,012
57	42802	178	46	3.91	0.90	1,188	17	211,902
58	22703	244	157	1.56	0.72	1,668	15	406,795
59	45402	266	195	1.36	1.08	1,644	83	438,017
60	55001	763	144	5.30	0.64	1,253	151	956,545
61	56803	178	60	2.95	0.51	1,280	35	227,872
62	54202	178	138	1.29	0.52	2,112	18	376,539
63	46602	197	95	2.07	0.97	1,526	65	300,093

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

01 Circuit 26604 -- BROOKSIDE 66-04

Performance Analysis

The BROOKSIDE 66-04 circuit experienced eight outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 291 customers for up to 675 minutes resulting in 109,648 CMI.

On July 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 493 customers for up to 1,441 minutes resulting in 122,603 CMI.

On February 22, 2023, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 531 customers for up to 61 minutes resulting in 31,923 CMI.

On July 24, 2022, during a period of strong wind, a tree contacted an overhead transmission component causing a recloser to trip to lockout. This outage affected 105 customers for up to 1,199 minutes resulting in 125,877 CMI.

On May 16, 2022, during a period of strong wind, a tree contacted an overhead switch causing a recloser to trip to lockout. This outage affected 1,140 customers for up to 250 minutes resulting in 100,881 CMI.

On June 11, 2022, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 506 customers for up to 165 minutes resulting in 63,911 CMI.

On September 27, 2022, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 1,179 customers for up to 15 minutes resulting in 17,095 CMI.

On April 16, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,146 customers for up to 609 minutes resulting in 697,719 CMI.

In total, the BROOKSIDE 66-04 circuit had 86 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (49); animal contacts (19); equipment failure (11); vehicles (4); nothing found (2); other (1).

Remedial Actions

- In 2022, additional fusing was installed.
- In 2022, a Smart Grid device was installed.
- In 2022, six single-phase reclosers were installed.
- In 2022, additional animal guarding was installed.
- In 2023, three existing reclosers will be replaced with single-phase reclosers.
- In 2023, additional animal guarding will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, a section of difficult-to-access three-phase conductor will be relocated.
- In 2023, five single-phase reclosers will be installed.
- In 2024, a battery storage system will be installed on this circuit.
- In 2024, a section of this circuit will receive tree shielding cable.

02 Circuit 47002 -- HUGHESVILLE 70-02

Performance Analysis

The HUGHESVILLE 70-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 27, 2022, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 2,020 customers for up to 410 minutes resulting in 51,279 CMI.

On July 24, 2022, during a period of lightning, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 625 customers for up to 507 minutes resulting in 235,955 CMI.

In total, the HUGHESVILLE 70-02 circuit had 85 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (59); equipment failure (12); nothing found (5); animal contacts (4); vehicles (4); other (1).

Remedial Actions

- In 2022, an existing recloser was replaced with a Smart Grid device.
- In 2022, an existing cutout was replaced.
- In 2023, a section of difficult-to-access single-phase will be evaluated for relocation.
- In 2024, several sections of this circuit will be storm hardened.

03 Circuit 26603 -- BROOKSIDE 66-03

Performance Analysis

The BROOKSIDE 66-03 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On September 18, 2022, an unidentified issue occurred with an overhead switch causing a recloser to trip to lockout. This outage affected 1,001 customers for up to 112 minutes resulting in 111,211 CMI.

On August 30, 2022, during a period of strong wind, an unidentified issue occurred with a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,003 customers for up to 88 minutes resulting in 77,365 CMI.

On September 23, 2022, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 1,491 customers for up to 137 minutes resulting in 188,548 CMI.

In total, the BROOKSIDE 66-03 circuit had 73 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (42); equipment failure (18); animal contacts (7); nothing found (3); contact or dig in (1); other (1); vehicles (1).

Remedial Actions

- In 2022, additional animal guarding was installed.
- In 2022, ten single-phase reclosers were installed.
- In 2022, numerous porcelain cutouts were replaced.
- In 2023, additional fusing will be installed.
- In 2023, additional animal guarding will be installed.
- In 2023, an additional single-phase recloser will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2025, full circuit trimming will be performed.

04 Circuit 25501 -- MADISONVILLE 55-01

Performance Analysis

The MADISONVILLE 55-01 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On January 29, 2023, a vehicle contacted a pole causing an interruption. This outage affected 820 customers for up to 408 minutes resulting in 129,664 CMI.

On July 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 327 customers for up to 562 minutes resulting in 183,473 CMI.

On December 1, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 537 customers for up to 245 minutes resulting in 31,600 CMI.

On December 1, 2022, during a period of strong wind, a tree contact caused a circuit breaker to trip to lockout. This outage affected 1,692 customers for up to 400 minutes resulting in 289,076 CMI.

In total, the MADISONVILLE 55-01 circuit had 63 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (31); equipment failure (14); animal contacts (12); vehicles (4); nothing found (1); other (1).

Remedial Actions

- In 2022, four poles were replaced.
- In 2022, hot spot trimming was performed.
- In 2022, two single-phase reclosers were installed.
- In 2022, three poles were replaced.
- In 2022, a section of underground primary was replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, a single-phase recloser will be installed.
- In 2023, a section of difficult-to-access conductor will be relocated.
- In 2023, numerous porcelain cutouts will be replaced.

05 Circuit 23401 -- HONESDALE 34-01

Performance Analysis

The HONESDALE 34-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On September 10, 2022, a vehicle contacted a pole causing an interruption. This outage affected 500 customers for up to 185 minutes resulting in 42,136 CMI.

On August 4, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,731 customers for up to 382 minutes resulting in 312,806 CMI.

On August 19, 2022, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 893 customers for up to 366 minutes resulting in 23,261 CMI.

In total, the HONESDALE 34-01 circuit had 64 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (28); equipment failure (17); animal contacts (8); nothing found (7); vehicles (4).

Remedial Actions

- In 2022, additional animal guarding was installed.
- In 2022, two single-phase reclosers were installed.
- In 2023, a single-phase recloser will be installed.
- In 2023, additional animal guarding will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2024, a section of difficult-to-access conductor will be relocated.

06 Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 4, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 326 customers for up to 425 minutes resulting in 138,481 CMI.

On December 16, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 165 customers for up to 814 minutes resulting in 134,184 CMI.

On September 9, 2022, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 791 customers for up to 133 minutes resulting in 105,535 CMI.

In total, the SULLIVAN TRAIL 58-01 circuit had 80 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (50); equipment failure (15); animal contacts (9); vehicles (3); other (2); nothing found (1).

Remedial Actions

- In 2022, hazard tree removal was performed.
- In 2022, a Proactive Circuit Analysis was performed with several minor remediations performed.
- In 2023, additional fusing will be installed.
- In 2023, additional hazard tree removal will be evaluated.
- In 2023, a section of heavily wooded conductor will be evaluated for undergrounding.

07 Circuit 16801 -- WAGNERS 68-01

Performance Analysis

The WAGNERS 68-01 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 7, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 730 customers for up to 349 minutes resulting in 254,653 CMI.

On September 23, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 259 customers for up to 481 minutes resulting in 107,333 CMI.

On July 13, 2022, a contact or dig-in occurred on an underground conductor causing a recloser to trip to lockout. This outage affected 1,482 customers for up to 998 minutes resulting in 113,656 CMI.

On May 31, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 730 customers for up to 123 minutes resulting in 59,299 CMI.

In total, the WAGNERS 68-01 circuit had 51 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (41); animal contacts (4); equipment failure (3); contact or dig in (1); nothing found (1); other (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2023, additional animal guarding will be installed.
- In 2023, three single-phase reclosers will be installed.
- In 2025, reconductoring will be performed on a section of this circuit.
- In 2025, a single-phase tie will be constructed.

08 Circuit 27102 -- GREENFIELD 71-02

Performance Analysis

The GREENFIELD 71-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 10, 2022, an unidentified issue occurred with an overhead switch causing a recloser to trip to lockout. This outage affected 787 customers for up to 66 minutes resulting in 46,859 CMI.

On December 16, 2022, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 73 customers for up to 1,501 minutes resulting in 106,526 CMI.

On September 6, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 416 customers for up to 497 minutes resulting in 145,037 CMI.

In total, the GREENFIELD 71-02 circuit had 51 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (27); equipment failure (9); animal contacts (7); nothing found (3); other (3); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2022, numerous porcelain cutouts were replaced.
- In 2022, several poles were replaced with more to be replaced this year.
- In 2023, one single-phase recloser was installed with two more to be installed this year.
- In 2023, additional animal guarding will be installed.
- In 2023, several porcelain cutouts will be replaced.
- In 2024, a section of this circuit will be recondored or relocated.
- In 2024, three single-phase reclosers will be installed.

09 Circuit 56802 -- BENVENUE 68-02

Performance Analysis

The BENVENUE 68-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 16, 2022, during a period of lightning, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 456 customers for up to 1,101 minutes resulting in 501,805 CMI.

On March 27, 2023, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,528 customers for up to 22 minutes resulting in 31,048 CMI.

On December 3, 2022, an equipment failure occurred on an overhead switch causing an interruption. This outage affected 765 customers for up to 11 minutes resulting in 8,415 CMI.

In total, the BENVENUE 68-02 circuit had 54 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (32); equipment failure (8); animal contacts (6); nothing found (3); other (3); vehicles (2).

Remedial Actions

- In 2022, additional fusing was installed.
- In 2022, a section of single-phase was relocated and reconfigured.
- In 2022, two single-phase reclosers were installed.
- In 2023, a single-phase tie line will be evaluated.
- In 2023, full circuit trimming will be performed.
- In 2023, a recloser will be upgraded for remote operability.
- In 2025, a section of single-phase will be relocated underground.

10 Circuit 10904 -- COOPERSBURG 09-04

Performance Analysis

The COOPERSBURG 09-04 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 27, 2022, a tree contacted a pole or pole arm causing an interruption. This outage affected 1,732 customers for up to 187 minutes resulting in 41,814 CMI.

In total, the COOPERSBURG 09-04 circuit had 135 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (103); equipment failure (12); animal contacts (11); vehicles (5); nothing found (3); other (1).

Remedial Actions

- In 2022, five additional single-phase reclosers were installed.
- In 2022, additional trimming was performed.
- In 2022, a section of difficult-to-access single-phase was relocated.
- In 2022, a single-phase recloser was upgraded.
- In 2022, predictive fault indicators were installed.
- In 2022, a three-phase recloser was replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, an additional single-phase recloser will be evaluated.
- In 2023, additional fusing will be installed.
- In 2023, a section of conductor in a heavily wooded area will be evaluated for reconductoring with covered conductor.
- In 2023, a section of this circuit will be evaluated for reconfiguration.
- In 2025, a new substation will be constructed at a new location.

11 Circuit 24703 -- FREELAND 47-03

Performance Analysis

The FREELAND 47-03 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On December 24, 2022, during a period of extreme temperatures, an equipment failure occurred causing a circuit breaker to trip to lockout. This outage affected 1,618 customers for up to 22 minutes resulting in 34,204 CMI.

On March 3, 2023, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 547 customers for up to 602 minutes resulting in 184,422 CMI.

On August 4, 2022, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 297 customers for up to 367 minutes resulting in 108,987 CMI.

On August 4, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a sectionalizing device to be interrupted. This outage affected 414 customers for up to 627 minutes resulting in 186,858 CMI.

In total, the FREELAND 47-03 circuit had 28 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (13); animal contacts (6); equipment failure (6); nothing found (2); vehicles (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2022, hazard tree removal was performed.
- In 2022, a section of single-phase was extended.
- In 2022, an existing section of line was split into two sections with tie capability.
- In 2022, an existing Smart Grid device was replaced.
- In 2022, an additional single-phase recloser was installed.
- In 2023, a single-phase recloser will be installed.
- In 2023, a large single-phase tap will be transferred to an adjacent circuit.
- In 2023, 12 new fuses will be installed.
- In 2023, the circuit protection settings will be optimized.
- In 2025, a three-phase tie to the ST JOHNS 30-02 will be constructed.

12 Circuit 15001 -- BLUE MOUNTAIN 50-01

Performance Analysis

The BLUE MOUNTAIN 50-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 23, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,391 customers for up to 69 minutes resulting in 27,159 CMI.

On May 17, 2022, an unidentified issue occurred with an overhead switch causing a recloser to trip to lockout. This outage affected 853 customers for up to 26 minutes resulting in 21,836 CMI.

On November 26, 2022, a vehicle contacted a pole. This outage affected 1,092 customers for up to 10 minutes resulting in 10,909 CMI.

In total, the BLUE MOUNTAIN 50-01 circuit had 49 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (27); equipment failure (9); animal contacts (8); nothing found (4); vehicles (1).

Remedial Actions

- In 2022, four additional single-phase reclosers were installed.
- In 2022, additional fusing was installed.
- In 2022, the protection scheme was evaluated. Several protection settings will be revised as a result.
- In 2023, a pole was replaced.
- In 2023, additional fusing will be installed.
- In 2023, additional animal guarding will be installed.
- In 2024, an additional single-phase recloser will be installed.
- In 2024, a section of this circuit will be transferred to an adjacent circuit.
- In 2024, a Proactive Circuit Analysis will be performed.

13 Circuit 22404 -- MORGAN 24-04

Performance Analysis

The MORGAN 24-04 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 1, 2022, during a period of strong wind, a tree contacted a pole or pole arm causing an interruption. This outage affected 502 customers for up to 208 minutes resulting in 64,023 CMI.

On May 25, 2022, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,810 customers for up to 211 minutes resulting in 256,847 CMI.

In total, the MORGAN 24-04 circuit had 23 outages between April 2022 and March 2023, with the causes breaking down as follows: equipment failure (11); tree related (8); animal contacts (4).

Remedial Actions

- In 2022, additional animal guarding was installed.
- In 2023, two single-phase reclosers will be installed.
- In 2023, seven additional locations will receive animal guarding.
- In 2024, full circuit trimming will be performed.

14 Circuit 21203 -- EAST CARBONDALE 12-03

Performance Analysis

The EAST CARBONDALE 12-03 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 14, 2022, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 882 customers for up to 201 minutes resulting in 78,914 CMI.

In total, the EAST CARBONDALE 12-03 circuit had 40 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (19); equipment failure (14); nothing found (5); animal contacts (1); vehicles (1).

Remedial Actions

- In 2023, additional animal guarding will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, additional single-phase reclosers will be installed.
- In 2024, a section of line will be reconductored.
- In 2024, a section of this circuit will be relocated.
- In 2025, full circuit trimming will be performed.

15 Circuit 22406 -- MORGAN 24-06

Performance Analysis

The MORGAN 24-06 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On December 16, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 148 customers for up to 955 minutes resulting in 141,322 CMI.

On December 16, 2022, 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 994 customers for up to 2,086 minutes resulting in 50,459 CMI.

In total, the MORGAN 24-06 circuit had 42 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (22); animal contacts (8); equipment failure (7); nothing found (3); contact or dig in (1); other (1).

Remedial Actions

- In 2022, 127 hazard trees were removed.
- In 2022, additional animal guarding was installed.
- In 2023, additional fusing was installed.
- In 2023 a section of underground cable will be installed.
- In 2023, an additional single-phase recloser will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2024, a new Smart Grid device will be installed.
- In 2024, a section of this line will be extended.

16 Circuit 24401 -- TINKER 44-01

Performance Analysis

The TINKER 44-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 24, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 826 customers for up to 26 minutes resulting in 21,484 CMI.

On May 19, 2022, an unidentified issue occurred with an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,269 customers for up to 344 minutes resulting in 120,309 CMI.

In total, the TINKER 44-01 circuit had 46 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (24); animal contacts (12); equipment failure (6); nothing found (3); other (1).

Remedial Actions

- In 2022, several poles were replaced.
- In 2022, a section of difficult-to-access three-phase was relocated.
- In 2022, a new Smart Grid device was installed.
- In 2022, additional fusing was installed.
- In 2022, additional animal guarding was installed.
- In 2023, an additional single-phase recloser will be installed.
- In 2023, a pole will be replaced.

- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, additional animal guarding will be installed.

17 Circuit 53601 -- DALMATIA 36-01

Performance Analysis

The DALMATIA 36-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 28, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,125 customers for up to 32 minutes resulting in 35,316 CMI.

On October 15, 2022, a vehicle contacted a pole causing a recloser to trip to lockout. This outage affected 322 customers for up to 361 minutes resulting in 116,045 CMI.

In total, the DALMATIA 36-01 circuit had 41 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (14); equipment failure (13); animal contacts (6); vehicles (4); contact or dig in (2); nothing found (2).

Remedial Actions

- In 2023, additional fusing will be installed.
- In 2023, a section of three-phase will be evaluated for reconductoring.
- In 2023, a three-phase device will be upgraded to remote operability.
- In 2025, a three-phase tie will be constructed to the HUNTER circuit.

18 Circuit 46001 -- BERWICK 60-01

Performance Analysis

The BERWICK 60-01 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 4, 2022, during a period of heavy rain, a vehicle contact caused a recloser to trip to lockout. This outage affected 933 customers for up to 33 minutes resulting in 30,789 CMI.

On September 17, 2022, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 575 customers for up to 137 minutes resulting in 78,775 CMI.

On September 9, 2022, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 575 customers for up to 453 minutes resulting in 229,840 CMI.

On April 8, 2022, an equipment failure occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 576 customers for up to 230 minutes resulting in 119,691 CMI.

In total, the BERWICK 60-01 circuit had 46 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (27); equipment failure (12); animal contacts (4); vehicles (2); other (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2022, additional fusing was installed.
- In 2022, several poles and cross-arms were replaced.
- In 2022, an additional single-phase recloser was installed.
- In 2022, a section of difficult-to-access conductor was eliminated, and the downstream customers transferred to an adjacent circuit.
- In 2023, a new three-phase tie will be constructed.
- In 2023, a section of this circuit will be evaluated for reconductoring and relocation.
- In 2024, a new single-phase tie will be constructed.
- In 2025, a new line and terminal will be constructed for this circuit.

19 Circuit 10601 -- BLOOMING GLEN 06-01

Performance Analysis

The BLOOMING GLEN 06-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 21, 2022, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 390 customers for up to 779 minutes resulting in 104,060 CMI.

On August 1, 2022, a vehicle contact caused a recloser to trip to lockout. This outage affected 793 customers for up to 367 minutes resulting in 88,167 CMI.

On September 6, 2022, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 599 customers for up to 242 minutes resulting in 144,730 CMI.

In total, the BLOOMING GLEN 06-01 circuit had 72 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (45); animal contacts (11); equipment failure (10); nothing found (4); vehicles (2).

Remedial Actions

- In 2022, additional fusing was installed at nine locations.
- In 2022, two single-phase reclosers were installed.
- In 2022, hot spot trimming was performed.

- In 2022, a section of inaccessible conductor was re-sourced.
- In 2022, full circuit trimming was performed.
- In 2022, a section of this circuit was re-conducted.
- In 2023, additional animal guarding will be installed.
- In 2023, additional fusing will be installed.
- In 2023, an additional single-phase recloser will be installed.
- In 2023, a section of conductor will be evaluated for relocation.
- In 2023, an additional multi-phase tie line will be evaluated.
- In 2024, a section of this circuit will be relocated.
- In 2024, two additional multi-phase protective devices will be installed.

20 Circuit 17902 -- BARTONSVILLE 79-02

Performance Analysis

The BARTONSVILLE 79-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On November 28, 2022, a tree contacted an overhead conductor. This outage affected 824 customers for up to 126 minutes resulting in 50,760 CMI.

On June 18, 2022, during a period of strong wind, a tree contacted a pole or pole arm causing a load break fuse to operate. This outage affected 822 customers for up to 424 minutes resulting in 28,866 CMI.

In total, the BARTONSVILLE 79-02 circuit had 41 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (22); animal contacts (10); equipment failure (5); nothing found (2); contact or dig in (1); other (1).

Remedial Actions

- In 2022, two single-phase reclosers were installed.
- In 2022, several poles were replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, one section of three-phase will be re-conducted.
- In 2023, a section of conductor will be relocated underground.
- In 2023, full circuit trimming will be performed.
- In 2025, a single-phase tie will be constructed.

21 Circuit 40201 -- BEAR GAP 02-01

Performance Analysis

The BEAR GAP 02-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On December 22, 2022, during a period of heavy rain, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 1,675 customers for up to 161 minutes resulting in 65,742 CMI.

On August 8, 2022, an equipment failure occurred on a pole or pole arm causing an interruption. This outage affected 629 customers for up to 161 minutes resulting in 73,615 CMI.

In total, the BEAR GAP 02-01 circuit had 79 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (43); equipment failure (16); animal contacts (15); nothing found (2); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2022, a section of conductor in a heavily wooded area was undergrounded.
- In 2022, a section of single-phase conductor was relocated.
- In 2022, approximately 150 hazard trees were removed.
- In 2023, a three-phase recloser was replaced.
- In 2023, a section of difficult-to-access conductor will be evaluated for relocation.

22 Circuit 26704 -- HEMLOCK FARMS 67-04

Performance Analysis

The HEMLOCK FARMS 67-04 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 15, 2022, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 570 customers for up to 99 minutes resulting in 24,114 CMI.

In total, the HEMLOCK FARMS 67-04 circuit had 50 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (31); equipment failure (7); animal contacts (6); nothing found (5); other (1).

Remedial Actions

- In 2022, a pole was replaced.
- In 2022, a Smart Grid device was replaced.
- In 2023, full circuit trimming will be performed.
- In 2023, numerous porcelain cutouts will be replaced.

- In 2023, additional animal guarding will be installed.
- In 2023, a section of conductor will be replaced.

23 Circuit 46004 -- BERWICK 60-04

Performance Analysis

The BERWICK 60-04 circuit experienced five outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 10, 2022, a tree contacted an overhead conductor. This outage affected 793 customers for up to 13 minutes resulting in 9,833 CMI.

On December 6, 2022, during a period of heavy rain, an equipment failure occurred on an overhead conductor. This outage affected 795 customers for up to 13 minutes resulting in 10,335 CMI.

On February 10, 2023, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 796 customers for up to 59 minutes resulting in 16,234 CMI.

On September 7, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing an outage. This outage affected 793 customers for up to 25 minutes resulting in 19,825 CMI.

On April 2, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 1,167 customers for up to 218 minutes resulting in 108,382 CMI.

In total, the BERWICK 60-04 circuit had 53 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (33); animal contacts (8); equipment failure (6); nothing found (4); other (1); vehicles (1).

Remedial Actions

- In 2022, additional fusing was installed.
- In 2022, additional single-phase reclosers were installed.
- In 2023, additional fusing will be installed.
- In 2023, an additional single-phase Smart Grid device will be installed.
- In 2024, full circuit trimming will be performed.
- In 2024, three single-phase reclosers will be installed.

24 Circuit 42701 -- AUGUSTAVILLE 27-01

Performance Analysis

The AUGUSTAVILLE 27-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On November 8, 2022, a tree contacted an overhead conductor causing an outage. This outage affected 547 customers for up to 139 minutes resulting in 32,697 CMI.

In total, the AUGUSTAVILLE 27-01 circuit had 66 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (39); animal contacts (13); equipment failure (13); vehicles (1).

Remedial Actions

- In 2022, an additional single-phase recloser was installed.
- In 2022, a section of difficult-to-access conductor was relocated.
- In 2023, a section of conductor will be evaluated for storm hardening.
- In 2023, a Proactive Circuit Analysis was performed with additional fusing opportunities identified.
- In 2023 five locations received fusing with three more fuses to be installed.
- In 2023, additional animal guarding will be installed at seven locations.

25 Circuit 20403 -- ASHFIELD 04-03

Performance Analysis

The ASHFIELD 04-03 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 7, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 153 customers for up to 691 minutes resulting in 104,529 CMI.

On October 27, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 533 customers for up to 177 minutes resulting in 48,475 CMI.

In total, the ASHFIELD 04-03 circuit had 81 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (52); animal contacts (12); equipment failure (6); nothing found (6); vehicles (5).

Remedial Actions

- In 2022, a single-phase recloser was installed.
- In 2022, approximately seven miles of this circuit received tree trimming.
- In 2023, a section of difficult-to-access single-phase will be relocated.
- In 2023, five single-phase reclosers will be installed.
- In 2023, a single-phase tie will be constructed to the ASHFIELD 01 circuit.
- In 2023, a section of conductor will be evaluated for relocation.
- In 2024, two sections of difficult-to-access conductor will be relocated.
- In 2024, full circuit trimming will be performed.

26 Circuit 23902 -- EFFORT MOUNTAIN 39-02

Performance Analysis

The EFFORT MOUNTAIN 39-02 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On December 17, 2022, a vehicle contact caused a recloser to trip to lockout. This outage affected 779 customers for up to 637 minutes resulting in 214,246 CMI.

In total, the EFFORT MOUNTAIN 39-02 circuit had 32 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (20); animal contacts (7); vehicles (3); equipment failure (2).

Remedial Actions

- In 2022, hazard tree removal was performed.
- In 2022, several poles were replaced.
- In 2022, a section of conductor was extended.
- In 2022, a three-phase capacitor bank was replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, several poles will be replaced.
- In 2023, a single-phase recloser will be installed.

27 Circuit 43201 -- MILLVILLE 32-01

Performance Analysis

The MILLVILLE 32-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 18, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 262 customers for up to 510 minutes resulting in 102,081 CMI.

On July 13, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 577 customers for up to 12 minutes resulting in 6,924 CMI.

On August 6, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 490 customers for up to 655 minutes resulting in 113,417 CMI.

In total, the MILLVILLE 32-01 circuit had 50 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (33); animal contacts (8); equipment failure (6); nothing found (2); vehicles (1).

Remedial Actions

- In 2022, a section of difficult-to-access conductor was relocated.
- In 2022, two additional single-phase reclosers were installed.
- In 2023, a section of single-phase will be evaluated for additional sectionalizing.
- In 2023, full circuit trimming will be performed.
- In 2023, a section of single-phase will be transferred to an adjacent circuit.
- In 2024, a section of conductor will be relocated underground.
- In 2024, a section of three-phase conductor will be recondored and storm hardened.

28 Circuit 41701 -- LOGANTON 17-01

Performance Analysis

The LOGANTON 17-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On February 24, 2023, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 984 customers for up to 284 minutes resulting in 58,638 CMI.

On May 7, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 990 customers for up to 164 minutes resulting in 161,617 CMI.

In total, the LOGANTON 17-01 circuit had 63 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (41); animal contacts (10); equipment failure (9); nothing found (2); contact or dig in (1).

Remedial Actions

- In 2022, a new transformer was installed at the substation.
- In 2022, additional animal guarding was installed.
- In 2022, additional fusing was installed.
- In 2023, two existing reclosers will be replaced with Smart Grid devices.
- In 2023, a section of single-phase will be evaluated for relocation to underground.

- In 2024, an additional Smart Grid device will be installed.

29 Circuit 67801 -- WEST LANCASTER 78-01

Performance Analysis

The WEST LANCASTER 78-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 1, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 2,143 customers for up to 271 minutes resulting in 481,975 CMI.

In total, the WEST LANCASTER 78-01 circuit had 26 outages between April 2022 and March 2023, with the causes breaking down as follows: equipment failure (10); tree related (9); animal contacts (3); vehicles (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2022, a new three-phase tie was constructed.
- In 2022, a section of single-phase was recondored.
- In 2022, full circuit trimming was performed.
- In 2022, two additional single-phase reclosers were installed.
- In 2022, two sections of single-phase were relocated.
- In 2022, two sections of single-phase were re-sourced.
- In 2023, three single-phase reclosers will be installed.
- In 2023, additional animal guarding will be installed.
- In 2024, ten additional sectionalizing devices will be installed.
- In 2024, a substation conversion will be performed.
- In 2024, several sections of single-phase will be storm hardened.
- In 2025, a new three-phase sectionalizing device will be installed.

30 Circuit 17802 -- GILBERT 78-02

Performance Analysis

The GILBERT 78-02 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 18, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 621 customers for up to 344 minutes resulting in 213,127 CMI.

In total, the GILBERT 78-02 circuit had 75 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (40); equipment failure (15); animal contacts (12); nothing found (3); vehicles (3); other (2).

Remedial Actions

- In 2022, a single-phase recloser was installed.
- In 2022, full circuit trimming was performed.
- In 2022, hot spot trimming was performed.
- In 2022, several poles were replaced or relocated.
- In 2023, additional animal guarding will be installed.
- In 2023, two sections of difficult-to-access single-phase will be relocated.
- In 2023, three single-phase reclosers will be installed.

31 Circuit 45602 -- WOOLRICH 56-02

Performance Analysis

The WOOLRICH 56-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On February 10, 2023, during a period of strong wind, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 729 customers for up to 124 minutes resulting in 28,708 CMI.

On March 8, 2023, during a period of ice/sleet/snow, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 1,426 customers for up to 1,099 minutes resulting in 125,785 CMI.

On July 10, 2022, an equipment failure occurred on an overhead switch causing an interruption. This outage affected 530 customers for up to 82 minutes resulting in 43,454 CMI.

In total, the WOOLRICH 56-02 circuit had 69 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (42); equipment failure (11); animal contacts (10); nothing found (6).

Remedial Actions

- In 2023, additional animal guarding was installed.
- In 2023, two additional single-phase reclosers will be installed.
- In 2023, a section of difficult-to-access three-phase conductor will be evaluated for undergrounding or tree cable.
- In 2023, full circuit trimming will be performed.

32 Circuit 46702 -- RENOVO 67-02

Performance Analysis

The RENOVO 67-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 13, 2022, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 846 customers for up to 49 minutes resulting in 41,454 CMI.

On March 6, 2023, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 49 customers for up to 2,240 minutes resulting in 104,799 CMI.

In total, the RENOVO 67-02 circuit had 59 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (47); animal contacts (5); equipment failure (4); nothing found (2); vehicles (1).

Remedial Actions

- In 2022, an additional sectionalizing device was installed.
- In 2022, an additional single-phase recloser was installed.
- In 2024, full circuit trimming will be performed.

33 Circuit 27101 -- GREENFIELD 71-01

Performance Analysis

The GREENFIELD 71-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On January 25, 2023, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,100 customers for up to 43 minutes resulting in 12,708 CMI.

On August 4, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,480 customers for up to 228 minutes resulting in 49,208 CMI.

In total, the GREENFIELD 71-01 circuit had 75 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (39); animal contacts (15); equipment failure (14); nothing found (4); vehicles (2); other (1).

Remedial Actions

- In 2023, additional animal guarding will be installed.
- In 2023, numerous porcelain cutouts will be installed.
- In 2023, 13 poles will be replaced.

34 Circuit 29702 -- ANGELS 91-02

Performance Analysis

The ANGELS 91-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 15, 2022, an animal interfered with an overhead switch causing a recloser to trip to lockout. This outage affected 835 customers for up to 85 minutes resulting in 24,288 CMI.

On June 18, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 160 customers for up to 1,040 minutes resulting in 166,292 CMI.

In total, the ANGELS 91-02 circuit had 37 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (24); animal contacts (7); equipment failure (4); vehicles (2).

Remedial Actions

- In 2022, two single-phase reclosers were installed.
- In 2023, additional animal guarding will be installed.
- In 2023, additional single-phase reclosers will be installed.
- In 2023, several poles will be replaced or relocated.

35 Circuit 41602 -- CLEVELAND 16-02

Performance Analysis

The CLEVELAND 16-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 4, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 765 customers for up to 94 minutes resulting in 27,384 CMI.

On March 15, 2023, during a period of strong wind, the circuit was taken out of service at the direction of a non-PPL authority. This outage affected 845 customers for up to 230 minutes resulting in 15,765 CMI.

In total, the CLEVELAND 16-02 circuit had 55 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (35); equipment failure (9); animal contacts (7); nothing found (3); other (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2023, 50 hazard trees were removed.
- In 2023, several cross arms will be replaced.
- In 2023, four poles will be replaced.
- In 2023, a substation rebuild will be evaluated.
- In 2023, an additional Smart Grid device will be evaluated.

36 Circuit 53501 -- ELIZABETHVILLE 35-01

Performance Analysis

The ELIZABETHVILLE 35-01 circuit experienced five outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On December 22, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 563 customers for up to 241 minutes resulting in 135,683 CMI.

On August 28, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 2,171 customers for up to 14 minutes resulting in 28,518 CMI.

On December 22, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 563 customers for up to 129 minutes resulting in 72,627 CMI.

On August 14, 2022, a vehicle contacted a pole causing a recloser to trip to lockout. This outage affected 1,203 customers for up to 14 minutes resulting in 16,842 CMI.

On October 3, 2022, 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 575 customers for up to 164 minutes resulting in 93,937 CMI.

In total, the ELIZABETHVILLE 35-01 circuit had 62 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (33); equipment failure (15); animal contacts (6); vehicles (6); nothing found (2).

Remedial Actions

- In 2022, eight single-phase reclosers were installed.
- In 2023, a single-phase recloser was installed.
- In 2023, fusing will be installed at two locations.
- In 2023, additional three-phase sectionalizing devices will be evaluated.
- In 2023, additional single-phase fusing will be evaluated.

37 Circuit 46206 -- DANVILLE 62-06

Performance Analysis

The DANVILLE 62-06 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On March 4, 2023, during a period of strong wind, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,219 customers for up to 135 minutes resulting in 47,731 CMI.

On October 20, 2022, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 563 customers for up to 100 minutes resulting in 43,871 CMI.

In total, the DANVILLE 62-06 circuit had 32 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (18); equipment failure (7); animal contacts (3); nothing found (2); vehicles (2).

Remedial Actions

- In 2022, a Proactive Circuit Analysis was performed.
- In 2023, full circuit trimming will be performed.

38 Circuit 58402 -- MOUNT ROCK 84-02

Performance Analysis

The MOUNT ROCK 84-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On January 13, 2023, an equipment failure occurred on an overhead transformer causing a circuit breaker to trip to lockout. This outage affected 1,125 customers for up to 208 minutes resulting in 217,943 CMI.

On November 3, 2022, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,565 customers for up to 273 minutes resulting in 75,052 CMI.

In total, the MOUNT ROCK 84-02 circuit had 32 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (15); equipment failure (9); animal contacts (5); other (2); vehicles (1).

Remedial Actions

- In 2023, full circuit trimming will be performed.
- In 2023, a new tie line will be installed.
- In 2023, additional fusing will be installed.
- In 2023, a new tie line will be evaluated.

39 Circuit 21601 -- EYNON 16-01

Performance Analysis

The EYNON 16-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On March 4, 2023, during a period of strong wind, an unidentified issue occurred with a pole or pole arm causing an interruption. This outage affected 328 customers for up to 555 minutes resulting in 148,839 CMI.

In total, the EYNON 16-01 circuit had 41 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (17); animal contacts (11); equipment failure (11); other (1); vehicles (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2023, additional animal guarding will be installed.
- In 2023, additional fusing will be installed.
- In 2023, numerous porcelain cutouts will be replaced.

40 Circuit 26601 -- BROOKSIDE 66-01

Performance Analysis

The BROOKSIDE 66-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 7, 2022, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 564 customers for up to 15 minutes resulting in 8,460 CMI.

On July 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 183 customers for up to 685 minutes resulting in 103,166 CMI.

In total, the BROOKSIDE 66-01 circuit had 46 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (28); animal contacts (7); equipment failure (7); nothing found (2); vehicles (2).

Remedial Actions

- In 2022, a section of difficult-to-access conductor was relocated.
- In 2022, additional animal guarding was installed.
- In 2022, additional fusing was installed.
- In 2023, several cutouts will be installed.
- In 2023, additional fusing will be installed.
- In 2023, several cutouts will be installed.
- In 2024, a section of difficult-to-access conductor was relocated.

41 Circuit 26401 -- INDIAN ORCHARD 64-01

Performance Analysis

The INDIAN ORCHARD 64-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On March 11, 2023, during a period of ice/sleet/snow, an improper operation occurred on an overhead conductor causing a recloser to trip to lockout. This outage affected 1,468 customers for up to 312 minutes resulting in 185,184 CMI.

In total, the INDIAN ORCHARD 64-01 circuit had 85 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (40); animal contacts (21); equipment failure (17); nothing found (5); Improper Design (1); other (1).

Remedial Actions

- In 2024, full circuit trimming will be performed.
- In 2024, a section of difficult-to-access conductor will be relocated.
- In 2025, four single-phase reclosers will be installed.

42 Circuit 52401 -- GREEN PARK 24-01

Performance Analysis

The GREEN PARK 24-01 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On May 6, 2022, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 565 customers for up to 77 minutes resulting in 43,171 CMI.

On July 23, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 565 customers for up to 116 minutes resulting in 65,364 CMI.

On March 27, 2023, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,318 customers for up to 12 minutes resulting in 14,919 CMI.

In total, the GREEN PARK 24-01 circuit had 74 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (51); equipment failure (11); animal contacts (7); nothing found (2); vehicles (2); contact or dig in (1).

Remedial Actions

- In 2022, 5 fuses were installed.
- In 2022, a section of single phase was relocated .
- In 2022, additional sectionalizing devices were installed.
- In 2022, an additional Smart Grid device was installed.
- In 2023, full circuit trimming will be performed.
- In 2023, an additional sectionalizing device will be installed.
- In 2023, a new battery storage installation will be installed.
- In 2025, multiple sections of single phase will be relocated out of the right of way.
- In 2025, a section of single phase will be relocated underground.
- In 2025, an additional sectionalizing device will be installed.

43 Circuit 13601 -- RICHLAND 36-01

Performance Analysis

The RICHLAND 36-01 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On March 3, 2023, during a period of strong wind, a tree contacted an overhead component causing an interruption. This outage affected 105 customers for up to 958 minutes resulting in 100,590 CMI.

On March 3, 2023, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 221 customers for up to 926 minutes resulting in 106,626 CMI.

On November 12, 2022, during a period of strong wind, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 222 customers for up to 817 minutes resulting in 177,011 CMI.

On December 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 164 customers for up to 970 minutes resulting in 130,734 CMI.

In total, the RICHLAND 36-01 circuit had 42 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (31); animal contacts (4); equipment failure (3); vehicles (3); nothing found (1).

Remedial Actions

- In 2022, hazard tree removal was performed.
- In 2022, a pole was replaced.
- In 2022, a single-phase recloser was installed.
- In 2023, several poles will be replaced.
- In 2023, additional fusing will be installed.

44 Circuit 16101 -- BINGEN 61-01

Performance Analysis

The BINGEN 61-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On January 5, 2023, a tree contacted an overhead conductor causing an interruption. This outage affected 428 customers for up to 482 minutes resulting in 206,107 CMI.

In total, the BINGEN 61-01 circuit had 67 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (46); animal contacts (10); equipment failure (7); nothing found (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2023, additional single-phase reclosers will be evaluated.
- In 2023, full circuit trimming will be performed.
- In 2023, additional animal guarding will be installed.
- In 2023, relocating a section of conductor will be evaluated.
- In 2024, a new Smart Grid device will be installed.

45 Circuit 11003 -- EAST GREENVILLE 10-03

Performance Analysis

The EAST GREENVILLE 10-03 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On August 14, 2022, a tree contacted a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 721 customers for up to 403 minutes resulting in 114,511 CMI.

In total, the EAST GREENVILLE 10-03 circuit had 17 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (15); animal contacts (1); equipment failure (1).

Remedial Actions

- In 2022, the transmission line that feeds East Greenville received tree trimming.
- In 2022, a new Smart Grid device was installed.
- In 2023, additional fusing will be installed.
- In 2023, covered conductor will be evaluated for this circuit.
- In 2024, an additional single-phase recloser will be installed.
- In 2024, the transmission line that feeds East Greenville substation will be rebuilt.
- In 2025, full circuit trimming will be performed.

46 Circuit 46203 -- DANVILLE 62-03

Performance Analysis

The DANVILLE 62-03 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On February 1, 2023, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 659 customers for up to 127 minutes resulting in 14,804 CMI.

On November 8, 2022, an unidentified issue occurred with an overhead conductor causing a recloser to trip to lockout. This outage affected 659 customers for up to 9 minutes resulting in 5,779 CMI.

On July 18, 2022, during a period of heavy rain, an equipment failure occurred causing a recloser to trip to lockout. This outage affected 1,033 customers for up to 236 minutes resulting in 87,419 CMI.

In total, the DANVILLE 62-03 circuit had 41 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (21); equipment failure (9); animal contacts (7); nothing found (4).

Remedial Actions

- In 2023, additional fusing was installed with more to be performed.
- In 2023, an additional Smart Grid device was installed.
- In 2023, two cutouts will be replaced.
- In 2023, full circuit trimming will be performed.

47 Circuit 17002 -- RIDGE ROAD 70-02

Performance Analysis

The RIDGE ROAD 70-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 1, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,072 customers for up to 21 minutes resulting in 10,542 CMI.

On March 14, 2023, during a period of strong wind, a tree contacted an overhead splice causing a circuit breaker to trip to lockout. This outage affected 1,078 customers for up to 269 minutes resulting in 37,939 CMI.

In total, the RIDGE ROAD 70-02 circuit had 40 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (25); equipment failure (7); animal contacts (3); nothing found (3); other (1); vehicles (1).

Remedial Actions

- In 2022, a Proactive Circuit Analysis was performed with several minor remediations implemented.
- In 2023, the protection settings on this circuit will be re-evaluated.
- In 2023, a pole will be replaced.
- In 2023, replacing an existing recloser will be evaluated.
- In 2023, additional single-phase reclosers will be evaluated.
- In 2025, full circuit trimming will be performed.

48 Circuit 52402 -- GREEN PARK 24-02

Performance Analysis

The GREEN PARK 24-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 27, 2022, a vehicle contact caused a recloser to trip to lockout. This outage affected 622 customers for up to 122 minutes resulting in 75,884 CMI.

On March 27, 2023, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,703 customers for up to 12 minutes resulting in 19,277 CMI.

On June 9, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a load break fuse to operate. This outage affected 1,158 customers for up to 267 minutes resulting in 113,664 CMI.

In total, the GREEN PARK 24-02 circuit had 55 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (26); animal contacts (14); equipment failure (9); vehicles (4); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2022, full circuit trimming was performed.
- In 2022, two additional single-phase reclosers were installed.
- In 2022, a section of single-phase was relocated.
- In 2022, a section of single-phase was reconductored.
- In 2022, two sections of single-phase were re-sourced.
- In 2023, two single-phase reclosers were installed.
- In 2023, additional animal guarding will be installed.
- In 2023, a new battery storage installation will be installed.
- In 2024, a single-phase recloser will be installed.
- In 2025, ten additional sectionalizing devices will be installed.
- In 2025, a substation conversion will be performed.
- In 2025, several sections of single-phase will be storm hardened.

49 Circuit 64801 -- MOUNT NEBO 48-01

Performance Analysis

The MOUNT NEBO 48-01 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On July 2, 2022, during a period of heavy rain, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,511 customers for up to 448 minutes resulting in 124,942 CMI.

On July 31, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,512 customers for up to 125 minutes resulting in 39,273 CMI.

In total, the MOUNT NEBO 48-01 circuit had 52 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (23); animal contacts (12); equipment failure (8); nothing found (4); vehicles (4); contact or dig in (1).

Remedial Actions

- In 2022, four single-phase reclosers were installed.
- In 2022, a section of three-phase conductor was relocated.
- In 2023, multiple sections of single-phase will be evaluated for reconfiguration.
- In 2023, multiple sections of single-phase will be evaluated for reconductoring.
- In 2023, additional animal guarding will be evaluated.
- In 2025, full circuit trimming will be performed.

50 Circuit 53102 -- WILLIAMSTOWN 31-02

Performance Analysis

The WILLIAMSTOWN 31-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 27, 2022, during a period of heavy rain, a tree contacted a pole or pole arm causing an interruption. This outage affected 3,139 customers for up to 223 minutes resulting in 83,587 CMI.

On July 21, 2022, a tree contacted a pole or pole arm causing a recloser to trip to lockout. This outage affected 537 customers for up to 239 minutes resulting in 96,261 CMI.

On August 28, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 1,246 customers for up to 14 minutes resulting in 17,444 CMI.

In total, the WILLIAMSTOWN 31-02 circuit had 15 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (9); equipment failure (3); animal contacts (2); contact or dig in (1).

Remedial Actions

- In 2022, animal guarding was installed.
- In 2023, full circuit trimming will be performed.
- In 2023, additional fusing will be installed.
- In 2023, additional sectionalizing devices will be installed.
- In 2023, additional animal guarding will be installed.

51 Circuit 24502 -- GOULDSBORO 45-02

Performance Analysis

The GOULDSBORO 45-02 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 15, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 565 customers for up to 281 minutes resulting in 158,635 CMI.

In total, the GOULDSBORO 45-02 circuit had 30 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (22); equipment failure (5); animal contacts (2); vehicles (1).

Remedial Actions

- In 2022, additional animal guarding was installed.
- In 2022, three poles were replaced.
- In 2022, a single-phase recloser was installed.
- In 2023, numerous porcelain cutouts will be replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, a section of this circuit will be reconductored.
- In 2024, full circuit trimming will be performed.

52 Circuit 65702 -- ROSEVILLE 57-02

Performance Analysis

The ROSEVILLE 57-02 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On October 1, 2022, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 1,102 customers for up to 550 minutes resulting in 382,529 CMI.

In total, the ROSEVILLE 57-02 circuit had 25 outages between April 2022 and March 2023, with the causes breaking down as follows: equipment failure (9); tree related (9); animal contacts (5); nothing found (1); vehicles (1).

Remedial Actions

- In 2022, a three-phase sectionalizing device was installed.
- In 2023, a section of single-phase was resourced.
- In 2023, three fuses will be installed.
- In 2023, animal guarding in rear-lot areas will be evaluated.
- In 2023, drone data will be analyzed for failure patterns.
- In 2023, a single-phase recloser will be installed.
- In 2024, full circuit trimming will be performed.
- In 2024, a three-phase recloser will be installed.

53 Circuit 20401 -- ASHFIELD 04-01

Performance Analysis

The ASHFIELD 04-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On January 25, 2023, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 1,252 customers for up to 550 minutes resulting in 366,783 CMI.

In total, the ASHFIELD 04-01 circuit had 53 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (21); equipment failure (16); animal contacts (7); nothing found (7); vehicles (2).

Remedial Actions

- In 2022, a three-phase tie was constructed.
- In 2023, remotely operable tie devices were commissioned.
- In 2023, additional Smart Grid devices will be evaluated.
- In 2023, additional fusing will be evaluated.
- In 2025, a single-phase tie to the ASHFIELD 04-03 circuit will be constructed.

54 Circuit 14302 -- SUMNER 43-02

Performance Analysis

The SUMNER 43-02 circuit experienced two outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On November 7, 2022, an animal interfered with a substation component causing a circuit breaker to trip to lockout. This outage affected 1,237 customers for up to 29 minutes resulting in 35,378 CMI.

On April 2, 2022, a vehicle contacted a pole causing an interruption. This outage affected 1,233 customers for up to 796 minutes resulting in 245,958 CMI.

In total, the SUMNER 43-02 circuit had 7 outages between April 2022 and March 2023, with the causes breaking down as follows: animal contacts (3); equipment failure (2); other (1); vehicles (1).

Remedial Actions

- In 2023, a substation transformer was replaced.
- In 2023, an infrared inspection will be performed.
- In 2023, full circuit trimming will be performed.
- In 2023, the load on a section of this circuit will be split.
- In 2024, devices on the transmission line that serves the substation will be converted to remotely operable, switchable devices.
- In 2024, the substation animal guarding will be upgraded.
- In 2025, a transrupter at the substation will be replaced.

55 Circuit 13606 -- RICHLAND 36-06

Performance Analysis

The RICHLAND 36-06 circuit experienced no outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

In total, the RICHLAND 36-06 circuit had 34 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (25); equipment failure (4); nothing found (2); vehicles (2); animal contacts (1).

Remedial Actions

- In 2022, additional single-phase reclosers were installed.
- In 2023, additional animal guarding will be installed.
- In 2023, additional fusing will be installed.
- In 2023, additional single-phase reclosers will be evaluated.
- In 2024, full circuit trimming will be performed.

56 Circuit 56504 -- ROCKVILLE 65-04

Performance Analysis

The ROCKVILLE 65-04 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 16, 2022, during a period of strong wind, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 231 customers for up to 541 minutes resulting in 124,927 CMI.

In total, the ROCKVILLE 65-04 circuit had 83 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (53); animal contacts (14); equipment failure (12); other (2); contact or dig in (1); vehicles (1).

Remedial Actions

- In 2022, additional fusing was installed.
- In 2022, one single-phase recloser was installed.
- In 2022, a section of single-phase was relocated underground.
- In 2023, full circuit trimming was performed.
- In 2023, two single-phase reclosers will be installed and protection settings will be optimized.
- In 2024, a single-phase recloser will be installed.

57 Circuit 42802 -- SELINGROVE 28-02

Performance Analysis

The SELINGROVE 28-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On May 31, 2022, a vehicle contact caused a circuit breaker to trip to lockout. This outage affected 1,196 customers for up to 14 minutes resulting in 7,912 CMI.

On September 20, 2022, an animal interfered with an underground component causing a circuit breaker to trip to lockout. This outage affected 1,196 customers for up to 39 minutes resulting in 35,014 CMI.

On April 7, 2022, during a period of heavy rain, an animal interfered with a substation component causing a circuit breaker to trip to lockout. This outage affected 1,199 customers for up to 11 minutes resulting in 13,057 CMI.

In total, the SELINGROVE 28-02 circuit had 17 outages between April 2022 and March 2023, with the causes breaking down as follows: equipment failure (7); animal contacts (4); vehicles (3); nothing found (2); other (1).

Remedial Actions

- In 2023, six fuses will be resized to improve protection coordination.
- In 2023, an existing switch will be replaced with a Smart Grid device.
- In 2024, full circuit trimming will be performed.

58 Circuit 22703 -- MINOOKA 27-03

Performance Analysis

The MINOOKA 27-03 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On September 2, 2022, a vehicle contacted a pole causing a circuit breaker to trip to lockout. This outage affected 1,667 customers for up to 503 minutes resulting in 338,886 CMI.

In total, the MINOOKA 27-03 circuit had 15 outages between April 2022 and March 2023, with the causes breaking down as follows: equipment failure (6); tree related (6); vehicles (2); animal contacts (1).

Remedial Actions

- In 2022, additional animal guarding was installed.
- In 2022, a targeted line patrol was performed with several minor remediations performed.
- In 2023, additional animal guarding will be installed.
- In 2023, switching improvements will be evaluated.

59 Circuit 45402 -- WEST BLOOMSBURG 54-02

Performance Analysis

The WEST BLOOMSBURG 54-02 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On April 24, 2022, during a period of strong wind, a tree contacted an overhead conductor causing an interruption. This outage affected 287 customers for up to 469 minutes resulting in 134,468 CMI.

In total, the WEST BLOOMSBURG 54-02 circuit had 84 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (62); equipment failure (11); animal contacts (7); nothing found (2); other (1); vehicles (1).

Remedial Actions

- In 2022, six single-phase reclosers were installed.
- In 2022, full circuit trimming was performed.
- In 2023, additional sectionalizing will be evaluated.
- In 2023, a single-phase tie will be evaluated.
- In 2023, additional animal guarding will be installed.
- In 2023, additional fusing will be installed.
- In 2023, a section of difficult-to-access conductor will be relocated underground.
- In 2023, an additional single-phase recloser will be installed.
- In 2024, additional reconductoring and storm hardening will be performed.

60 Circuit 55001 -- NEWPORT 50-01

Performance Analysis

The NEWPORT 50-01 circuit experienced one outage of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On June 25, 2022, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 673 customers for up to 336 minutes resulting in 49,637 CMI.

In total, the NEWPORT 50-01 circuit had 52 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (29); equipment failure (13); animal contacts (9); other (1).

Remedial Actions

- In 2022, a 2.1-mile section of three-phase conductor in a heavily wooded area was relocated.
- In 2022, three fuses were installed.
- In 2022, a section of single-phase was reconductored.
- In 2022, 75 hazard trees were removed.
- In 2023, a single-phase tie will be evaluated.
- In 2023, a section of single-phase will be resourced.
- In 2025, an additional three-phase sectionalizing device will be installed.
- In 2025, a section of single-phase will be reconductored.

61 Circuit 56803 -- BENVENUE 68-03

Performance Analysis

The BENVENUE 68-03 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On March 27, 2023, a tree contacted an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,284 customers for up to 19 minutes resulting in 23,522 CMI.

On August 31, 2022, an equipment failure occurred on an overhead conductor causing a circuit breaker to trip to lockout. This outage affected 772 customers for up to 76 minutes resulting in 58,548 CMI.

On January 25, 2023, during a period of ice/sleet/snow, an equipment failure occurred on a pole or pole arm causing a load break fuse to operate. This outage affected 662 customers for up to 134 minutes resulting in 6,208 CMI.

In total, the BENVENUE 68-03 circuit had 35 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (14); equipment failure (12); animal contacts (6); nothing found (1); other (1); vehicles (1).

Remedial Actions

- In 2022, five additional single-phase sectionalizing devices were installed.
- In 2023, a section of single-phase conductor will be evaluated for relocation.
- In 2025, a new substation will be constructed reducing the exposure for some BENVENUE 68-03 customers.
- In 2025, a three-phase Smart Grid device will be installed.

62 Circuit 54202 -- PENNSBORO 42-02

Performance Analysis

The PENNSBORO 42-02 circuit experienced four outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On April 8, 2022, an equipment failure occurred on a substation component causing a circuit breaker to trip to lockout. This outage affected 986 customers for up to 85 minutes resulting in 83,455 CMI.

On May 26, 2022, an equipment failure occurred on an overhead splice causing an interruption. This outage affected 625 customers for up to 121 minutes resulting in 18,911 CMI.

On June 1, 2022, during a period of heavy rain, an unidentified issue occurred with a pole or pole arm causing a recloser to trip to lockout. This outage affected 505 customers for up to 762 minutes resulting in 127,086 CMI.

On November 15, 2022, during a period of ice/sleet/snow, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 706 customers for up to 186 minutes resulting in 80,886 CMI.

In total, the PENNSBORO 42-02 circuit had 19 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (10); animal contacts (4); equipment failure (4); other (1).

Remedial Actions

- In 2022, settings on a three-phase device were optimized for coordination.
- In 2023, additional fusing will be installed.
- In 2023, the coordination settings on this circuit will be reviewed.
- In 2024, full circuit trimming will be performed.
- In 2025, a three-phase sectionalizing device will be installed.

63 Circuit 46602 -- LARRYS CREEK 66-02

Performance Analysis

The LARRYS CREEK 66-02 circuit experienced three outages of over 100,000 CMI or 500 CI between April 2022 and March 2023.

On September 21, 2022, an equipment failure occurred on an overhead splice causing a recloser to trip to lockout. This outage affected 836 customers for up to 43 minutes resulting in 35,948 CMI.

On November 18, 2022, a tree contacted an overhead conductor causing a recloser to trip to lockout. This outage affected 659 customers for up to 29 minutes resulting in 18,629 CMI.

On July 22, 2022, during a period of heavy rain, an equipment failure occurred on an overhead conductor causing an interruption. This outage affected 839 customers for up to 186 minutes resulting in 61,216 CMI.

In total, the LARRYS CREEK 66-02 circuit had 65 outages between April 2022 and March 2023, with the causes breaking down as follows: tree related (39); equipment failure (12); animal contacts (6); nothing found (5); other (2); vehicles (1).

Remedial Actions

- In 2022, two additional single-phase reclosers were installed.
- In 2023, several porcelain cutouts will be replaced.
- In 2023, additional animal guarding will be installed.
- In 2023, an additional single-phase recloser will be installed.
- In 2023, additional fusing will be installed.
- 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	4,082	18.2%	79,754	6.9%	5,410,445	3.0%
Contact / Dig-In	166	0.7%	12,445	1.1%	1,123,993	0.6%
Directed by Non-PPL Authority	72	0.3%	8,554	0.7%	483,299	0.3%
Equipment Failures	5,169	23.1%	265,336	23.0%	28,214,063	15.5%
Improper Design	2	0.0%	1,633	0.1%	189,644	0.1%
Improper Installation	3	0.0%	538	0.0%	44,901	0.0%
Improper Operation	2	0.0%	859	0.1%	48,189	0.0%
Nothing Found	902	4.0%	50,013	4.3%	4,845,364	2.7%
Other Controllable	56	0.2%	9,818	0.9%	624,695	0.3%
Other Non-Control	175	0.8%	28,775	2.5%	1,781,237	1.0%
Other Public	20	0.1%	1,600	0.1%	142,285	0.1%
Tree Related	10,970	49.0%	580,026	50.3%	126,003,392	69.3%
Unknown	-	0.0%	-	0.0%	-	0.0%
Vehicles	791	3.5%	113,021	9.8%	13,029,142	7.2%
Total	22,410	100.0%	1,152,372	100.0%	181,940,647	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 48% of cases, 54% of customer interruptions, and 72% of CMI.

Tree Related: Vegetation is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. For the current reporting period, approximately 77% of the cases of trouble, 79% of the customer interruptions and 88% of the customer minutes attributed to tree related outages were weather-related.

Animals: Animals accounted for approximately 18% 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 74% 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 34% of the cases of trouble, 39% of the customer interruptions and 48% 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	1st Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Transmission					
Transmission C-tag poles (# of poles)	88	1	1	1	1
Transmission arm replacements (# of arms)	18	1	1	1	1
Transmission air break switch inspections (# of switches)	0	0	0	0	0
Transmission surge arrester installations (# of sets)	72	0	0	0	0
Transmission structure inspections (# of activities)	14,524	3,586	3,586	3,586	3,586
Transmission tree side trim-Bulk Power (linear feet)	N/A				
Transmission herbicide-Bulk Power (# of acres)	N/A				
Transmission reclearing (# of miles) BES Only	901	351	289	351	289
Transmission reclearing (# of miles) 69 kV	1,651	125	101	125	101
Transmission reclearing (# of miles) 138 kV	57	57	44	57	44
Transmission danger tree removals-Bulk Power (# of trees)	N/A				
Substation					
Substation batteries (# of activities)	457	25	24	25	24
Circuit breakers (# of activities)	223	0	0	0	0
Substation inspections (# of activities)	1,460	365	350	365	350
Transformer maintenance (# of activities)	786	0	0	0	0

Inspection & Maintenance Goals/Objectives	Annual Budget	1st Quarter		Year-to-date	
		Budget	Actual	Budget	Actual
Distribution					
Distribution C-tag poles replaced (# of poles)	1,800	497	497	497	497
C-truss distribution poles (# of poles)	2,400	0	0	0	0
Capacitor (MVAR added)	N/A				
OCR Replacements (# of)	33	0	0	0	0
Distribution pole inspections (# of poles)	80,000	10,000	8,500	10,000	8,500
Distribution line inspections (miles)	400	0	0	0	0
Group re-lamping (# of lamps)	0	0	0	0	0
Test sections of underground distribution cable	N/A	48	48	48	48
Distribution tree trimming (# of miles)	5,261	1,199	1,018	1,199	1,018
Distribution herbicide (# of acres)	N/A	0	0	0	0
Distribution >18" removals within R/W (# of trees)	N/A	199	199	199	199
Distribution hazard tree removals outside R/W (# of trees)	N/A	4,718	4,718	4,718	4,718
LTN manhole inspections (# of)	0	0	0	0	0
LTN vault inspections (# of)	70	0	0	0	0
LTN network protector overhauls (# of)	48	0	0	0	0
LTN reverse power trip testing (# of)	33	0	0	0	0

- 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	1st Quarter			Year-to-date	
	Annual Budget (000s)	Budget (\$000)	Actual (\$000)	Budget (\$000)	Actual (\$000)
Provide Electric Service	4,867	1,142	1,945	1,142	1,945
Vegetation Management	32,144	7,348	9,326	7,348	9,326
Customer Response	55,137	12,285	22,533	12,285	22,533
Reliability Maintenance	16,632	7,509	6,684	7,509	6,684
System Upgrade	2,144	513	44	513	44
Customer Service/Accounts	100,417	25,174	43,285	25,174	43,285
Others	64,476	16,960	15,520	16,960	15,520
Total O&M Expenses	275,818	70,929	99,337	70,929	99,337

- 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	1st Quarter			Year-to-date	
	Annual Budget (000s)	Budget (\$000)	Actual (\$000)	Budget (\$000)	Actual (\$000)
New Service/Revenue	81,753	20,591	38,390	20,591	38,390
System Upgrade	255,756	53,329	54,082	53,329	54,082
Reliability & Maintenance	365,545	99,740	90,261	99,740	90,261
Customer Response	44,107	9,356	19,623	9,356	19,623
Other	22,024	4,554	5,280	4,554	5,280
Total	769,185	187,570	207,637	187,570	207,637

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

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

Transmission and Distribution	
Lineman Leader	67
Journeyman Lineman	146
Journeyman Lineman-Trainee	88
Helper	25
Groundhand	1
Troubleman	47
T&D Total	374
Electrical	
Elect Leaders-UG	1
Elect Leaders-Net	9
Elect Leaders-Sub	20
Journeyman Elect-UG	6
Journeyman Elect-Net	26
Journeyman Elect-Sub	37
Electrical Total	99
Overall Total	473

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.

PPL Electric Utilities Corporation

Job Descriptions

Transmission and Distribution

Groundhand	<ul style="list-style-type: none">• Performs manual labor and assists employees in higher job classifications.
Helper	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Performs manual labor and assists employees in higher job classifications.
Journeyman Electrician - Substation - Network - Underground	<ul style="list-style-type: none">• 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

<p>Journeyman Electrician - Trainee</p> <ul style="list-style-type: none">- Substation- Network- Underground	<ul style="list-style-type: none">• 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.
--	--