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April 28, 2023

VIA E-FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: Joint 1st Quarter 2023 Reliability Report – Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company – Public Version; Docket No. M-2016-2522508

Dear Secretary Chiavetta:

Pursuant to 52 Pa. Code § 57.195(d) and (e), enclosed for filing on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company (collectively, the "Companies") are the Joint 1st Quarter 2023 Reliability Report – Public Version ("Joint Report"). Additionally, the Companies have enclosed redline and clean versions of their modified Inspection and Maintenance Plans ("I&M") as an addendum to its quarterly reliability report in accordance with § 57.193(c) and § 57.195. The revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program that would serve as a life extension mechanism for existing poles. The plan is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles.

On December 22, 2004, the Companies filed an Application for Protective Order at Docket No. L-00030161. The Application was granted, allowing the Companies to file proprietary versions of the quarterly reliability reports. The Proprietary Version of this Joint Report is being filed under separate cover.

Please feel free to contact me if you have any questions or need additional information regarding this matter.

Sincerely,

Darsh Singh

Enclosures
c: As Per Certificate of Service
D. Searfoorce - Bureau of Technical Utility Services (via electronic email)
J. Van Zant – Bureau of Technical Utility Services (via electronic email)
Derek Ruhl - PaPUC Bureau of Technical Utility Services (via electronic mail)
Harry Bidelspach – PaPUC Bureau of Technical Utility Services (via electronic mail)

PUBLIC VERSION

Met-Ed A FirstEnergy Company | Penelec A FirstEnergy Company | PennPower A FirstEnergy Company | WestPenn Power A FirstEnergy Company

Joint 2023 1st Quarter Reliability Report

Metropolitan Edison Company,
Pennsylvania Electric Company,
Pennsylvania Power Company, and
West Penn Power Company

Pursuant to 52 Pa. Code § 57.195(d) and (e)

Joint 1st Quarter 2023 Reliability Report – Metropolitan Edison Company ("Met-Ed"), Pennsylvania Electric Company ("Penelec"), Pennsylvania Power Company ("Penn Power"), and West Penn Power Company ("West Penn")

Section 57.195(e)(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

None of the Companies experienced a major event during the reporting period ending March 31, 2023

Section 57.195(e)(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.*

Reliability Index Values

1Q 2023 (12-Mo Rolling)	Met-Ed			Penelec			Penn Power			West Penn		
	Benchmark	12-Month Standard	12-Month Actual	Benchmark	12-Month Standard	12-Month Actual	Benchmark	12-Month Standard	12-Month Actual	Benchmark	12-Month Standard	12-Month Actual
SAIFI	1.15	1.38	1.14	1.26	1.52	1.85	1.12	1.34	1.36	1.05	1.26	1.37
CAIDI	117	140	140.09	117	141	229.99	101	121	310.75	170	204	282.46
SAIDI	135	194	160.17	148	213	424.84	113	162	422.42	179	257	386.49
MAIFI[1]			0.270			0.667			0.013			
Customers Served[2]	576,462			579,336			167,612			726,049		
Number of Sustained Interruptions	12,407			19,259			4,277			16,281		
Customers Affected	659,077			1,070,223			227,840			993,437		
Customer Minutes	92,331,686			246,137,685			70,802,367			280,608,950		
Number of Customer Momentary Interruptions	155,764			386,796			2,224					

[1] MAIFI values are not available for West Penn.

[2] Represents the average number of customers served during the reporting period.

Unique Events Occurring in 1Q 2023:

Penelec

- Beginning Friday, March 3, 2023, Winter Storm Quest, producing a wintry mix of snow and ice along with high wind gusts, moved from west to east across Pennsylvania including the Penelec service territory. Wind gusts up to 60 miles per hour were experienced in the Penelec service territory on March 3 & 4, 2023. The reliability impact of the storm was 35.1 minutes of SAIDI, 0.09 of SAIFI, and an overall storm CAIDI of 407.0 minutes.

- Beginning Monday, March 6, 2023, a winter weather system moved through the northern part of the Penelec service territory resulting in more than 10 inches of heavy wet snow in some areas. This caused downed trees and wires, broken poles, and damaged equipment. The reliability impact of the storm was 6.8 minutes of SAIDI, 0.02 of SAIFI, and an overall storm CAIDI of 419.88 minutes.

- Beginning Saturday morning, March 25, 2023, a weather system moved through Penelec producing high winds. On March 25, wind gusts up to 58 miles per hour were experienced in the northern Penelec service territories and exceeded 80 miles per hour in areas of southwestern Penelec. Wind gusts above 30 mile per hour continued in the southwestern districts on Sunday March 26. The reliability impact of the storm was 55.2 minutes of SAIDI, 0.09 of SAIFI, and an overall storm CAIDI of 610.35 minutes.

Penn Power

- Beginning Saturday, March 25, 2023, a storm producing rain and strong winds moved through Pennsylvania including the Penn Power service territory. Wind gusts up to 58 miles per hour were recorded in the Penn Power service territory and portions of the service territory received up to 1.5 inches of rain. The reliability impact of the storm was 295.9 minutes of SAIDI, 0.35 of SAIFI, and an overall storm CAIDI of 814.46 minutes.

West Penn

- Beginning Friday, March 3, 2023, Winter Storm Quest, producing a wintry mix of snow and ice along with high wind gusts, moved from west to east across Pennsylvania including the West Penn service territory. The storm produced a wintry mix of snow and ice along with wind gusts of up to 60 miles per hour on March 3 and 4, 2023. Wind continued to affect the West Penn Service territory during the restoration period with gusts in excess of 40 miles per hour on March 6 and March 7, 2023. The reliability impact of the storm was 79.2 minutes of SAIDI, 0.07 of SAIFI, and an overall storm CAIDI of 1,089.48 minutes.

- Beginning the morning of Saturday, March 25, 2023, a severe windstorm moved from west to east across Pennsylvania, including the West Penn service territory. The windstorm produced rain and wind gusts of over 60 miles per hour on March 25, 2023. Wind continued to affect the West Penn service territory during the restoration period with gusts in excess of 40 miles per hour on March

26, 2023. The reliability impact of the storm was 41.0 minutes of SAIDI, 0.08 of SAIFI, and an overall storm CAIDI of 487.03 minutes.

Section 57.195(e)(3): Rolling 12-month reliability index values (SAIFI, CAIDI, SAIDI, 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.

Worst Performing Circuits – Reliability Indices

The methodology used to identify worst performing circuits is based on both SAIFI and SAIDI. The methodology consists of the following steps:

1. For each circuit, calculate a circuit SAIFI using only distribution-caused outages.
2. Select the worst 20% of circuits based on the highest circuit SAIFI.
3. Rank the selected circuits based on SAIDI using only distribution-caused customer minutes.
4. Select 5% of the circuits based on the highest customer minutes. These circuits are then identified as the worst performing circuits.

Met-Ed, Penelec, Penn Power, and West Penn's rankings of the 5% Worst Performing Circuits are provided in Attachment A to this report.

Section 57.195(e)(4): Specific remedial efforts taken and planned for the worst performing 5% of the circuits identified in paragraph (3).

Worst Performing Circuits – Remedial Actions

Met-Ed, Penelec, Penn Power, and West Penn's Remedial Actions for Worst Performing Circuits are provided in Attachment B to this report.

Section 57.195(e)(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.

Outages by Cause – Met-Ed

Outage by Cause				
1st Quarter 2023 12-Month Rolling	Met-Ed			
Cause	**Customer Minutes**	**Number of Sustained Interruptions**	**Customers Affected**	**% Based on Customer Minutes**
Trees off ROW - tree	36,036,639	2,723	150,350	39.03%
Equipment Failure	16,533,313	2,455	145,151	17.91%
Vehicle	7,103,480	392	49,420	7.69%
Unknown	6,142,161	1,370	76,865	6.65%
Trees Off Row-Limb	6,127,954	860	34,111	6.64%
Forced Outage	5,328,689	548	75,768	5.77%
Line Failure	4,039,645	665	21,061	4.38%
Animal	2,938,175	1,662	30,147	3.18%
Human Error - Company	1,987,151	68	34,479	2.15%
Trees On Row	1,209,735	155	4,855	1.31%
Lightning	1,033,000	150	6,681	1.12%
Bird	1,000,106	571	11,801	1.08%
Trees - Sec/Service	773,136	465	2,094	0.84%
Wind	614,337	48	2,921	0.67%
Human Error -Non-Company	480,711	62	4,386	0.52%
Object Contact With Line	395,638	54	4,177	0.43%
Overload	311,344	70	2,727	0.34%
Ice	117,398	12	679	0.13%
Trees off ROW-Limb	43,223	6	209	0.05%
Trees off ROW-Tree	34,794	3	902	0.04%
Ug Dig-Up	33,826	26	146	0.04%
Other Electric Utility	28,186	11	69	0.03%
Customer Equipment	11,936	22	57	0.01%
Vandalism	5,487	5	8	0.01%
Contamination	903	1	7	0.00%
Fire	719	3	6	0.00%
Total	**92,331,686**	**12,407**	**659,077**	**100%**

Proposed Solutions – Met-Ed

Met-Ed analyzes its outage data to develop solutions for improving reliability. The following paragraphs identify the top outage causes for the rolling twelve-month period ending March 31, 2023, and associated actions designed to address these outage causes.

To address outages caused by trees, Met-Ed performs cycle-based tree trimming and enhanced tree trimming in select locations. Enhanced tree trimming removes healthy limbs overhanging primary conductors. Met-Ed's options under the law are strictly limited when it comes to all forms of off-right-of-way ("ROW") tree management. However, Met-Ed is legally permitted to identify priority off-ROW trees that are dead, dying, diseased, leaning, and significantly encroaching the corridor and remove those trees when customer consent is obtained or easement rights permit. Met-Ed is very active in pursuing this option, where available. Trees identified as a potential cause of a future outage are removed to prevent an interruption of electrical service to Met-Ed's customers. Met-Ed continues its program to mitigate trees subject to damage from the Emerald Ash Borer.

To reduce the likelihood of equipment failure outages, Met-Ed follows inspection and maintenance ("I&M") programs[3] that set forth schedules for regular inspections of distribution and substation facilities. These programs are geared towards specific components such as capacitors, poles, circuits, transformers, radio-controlled switches, substations, and reclosers. Equipment identified is repaired or replaced as appropriate.

Met-Ed reviews vehicle caused outages to determine if it is a repeat location warranting remedial action, which could include modifying attachment height for communications, installing a taller pole, relocating the pole, or installing sectionalizing equipment to minimize customer impact.

[3] Pursuant to 52 Pa. Code § 57.198, every two years an electric distribution company shall file, and receive approval from the Commission of, a biennial plan for the periodic inspection, maintenance, repair, and replacement of its facilities. The Companies submitted their Biennial Inspection, Maintenance, Repair and Replacement Plan for the period January 1, 2021 through December 31, 2022 on October 1, 2019, which was deemed approved pursuant to 52 Pa. Code § 57.198(i).

Outages by Cause – Penelec

Outage by Cause				
1st Quarter 2023 12-Month Rolling	Penelec			
Cause	Customer Minutes	Number of Sustained Interruptions	Customers Affected	% Based on Customer Minutes
Trees off ROW - tree	88,244,928	3,741	270,289	35.85%
Ice	40,411,402	496	48,396	16.42%
Equipment Failure	33,531,765	3,370	252,588	13.62%
Wind	18,587,434	260	30,083	7.55%
Unknown	12,217,395	2,506	121,638	4.96%
Line Failure	11,408,886	1,919	76,902	4.64%
Trees Off Row-Limb	8,958,063	613	35,144	3.64%
Forced Outage	8,726,987	1,383	86,110	3.55%
Lightning	8,179,119	607	32,278	3.32%
Vehicle	6,991,776	544	42,935	2.84%
Animal	3,114,466	1,782	29,755	1.27%
Trees - Sec/Service	1,258,483	937	2,849	0.51%
Trees On Row	842,081	95	2,094	0.34%
Bird	759,010	544	12,560	0.31%
Other Electric Utility	708,009	93	2,954	0.29%
Overload	454,024	31	4,005	0.18%
Human Error -Non-Company	453,096	88	5,769	0.18%
Object Contact With Line	377,237	44	1,964	0.15%
Human Error - Company	307,536	46	6,509	0.12%
Vandalism	184,884	28	3,346	0.08%
Ug Dig-Up	144,032	64	550	0.06%
Switching Error	141,892	5	742	0.06%
Fire	65,887	13	203	0.03%
Other Utility-Non Elec	46,863	1	381	0.02%
Contamination	11,441	31	106	0.00%
Previous Lightning	6,208	8	38	0.00%
Customer Equipment	4,781	10	35	0.00%
Total	**246,137,685**	**19,259**	**1,070,223**	**100%**

Proposed Solutions – Penelec

Penelec analyzes its outage data to develop solutions for improving reliability. The following paragraphs identify the top outage causes for the rolling twelve-month period ending March 31, 2023 and the associated actions designed to address these outage causes.

To reduce outages caused by trees, Penelec performs cycle-based tree trimming which removes selected incompatible trees within the clearing zone corridor, removes certain defective limbs that are overhanging primary conductors, controls selected incompatible brush, and removes off-ROW priority trees. Penelec's options under the law are strictly limited when it comes to all forms of off-ROW tree management. However, Penelec is legally permitted to identify priority off-ROW trees that are dead, dying, diseased, leaning, and significantly encroaching the corridor and remove those trees when customer consent is obtained or easement rights permit. Penelec is very active in pursuing this option, where available. Trees identified as a potential cause of a future outage are removed to prevent an interruption of electrical service to Penelec's customers. In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way was completed in 2019. Beyond 2019, any additional ash trees are addressed under Penelec's hazardous tree maintenance process.

To reduce the likelihood of outages caused by equipment and line failure, Penelec follows I&M programs that set forth schedules for regular inspections of distribution and substation facilities. These programs are geared towards specific components such as capacitors, poles, circuits, transformers, radio-controlled switches, substations, and reclosers. Equipment identified is repaired or replaced as appropriate.

Outages by Cause – Penn Power

Outage by Cause				
1st Quarter 2023 12-Month Rolling	Penn Power			
Cause	**Customer Minutes**	**Number of Sustained Interruptions**	**Customers Affected**	**% Based on Customer Minutes**
Trees off ROW - tree	40,501,400	1,258	66,680	57.20%
Unknown	5,984,837	215	29,281	8.45%
Equipment Failure	4,823,397	438	28,702	6.81%
Line Failure	4,632,660	412	26,951	6.54%
Wind	4,044,197	49	9,752	5.71%
Trees Off Row-Limb	3,668,075	316	17,566	5.18%
Animal	2,065,352	487	16,351	2.92%
Vehicle	1,494,950	124	10,820	2.11%
Trees On Row	1,241,718	12	733	1.75%
Lightning	726,306	231	5,873	1.03%
Trees - Sec/Service	585,546	212	542	0.83%
Bird	447,282	366	5,414	0.63%
Forced Outage	370,261	78	6,914	0.52%
Overload	78,417	19	993	0.11%
Human Error -Non-Company	30,126	18	143	0.04%
Human Error - Company	29,756	3	665	0.04%
Ug Dig-Up	18,199	14	158	0.03%
Other Electric Utility	15,470	1	70	0.02%
Other Utility-Non Elec	12,772	3	14	0.02%
Customer Equipment	11,330	7	135	0.02%
Call Error	9,015	2	14	0.01%
Ice	6,783	2	21	0.01%
Previous Lightning	2,146	5	37	0.00%
Object Contact With Line	1,180	2	6	0.00%
Fire	1,038	1	3	0.00%
Vandalism	154	2	2	0.00%
Total	**70,802,367**	**4,277**	**227,840**	**100%**

Proposed Solutions – Penn Power

Penn Power analyzes its outage data to develop solutions for improving reliability. The following paragraphs identify the top outage causes for the rolling twelve-month period ending March 31, 2023 and the associated actions designed to address these outage causes.

To address outages caused by trees, Penn Power performs tree trimming which removes selected incompatible trees within the clearing zone corridor, removes certain defective limbs that are overhanging primary conductors, controls selected incompatible brush, and removes off-ROW priority trees. Penn Power's options under the law are strictly limited when it comes to all forms of off-ROW tree management. However, Penn Power is legally permitted to identify priority off-ROW trees that are dead, dying, diseased, leaning, and significantly encroaching the corridor and remove those trees when customer consent is obtained or easement rights permit. Penn Power is very active in pursuing this option, where available. Trees identified as a potential cause of a future outage are removed to prevent an interruption of electrical service to Penn Power's customers. In addition, Penn Power performs enhanced trimming to circuits that experience high customer interruption minutes due to vegetation, which removes limbs overhanging primary conductors.

To reduce the likelihood of outages caused by equipment and line failure outages, Penn Power follows I&M programs that set forth schedules for regular inspections of distribution facilities. These programs are geared towards specific components such as capacitors, poles, circuits, transformers, and reclosers. Equipment identified is repaired or replaced as appropriate.

Outages by Cause – West Penn

Outage by Cause				
1st Quarter 2023 12-Month Rolling	West Penn			
Cause	**Customer Minutes**	**Number of Sustained Interruptions**	**Customers Affected**	**% Based on Customer Minutes**
Trees Off Row-Tree	160,677,805	4,904	337,900	57.26%
Unknown	27,851,634	1,894	141,640	9.93%
Equipment Failure	20,577,268	2,346	123,046	7.33%
Line Failure	19,996,763	1,782	87,819	7.13%
Wind	10,995,972	251	18,011	3.92%
Vehicle	8,791,207	492	63,453	3.13%
Trees Off Row-Limb	8,161,111	451	31,236	2.91%
Forced Outage	7,923,677	838	98,806	2.82%
Trees On Row	6,778,097	443	19,295	2.42%
Animal	3,368,228	1,538	39,205	1.20%
Lightning	919,715	163	3,982	0.33%
Trees - Sec/Service	915,421	477	1,500	0.33%
Human Error - Company	909,386	26	9,923	0.32%
Object Contact With Line	624,354	58	4,287	0.22%
Bird	389,932	427	4,578	0.14%
Previous Lightning	315,800	4	1,408	0.11%
Other Electric Utility	308,989	10	911	0.11%
Ice	299,889	13	279	0.11%
Human Error -Non-Company	241,109	63	3,288	0.09%
Ug Dig-Up	223,959	46	1,033	0.08%
Fire	206,480	19	1,233	0.07%
Overload	113,246	11	509	0.04%
Contamination	6,449	2	17	0.00%
Customer Equipment	6,068	12	30	0.00%
Other Utility-Non Elec	4,794	4	32	0.00%
Vandalism	1,597	7	16	0.00%
Total	**280,608,950**	**16,281**	**993,447**	**100%**

Proposed Solutions – West Penn

West Penn analyzes its outage data to develop solutions for improving reliability. The following paragraphs identify the top outage causes for the rolling twelve-month period ending March 31, 2023, and the associated actions designed to address these outage causes.

To reduce outages caused by trees, West Penn performs cycle-based tree trimming which removes selected incompatible trees within the clearing zone corridor, removes certain defective limbs that are overhanging primary conductors, controls selected incompatible brush, and removes off-ROW priority trees. West Penn 's options under the law are strictly limited when it comes to all forms of off-ROW tree management. However, West Penn is legally permitted to identify priority off-ROW trees that are dead, dying, diseased, leaning, and significantly encroaching the corridor and remove those trees when customer consent is obtained or easement rights permit. West Penn is very active in pursuing this option, where available. Trees identified as a potential cause of a future outage are removed to prevent an interruption of electrical service to West Penn's customers. West Penn continues its program to mitigate trees subject to damage from the Emerald Ash Borer.

To reduce the likelihood of equipment and line failures, West Penn follows I&M programs that set forth schedules for regular inspections of distribution and substation facilities. These programs are geared towards specific components such as capacitors, poles, circuits, transformers, substations, and reclosers. Equipment identified is repaired or replaced as appropriate.

Section 57.195(e)(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 and Maintenance		Met-Ed			Penelec			Penn Power			West Penn		
2023		Planned	Completed		Planned	Completed		Planned	Completed		Planned	Completed	
		Annual	1Q	YTD	Annual	1Q	YTD	Annual	1Q	YTD	Annual	1Q	YTD
Forestry	Transmission (Miles)	2,605	696	26.7%	3,438	867.0	25.2%	1,121	300.3	26.8%	4,203	1,243.1	29.6%
	Distribution (Miles)	283	101.4	35.8%	372	172.4	46.3%	78	8.7	11.1%	533	139.1	26.1%
Transmission	Aerial Patrols	2	0.0	0.0%	2	0.0	0.0%	2	0.0	0.0%	2	0.0	0.0%
	Groundline	2,246	0.0	0.0%	2,398	0.0	0.0%	0	0.0	-	1,591	0.0	0.0%
Substation	Substation Inspections Class A	418	209.0	50.0%	780	391.0	50.1%	148	74.0	50.0%	936	468	50.0%
	Substation Inspections Class B	418	0.0	0.0%	780	2.0	0.3%	148	0.0	0.0%	936	0	0.0%
	Substation Inspections Class C	1,672	418.0	25.0%	3,120	786.0	25.2%	592	148.0	25.0%	3,744	936	25.0%
	Transformers	157	64.0	40.8%	432	178.0	41.2%	11	0.0	0.0%	382	204	53.4%
	Breakers	63	30.0	47.6%	366	65.0	17.8%	7	0.0	0.0%	387	16	4.1%
	Relay Schemes	138	24.0	17.4%	276	105.0	38.0%	22	12.0	54.5%	159	8	5.0%
Distribution	Capacitors	4,864	4,864	100.0%	8,646	8,591.0	99.4%	318	319.0	100.0%	1,310	1,310.0	100.0%
	Poles	49,000	6,667	13.6%	41,590	20,656	49.7%	9,687	0.0	0.0%	53,746	4,297.0	8.0%
	Reclosers	1,526	1,055	69.1%	2,607	1,530	58.7%	1,073	1,069.0	99.6%	4,128	3,628	87.9%
	Radio-Controlled Switches	1,566	558	35.6%	2,628	247	9.4%	Penn Power has no radio-controlled switches			West Penn has no radio-controlled switches		

General Note: Unless specified otherwise, all inspections are reported on a unit basis rather than on a location basis.

Section 57.195(e)(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 as available. (For first, second, and third quarter reports only).

Budgeted vs. Actual T&D Operation & Maintenance Expenditures[4]

This portion of the report is confidential.

[4] Budgets are subject to change.

Budgeted vs. Actual T&D Operation & Maintenance Expenditures[5]
Section 57.195(e)(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. (For first, second, and third quarter reports only).

This portion of the report is confidential.

[5] Budgets are subject to change.

Section 57.195(e)(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). [6]

Staffing Levels

Met-Ed 2023												
		Staffing Level				Staff Added in Quarter			Staff Lost in Quarter			
Department	Position	1Q	2Q	3Q	4Q	New Hire – Experienced	New Hire – PSI Student	Other[7]	Retirement	Voluntary Separation	Other[8]	Plan to Hire in 2024
Distribution	Line Leader	45										
	Line Troubleshooter	33										
	Lineman	146				1					4	17
Substation	Substation Leader	14										
	Substation Employee	61						1			2	7
Transmission	Line Leader	2										
	Lineman	10										
	Total	**311**				**1**		**1**			**6**	**24**

[6] As ordered on March 30, 2015 at Docket Nos. D-2014-2365991, D-2014-2365992, D-2014-2365993, and D-2014-2365994, *Implementation Plan of the Focused Management Audit of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company* (Appendix A) (5), the Companies are directed to provide additional detail as described below in the staff reporting section in the Quarterly Reliability Reports. Specifically, for each staff member added, the Companies provide information on whether they were a new hire, whether they were already at the journeyman level, or whether they had obtained some other experienced level of training. For each staff member lost, the Companies provide the reason for the loss (retirement, voluntary separation, etc.). Additionally, the Companies also disclose the number of staff in each category that each one is planning to hire in the next calendar year.

[7] Includes transfers and promotions.

[8] Includes transfers, voluntary separations, and promotions.

[12] Hiring plan to be provided annually in the 4Q report.

Penelec 2023												
		Staffing Level				Staff Added in Quarter			Staff Lost in Quarter			
Department	**Position**	**1Q**	**2Q**	**3Q**	**4Q**	**New Hire – Experienced**	**New Hire – PSI Student**	**Other[9]**	**Retirement**	**Voluntary Separation**	**Other[10]**	**Plan to Hire in 2024**
Distribution	Line Leader	58						4			2	
	Line Troubleshooter	78						4			2	
	Lineman	130						2		2	11	20
Substation	Substation Leader	27						1	1		2	
	Substation Employee	47						2			6	4
Transmission	Line Leader	5										
	Lineman	18										
	Total	**363**						**13**	**1**	**2**	**23**	**24**

[13] Includes transfers and promotions.

[14] Includes transfers, involuntary separations, and promotions.

Penn Power 2023												
		Staffing Level				Staff Added in Quarter			Staff Lost in Quarter			
Department	**Position**	**1Q**	**2Q**	**3Q**	**4Q**	**New Hire – Experienced**	**New Hire – PSI Student**	**Other[11]**	**Retirement**	**Voluntary Separation**	**Other[12]**	**Plan to Hire in 2024**
Distribution	Line Leader	23						1			1	
	Line Troubleshooter	12										
	Lineman	43										5
Substation	Substation Leader	4										
	Substation Employee	17							1			1
Transmission	Line Leader	1										
	Lineman	5						3			3	
	Total	**105**						**4**	**1**		**4**	**6**

[15] Includes transfers, promotions, and promotions within a position.

[16] Includes transfers, involuntary separations, promotions, and promotions within a position.

West Penn 2023												
		Staffing Level				Staff Added in Quarter			Staff Lost in Quarter			
Department	**Position**	**1Q**	**2Q**	**3Q**	**4Q**	**New Hire – Experienced**	**New Hire – PSI Student**	**Other[13]**	**Retirement**	**Voluntary Separation**	**Other[14]**	**Plan to Hire in 2024**
Distribution	Line Leader	64						5			6	
	Line Troubleshooter	56						5	1		5	
	Lineman	138										14
Substation	Substation Leader	22						1	2			
	Substation Employee	70						4			6	6
Transmission	Line Leader	1										
	Lineman	9									2	
	Total	**360**						**15**	**3**		**19**	**20**

[17] Includes transfers, promotions, and promotions within a position.

[18] Includes transfers, involuntary separations, promotions, and promotions within a position.

Section 57.195(e)(10): Quarterly and year-to-date information on contractor hours and dollars for transmission and distribution operation and maintenance.

Contractor Expenditures

Contractor expenses are billed on a lump-sum basis. As a result, hourly information is not available.

This portion of the report is confidential.

Section 57.195(e)(11): Monthly call-out acceptance rate for transmission and distribution maintenance workers presented in terms of both the percentage of accepted calls-out and the amount of time it takes the EDC to obtain the necessary personnel. A brief description of the EDC's call-out procedure should be included when appropriate.

Call-out Acceptance Rate

Call-out percentage is defined as the number of workers accepting to total call outs.

This portion of the report is confidential.

Call-out Response

This portion of the report is confidential.

Call-Out Procedure:

When an event occurs, Met-Ed, Penelec, Penn Power, and West Penn dispatch a troubleman to find and assess the cause of the outage. If the troubleman is unable to repair the damage and a crew is required, the troubleman will inform the Distribution Control Center ("DCC"). The on-duty DCC person or Customer Operations Center person, or both, will then initiate the call-out process until desired staffing levels required to complete the restoration have been achieved.

The number of unique workers called for an outage event is recorded and represents the total calls, or opportunities, for an outage event. The number of unique workers who accept the opportunity is recorded and represents the workers accepting. The elapsed time is calculated by taking the date and time of the first employee called for an event minus the date and time of the last accepting employee for that event. The call-out results from all outages experienced during a particular month are added together to derive a total value for each field.

ATTACHMENT A

Worst Performing Circuits - Reliability Indices

Met-Ed													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
1	No Bangor	00813-3	Easton	1,357	54	0	1,299,019	4,263	2.25	957.27	3.14	304.72	0.00
2	Ottsville Sub	00660-3	Easton	872	87	0	1,266,050	2,838	2.19	1,451.89	3.25	446.11	1.00
3	Barto Sub	00706-1	Boyertown	2,986	184	0	1,164,385	4,178	2.02	389.95	1.40	278.69	0.05
4	N Cornwall Sub	00610-2	Lebanon	2,309	58	2	1,149,558	4,651	1.99	497.86	2.01	247.16	0.13
5	No Bangor	00826-3	Easton	3,281	114	0	1,087,632	6,756	1.89	331.49406	2.06	160.99	0.04
6	Lyons Sub	00729-1	Reading	1,316	112	0	1,056,297	3,120	1.83	802.66	2.37	338.56	0.39
7	Snydersville Sub	00621-3	Stroudsburg	1,280	51	0	1,003,778	2,236	1.74	784.20156	1.75	448.92	1.00
8	Walker Sub	00865-3	Stroudsburg	2,912	79	0	984,201	4,981	1.71	337.98111	1.71	197.59	0.73
9	W Boyertown Sub	00714-1	Boyertown	1,882	62	1	945,805	4,753	1.64	502.55313	2.53	198.99	0.00
10	Huffs Church	00600-1	Boyertown	1,518	124	0	883,575	3,405	1.53	582.06522	2.24	259.49	0.78
11	Mc Knights Gap	00773-1	Reading	1,604	85	0	850,159	4,939	1.47	530.02431	3.08	172.13	0.86
12	Mountain Sub	00743-4	Dillsburg	1,032	26	0	824,785	1,597	1.43	799.21027	1.55	516.46	0.00
13	Bernville Sub	00787-1	Hamburg	1,851	63	0	803,094	3,397	1.39	433.87034	1.84	236.41	0.40
14	Lynnville Sub	00737-1	Hamburg	1,080	87	0	781,377	2,373	1.36	723.49722	2.20	329.28	0.00
15	Carsonia Sub	00767-1	Reading	1018	21	3	778,865	5,303	1.35	765.09	5.21	146.87	0.00
16	River View Sub	00793-1	Reading	3,177	26	1	706,170	4,823	1.23	222.27573	1.52	146.42	0.11
17	W Boyertown Sub	00715-1	Boyertown	1,698	70	0	679,215	3,577	1.18	400.00883	2.11	189.88	0.46
18	Carsonia Sub	00766-1	Reading	816	40	0	652,021	1,876	1.13	799.05	2.30	347.56	0.41
19	Flying Hills Sub	00777-1	Reading	1789	79	0	630,034	2,881	1.09	352.17	1.61	218.69	0.00
20	S Hamb Sub	00741-1	Hamburg	1832	68	0	610,243	2,316	1.06	333.10	1.26	263.49	1.34
21	Angelica Sub	00129-1	Reading	701	30	2	599,046	2,362	1.04	854.56	3.37	253.62	0.00
22	Stroudsburg	00693-3	Stroudsburg	333	12	1	598,768	4,070	1.04	1798.1021	12.22	147.12	0.00
23	Bushkill Falls	00698-3	Stroudsburg	1,757	30	1	588,399	2,593	1.02	334.88845	1.48	226.92	0.00
24	Barto Sub	00705-1	Boyertown	656	82	0	582,661	1,863	1.01	888.20274	2.84	312.75	0.00
25	Mountain Sub	00744-4	Dillsburg	1,866	47	1	581,780	3,583	1.01	311.77921	1.92	162.37	0.39
26	Lynnville Sub	00735-1	Hamburg	1,403	55	0	560,464	2,125	0.97	399.47541	1.51	263.75	0.09
27	S Hamb Sub	00740-1	Hamburg	1,277	50	0	543,107	2,928	0.94	425.29914	2.29	185.49	2.00
28	Carsonia Sub	00764-1	Reading	2,994	71	0	538,418	5,308	0.93	179.83233	1.77	101.44	0.27

Met-Ed													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
29	Bairs Sub	00571-4	York	2,373	71	1	532,519	6,321	0.92	224.4075	2.66	84.25	0.72
30	Pine Lane Sub	00713-1	Boyertown	717	27	0	526,418	2,657	0.91	734.19526	3.71	198.12	0.82
31	Birdsboro	00759-1	Reading	927	26	1	518,031	3,055	0.90	558.82524	3.30	169.57	0.00
32	Mt Rose Sub	00564-4	York	1147	10	2	494,270	3,430	0.86	430.92415	2.99	144.10	0.00
33	Bath Sub	00873-3	Easton	2,138	44	1	489,020	4,839	0.85	228.72778	2.26	101.06	1.42
34	Gardners	00752-4	Gettysburg	1,521	83	1	484,578	3,878	0.84	318.59172	2.55	124.96	0.00
35	Ringing Rocks	00708-1	Boyertown	2,493	46	1	460,104	3,720	0.80	184.55836	1.49	123.68	0.00
36	Friedensburg	00141-1	Reading	631	39	0	458,546	1,533	0.80	726.69731	2.43	299.12	0.00
37	Hill Sub	00735-4	York	1,626	59	1	433,428	4,077	0.75	266.56089	2.51	106.31	0.00
38	Grantville Sub	00720-2	Lebanon	1,445	32	0	428,162	2,137	0.74	296.30588	1.48	200.36	0.00
39	Gilbert Sub	00029-3	Easton	65	11	0	427,170	242	0.74	6571.8462	3.72	1765.17	0.00

Penelec													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
1	Thompson	00436-65	Montrose	1,329	94	0	4,730,491	4,515	1	3546.095	3.385	444.144	0.000
2	Tiffany	00435-65	Montrose	1,265	66	2	4,664,320	6,988	2	3678.486	5.511	232.2916	1.806
3	N Meshoppen Tran	00534-65	Montrose	839	78	1	3,875,249	5,574	2	4624.402	6.652	351.5876	1.052
4	Springboro	00237-52	Meadville	2,781	95	0	3,394,030	5,916	2	1227.054	2.139	1767.702	1.682
5	Tiffany	00440-65	Montrose	1,203	29	1	3,347,256	4,687	3	3327.292	4.659	1295.284	1.775
6	Natl Forge Sw Sta	00577-41	Warren	1,189	80	0	3,281,776	5,729	2	2753.168	4.806	267.8603	1.681
7	N Meshoppen Tran	00531-65	Montrose	412	67	0	3,072,685	5,307	1	5325.277	9.198	679.1544	0.498
8	Salix	00070-11	Johnstown	2,184	44	0	2,830,669	6,367	2	1294.908	2.913	319.5132	0.427
9	Lenox	00755-65	Montrose	681	56	0	2,723,505	4,569	2	3993.409	6.699	141.5345	0.073
10	Wyalusing	00532-62	Towanda	761	53	2	2,674,077	3,918	2	3589.365	5.259	132.9993	0.934
11	Thompson	00442-65	Montrose	657	38	1	2,437,061	3,274	3	3720.704	4.998	410.8011	1.005
12	Montrose	00457-65	Montrose	659	45	3	2,119,497	3,934	2	3580.231	6.645	223.2081	1.571
13	Warren South	00220-41	Warren	2,817	109	0	1,984,656	8,756	1	703.0308	3.102	381.4264	2.352
14	Laurel Lake Sub Tran	00769-65	Montrose	481	13	1	1,915,014	1,011	1	3956.64	2.089	468.1511	0.000
15	Tunkhannock	00533-65	Montrose	1,244	82	0	1,710,391	3,717	1	1377.126	2.993	163.7557	4.306
16	Oxbow	00555-65	Montrose	730	53	0	1,706,713	4,279	2	2344.386	5.878	354.58	2.030
17	Russell Hill	00282-65	Montrose	1,004	39	0	1,697,584	3,844	2	2098.373	4.752	406.0894	1.003
18	Brooklyn	00749-65	Montrose	500	36	0	1,681,278	1,298	3	3369.295	2.601	387.8477	0.998
19	Grover	00527-63	Towanda	1,059	94	0	1,644,862	4,241	3	1560.59	4.024	720.9854	2.569
20	Union City	00239-43	Erie	806	39	4	1,638,093	2,955	2	2039.966	3.680	466.6496	0.438
21	Seward	00075-11	Johnstown	906	50	0	1,608,865	6,756	2	1781.689	7.482	1168.841	3.321
22	Union City	00206-43	Erie	2,451	113	0	1,583,578	6,277	3	610.7127	2.421	768.8357	4.763
23	Laurel Lake Sub Tran	00449-65	Montrose	521	58	2	1,563,043	2,033	3	3000.083	3.902	1894.178	3.679
24	Industrial Park	00796-65	Montrose	360	24	2	1,485,951	2,061	2	4139.139	5.741	969.4475	2.992
25	East Towanda	00525-62	Towanda	665	58	0	1,472,722	3,585	5	2217.955	5.399	596.0834	0.877
26	Madera	00165-22	Philipsburg	1,184	53	3	1,459,933	4,872	2	1101.836	3.677	253.5	1.332
27	Madera	00166-22	Philipsburg	2,137	82	0	1,393,175	4,762	3	694.504	2.374	299.6578	0.000
28	Blairsville East	00080-13	Indiana	1,019	33	0	1,342,413	5,779	2	1319.973	5.682	292.5609	0.265

Penelec													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
29	Marienville	00328-51	Oil City	1,214	65	0	1,338,922	3,207	2	1105.633	2.648	417.4998	0.848
30	Saxton	00625-73	Altoona	1,268	20	0	1,307,448	3,968	4	1525.61	4.630	538.7639	0.000
31	Laurel Lake Sub Tran	00448-65	Montrose	203	20	3	1,272,868	1,089	2	3142.884	2.689	547.9855	1.567
32	Brooklyn	00748-65	Montrose	191	19	0	1,246,230	705	5	6423.866	3.634	578.9872	1.016
33	Utica Junction	00331-51	Oil City	636	55	0	1,212,990	2,226	7	1916.256	3.517	695.2366	2.978
34	Blairsville East	00082-13	Indiana	1,564	52	0	1,186,608	3,375	6	759.1862	2.159	572.8357	0.371
35	Lenox	00434-65	Montrose	275	34	1	1,172,062	1,209	1	4293.267	4.429	235.9754	0.044
36	Russell Hill	00765-65	Montrose	375	37	0	1,089,534	1,067	3	2913.193	2.853	398.8579	0.995
37	Grandview	00354-51	Oil City	518	42	2	1,085,477	2,673	1	2087.456	5.140	495.5089	0.098
38	Salix	00071-11	Johnstown	1,554	48	1	1,071,177	3,356	1	689.3031	2.160	594.389	0.010
39	Cranberry	00350-51	Oil City	1,065	49	1	1,050,240	3,287	3	987.0677	3.089	441.6191	0.008
40	Logan	00700-81	Lewistown	1,001	44	0	1,034,280	4,080	2	1035.315	4.084	1021.119	1.513
41	Youngsville	00257-41	Warren	1,198	30	1	1,020,058	5,397	5	852.1788	4.509	444.5844	1.003
42	Tionesta	00344-51	Oil City	516	24	2	996,036	2,272	2	1930.302	4.403	319.1827	0.039
43	Dubois	00131-23	Dubois	577	59	0	978,145	6,911	2	988.0253	6.981	329.498	4.653
44	Elk Run	00622-23	Dubois	1,017	45	0	964,259	4,320	3	951.8845	4.265	238.1387	2.655
45	N Meshoppen Tran	00437-65	Montrose	477	62	0	946,371	1,727	6	1739.653	3.175	573.7035	1.260
46	Grandview	00353-51	Oil City	861	26	0	942,119	2,657	8	1095.487	3.090	1047.728	0.000
47	Dubois	00137-23	Dubois	3,005	65	0	926,473	6,966	4	357.7116	2.690	744.3681	0.698
48	Lake Como	00787-65	Montrose	926	51	0	913,700	1,958	8	979.314	2.099	667.4757	0.019
49	Brookville	00125-23	Dubois	613	51	0	874,296	3,264	6	1423.935	5.316	714.1575	3.734
50	Tionesta Sw St	00498-51	Oil City	382	52	2	870,292	2,699	2	2272.303	7.047	438.3961	0.539
51	Franklin	00307-51	Oil City	630	17	1	796,325	1,701	2	1270.056	2.713	322.4498	0.548
52	Utica Junction	00511-51	Oil City	396	43	0	783,720	2,782	1	1984.101	7.043	281.906	1.889
53	Reeder Street	00041-11	Johnstown	728	6	2	775,967	1,566	3	1067.355	2.154	460.1536	1.846
54	Warren South	00219-41	Warren	319	30	1	755,347	1,723	3	2360.459	5.384	252.2826	0.429
55	Emlenton	00322-51	Oil City	453	28	0	740,730	1,942	3	1635.166	4.287	554.3462	0.373
56	Revloc	00069-72	Altoona	557	8	0	682,953	1,149	2	1226.127	2.063	544.9191	0.000

Penelec													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
57	French Road	00219-31	Erie	1,485	9	0	651,584	3,979	1	584.9048	3.572	281.711	0.000
58	Ashville	00061-71	Altoona	487	19	1	610,698	1,375	1	1251.43	2.818	438.3906	0.000
59	North Towanda	00521-62	Towanda	989	75	2	603,389	2,557	3	625.2736	2.650	226.6624	1.304
60	Titusville	00387-51	Oil City	626	23	0	593,694	2,106	1	948.393	3.364	219.1816	0.000
61	Covington	00727-63	Mansfield	263	33	0	589,506	868	5	2241.468	3.300	682.5107	0.000
62	Warren South	00255-41	Warren	611	48	3	560,009	2,555	2	912.0668	4.161	189.0046	0.285

Penn Power													
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
1	Hartstown	W-126	Clark	2,358	82	1	1,048,495	5,767	6.27	445	2.45	182	0.00
2	Mcknight	W748	Zelienople	1,266	12	1	631,594	1,927	3.77	499	1.52	328	2.18
3	Richard	W742	Zelienople	1,547	24	0	525,148	3,383	3.14	339	2.19	155	0.00
4	Stoneboro	W-131	Clark	1,489	91	0	509,467	2,524	3.04	342	1.70	202	0.00
5	Ray Street	D-389	New Castle	1,214	10	2	439,760	2,551	2.63	362	2.10	172	0.00
6	Jamestown	W-162	Clark	929	29	3	426,076	3,019	2.55	459	3.25	141	0.06
7	Hadley	W-195	Clark	897	49	0	381,273	1,069	2.28	425	1.19	357	0.00
8	Stoneboro	W-132	Clark	984	53	1	355,252	2,483	2.12	361	2.52	143	0.05
9	Perry	W-156	Clark	1,053	68	0	348,202	2,623	2.08	331	2.49	133	0.21
10	Mercer	W-167	Clark	854	32	0	313,745	1,645	1.87	367	1.93	191	0.00

West Penn Power												
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**
1	South Union	York Run	Uniontown	1,755	41	0	5,337,374	2,942	7.3	3041	2	1,814
2	Donegal	Champion	Pleasant Valley	1,184	44	0	3,744,390	2,294	5.1	3162	2	1,632
3	Bethlen	Laurel Valley	Latrobe	1,421	68	1	2,420,723	4,378	3.3	1704	3	553
4	Whitney	Youngstown	Latrobe	1,236	67	1	2,198,097	4,182	3.0	1778	3	526
5	Ethel Springs	Railroad	Latrobe	731	32	2	1,924,341	2,624	2.6	2632	4	733
6	Karns City	Kaylor	Butler	1,144	30	1	1,783,428	2,724	2.5	1559	2	655
7	Franklin (Wpp)	S. Waynesburg	Jefferson	2,065	36	2	1,746,925	8,411	2.4	846	4	208
8	Butler	Penn St	Butler	2,641	25	1	1,717,558	4,747	2.4	650	2	362
9	White Valley	Congruity	Jeannette	1,733	43	2	1,717,225	5,118	2.4	991	3	336
10	Houston	Mcgovern	Washington Pa	2,103	41	0	1,571,116	4,054	2.2	747	2	388
11	Piney Fork	Gillhall	Charleroi	2,287	25	1	1,556,668	6,109	2.1	681	3	255
12	Whitney	Pleasant Unity	Latrobe	1,420	54	0	1,517,921	3,143	2.1	1069	2	483
13	Linden-Wash	Wylandville	Washington Pa	1,161	36	1	1,491,829	6,411	2.1	1285	6	233
14	Houston	Weavertown	Washington Pa	2,308	40	0	1,479,464	7,652	2.0	641	3	193
15	Rutan	Bristoria	Jefferson	1,109	71	1	1,470,298	2,670	2.0	1326	2	551
16	Springfield Pike	Rock Ridge	Pleasant Valley	736	17	0	1,457,334	2,030	2.0	1980	3	718
17	Fawn	Bull Creek	Arnold	859	26	1	1,432,689	1,913	2.0	1668	2	749
18	Robbins	Balkan	Jeannette	1,687	22	1	1,421,665	4,439	2.0	843	3	320
19	St. Clair	Fort Couch	Boyce	1,157	26	0	1,368,756	3,130	1.9	1183	3	437
20	Shaffers Corner	Braeburn	Arnold	1,387	30	2	1,298,054	3,257	1.8	936	2	399
21	Ethel Springs	Peach Hollow	Latrobe	2,411	46	1	1,268,485	6,277	1.7	526	3	202
22	Peters	Boxer	Boyce	2,188	26	1	1,256,504	5,501	1.7	574	3	228
23	Blue Ridge Summit	Sabillasville	Waynesboro	972	51	1	1,221,577	3,450	1.7	1257	4	354
24	Gordon	Wolfdale	Washington Pa	2,086	33	1	1,195,726	3,818	1.6	573	2	313
25	Mateer	Dime Rd	Arnold	1,190	82	0	1,185,277	2,238	1.6	996	2	530
26	Laurelville	Laurelville	Pleasant Valley	662	32	0	1,176,897	1,807	1.6	1778	3	651
27	Lagonda	Lagonda	Washington Pa	1,451	54	1	1,161,409	3,714	1.6	800	3	313
28	Roundhill	Roundhill	Charleroi	955	26	1	1,131,013	2,478	1.6	1184	3	456

West Penn Power												
Circuit Rank	**Substation**	**Circuit**	**District**	**Average Customers**	**Outages**	**Lockouts**	**Customer Minutes**	**Customers Affected**	**SAIDI Impact**	**SAIDI**	**SAIFI**	**CAIDI**
29	Stahlstown	Kreager	Latrobe	289	35	1	1,128,834	1,335	1.6	3906	5	846
30	Saltsburg	Bell Township	Arnold	756	31	4	1,116,424	3,762	1.5	1477	5	297
31	Kittanning	Cadogan	Kittanning	988	16	0	1,116,180	1,887	1.5	1130	2	592
32	South Union	Rte. 119 North	Uniontown	1,734	21	1	1,085,133	3,212	1.5	626	2	338
33	Millheim	Rebersburg	State College	809	32	0	1,074,565	1,372	1.5	1328	2	783
34	Hilliards	Hilliards	Butler	895	36	0	1,064,992	4,452	1.5	1190	5	239
35	Franklin (Wpp)	Rogersville	Jefferson	823	51	1	1,055,854	2,224	1.5	1283	3	475
36	Bentleyville	Ellsworth	Charleroi	1,214	37	0	1,050,868	3,694	1.4	866	3	284
37	Hickory	Fort Cherry	Washington Pa	1,062	39	0	988,440	2,000	1.4	931	2	494
38	Rutan	Windridge	Jefferson	540	30	1	973,977	1,641	1.3	1804	3	594
39	Vanceville	Vanceville	Charleroi	1,385	63	1	960,868	3,002	1.3	694	2	320
40	Cecil	Bishop	Boyce	2,011	32	1	954,914	4,397	1.3	475	2	217

ATTACHMENT B

Worst Performing Circuits – Remedial Actions

As ordered on March 30, 2015 at Docket Nos. D-2014-2365991, D-2014-2365992, D-2014-2365993, and D-2014-2365994, *Implementation Plan of the Focused Management Audit of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company* (Appendix A)(1), the Companies were directed to provide additional detail in their Commission Quarterly Reliability Report of the 5% of worst performing circuits in the Commission Quarterly Reliability Reports to highlight those circuits that appear multiple times on Quarterly Reliability Reports, but not necessarily in four quarters in a calendar year. For each Quarterly Reliability Report filed pursuant to 52 Pa. Code § 57.195, this additional detail shall include highlighting those worst performing circuits that have appeared in two or more Quarterly Reliability Reports in the past four quarters.

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
1	No Bangor	00813-3	Easton	1,357	54
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.25	Vehicle	31%	3Q 2022
	SAIDI	957.27	Lightning	24%	4Q 2022
	SAIFI	3.14	Trees Off Row-Tree	23%	1Q 2023
	CAIDI	305	All Other	21%	
	Customer Minutes	1,299,019			
	Customers Affected	4,263			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Fuse relocation project			To be completed 2023	50%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
2	Ottsville Sub	00660-3	Easton	872	87
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.19	Trees Off Row-Tree	60%	3Q 2022
	SAIDI	1,451.89	Equipment Failure	14%	4Q 2022
	SAIFI	3.25	Line Failure	8%	1Q 2023
	CAIDI	446	All Other	17%	
	Customer Minutes	1,266,050			
	Customers Affected	2,838			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			Complete	Jan -22
	Install TripSaver			Complete	Nov-22

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
3	Barto Sub	00706-1	Boyertown	2,986	184
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.02	Trees Off Row-Tree	54%	2Q 2022
	SAIDI	389.95	Equipment Failure	17%	3Q 2022
	SAIFI	1.40	Unknown	12%	4Q 2022
	CAIDI	279	All Other	17%	1Q 2023
	Customer Minutes	1,164,385			
	Customers Affected	4,178			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace mainline switch			Complete	Apr-22
	Targeted forestry inspection - 70612 Recloser Zone			Complete	Apr-22
	Targeted overhead circuit inspection			Complete	Sep-22
	Targeted Mainline Circuit Rehabilitation LTIIP Engineering Review			Complete	Feb-23
	Circuit Improvement Project LTIIP Engineering Review			Complete	Feb-23
	Install Supervisory Control and Data Acquisition (SCADA) LTIIP Engineering Review			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
4	N Cornwall Sub	00610-2	Lebanon	2,309	58
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.99	Trees Off Row-Tree	87%	2Q 2022
	SAIDI	497.86	Unknown	5%	3Q 2022
	SAIFI	2.01	Trees Off Row-Limb	3%	4Q 2022
	CAIDI	247	All Other	4%	1Q 2023
	Customer Minutes	1,149,558			
	Customers Affected	4,651			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Circuit rehab project LTIIP			To be completed 2023	50%
	Install Supervisory Control and Data Acquisition (SCADA) LTIIP (1 device)			To be completed 2023	50%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
5	No Bangor	00826-3	Easton	3,281	114
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.89	Trees Off Row-Tree	33%	2Q 2022
	SAIDI	331.49	Vehicle	32%	3Q 2022
	SAIFI	2.06	Equipment Failure	10%	4Q 2022
	CAIDI	161	All Other	24%	1Q 2023
	Customer Minutes	1,087,632			
	Customers Affected	6,756			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Dec-22
	Pole relocation project			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
6	Lyons Sub	00729-1	Reading	1,316	112
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.83	Trees Off Row-Tree	57%	3Q 2022
	SAIDI	802.66	Trees Off Row-Limb	17%	4Q 2022
	SAIFI	2.37	Equipment Failure	10%	1Q 2023
	CAIDI	339	All Other	16%	
	Customer Minutes	1,056,297			
	Customers Affected	3,120			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Install additional mainline disconnects LTIIP			Complete	Feb-23
	Overhead circuit inspection			To be completed 2023	0%
	Targeted forestry inspection (Bick Rd)			Complete	Feb-23
	Targeted tree trimming (Bick Rd)			To be completed 2023	50%
	Targeted tree removals (Schweitz Rd)			To be completed 2023	25%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
7	Snydersville Sub	00621-3	Stroudsburg	1,280	51
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.74	Trees Off Row-Tree	91%	2Q 2022
	SAIDI	784.20	Vehicle	7%	3Q 2022
	SAIFI	1.75	Unknown	1%	4Q 2022
	CAIDI	449	All Other	1%	1Q 2023
	Customer Minutes	1,003,778			
	Customers Affected	2,236			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Aug-22
	Replace 2022 priority poles (2 poles)			To be completed 2023	75%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
8	Walker Sub	00865-3	Stroudsburg	2,912	79
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.71	Equipment Failure	46%	1Q 2023
	SAIDI	337.98	Trees Off Row-Tree	41%	
	SAIFI	1.71	Lightning	4%	
	CAIDI	198	All Other	9%	
	Customer Minutes	984,201			
	Customers Affected	4,981			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			To be completed 2023	48%
	Cycle tree trimming			To be completed 2023	10%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
9	W Boyertown Sub	00714-1	Boyertown	1,882	62
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.64	Trees Off Row-Tree	85%	3Q 2022
	SAIDI	502.55	Equipment Failure	7%	4Q 2022
	SAIFI	2.53	Trees Off Row-Limb	5%	1Q 2023
	CAIDI	199	All Other	4%	
	Customer Minutes	945,805			
	Customers Affected	4,753			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Upgrade mainline recloser			Complete	Aug-22
	Construct circuit tie LTIIP			Complete	Feb-23
	Install Supervisory Control and Data Acquisition (SCADA) LTIIP Engineering Review			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
10	Huffs Church	00600-1	Boyertown	1,518	124
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.53	Trees Off Row-Tree	72%	2Q 2022
	SAIDI	582.07	Trees Off Row-Limb	9%	3Q 2022
	SAIFI	2.24	Line Failure	7%	4Q 2022
	CAIDI	259	All Other	12%	1Q 2023
	Customer Minutes	883,575			
	Customers Affected	3,405			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Targeted forestry inspection			Complete	Jan-22
	Targeted tree trimming (Maryann Drive)			Complete	Jan-23
	CEMI re-route project LTIIP			Complete	Mar-23

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
11	Mc Knights Gap	00773-1	Reading	1,604	85
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.47	Trees Off Row-Tree	52%	3Q 2022
	SAIDI	530.02	Trees Off Row-Limb	20%	4Q 2022
	SAIFI	3.08	Equipment Failure	11%	1Q 2023
	CAIDI	172	All Other	17%	
	Customer Minutes	850,159			
	Customers Affected	4,939			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace mainline backlog poles LTIIP (2 poles)			Complete	May-22
	Upgrade mainline switch LTIIP			Complete	Jan-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
12	Mountain Sub	00743-4	Dillsburg	1,032	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.43	Vehicle	95%	3Q 2022
	SAIDI	799.21	Trees Off Row-Tree	1%	4Q 2022
	SAIFI	1.55	Equipment Failure	1%	1Q 2023
	CAIDI	516	All Other	2%	
	Customer Minutes	824,785			
	Customers Affected	1,597			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Aug-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
13	Bernville Sub	00787-1	Hamburg	1,851	63
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.39	Vehicle	51%	3Q 2022
	SAIDI	433.87	Trees Off Row-Tree	29%	4Q 2022
	SAIFI	1.84	Equipment Failure	10%	1Q 2023
	CAIDI	236	All Other	11%	
	Customer Minutes	803,094			
	Customers Affected	3,397			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Dec-21
	CEMI re-route project LTIIP			Complete	Sep-22
	Replace backlog pole LTIIP (1 pole)			Complete	Apr-23

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
14	Lynnville Sub	00737-1	Hamburg	1,080	87
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.36	Trees Off Row-Tree	51%	2Q 2022
	SAIDI	723.50	Equipment Failure	16%	3Q 2022
	SAIFI	2.20	Vehicle	10%	4Q 2022
	CAIDI	329	All Other	23%	1Q 2023
	Customer Minutes	781,377			
	Customers Affected	2,373			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Targeted forestry inspection			Complete	Jan-22
	Replace mainline backlog poles LTIIP (2 poles)			Complete	Jul-22
	Cycle Tree Trimming			Complete	Dec-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
15	Carsonia Sub	00767-1	Reading	1,018	21
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.35	Trees Off Row-Tree	43%	2Q 2022
	SAIDI	765.09	Equipment Failure	31%	3Q 2022
	SAIFI	5.21	Unknown	21%	4Q 2022
	CAIDI	147	All Other	4%	1Q 2023
	Customer Minutes	778,865			
	Customers Affected	5,303			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace priority one pole			Complete	May-22
	Install TripSaver LTIIP			Complete	Jan-23
	Cycle tree trimming			To be completed 2023	98%
	Install Supervisory Control and Data Acquisition (SCADA) LTIIP Engineering Review			Complete	Feb-23
	Replace Priority One mainline pole			Complete	Mar-23

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
16	River View Sub	00793-1	Reading	3,177	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.23	Vehicle	50%	1Q 2023
	SAIDI	222.28	Trees Off Row-Limb	36%	
	SAIFI	1.52	Trees On Row	7%	
	CAIDI	146	All Other	7%	
	Customer Minutes	706,170			
	Customers Affected	4,823			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Oct-21
	Targeted Mainline Circuit Rehabilitation Cutout Replacements LTIIP (5 projects)			Complete	May-22
	Overhead circuit inspection			To be completed 2023	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
17	W Boyertown Sub	00715-1	Boyertown	1,698	70
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.18	Trees Off Row-Tree	72%	2Q 2022
	SAIDI	400.01	Trees Off Row-Limb	15%	4Q 2022
	SAIFI	2.11	Unknown	4%	1Q 2023
	CAIDI	190	All Other	8%	
	Customer Minutes	679,215			
	Customers Affected	3,577			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Targeted tree trimming investigation			Complete	Oct-21
	Targeted forestry inspections (Old State Rd & Long Lane)			Complete	Jan-22
	Repair/replace priority items from overhead circuit inspection			Complete	May-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
18	Carsonia Sub	00766-1	Reading	816	40
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.13	Trees Off Row-Tree	88%	1Q 2023
	SAIDI	799.05	Trees On Row	4%	
	SAIFI	2.30	Forced Outage	3%	
	CAIDI	348	All Other	5%	
	Customer Minutes	652,021			
	Customers Affected	1,876			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Aug-21
	Install Supervisory Control and Data Acquisition (SCADA) (1 device)			To be completed 2023	50%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
19	Flying Hills Sub	00777-1	Reading	1,789	79
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.09	Trees Off Row-Tree	56%	2Q 2022
	SAIDI	352.17	Trees Off Row-Limb	17%	3Q 2022
	SAIFI	1.61	Human Error - Company	10%	4Q 2022
	CAIDI	219	All Other	17%	1Q 2023
	Customer Minutes	630,034			
	Customers Affected	2,881			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Install Supervisory Control and Data Acquisition (SCADA) switch LTIIP (4 devices)			Complete	Dec-22
	Targeted Mainline Circuit Rehabilitation Cutout Replacements LTIIP (3 units)			To be Completed 2023	75%
	Targeted Mainline Circuit Rehabilitation LTIIP (2 rehabs)			To be Completed 2023	50%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
20	S Hamb Sub	00741-1	Hamburg	1,832	68
	S Hamb Sub		00741-1		Hamburg
	SAIDI Impact	1.06	Equipment Failure	50%	1Q 2023
	SAIDI	333.10	Trees Off Row-Tree	30%	
	SAIFI	1.26	Unknown	10%	
	CAIDI	263	All Other	10%	
	Customer Minutes	610,243			
	Customers Affected	2,316			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			Complete	Aug-22
	Create additional circuit tie LTIIP			Complete	Feb-23
	Repair/Replace priority item from overhead inspection			To be Completed 2023	50%
	Cycle tree trimming			To be Completed 2023	0%
21	Shawnee	00860-3	Stroudsburg	3,228	50
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.48	Trees Off Row-Tree	54%	1Q 2022
	SAIDI	264.78	Equipment Failure	24%	2Q 2022
	SAIFI	1.81	Lightning	13%	3Q 2022
	CAIDI	146	All Other	10%	4Q 2022
	Customer Minutes	854,714			
	Customers Affected	5,842			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace mainline backlog pole LTIIP			Complete	Jun-22
	Cycle tree trimming			To be completed 2023	85%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
22	Stroudsburg	00693-3	Stroudsburg	333	12
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.04	Animal	39%	1Q 2023
	SAIDI	1,798.10	Equipment Failure	25%	
	SAIFI	12.22	Forced Outage	16%	
	CAIDI	147	All Other	21%	
	Customer Minutes	598,768			
	Customers Affected	4,070			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Protective setting review on line device to adjust settings for current line configuration			Complete	Dec-21
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
23	Bushkill Falls	00698-3	Stroudsburg	1,757	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.02	Trees Off Row-Tree	72%	2Q 2022
	SAIDI	334.89	Equipment Failure	20%	1Q 2023
	SAIFI	1.48	Line Failure	3%	
	CAIDI	227	All Other	6%	
	Customer Minutes	588,399			
	Customers Affected	2,593			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle Tree Trimming			Complete	Dec-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
24	Barto Sub	00705-1	Boyertown	656	82
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.01	Trees Off Row-Tree	70%	2Q 2022
	SAIDI	888.20	Unknown	21%	3Q 2022
	SAIFI	2.84	Forced Outage	4%	1Q 2023
	CAIDI	313	All Other	4%	
	Customer Minutes	582,661			
	Customers Affected	1,863			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Targeted forestry inspection (Mountain Mary Rd)			Complete	Jun-22
	Targeted forestry inspection - 2-18-22 Recloser lockout			Complete	Apr-22

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
25	Mountain Sub	00744-4	Dillsburg	1,866	47
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.01	Trees Off Row-Tree	74%	2Q 2022
	SAIDI	311.78	Unknown	7%	3Q 2022
	SAIFI	1.92	Equipment Failure	7%	4Q 2022
	CAIDI	162	All Other	12%	1Q 2023
	Customer Minutes	581,780			
	Customers Affected	3,583			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle Tree Trimming			Complete	Apr-21
	Targeted overhead circuit inspection			Complete	Jan-22
	Circuit Rehabilitation LTIIP Zone 2			Complete	Feb-23
	Circuit Zone 2 Conversion LTIIP			To be completed 2023	25%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
26	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.97	Trees Off Row-Tree	72%	2Q 2022
	SAIDI	399.48	Trees Off Row-Limb	11%	3Q 2022
	SAIFI	1.51	Equipment Failure	10%	4Q 2022
	CAIDI	264	All Other	7%	1Q 2023
	Customer Minutes	560,464			
	Customers Affected	2,125			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle Tree Trimming			Complete	Dec-22
	Replace Priotiry One Mainline Poles (2 poles)			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
27	S Hamb Sub	00740-1	Hamburg	1,277	50
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.94	Trees Off Row-Tree	62%	2Q 2022
	SAIDI	425.30	Equipment Failure	30%	3Q 2022
	SAIFI	2.29	Trees Off Row-Limb	5%	1Q 2023
	CAIDI	185	All Other	4%	
	Customer Minutes	543,107			
	Customers Affected	2,928			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			Complete	Jun-22
	Replace mainline backlog poles LTIIP (3 poles)			Complete	Mar-22
	Repair/replace priority items from overhead circuit inspection			To be completed 2023	50%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
28	Carsonia Sub	00764-1	Reading	2,994	71
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.93	Trees Off Row-Tree	38%	3Q 2022
	SAIDI	179.83	Line Failure	25%	4Q 2022
	SAIFI	1.77	Human Error - Company	10%	1Q 2023
	CAIDI	101	All Other	26%	
	Customer Minutes	538,418			
	Customers Affected	5,308			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Circuit rehab project LTIIP			Complete	Sep-22
	Construct circuit tie LTIIP			Complete	Jan-23
	Targeted Mainline Circuit Rehabilitation LTIIP Engineering Review			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
29	Bairs Sub	00571-4	York	2,373	71
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.92	Animal	33%	2Q 2022
	SAIDI	224.41	Equipment Failure	29%	3Q 2022
	SAIFI	2.66	Trees Off Row-Tree	10%	4Q 2022
	CAIDI	84	All Other	29%	1Q 2023
	Customer Minutes	532,519			
	Customers Affected	6,321			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Dec-21
	Engineering SCADA Analysis			Complete	Feb-22
	Replace Recloser			Complete	Oct-22
	Replace backlog poles (38 poles)			Complete	Mar-23
	Install Animal Guarding CEMI (2 locations)			Complete	Mar-23

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
30	Pine Lane Sub	00713-1	Boyertown	717	27
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.91	Trees Off Row-Tree	60%	4Q 2022
	SAIDI	734.20	Trees Off Row-Limb	19%	1Q 2023
	SAIFI	3.71	Equipment Failure	12%	
	CAIDI	198	All Other	10%	
	Customer Minutes	526,418			
	Customers Affected	2,657			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace backlog poles (2 poles)			Complete	Sep-22
	Upgrade mainline recloser			Complete	Oct-22
	Cycle Tree Trimming			To be Completed 2023	63%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
31	Birdsboro	00759-1	Reading	927	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.90	Trees Off Row-Tree	44%	2Q 2022
	SAIDI	558.83	Line Failure	29%	3Q 2022
	SAIFI	3.30	Trees Off Row-Limb	21%	4Q 2022
	CAIDI	170	All Other	6%	1Q 2023
	Customer Minutes	518,031			
	Customers Affected	3,055			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Replace backlog poles (3 poles)			Complete	May-22
	Cycle tree trimming			Complete	Sep-22
	Upgrade mainline recloser			Complete	Dec-22
	Install Supervisory Control and Data Acquisition (SCADA) LTIIP (4 devices)			To be completed 2023	50%
	Overhead circuit inspection			To be completed 2023	48%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
32	Mt Rose Sub	00564-4	York	1,147	10
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.86	Trees Off Row-Tree	100%	1Q 2023
	SAIDI	430.92	Trees - Sec/Service	0%	
	SAIFI	2.99	Overload	0%	
	CAIDI	144	All Other	0%	
	Customer Minutes	494,270			
	Customers Affected	3,430			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Jul-22
	Replace Priotiry One Mainline Pole			Complete	Aug-22

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
33	Bath Sub	00873-3	Easton	2,138	44
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.85	Equipment Failure	48%	1Q 2023
	SAIDI	228.73	Trees Off Row-Tree	24%	
	SAIFI	2.26	Trees Off Row-Limb	9%	
	CAIDI	101	All Other	19%	
	Customer Minutes	489,020			
	Customers Affected	4,839			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle Tree Trimming			Complete	Sep-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
34	Gardners	00752-4	Gettysburg	1,521	83
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.84	Vehicle	45%	4Q 2022
	SAIDI	318.59	Trees Off Row-Tree	18%	1Q 2023
	SAIFI	2.55	Ice	11%	
	CAIDI	125	All Other	26%	
	Customer Minutes	484,578			
	Customers Affected	3,878			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Install Supervisory Control and Data Acquisition (SCADA) device LTIIP			Complete	Mar-23
	Cycle Tree Trimming			To be Completed 2023	2%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
35	Ringing Rocks	00708-1	Boyertown	2,493	46
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.80	Vehicle	50%	2Q 2022
	SAIDI	184.56	Trees Off Row-Tree	25%	1Q 2023
	SAIFI	1.49	Trees Off Row-Limb	12%	
	CAIDI	124	All Other	13%	
	Customer Minutes	460,104			
	Customers Affected	3,720			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle tree trimming			Complete	Oct-21
	Overhead circuit inspection			To be Completed 2023	0%

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
36	Friedensburg	00141-1	Reading	631	39
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.80	Trees Off Row-Limb	51%	2Q 2022
	SAIDI	726.70	Trees Off Row-Tree	32%	3Q 2022
	SAIFI	2.43	Equipment Failure	6%	1Q 2023
	CAIDI	299	All Other	10%	
	Customer Minutes	458,546			
	Customers Affected	1,533			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair/Replace high priority items from overhead circuit inspection			Complete	May-22
	Cycle Tree Trimming			Complete	May-22
	CEMI re-route project LTIIP			Complete	Sep-22
	Targeted forester inspection (Forgedale Rd)			Complete	Mar-23
	Targeted tree removals (Forgedale Rd)			To be Completed 2023	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
37	Hill Sub	00735-4	York	1,626	59
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.75	Trees Off Row-Tree	55%	2Q 2022
	SAIDI	266.56	Equipment Failure	33%	3Q 2022
	SAIFI	2.51	Trees Off Row-Limb	7%	4Q 2022
	CAIDI	106	All Other	4%	1Q 2023
	Customer Minutes	433,428			
	Customers Affected	4,077			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			To be completed 2023	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
38	Grantville Sub	00720-2	Lebanon	1,445	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.74	Equipment Failure	82%	1Q 2023
	SAIDI	296.31	Vehicle	5%	
	SAIFI	1.48	Line Failure	4%	
	CAIDI	200	All Other	9%	
	Customer Minutes	428,162			
	Customers Affected	2,137			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Cycle Tree Trimming			Complete	Dec-21

Met-Ed					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
39	Gilbert Sub	00029-3	Easton	65	11
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.74	Trees Off Row-Tree	95%	1Q 2023
	SAIDI	6,571.85	Unknown	3%	
	SAIFI	3.72	Trees Off Row-Limb	1%	
	CAIDI	1,765	All Other	1%	
	Customer Minutes	427,170			
	Customers Affected	242			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Overhead circuit inspection			To be completed 2023	0%

Met-Ed					
Unranked circuits appearing 2 or more quarters in the last 4 quarters					
Substation	**Circuit**	**2Q 2022**	**3Q 2022**	**4Q 2022**	**1Q 2023**
Flying Hills Sub	00777-1	X	X	X	X
Huffs Church	00600-1	X	X	X	X
Lynnville Sub	00737-1	X	X	X	X
Mountain Substation	00744-4	X	X	X	
No Bangor	00826-3	X	X	X	X
North Cornwall Sub	00610-2	X	X	X	X
Snydersville Sub	00621-3	X	X	X	X
Angelica Sub	00129-1	X	X	X	X
Bairs Sub	00571-4	X	X	X	X
Barto Sub	00706-1	X	X	X	X
Birdsboro	00759-1	X	X	X	X
Carsonia Sub	00767-1	X	X	X	X
Hill Sub	00735-4	X	X	X	X
Lynnville Sub	00735-1	X	X	X	
Carsonia Sub	00764-1	X	X	X	X
No Bangor	00813-3	X	X	X	X
Lyons Sub	00729-1	X	X	X	X
Mc Knights Gap Sub	00773-1	X	X	X	X
Mountain Substation	00743-4	X	X	X	X
Ottsville Substation	00660-3	X	X	X	X
W Boyertown Sub	00714-1	X	X	X	X
W Boyertown Sub	00715-1		X	X	X
Bernville Sub	00787-1		X	X	X
Gardners	00752-4		X	X	X
Pine Lane Sub	00713-1		X	X	X
S Hamb Sub	00740-1	X		X	X
Barto Sub	00705-1	X		X	X
Friedensburg Sub	00141-1	X		X	X
Bushkill Falls	00698-3			X	X
Ringing Rocks Sub	00708-1			X	X
Collins Substation	00760-2	X	X		
North Lebanon	00712-2	X	X		
Shawnee Sub	00860-3	X	X		
Birdsboro	00756-1	X	X		
North Lebanon	00715-2	X	X		
Painted Sky	00650-1	X	X		
Ferndale Sub	00077-3	X	X		
North Cornwall Sub	00611-2		X		
Raubsville St	00079-3	X			

Met-Ed				
Unranked circuits with remedial actions scheduled to be or recently completed				
Substation	**Circuit**	**Remedial Action Planned or Taken**	**Status of Remedial Work**	**Progress of Remedial Work or Date Completed**
Earlville	00126-1	Overhead circuit inspection	Complete	Jun-22
Earlville	00126-1	Construct circuit tie	To be completed 2023	75%
Earlville	00126-1	Cycle tree trimming	To be completed 2023	0%
Newberry	00586-4	Cycle tree trimming	Complete	Dec-22
Stouchburg	00758-2	Overhead circuit inspection	Complete	Jan-22
Stouchburg	00758-2	Repair/replace priority items from overhead circuit inspection	Complete	Oct-22
Rehrersburg	00718-2	Cycle tree trimming	Complete	Dec-22
County Line	00703-1	Repair/Replace priority items from overhead circuit inspection	Complete	Aug-22
County Line	00703-1	Install Supervisory Control and Data Acquisition (SCADA) switch	Complete	Aug-22
County Line	00703-1	Cycle tree trimming	To be completed 2023	0%
Grantley	00401-4	Repair/replace priority items from overhead circuit inspection	Complete	Jun-22
Mountain	00742-4	Cycle Tree Trimming	Complete	Sep-22
Shawnee	00895-3	Overhead circuit inspection	Complete	Jun-22
Shawnee	00895-3	Replace insulators	Complete	May-22
Ferndale	00076-3	Repair/Replace priority items from overhead circuit inspection	Complete	Jul-22
Gardners	00750-4	Install Supervisory Control and Data Acquisition (SCADA) (2 Devices)	To be Completed 2023	50%
Grantley	00539-4	Repair/replace priority items from overhead circuit inspection	Complete	May-22
Hokes	00587-4	Install Supervisory Control and Data Acquisition (SCADA) recloser	Complete	Jan-23
Hokes	00587-4	Cycle Tree Trimming	Complete	Dec-22
Ottsville	00661-3	Overhead circuit inspection	Complete	Jan-22
Palmer	00658-3	Cycle Tree Trimming	Complete	Jan-22
Raintree	00642-4	Cycle Tree Trimming	Complete	Jul-22
Swatara Hill	00763-2	Cycle tree trimming	Complete	Oct-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
1	Thompson	00436-65	Montrose	1,329	94
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.05	Trees Off Row-Tree	68%	1Q 2022
	SAIDI	3,546.10	Ice	23%	2Q 2022
	SAIFI	3.38	Equipment Failure	3%	3Q 2022
	CAIDI	444.14	All Other	5%	4Q 2022
	Customer Minutes	4,730,491			
	Customers Affected	4,515			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Nov-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Apr-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
2	Tiffany	00435-65	Montrose	1,265	66
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.32	Ice	39%	1Q 2022
	SAIDI	3,678.49	Trees Off Row-Tree	38%	2Q 2022
	SAIFI	5.51	Equipment Failure	14%	3Q 2022
	CAIDI	232.29	All Other	9%	4Q 2022
	Customer Minutes	4,664,320			
	Customers Affected	6,988			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Oct-21
	Repair damage caused by trees during a storm			Complete	Apr-22
	Repair damage caused by ice			Complete	Apr-22
	Repair equipment failure			Complete	Jun-22
	On cycle tree clearing			Complete	Sep-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
3	N Meshoppen Tran	00534-65	Montrose	839	78
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.05	Ice	78%	1Q 2022
	SAIDI	4,624.40	Trees Off Row-Tree	12%	2Q 2022
	SAIFI	6.65	Trees Off Row-Limb	6%	3Q 2022
	CAIDI	351.59	All Other	5%	4Q 2022
	Customer Minutes	3,875,249			
	Customers Affected	5,574			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Mar-22
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	On cycle tree clearing			Complete	Nov-22
	Circuit Inspection			Complete	Mar-23
	Target Circuit Rehab			To Be Complete	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
4	Springboro	00237-52	Meadville	2,781	95
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.15	Wind	87%	1Q 2022
	SAIDI	1,227.05	Equipment Failure	4%	2Q 2022
	SAIFI	2.14	Trees Off Row-Tree	3%	
	CAIDI	1,767.70	All Other	6%	
	Customer Minutes	3,394,030			
	Customers Affected	5,916			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	May-22
	Repair damage caused by wind			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
5	Tiffany	00440-65	Montrose	1,203	29
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.90	Ice	75%	1Q 2022
	SAIDI	3,327.29	Trees Off Row-Tree	9%	2Q 2022
	SAIFI	4.66	Trees Off Row-Limb	8%	3Q 2022
	CAIDI	1,295.28	All Other	9%	4Q 2022
	Customer Minutes	3,347,256			
	Customers Affected	4,687			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Nov-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Apr-22
	On cycle tree clearing			To Be Completed	0%
	Circuit inspection			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
6	Natl Forge Sw Sta	00577-41	Warren	1,189	80
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.51	Trees Off Row-Tree	94%	1Q 2022
	SAIDI	2,753.17	Trees Off Row-Limb	2%	2Q 2022
	SAIFI	4.81	Equipment Failure	2%	3Q 2022
	CAIDI	267.86	All Other	3%	4Q 2022
	Customer Minutes	3,281,776			
	Customers Affected	5,729			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Dec-21
	Repair damage caused by trees during a storm			Complete	Jun-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	On cycle tree clearing			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
7	N Meshoppen Tran	00531-65	Montrose	412	67
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.02	Ice	75%	1Q 2022
	SAIDI	5,325.28	Trees Off Row-Tree	15%	2Q 2022
	SAIFI	9.20	Equipment Failure	5%	3Q 2022
	CAIDI	679.15	All Other	4%	4Q 2022
	Customer Minutes	3,072,685			
	Customers Affected	5,307			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Mar-22
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees			Complete	Sep-22
	Circuit inspection			To Be Completed	0%
	Targeted Circuit Rehab			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
8	Salix	00070-11	Johnstown	2,184	44
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.81	Trees Off Row-Tree	50%	
	SAIDI	1,294.91	Ice	42%	
	SAIFI	2.91	Forced Outage	4%	
	CAIDI	319.51	All Other	5%	
	Customer Minutes	2,830,669			
	Customers Affected	6,367			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Mar-23
	Repair damage caused by trees			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
9	Lenox	00755-65	Montrose	681	56
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.69	Ice	52%	2Q 2022
	SAIDI	3,993.41	Trees Off Row-Tree	18%	3Q 2022
	SAIFI	6.70	Equipment Failure	17%	4Q 2022
	CAIDI	141.53	All Other	13%	
	Customer Minutes	2,723,505			
	Customers Affected	4,569			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Oct-21
	Repair damage caused by ice			Complete	Apr-22
	Repair equipment failure			Complete	May-22
	Repair damage caused by trees during a storm			Complete	Aug-22
	On cycle tree clearing			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
10	Wyalusing	00532-62	Towanda	761	53
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.60	Ice	80%	1Q 2022
	SAIDI	3,589.37	Lightning	11%	2Q 2022
	SAIFI	5.26	Trees Off Row-Tree	5%	3Q 2022
	CAIDI	133.00	All Other	5%	4Q 2022
	Customer Minutes	2,674,077			
	Customers Affected	3,918			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Mar-22
	Repair damage caused by lightning			Complete	Apr-22
	Repair damage caused by ice			Complete	Apr-22
	Circuit inspection			Complete	Aug-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
11	Thompson	00442-65	Montrose	657	38
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.54	Ice	51%	2Q 2022
	SAIDI	3,720.70	Trees Off Row-Tree	26%	3Q 2022
	SAIFI	5.00	Trees Off Row-Limb	12%	4Q 2022
	CAIDI	410.80	All Other	10%	
	Customer Minutes	2,437,061			
	Customers Affected	3,274			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm (Tree)			Complete	Apr-22
	Repair damage caused by trees during a storm (Limb)			Complete	Jul-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
12	Montrose	00457-65	Montrose	659	45
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.66	Ice	63%	2Q 2022
	SAIDI	3,580.23	Trees Off Row-Tree	26%	3Q 2022
	SAIFI	6.65	Vehicle	4%	4Q 2022
	CAIDI	223.21	All Other	7%	
	Customer Minutes	2,119,497			
	Customers Affected	3,934			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Apr-22
	On cycle tree clearing			To Be Completed	95%
	Circuit inspection			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
13	Warren South	00220-41	Warren	2,817	109
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.28	Trees Off Row-Tree	52%	1Q 2022
	SAIDI	703.03	Unknown	25%	2Q 2022
	SAIFI	3.10	Forced Outage	9%	3Q 2022
	CAIDI	381.43	All Other	1%	
	Customer Minutes	1,984,656			
	Customers Affected	8,756			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Nov-21
	Repair damage caused by trees			Complete	Jul-22
	Repair damage caused by trees			Complete	Mar-23
	Restore fuse operation of unknown cause			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
14	Laurel Lake Sub Tran	00769-65	Montrose	481	13
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.37	Trees Off Row-Tree	99%	2Q 2022
	SAIDI	3,956.64	Forced Outage	1%	3Q 2022
	SAIFI	2.09	Unknown	0%	4Q 2022
	CAIDI	468.15	All Other	0%	
	Customer Minutes	1,915,014			
	Customers Affected	1,011			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Mar-22
	Repair damage caused by trees during a storm			Complete	Apr-22
	Repair damage caused by line failure (forced)			Complete	Nov-22
	Circuit inspection			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
15	Tunkhannock	00533-65	Montrose	1,244	82
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.12	Trees Off Row-Tree	59%	1Q 2022
	SAIDI	1,377.13	Equipment Failure	14%	2Q 2022
	SAIFI	2.99	Trees Off Row-Limb	9%	3Q 2022
	CAIDI	163.76	All Other	18%	4Q 2022
	Customer Minutes	1,710,391			
	Customers Affected	3,717			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Apr-22
	Repair equipment failure			Complete	Jul-22
	Circuit inspection			Complete	Aug-22
	Repair damage caused by trees			Complete	Sep-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
16	Oxbow	00555-65	Montrose	730	53
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.62	Ice	46%	2Q 2022
	SAIDI	2,344.39	Trees Off Row-Tree	39%	3Q 2022
	SAIFI	5.88	Equipment Failure	8%	4Q 2022
	CAIDI	354.58	All Other	7%	
	Customer Minutes	1,706,713			
	Customers Affected	4,279			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Aug-22
	Repair damage caused by trees			Complete	Sep-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
17	Russell Hill	00282-65	Montrose	1,004	39
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.87	Ice	48%	1Q 2022
	SAIDI	2,098.37	Equipment Failure	20%	2Q 2022
	SAIFI	4.75	Trees Off Row-Tree	10%	3Q 2022
	CAIDI	406.09	All Other	22%	4Q 2022
	Customer Minutes	1,697,584			
	Customers Affected	3,844			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Oct-21
	Repair damage caused by wind			Complete	Dec-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair equipment failure			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
18	Brooklyn	00749-65	Montrose	500	36
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.84	Ice	78%	2Q 2022
	SAIDI	3,369.29	Line Failure	10%	3Q 2022
	SAIFI	2.60	Trees Off Row-Tree	9%	4Q 2022
	CAIDI	387.85	All Other	3%	
	Customer Minutes	1,681,278			
	Customers Affected	1,298			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Dec-21
	Repair damage caused by ice			Complete	Apr-22
	Repair line failure			Complete	Aug-22
	On cycle tree clearing			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
19	Grover	00527-63	Towanda	1,059	94
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.56	Equipment Failure	26%	1Q 2022
	SAIDI	1,560.59	Trees Off Row-Tree	26%	2Q 2022
	SAIFI	4.02	Vehicle	24%	3Q 2022
	CAIDI	720.99	All Other	24%	4Q 2022
	Customer Minutes	1,644,862			
	Customers Affected	4,241			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	Oct-21
	Repair damage caused by vehicle accident			Complete	Nov-21
	Repair damage caused by lightning			Complete	Jul-22
	Repair damage caused by vehicle accident			Complete	Aug-22
	Repair damage caused by trees during a storm			Complete	Mar-23
	Repair equipment failure			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
20	Union City	00239-43	Erie	806	39
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.58	Trees Off Row-Tree	75%	4Q 2022
	SAIDI	2,039.97	Equipment Failure	21%	
	SAIFI	3.68	Unknown	2%	
	CAIDI	466.65	All Other	3%	
	Customer Minutes	1,638,093			
	Customers Affected	2,955			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	Nov-22
	Repair equipment failure			Complete	Dec-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair equipment failure			Complete	Mar-23
	Circuit inspection			Complete	Mar-23

Penelec					
Rank	**Substation**		**District**	**Customers**	**Outages**
21	Seward	00075-11	Johnstown	906	50
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.20	Trees Off Row-Tree	85%	1Q 2022
	SAIDI	1,781.69	Line Failure	7%	4Q 2022
	SAIFI	7.48	Unknown	3%	
	CAIDI	1,168.84	All Other	5%	
	Customer Minutes	1,608,865			
	Customers Affected	6,756			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Nov-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair damage caused by trees during a storm			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
22	Union City	00206-43	Erie	2,451	113
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.70	Trees Off Row-Tree	58%	1Q 2022
	SAIDI	610.71	Equipment Failure	27%	2Q 2022
	SAIFI	2.42	Forced Outage	7%	3Q 2022
	CAIDI	768.84	All Other	8%	4Q 2022
	Customer Minutes	1,583,578			
	Customers Affected	6,277			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Install advanced Dx protective devices			Complete	Dec-21
	Install new radio-controlled switch			Complete	Jan-22
	Repair equipment failure			Complete	Feb-22
	Repair damage caused by trees during a storm			Complete	May-22
	Repair equipment failure (forced outage)			Complete	Jul-22
	Repair equipment failure			Complete	Feb-23
	Repair damage caused by trees during a storm			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
23	Laurel Lake Sub Tran	00449-65	Montrose	521	58
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	3.30	Ice	59%	2Q 2022
	SAIDI	3,000.08	Trees Off Row-Tree	32%	3Q 2022
	SAIFI	3.90	Unknown	3%	4Q 2022
	CAIDI	1,894.18	All Other	6%	
	Customer Minutes	1,563,043			
	Customers Affected	2,033			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Oct-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Jul-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
24	Industrial Park	00796-65	Montrose	360	24
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.02	Ice	59%	2Q 2022
	SAIDI	4,139.14	Vehicle	11%	3Q 2022
	SAIFI	5.74	Equipment Failure	11%	4Q 2022
	CAIDI	969.45	All Other	18%	
	Customer Minutes	1,485,951			
	Customers Affected	2,061			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Dec-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by lightning			Complete	Jul-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
25	Union City	00239-43	Erie	783	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.26	Trees Off Row-Tree	92%	
	SAIDI	1,677.03	Equipment Failure	4%	
	SAIFI	2.93	Unknown	2%	
	CAIDI	571.66	All Other	2%	
	Customer Minutes	1,313,113			
	Customers Affected	2,297			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Feb-22
	Repair damage caused by ice			Complete	Apr-22
	Restore recloser operation of unknown cause			Complete	May-22
	Repair damage caused by lightning			Complete	Jul-22
	Targeted Circuit Rehab			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
26	Madera	00165-22	Philipsburg	1,184	53
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.78	Trees Off Row-Tree	66%	1Q 2022
	SAIDI	1,101.84	Equipment Failure	21%	2Q 2022
	SAIFI	3.68	Line Failure	3%	3Q 2022
	CAIDI	253.50	All Other	10%	4Q 2022
	Customer Minutes	1,459,933			
	Customers Affected	4,872			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Oct-21
	Repair damage caused by trees during a storm			Complete	Mar-22
	Repair damage caused by wind			Complete	Mar-22
	Repair equipment failure			Complete	Aug-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Circuit inspection			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
27	Madera	00166-22	Philipsburg	2,137	82
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.52	Trees Off Row-Tree	76%	1Q 2022
	SAIDI	694.50	Forced Outage	9%	2Q 2022
	SAIFI	2.37	Lightning	4%	4Q 2022
	CAIDI	299.66	All Other	11%	
	Customer Minutes	1,393,175			
	Customers Affected	4,762			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	May-22
	Repair damage caused by vehicle accident (forced outage)			Complete	Nov-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair damage caused by trees during a storm			Complete	Jan-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
28	Blairsville East	00080-13	Indiana	1,019	33
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.40	Trees Off Row-Tree	51%	1Q 2022
	SAIDI	1,319.97	Trees Off Row-Limb	42%	
	SAIFI	5.68	Unknown	4%	
	CAIDI	292.56	All Other	3%	
	Customer Minutes	1,342,413			
	Customers Affected	5,779			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Jul-22
	Repair damage caused by trees during a storm (limb)			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
29	Marienville	00328-51	Oil City	1,214	65
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.31	Trees Off Row-Tree	64%	1Q 2022
	SAIDI	1,105.63	Line Failure	13%	2Q 2022
	SAIFI	2.65	Wind	9%	3Q 2022
	CAIDI	417.50	All Other	15%	4Q 2022
	Customer Minutes	1,338,922			
	Customers Affected	3,207			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Install advanced Dx protective devices			Complete	Oct-21
	Repair damage caused by trees during a storm			Complete	Dec-21
	Repair line failure			Complete	Mar-22
	Repair damage caused by trees during a storm			Complete	Jun-22
	On cycle tree clearing			Complete	Nov-22
	Repair damage caused by trees during a storm			Complete	Dec-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
30	Saxton	00625-73	Altoona	1,268	20
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	3.66	Trees Off Row-Tree	56%	1Q 2022
	SAIDI	1,525.61	Line Failure	23%	2Q 2022
	SAIFI	4.63	Equipment Failure	19%	4Q 2022
	CAIDI	538.76	All Other	2%	
	Customer Minutes	1,307,448			
	Customers Affected	3,968			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Dec-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair line failure			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
31	Laurel Lake Sub Tran	00448-65	Montrose	203	20
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.63	Trees Off Row-Tree	65%	3Q 2022
	SAIDI	3,142.88	Equipment Failure	12%	4Q 2022
	SAIFI	2.69	Lightning	10%	
	CAIDI	547.99	All Other	13%	
	Customer Minutes	1,272,868			
	Customers Affected	1,089			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Apr-22
	Repair equipment failure			Complete	Jul-22
	Repair damage caused by lightning			Complete	Jul-22
	Circuit inspection			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
32	Brooklyn	00748-65	Montrose	191	19
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	5.30	Equipment Failure	36%	2Q 2022
	SAIDI	6,423.87	Trees Off Row-Tree	32%	3Q 2022
	SAIFI	3.63	Ice	31%	4Q 2022
	CAIDI	578.99	All Other	1%	
	Customer Minutes	1,246,230			
	Customers Affected	705			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Oct-21
	Repair damage caused by ice			Complete	Apr-22
	Repair equipment failure			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Jul-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
33	Utica Junction	00331-51	Oil City	636	55
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	6.68	Trees Off Row-Tree	90%	3Q 2022
	SAIDI	1,916.26	Trees Off Row-Limb	6%	4Q 2022
	SAIFI	3.52	Equipment Failure	1%	
	CAIDI	695.24	All Other	2%	
	Customer Minutes	1,212,990			
	Customers Affected	2,226			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	May-22
	Repair damage caused by trees during a storm (Limb)			Complete	Jul-22
	Repair damage caused by trees during a storm			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
34	Blairsville East	00082-13	Indiana	1,564	52
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	5.66	Trees Off Row-Limb	41%	
	SAIDI	759.19	Trees Off Row-Tree	17%	
	SAIFI	2.16	Unknown	16%	
	CAIDI	572.84	All Other	26%	
	Customer Minutes	1,186,608			
	Customers Affected	3,375			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Restore recloser operation of unknown cause			Complete	Mar-23
	Repair damage caused by trees during a storm (Limb)			Complete	Mar-23
	Repair damage caused by trees during a storm			Complete	Mar-23
	On cycle tree clearing			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
35	Lenox	00434-65	Montrose	275	34
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.04	Equipment Failure	64%	3Q 2022
	SAIDI	4,293.27	Trees Off Row-Tree	32%	4Q 2022
	SAIFI	4.43	Ice	1%	
	CAIDI	235.98	All Other	3%	
	Customer Minutes	1,172,062			
	Customers Affected	1,209			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Apr-22
	Repair damage caused by trees			Complete	Sep-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
36	Russell Hill	00765-65	Montrose	375	37
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.94	Trees Off Row-Tree	48%	1Q 2022
	SAIDI	2,913.19	Ice	47%	2Q 2022
	SAIFI	2.85	Unknown	2%	3Q 2022
	CAIDI	398.86	All Other	2%	4Q 2022
	Customer Minutes	1,089,534			
	Customers Affected	1,067			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Oct-21
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Apr-22
	On cycle tree clearing			Complete	Jun-22
	Repair damage caused by trees during a storm			Complete	Jul-22
	Circuit inspection			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
37	Grandview	00354-51	Oil City	518	42
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.34	Trees Off Row-Tree	90%	2Q 2022
	SAIDI	2,087.46	Unknown	4%	3Q 2022
	SAIFI	5.14	Equipment Failure	2%	4Q 2022
	CAIDI	495.51	All Other	4%	
	Customer Minutes	1,085,477			
	Customers Affected	2,673			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	Aug-22
	Repair damage caused by trees			Complete	Jan-23
	Install advanced Dx protective devices			To Be Completed	0%
	On cycle tree clearing			To Be Completed	82%
				37	
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
38	Salix	00071-11	Johnstown	1,554	48
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.18	Trees Off Row-Tree	51%	
	SAIDI	689.30	Trees On Row	17%	
	SAIFI	2.16	Equipment Failure	14%	
	CAIDI	594.39	All Other	18%	
	Customer Minutes	1,071,177			
	Customers Affected	3,356			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees on ROW			Complete	Mar-23
	Repair equipment failure			Complete	Mar-23
	Repair damage caused by trees			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
39	Laceyville	00612-65	Montrose	177	5
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.42	Ice	83%	2Q 2022
	SAIDI	4,667.58	Trees Off Row-Tree	7%	3Q 2022
	SAIFI	2.21	Vehicle	6%	
	CAIDI	2,112.95	All Other	5%	
	Customer Minutes	826,162			
	Customers Affected	391			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Oct-21
	Repair line failure			Complete	Dec-21
	Repair damage caused by trees during a storm			Complete	Feb-22
	Repair damage caused by lightning			Complete	May-22
	Repair equipment failure			Complete	May-22
	Circuit inspection			Complete	Jun-22
	On cycle tree clearing			Complete	Nov-22
	Repair damage caused by wind			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
40	Logan	00700-81	Lewistown	1,001	44
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.88	Trees Off Row-Tree	76%	1Q 2022
	SAIDI	1,035.32	Vehicle	11%	2Q 2022
	SAIFI	4.08	Equipment Failure	9%	4Q 2022
	CAIDI	1,021.12	All Other	4%	
	Customer Minutes	1,034,280			
	Customers Affected	4,080			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Oct-22
	Repair damage caused by vehicle accident			Complete	Nov-22
	Repair damage caused by trees during a storm			Complete	Dec-22
	Repair damage caused by trees during a storm			Complete	Jan-23
	On cycle tree clearing			To Be Completed	95%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
41	Youngsville	00257-41	Warren	1,198	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	4.88	Unknown	47%	
	SAIDI	852.18	Trees Off Row-Tree	34%	
	SAIFI	4.51	Equipment Failure	13%	
	CAIDI	444.58	All Other	6%	
	Customer Minutes	1,020,058			
	Customers Affected	5,397			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Nov-22
	Repair damaged caused by trees during a storm			Complete	Dec-22
	Repair damaged caused by trees during a storm (Unknown)			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
42	Tionesta	00344-51	Oil City	516	24
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.85	Trees Off Row-Tree	64%	
	SAIDI	1,930.30	Unknown	28%	
	SAIFI	4.40	Forced Outage	5%	
	CAIDI	319.18	All Other	4%	
	Customer Minutes	996,036			
	Customers Affected	2,272			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Restore breaker operation of unknown cause			Complete	Mar-23
	Repair damaged caused by trees during a storm			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
43	Dubois	00131-23	Dubois	577	59
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.25	Line Failure	48%	
	SAIDI	988.03	Trees Off Row-Tree	40%	
	SAIFI	6.98	Forced Outage	7%	
	CAIDI	329.50	All Other	5%	
	Customer Minutes	978,145			
	Customers Affected	6,911			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damaged caused by trees during a storm			Complete	Jun-22
	Repair damaged caused by trees during a storm			Complete	Jan-23
	Repair line failure			Complete	Feb-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
44	Elk Run	00622-23	Dubois	1,017	45
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.77	Trees Off Row-Tree	76%	3Q 2022
	SAIDI	951.88	Forced Outage	19%	4Q 2022
	SAIFI	4.26	Unknown	3%	
	CAIDI	238.14	All Other	2%	
	Customer Minutes	964,259			
	Customers Affected	4,320			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	May-22
	Repair damage caused by trees			Complete	Jul-22
	Repair equipment failure (forced outage)			Complete	Nov-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
45	N Meshoppen Tran	00437-65	Montrose	477	62
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	5.85	Trees Off Row-Tree	52%	3Q 2022
	SAIDI	1,739.65	Ice	31%	4Q 2022
	SAIFI	3.17	Unknown	7%	
	CAIDI	573.70	All Other	10%	
	Customer Minutes	946,371			
	Customers Affected	1,727			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees during a storm			Complete	Apr-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
46	Grandview	00353-51	Oil City	861	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	8.16	Wind	40%	1Q 2022
	SAIDI	1,095.49	Line Failure	27%	2Q 2022
	SAIFI	3.09	Trees Off Row-Tree	21%	
	CAIDI	1,047.73	All Other	12%	
	Customer Minutes	942,119			
	Customers Affected	2,657			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Sep-22
	Repair line failure			Complete	Mar-23
	Repair damage caused by wind			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
47	Dubois	00137-23	Dubois	3,005	65
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	4.20	Trees Off Row-Tree	33%	1Q 2022
	SAIDI	357.71	Line Failure	31%	2Q 2022
	SAIFI	2.69	Equipment Failure	18%	3Q 2022
	CAIDI	744.37	All Other	18%	4Q 2022
	Customer Minutes	926,473			
	Customers Affected	6,966			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	May-22
	Repair line failure			Complete	Jun-22
	Repair equipment failure			Complete	Dec-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
48	Lake Como	00787-65	Montrose	926	51
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	8.04	Unknown	41%	
	SAIDI	979.31	Trees Off Row-Tree	32%	
	SAIFI	2.10	Ice	15%	
	CAIDI	667.48	All Other	12%	
	Customer Minutes	913,700			
	Customers Affected	1,958			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by ice			Complete	Apr-22
	Repair damage caused by trees			Complete	Jul-22
	Restore recloser operation of unknown cause			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
49	Brookville	00125-23	Dubois	613	51
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	5.77	Trees Off Row-Tree	51%	1Q 2022
	SAIDI	1,423.93	Equipment Failure	27%	2Q 2022
	SAIFI	5.32	Vehicle	16%	3Q 2022
	CAIDI	714.16	All Other	6%	4Q 2022
	Customer Minutes	874,296			
	Customers Affected	3,264			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	Dec-21
	Repair damage caused by wind			Complete	Mar-22
	Repair damage caused by vehicle accident			Complete	Jun-22
	Repair equipment failure			Complete	Jul-22
	Repair damage caused by trees			Complete	Mar-23
	Circuit inspection			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
50	Tionesta Sw St	00498-51	Oil City	382	52
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.72	Trees Off Row-Tree	66%	3Q 2022
	SAIDI	2,272.30	Trees Off Row-Limb	23%	4Q 2022
	SAIFI	7.05	Unknown	4%	
	CAIDI	438.40	All Other	7%	
	Customer Minutes	870,292			
	Customers Affected	2,699			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Jun-22
	Repair damage caused by trees during a storm (Limb)			Complete	Aug-22

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
51	Franklin	00307-51	Oil City	630	17
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.50	Trees Off Row-Tree	46%	
	SAIDI	1,270.06	Lightning	38%	
	SAIFI	2.71	Line Failure	13%	
	CAIDI	322.45	All Other	3%	
	Customer Minutes	796,325			
	Customers Affected	1,701			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage cause by lightning			Complete	May-22
	Repair line failure			Complete	Nov-22
	Repair damage caused by trees			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
52	Utica Junction	00511-51	Oil City	396	43
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.02	Trees Off Row-Tree	71%	2Q 2022
	SAIDI	1,984.10	Trees Off Row-Limb	12%	
	SAIFI	7.04	Equipment Failure	8%	
	CAIDI	281.91	All Other	10%	
	Customer Minutes	783,720			
	Customers Affected	2,782			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure			Complete	Nov-22
	Repair damage caused by trees			Complete	Jan-23
	Repair damage caused by trees (limb)			Complete	Feb-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
53	Reeder Street	00041-11	Johnstown	728	6
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.95	Trees Off Row-Tree	86%	2Q 2022
	SAIDI	1,067.35	Unknown	11%	3Q 2022
	SAIFI	2.15	Trees Off Row-Limb	2%	4Q 2022
	CAIDI	460.15	All Other	0%	
	Customer Minutes	775,967			
	Customers Affected	1,566			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Restore breaker operation of unknown cause			Complete	Nov-21
	Repair damage caused by trees			Complete	Jun-22
	Repair damage caused by trees (forced outage)			Complete	Aug-22
	Install advanced Dx protective devices			To Be Completed	0%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
54	Warren South	00219-41	Warren	319	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.73	Trees Off Row-Tree	85%	3Q 2022
	SAIDI	2,360.46	Equipment Failure	11%	4Q 2022
	SAIFI	5.38	Unknown	1%	
	CAIDI	252.28	All Other	2%	
	Customer Minutes	755,347			
	Customers Affected	1,723			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Jul-22
	Repair damage caused by trees during a storm			Complete	Jul-22
	Circuit inspection			To Be Completed	0%

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
55	Emlenton	00322-51	Oil City	453	28
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.82	Wind	64%	1Q 2022
	SAIDI	1,635.17	Trees Off Row-Tree	17%	2Q 2022
	SAIFI	4.29	Equipment Failure	10%	
	CAIDI	554.35	All Other	9%	
	Customer Minutes	740,730			
	Customers Affected	1,942			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	Jan-23
	Repair damage caused by wind			Complete	Mar-23
	Repair equipment failure			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
56	Revloc	00069-72	Altoona	557	8
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.09	Ice	46%	3Q 2021
	SAIDI	1,226.13	Trees On Row	41%	2Q 2022
	SAIFI	2.06	Trees Off Row-Tree	6%	
	CAIDI	544.92	All Other	7%	
	Customer Minutes	682,953			
	Customers Affected	1,149			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees on ROW			Complete	Dec-22
	Repair damage caused by ice			Complete	Mar-23
	Repair damage cause by trees			Complete	Mar-23
Rank					
57	French Road	00219-31	Erie	1,485	9
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.35	Forced Outage	74%	1Q 2022
	SAIDI	584.90	Trees Off Row-Tree	15%	2Q 2022
	SAIFI	3.57	Equipment Failure	11%	
	CAIDI	281.71	All Other	0%	
	Customer Minutes	651,584			
	Customers Affected	3,979			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees			Complete	May-22
	Circuit inspection			Complete	Jun-22
	Repair damage cause by vehicle (forced outage)			Complete	Feb-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
58	Ashville	00061-71	Altoona	487	19
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.30	Ice	27%	
	SAIDI	1,251.43	Wind	24%	
	SAIFI	2.82	Forced Outage	15%	
	CAIDI	438.39	All Other	34%	
	Customer Minutes	610,698			
	Customers Affected	1,375			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by wind			Complete	Dec-22
	Repair damage caused by ice			Complete	Mar-23
	Repair damage caused by trees during a storm (forced outage)			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
59	North Towanda	00521-62	Towanda	989	75
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	3.42	Equipment Failure	63%	4Q 2022
	SAIDI	625.27	Trees Off Row-Tree	15%	
	SAIFI	2.65	Ice	7%	
	CAIDI	226.66	All Other	15%	
	Customer Minutes	603,389			
	Customers Affected	2,557			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair line failure			Complete	Mar-22
	Repair equipment failure			Complete	Nov-22
	Repair damage caused by trees			Complete	Mar-23
	Circuit inspection			Complete	Mar-23

Penelec					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
60	Titusville	00387-51	Oil City	626	23
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	0.97	Trees Off Row-Tree	51%	1Q 2022
	SAIDI	948.39	Line Failure	31%	
	SAIFI	3.36	Equipment Failure	12%	
	CAIDI	219.18	All Other	6%	
	Customer Minutes	593,694			
	Customers Affected	2,106			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Aug-22
	Repair equipment failure			Complete	Oct-22
	Repair line failure			Complete	Nov-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
61	Covington	00727-63	Mansfield Pa	263	33
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	4.61	Trees Off Row-Tree	95%	1Q 2022
	SAIDI	2,241.47	Forced Outage	2%	2Q 2022
	SAIFI	3.30	Ice	2%	
	CAIDI	682.51	All Other	2%	
	Customer Minutes	589,506			
	Customers Affected	868			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by trees during a storm			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
62	Warren South	00255-41	Warren	611	48
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.76	Trees Off Row-Tree	49%	3Q 2022
	SAIDI	912.07	Equipment Failure	24%	
	SAIFI	4.16	Line Failure	14%	
	CAIDI	189.00	All Other	12%	
	Customer Minutes	560,009			
	Customers Affected	2,555			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair equipment failure				May-22
	Repair damage caused by trees during a storm				Jul-22
	Repair line failure				Aug-22
	Install advanced Dx protective devices			Complete	Oct-22

Penelec					
Unranked circuits appearing 2 or more quarters in the last 4 quarters					
Substation	**Circuit**	**2Q 2022**	**3Q 2022**	**4Q 2022**	**1Q 2023**
Thompson	00436-65	X	X	X	X
Tiffany	00435-65	X	X	X	X
N Meshoppen Tran	00534-65	X	X	X	X
Springboro	00237-52	X			X
Tiffany	00440-65	X	X	X	X
Natl Forge Sw Sta	00577-41	X	X	X	X
N Meshoppen Tran	00531-65	X	X	X	X
Lenox	00755-65	X	X	X	X
Wyalusing	00532-62	X	X	X	X
Thompson	00442-65	X	X	X	X
Montrose	00457-65	X	X	X	X
Warren South	00220-41	X	X		X
Laurel Lake Sub Tran	00769-65	X	X	X	X
Tunkhannock	00533-65	X	X	X	X
Oxbow	00555-65	X	X	X	X
Russell Hill	00282-65	X	X	X	X
Brooklyn	00749-65	X	X	X	X
Grover	00527-63	X	X	X	X
Union City	00239-43			X	X
Seward	00075-11			X	X
Union City	00206-43	X	X	X	X
Laurel Lake Sub Tran	00449-65	X	X	X	X
Industrial Park	00796-65	X	X	X	X
East Towanda	00525-62	X	X	X	X
Madera	00165-22	X	X	X	X
Madera	00166-22	X		X	X
Marienville	00328-51	X	X	X	X
Saxton	00625-73	X		X	X
Laurel Lake Sub Tran	00448-65		X	X	X
Brooklyn	00748-65	X	X	X	X
Utica Junction	00331-51		X	X	X
Lenox	00434-65		X	X	X
Russell Hill	00765-65	X	X	X	X
Grandview	00354-51	X	X	X	X
Cranberry	00350-51	X	X	X	X
Logan	00700-81	X		X	X
Elk Run	00622-23		X	X	X
N Meshoppen Tran	00437-65		X	X	X

Dubois	00137-23	X	X	X	X
Brookville	00125-23	X	X	X	X
Tionesta Sw St	00498-51		X	X	X
Reeder Street	00041-11	X	X	X	X
Warren South	00219-41		X	X	X
French Road	00219-31	X			X
North Towanda	00521-62			X	X
Warren South	00255-41		X		X

Penelec				
Unranked circuits with remedial actions scheduled to be or recently completed				
Substation	**Circuit**	**Remedial Action Planned or Taken**	**Status of Remedial Work Completed**	**Progress of Remedial Work or Date Completed**
East Pike	00095-13	On cycle tree clearing	0%	
East Pike	00095-13	Install advanced Dx protective devices	0%	
Canton	00608-63	On cycle tree clearing	0%	
Lenox	00757-65	On cycle tree clearing	0%	
Knox	00323-51	Circuit inspection	0%	
Somerset	00031-12	Install advanced Dx protective devices	0%	
Somerset	00031-12	Install advanced Dx protective devices	0%	
East Pike	00096-13	Install advanced Dx protective devices	0%	
East Pike	00096-13	Install advanced Dx protective devices	0%	

Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
1	Hadley	W-195	Clark	904	55
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	18.77	Trees Off Row-Tree	71%	2Q 2022
	SAIDI	3,503.36	Trees Off Row-Limb	19%	3Q 2022
	SAIFI	1.89	Animal	4%	4Q 2022
	CAIDI	1,851	All Other	6%	1Q 2023
	Customer Minutes	3,146,020			
	Customers Affected	1,700			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
2	Hartstown	W-126	Clark	2,204	88
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	17.07	Vehicle	88%	2Q 2022
	SAIDI	1,213.71	Line Failure	9%	3Q 2022
	SAIFI	2.76	Equipment Failure	1%	4Q 2022
	CAIDI	439	All Other	1%	1Q 2023
	Customer Minutes	2,860,717			
	Customers Affected	6,516			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by vehicle			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
3	Jamestown	W-162	Clark	1,036	39
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	14.50	Trees Off Row-Tree	74%	2Q 2022
	SAIDI	2,613.49	Animal	17%	3Q 2022
	SAIFI	4.25	Line Failure	3%	4Q 2022
	CAIDI	615	All Other	6%	
	Customer Minutes	2,430,542			
	Customers Affected	3,953			
	Repair damage caused by tree			Complete	Mar-23

Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
4	Mercer	W-128	Clark	1,199	57
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	9.28	Trees Off Row-Tree	75%	1Q 2023
	SAIDI	1,297.82	Unknown	7%	
	SAIFI	1.64	Line Failure	5%	
	CAIDI	792	All Other	13%	
	Customer Minutes	1,556,092			
	Customers Affected	1,964			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Mar-23
	Repair damage caused by line failure			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
5	Camp Reynolds	W-134	Clark	1,727	87
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	9.27	Vehicle	53%	1Q 2023
	SAIDI	891.31	Line Failure	45%	
	SAIFI	1.69	Lightning	1%	
	CAIDI	526	All Other	1%	
	Customer Minutes	1,553,550			
	Customers Affected	2,952			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by vehicle			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
6	West Middlesex	W-138	Clark	1,362	63
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	8.84	Trees Off Row-Tree	68%	1Q 2023
	SAIDI	1,088.51	Trees Off Row-Limb	14%	
	SAIFI	1.61	Bird	13%	
	CAIDI	678	All Other	5%	
	Customer Minutes	1,482,552			
	Customers Affected	2,187			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Mar-23

Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
7	Canal	W-102	Clark	1,568	76
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.28	Trees Off Row-Tree	75%	
	SAIDI	425.05	Trees Off Row-Limb	8%	
	SAIFI	1.19	Equipment Failure	7%	
	CAIDI	357	All Other	11%	
	Customer Minutes	381,273			
	Customers Affected	1,069			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Feb-22
	Repair damage caused by tree			Complete	Feb-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
8	Stoneboro	W-131	Clark	1,457	85
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.12	Equipment Failure	38%	
	SAIDI	361.03	Trees Off Row-Tree	36%	
	SAIFI	2.52	Line Failure	11%	
	CAIDI	143	All Other	15%	
	Customer Minutes	355,252			
	Customers Affected	2,483			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Oct-22
	Repair caused by equipment failure			Complete	Oct-22
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
9	Sharpsville	W-218	Clark	1,341	36
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.08	Trees Off Row-Tree	35%	
	SAIDI	330.68	Trees Off Row-Limb	28%	
	SAIFI	2.49	Equipment Failure	15%	
	CAIDI	133	All Other	22%	
	Customer Minutes	348,202			
	Customers Affected	2,623			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	May-22

Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
10	Perry	W-156	Clark	1,048	74
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.87	Line Failure	37%	
	SAIDI	367.38	Trees Off Row-Limb	32%	
	SAIFI	1.93	Equipment Failure	18%	
	CAIDI	191	All Other	12%	
	Customer Minutes	313,745			
	Customers Affected	1,645			
	Remedial Action Planned or Taken			**Status**	**Progress**
	Repair damage caused by tree			Complete	Feb-22

Penn Power					
Unranked circuits appearing 2 or more quarters in the last 4 quarters					
Substation	**Circuit**	**2Q 2022**	**3Q 2022**	**4Q 2022**	**1Q 2023**
Hadley	W-195	X	X	X	X
Harlan	D-344		X	X	
Hartstown	W-126	X	X	X	X
Jamestown	W-162	X	X	X	X
Mcknight	W748	X	X	X	
Perry	W-156	X			X
Ray Street	D-389	X	X	X	
Richard	W742	X	X	X	
Stoneboro	W-131	X	X	X	X
Union	W-561		X	X	

Penn Power				
Unranked circuits with remedial actions scheduled to be or recently completed				
Substation	**Circuit**	**Remedial Action Planned**	**Status of Remedial Work**	**Progress of Remedial Work**
Penn Power has no unranked circuits with remedial actions scheduled to be or recently completed.				

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
1	South Union	York Run	Uniontown	1,755	41
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	7.3	Trees off ROW	96%	Q1 2023
	SAIDI	3,041	Trees on ROW	2%	
	SAIFI	1.68	Unknown	1%	
	CAIDI	1814	All Other	1%	
	Customer Minutes	5,337,374			
	Customers Affected	2,942			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree				
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
2	Donegal	Champion	Pleasant Valley	1,184	44
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	5.1	Trees off ROW	87%	Q1 2023
	SAIDI	3,162	Wind	11%	
	SAIFI	1.94	Unknown	1%	
	CAIDI	1632	All Other	1%	
	Customer Minutes	3,744,390			
	Customers Affected	12,294			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
3	Bethlen	Laurel Valley	Latrobe	1,421	68
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	3	Trees off ROW	70%	Q3 2022
	SAIDI	1778	Unknown	13%	Q4 2022
	SAIFI	3.38	Wind	8%	Q1 2023
	CAIDI	526	All Other	9%	
	Customer Minutes	2,198,097			
	Customers Affected	4,182			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
	Overhead Circuit Inspection (62259713)			In Progress	20%

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
4	Whitney	Youngstown	Latrobe	1,236	67
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	3	Trees off ROW	70%	Q3 2022
	SAIDI	1778	Unknown	13%	Q4 2022
	SAIFI	3.38	Wind	8%	Q1 2023
	CAIDI	526	All Other	9%	
	Customer Minutes	2,198,097			
	Customers Affected	4,182			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Overhead Circuit Inspection (61645994)			Complete	Aug-22
	Repair damage caused by a tree			Complete	Sep-22
	Repair damage caused by wind			Complete	Dec-22
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
5	Ethel Springs	Railroad	Latrobe	731	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.6	Trees off ROW	95%	Q1 2023
	SAIDI	2,632	Unknown	3%	
	SAIFI	3.59	Vehicle	1%	
	CAIDI	733	All Other	1%	
	Customer Minutes	1,924,341			
	Customers Affected	2,624			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
6	Karns City	Kaylor	Butler	1,144	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.5	Trees off ROW	86%	Q2 2022
	SAIDI	1,559	Vehicle	6%	Q1 2023
	SAIFI	2.38	Wind	3%	
	CAIDI	655	All Other	5%	
	Customer Minutes	1,783,428			
	Customers Affected	2,724			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Restor unknown outage during a storm			Complete	Jun-22
	Repair damage caused by a tree			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
7	Franklin	S.Waynesburg	Jefferson	2065	36
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.4	Unknown	56%	Q4 2022
	SAIDI	846	Trees off ROW	39%	Q1 2023
	SAIFI	4.07	Equipment Failure	4%	
	CAIDI	208	All Other	1%	
	Customer Minutes	1,746,925			
	SAIDI Impact	2.4	Unknown	56%	Q4 2022
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Restore unknown outage			Complete	Dec-22
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
8	Butler	Penn St.	Butler	2641	25
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.4	Unknown	84%	Q1 2023
	SAIDI	650	Forced Outage	15%	
	SAIFI	1.8	Equipment Failure	1%	
	CAIDI	362	All Other	0%	
	Customer Minutes	1,717,558			
	Customers Affected	4,747			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Overhead Circuit Inspection (62256716)			Complete	Feb-23
	Restore unknown outage			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
9	White Valley	Congruity	Jeannette	1,733	43
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.4	Trees off ROW	77%	Q2 2022
	SAIDI	991	Unknown	11%	Q3 2022
	SAIFI	2.95	Line Failure	4%	Q4 2022
	CAIDI	336	All Other	8%	Q1 2023
	Customer Minutes	1,717,225			
	Customers Affected	5,118			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	May-22
	Repair line failure during a storm			Complete	Jul-22
	Repair damage caused by a tree			Complete	Dec-22
	Repair damage caused by a tree			Complete	Jan-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
10	Houston	McGovern	Washington	2,103	41
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.14	Trees Off Row-Tree	75%	Q2 2022
	SAIDI	682.45	Forced Outage	16%	Q4 2022
	SAIFI	2.68	Line Failure	4%	Q1 2023
	CAIDI	255	All Other	5%	
	Customer Minutes	1,556,668			
	Customers Affected	6,109			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Apr-22
	Repair damage caused by a tree during a storm			Complete	Jul-22
	Repair damage caused by a tree			Complete	Dec-22
	Restore unknown outage			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
11	Piney Fork	Gillhall	Charleroi	2,287	25
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.1	Trees off ROW	77%	Q2 2022
	SAIDI	681	Forced Outage	16%	Q4 2022
	SAIFI	2.67	Line Failure	4%	Q1 2023
	CAIDI	255	All Other	3%	
	Customer Minutes	1,556,668			
	Customers Affected	6,109			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Jun-22
	Forced outage to repair damage			Complete	Dec-22
	Repair line failure			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
12	Whitney	Pleasant Unity	Latrobe	1,420	54
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.1	Trees off ROW	68%	Q1 2023
	SAIDI	1069	Unknown	13%	
	SAIFI	2.21	Line Failure	13%	
	CAIDI	483	All Other	6%	
	Customer Minutes	1,517,921			
	Customers Affected	3,143			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
13	Linden-Wash	Wylandville	Washington	1,161	36
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2.1	Trees off ROW	64%	Q2 2022
	SAIDI	1285	Unknown	17%	Q3 2022
	SAIFI	5.52	Forced Outage	11%	Q4 2022
	CAIDI	233	All Other	8%	Q1 2023
	Customer Minutes	1,491,829			
	Customers Affected	6,411			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	May-22
	Repair damage caused by a tree during a storm			Complete	Jul-22
	Zone 1 Infrared Inspection			Complete	Jul-22
	Restore unknown outage			Complete	Dec-22
	Repair damage caused by a tree			Complete	Mar-23
Rank					
14	Houston	Weavertown	Washington	2308	40
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2	Trees off ROW	68%	Q2 2022
	SAIDI	641	Line Failure	17%	Q3 2022
	SAIFI	3.32	Unknown	10%	Q4 2022
	CAIDI	193	All Other	5%	Q1 2023
	Customer Minutes	1,479,464			
	Customers Affected	7,652			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	May-22
	Repair damage caused by a tree			Complete	Jul-22
	Repair line failure			Complete	Dec-22
	Restore unknown outage			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
15	Rutan	Bristoria	Jefferson	1109	71
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2	Trees off ROW	66%	Q2 2022
	SAIDI	1326	Unknown	23%	Q3 2022
	SAIFI	2.41	Line Failure	7%	Q4 2022
	CAIDI	551	All Other	4%	Q1 2023
	Customer Minutes	1,470,298			
	Customers Affected	2,670			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Apr-22
	Zone 1 Infrared Inspection			Complete	Jun-22
	Repair damage caused by a tree			Complete	Jul-22
	Repair line failure			Complete	Nov-22
	Repair damage caused by a tree			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
16	Springfield Pike	Rock Ridge	Pleasant Valley	736	17
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2	Trees off ROW	85%	Q1 2023
	SAIDI	1980	Equipment Failure	8%	
	SAIFI	2.76	Line Failure	5%	
	CAIDI	718	All Other	2%	
	Customer Minutes	1,457,334			
	Customers Affected	2,030			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
	Overhead Circuit Inspection (62259770)			In Progress	30%

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
17	Fawn	Bull Creek	Arnold	859	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2	Trees off ROW	98%	Q2 2022
	SAIDI	1,668	Trees on ROW	2%	Q3 2022
	SAIFI	2.23	All Other	0%	Q4 2022
	CAIDI	749			Q1 2023
	Customer Minutes	1,432,689			
	Customers Affected	1,913			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Jun-22
	Repair damage caused by a tree during a storm			Complete	Jul-22
	Repair damage caused by a tree			Complete	Dec-22
	Overhead Circuit Inspection (62256805)			Complete	Jan-23
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
18	Robbins	Balkan	Jeannette	1,687	22
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	2	Trees off ROW	72%	Q2 2022
	SAIDI	843	Vehicle	19%	Q3 2022
	SAIFI	2.63	Forced Outage	4%	Q4 2022
	CAIDI	320	All Other	5%	Q1 2023
	Customer Minutes	1,421,665			
	Customers Affected	4,439			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Aug-22
	Forced outage to repair damage during a storm			Complete	Oct-22
	Restore unknown outage			Complete	
	Overhead Circuit Inspection (62259323)			Complete	
	Repair damage caused by a vehicle			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
19	St. Clair	Fort Couch	Boyce	1,157	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.9	Trees off ROW	85%	Q3 2022
	SAIDI	1183	Trees on ROW	11%	Q4 2022
	SAIFI	2.71	Line Failure	2%	Q1 2023
	CAIDI	437	All Other	2%	
	Customer Minutes	1,368,756			
	Customers Affected	3,130			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Aug-22
	Repair damage caused by a tree			Complete	Oct-22
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
20	Shaffers Corner	Braeburn	Arnold	1387	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.8	Trees off ROW	91%	Q3 2022
	SAIDI	936	Line Failure	7%	Q4 2022
	SAIFI	2.35	Equipment Failure	1%	Q1 2023
	CAIDI	399	All Other	1%	
	Customer Minutes	1,298,054			
	Customers Affected	3,257			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Aug-22
	Repair equipment failure			Complete	Dec-22
	Overhead Circuit Inspection (62256810)			Complete	Jan-23
	Repair damage caused by a tree			Complete	Jan-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
21	Ethel Springs	Peach Hollow	Latrobe	2411	46
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.7	Trees off ROW	70%	Q1 2023
	SAIDI	526	Unknown	13%	
	SAIFI	2.6	Wind	8%	
	CAIDI	202	All Other	9%	
	Customer Minutes	1,268,485			
	Customers Affected	6,277			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Feb-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
22	Peters	Boxer	Boyce	2188	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.7	Trees off ROW	70%	Q1 2023
	SAIDI	574	Trees on ROW	14%	
	SAIFI	2.51	Equipment Failure	12%	
	CAIDI	228	All Other	4%	
	Customer Minutes	1,256,504			
	Customers Affected	5,501			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
23	Blue Ridge Summit	Sabillasville	Waynesboro	972	51
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.7	Line Failure	27%	Q4 2022
	SAIDI	1257	Unknown	25%	Q1 2023
	SAIFI	3.55	Trees off ROW	23%	
	CAIDI	354	All Other	25%	
	Customer Minutes	1,221,577			
	Customers Affected	3,450			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair line failure			Complete	Dec-22
	Overhead Circuit Inspection (62256832)			Complete	Feb-23
	Repair damage caused by a tree			Complete	Mar-23
Rank					
24	Gordon	Wolfdale	Washington	2,086	33
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	50%	Q2 2022
	SAIDI	573	Wind	19%	Q1 2023
	SAIFI	1.83	Unknown	10%	
	CAIDI	313	All Other	21%	
	Customer Minutes	1,195,726			
	Customers Affected	3,818			
	SAIDI Impact		1.63	Trees Off Row-Tree	69%
	Repair damage caused by a tree during a storm			Complete	May-22
	Overhead Circuit Inspection (61646198)			Complete	Aug-23
	Repair damage caused by a tree			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
25	Mateer	Dime Rd	Arnold	1,190	82
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	69%	Q2 2022
	SAIDI	996	Trees on ROW	19%	Q1 2023
	SAIFI	1.88	Equipment Failure	9%	
	CAIDI	530	All Other	3%	
	Customer Minutes	1,185,277			
	Customers Affected	2,238			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Overhead Circuit Inspection (61645328)				
	Repair damage caused by a tree during a storm				
	Repair equipment failure				
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
26	Laurelville	Laurelville	Pleasant Valley	662	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	94%	Q1 2023
	SAIDI	1778	Vehicle	4%	
	SAIFI	2.73	Equipment Failure	2%	
	CAIDI	651	All Other	0%	
	Customer Minutes	1,176,897			
	Customers Affected	1,807			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
27	Lagonda	Lagonda	Washington	1,451	54
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	72%	Q2 2022
	SAIDI	800	Trees on ROW	10%	Q3 2022
	SAIFI	2.56	Line Failure	9%	Q4 2022
	CAIDI	313	All Other	9%	Q1 2023
	Customer Minutes	1,161,409			
	Customers Affected	3,714			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Jun-22
	Repair damage caused by a tree			Complete	Sep-22
	Repair equipment failure			Complete	Dec-22
	Overhead Circuit Inspection (62260064)			Complete	Jan-23
	Repair line failure			Complete	Feb-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
28	Roundhill	Roundhill	Charleroi	955	26
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	82%	Q1 2023
	SAIDI	1184	Line Failure	9%	
	SAIFI	2.59	Unknown	5%	
	CAIDI	456	All Other	4%	
	Customer Minutes	1,131,013			
	Customers Affected	2,478			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
	Overhead Circuit Inspection (62259364)			In Progress	48%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
29	Stahlstown	Kreager	Latrobe	289	35
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.6	Trees off ROW	49%	Q1 2023
	SAIDI	3906	Equipment Failure	43%	
	SAIFI	4.62	Wind	7%	
	CAIDI	846	All Other	1%	
	Customer Minutes	1,128,834			
	Customers Affected	1,335			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
30	Saltsburg	Bell Township	Arnold	756	31
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Trees off ROW	88%	Q2 2022
	SAIDI	1477	Forced Outage	8%	Q3 2022
	SAIFI	4.98	Unknown	2%	Q4 2022
	CAIDI	297	All Other	2%	Q1 2023
	Customer Minutes	1,116,424			
	Customers Affected	3,762			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	May-22
	Repair damage caused by a tree during a storm			Complete	Aug-22
	Repair damage caused by a tree			Complete	Dec-22
	Overhead Circuit Inspection (62256809)			Complete	Jan-23
	Repair damage caused by a tree			Complete	Feb-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
31	Kittanning	Cadogan	Kittanning	988	16
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Unknown	64%	Q1 2023
	SAIDI	1130	Trees off ROW	29%	
	SAIFI	1.91	Equipment Failure	6%	
	CAIDI	592	All Other	1%	
	Customer Minutes	1,116,180			
	Customers Affected	1,887			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
32	South Union	Rte. 119 North	Uniontown	1,734	21
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Trees off ROW	75%	Q1 2023
	SAIDI	626	Unknown	24%	
	SAIFI	1.85	Animal	1%	
	CAIDI	338	All Other	0%	
	Customer Minutes	1,085,133			
	Customers Affected	3,212			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
33	Millheim	Rebersburg	State College	809	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Trees off ROW	96%	Q4 2022
	SAIDI	1328	Line Failure	2%	Q1 2023
	SAIFI	1.7	Unknown	1%	
	CAIDI	783	All Other	1%	
	Customer Minutes	1,074,565			
	Customers Affected	1,372			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Dec-22
	Repair damage caused by a tree			Complete	Jan-23
	Overhead Circuit Inspection (62256793)			Complete	Feb-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
34	Hilliards	Hilliards	Butler	895	36
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Trees off ROW	68%	Q3 2022
	SAIDI	1190	Animal	22%	Q4 2022
	SAIFI	4.97	Forced Outage	6%	Q1 2023
	CAIDI	239	All Other	4%	
	Customer Minutes	1,064,992			
	Customers Affected	4,452			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by an animal			Complete	Aug-22
	Forced outage to repair damage			Complete	Nov-22
	Repair damage caused by a tree			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
35	Franklin	Rogersville	Jefferson	823	51
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.5	Line Failure	35%	Q2 2022
	SAIDI	1283	Trees off ROW	33%	Q3 2022
	SAIFI	2.7	Unknown	27%	Q4 2022
	CAIDI	475	All Other	5%	Q1 2023
	Customer Minutes	1,055,854			
	Customers Affected	2,224			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	Jun-22
	Repair line failure			Complete	Sep-22
	Restore unknown outage			Complete	Dec-22
	Repair damage caused by a tree			Complete	Mar-23
	Overhead Circuit Inspection (62259374)			In Progress	67%
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
36	Bentleyville	Ellsworth	Charleroi	1,214	37
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.4	Trees off ROW	66%	Q4 2022
	SAIDI	866	Forced Outage	22%	Q1 2023
	SAIFI	3.04	Unknown	8%	
	CAIDI	284	All Other	4%	
	Customer Minutes	1,050,868			
	Customers Affected	3,694			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Forced outage to repair damage			Complete	Dec-22
	Repair damage caused by a tree			Complete	Feb-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
37	Hickory	Fort Cherry	Washington	1,062	39
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.4	Unknown	73%	Q2 2022
	SAIDI	931	Trees off ROW	20%	Q3 2022
	SAIFI	1.88	Wind	5%	Q4 2022
	CAIDI	494	All Other	2%	Q1 2023
	Customer Minutes	988,440			
	Customers Affected	2,000			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	May-22
	Restore unknown outage during a storm			Complete	Jul-22
	Restore unknown outage			Complete	Dec-22
	Overhead Circuit Inspection (62259749)			Complete	Feb-23
	Repair damage caused by a tree			Complete	Feb-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
38	Rutan	Windridge	Jefferson	540	30
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.3	Trees off ROW	66%	Q3 2022
	SAIDI	1804	Wind	31%	Q4 2022
	SAIFI	3.04	Unknown	3%	Q1 2023
	CAIDI	594	All Other	0%	
	Customer Minutes	973,977			
	Customers Affected	1,641			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree			Complete	Aug-22
	Overhead Circuit Inspection (61645943)			Complete	Oct-22
	Repair damage caused by a tree			Complete	Nov-22
	Repair damage caused by wind			Complete	Mar-23
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
39	Vanceville	Vanceville	Charleroi	1385	63
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.3	Trees off ROW	43%	Q1 2023
	SAIDI	694	Line Failure	16%	
	SAIFI	2.17	Forced Outage	16%	
	CAIDI	320	All Other	25%	
	Customer Minutes	960,868			
	Customers Affected	3,002			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair line failure			Complete	Mar-23

West Penn Power					
Rank	**Substation**	**Circuit**	**District**	**Customers**	**Outages**
40	Cecil	Bishop	Boyce	2011	32
	Reliability		**Outage by Cause**		**Previously Ranked**
	SAIDI Impact	1.3	Trees off ROW	44%	Q2 2022
	SAIDI	475	Equipment Failure	26%	Q3 2022
	SAIFI	2.19	Unknown	14%	Q4 2022
	CAIDI	217	All Other	16%	Q1 2023
	Customer Minutes	954,914			
	Customers Affected	4,397			
	Remedial Action Planned or Taken		**Status**	**Progress**	
	Repair damage caused by a tree during a storm			Complete	May-22
	Repair damage caused by a tree during a storm			Complete	Jul-22
	Restore unknown outage			Complete	Nov-22
	Repair equipment failure			Complete	Mar-23

West Penn					
Unranked circuits appearing 2 or more quarters in the last 4 quarters					
Substation	**Circuit**	**2Q 2022**	**3Q 2022**	**4Q 2022**	**1Q 2023**
Amity	Banetown	X			
Avella	Penowa	X			
Avella	W Middletown	X	X		
Cecil	Murray Hill	X			
Crossgates	Peters Twp	X			
Flintstone	Chaneysville	X			
Gordon	Wolfdale	X			X
Graysville	Graysville	X	X		
Karns City	Kaylor	X			X
Midway	Midway	X			
North Fayette	Tyre	X	X		
Paris	Paris	X	X		
Peters	Library	X			
Thomas	Thomas	X	X		
Treveskyn	Treveskyn	X			
Vestaburg	Fredericktown	X			

West Penn				
Unranked circuits with remedial actions scheduled to be or recently completed				
Substation	**Circuit**	**Remedial Action Planned**	**Status of Remedial Work**	**Progress of Remedial Work**
Dutch Fork	Claysville	Overhead Circuit Inspection	Complete	Jan-23

Pursuant to Docket Nos. D-2014-2365991, D-2014-2365992, D-2014-2365993, and D-2014-2365994, (Appendix A)(3): *The Companies are directed to track and measure line hit incidents, causes of line hits, and damage recovery amounts for all third-party line hit incidents for each Company.*

Met-Ed –Third Party Line Hit Incidents			
1st Quarter 2023 12-Month Rolling			
Cause of Line Hit	**Number of Incidents**	**Invoice Amount ($)**	**Recovery Amount ($)**
Dig In - Other	12	18,997	0
Excavated in Tolerance	27	54,590	0
Excavation Inconsistent with Ticket Scope	5	10,328	0
Excavation Prior to Lawful Start Date	3	3,448	0
Expired Ticket	3	3,564	0
Hand Digging	0	0	0
Marked Improperly	19	120,745	0
No Ticket	26	84,304	1,141
Total	**95**	**295,976.00**	**1,141**

Penelec – Third Party Line Hit Incidents			
1st Quarter 2023 12-Month Rolling			
Cause of Line Hit	**Number of Incidents**	**Invoice Amount ($)**	**Recovery Amount ($)**
Dig In - Other	32	84,604	935
Excavated in Tolerance	31	70,654	364
Excavation Inconsistent with Ticket Scope	2	994	994
Excavation Prior to Lawful Start Date	4	3,392	777
Expired Ticket	5	20,649	1,933
Hand Digging	2	7,789	0
Marked Improperly	27	138,202	0
No Ticket	32	50,603	6,387
Total	**135**	**376,887**	**11,390**

Penn Power – Third Party Line Hit Incidents			
1st Quarter 2023 12-Month Rolling			
Cause of Line Hit	**Number of Incidents**	**Invoice Amount ($)**	**Recovery Amount ($)**
Dig In - Other	9	5,068	0
Excavated in Tolerance	9	6,346	154
Excavation Inconsistent with Ticket Scope	5	3,569	0
Excavation Prior to Lawful Start Date	1	0	0
Expired Ticket	1	0	0
Hand Digging	0	0	0
Marked Improperly	2	9,825	0
No Ticket	5	6,728	300
Total	**32**	**31,536**	**454**

West Penn – Third Party Line Hit Incidents			
1st Quarter 2023 12-Month Rolling			
Cause of Line Hit	**Number of Incidents**	**Invoice Amount ($)**	**Recovery Amount ($)**
Dig In - Other	60	50,470	2,947
Excavated in Tolerance	18	29,019	3,104
Excavation Inconsistent with Ticket Scope	4	5,642	0
Excavation Prior to Lawful Start Date	2	2,091	0
Expired Ticket	1	1,239	0
Hand Digging	2	0	0
Marked Improperly	26	108,600	5,533
No Ticket	29	88,116	9,971
Total	**142**	**285,177**	**21,555**

Cause of Line Hit	Definition
Dig In - Other	Still under investigation
Excavated in Tolerance	Excavator didn't use prudent digging techniques within the Tolerance Zone
Excavation Inconsistent with Ticket Scope	Excavation outside dig box and/or scope of ticket
Excavation Prior to Lawful Start Date	Three business days prior to start of excavation from when the ticket was called in to mark
Expired Ticket	After ten business days have passed, the ticket is considered expired
Hand Digging	Excavator was hand digging within the Tolerance Zone, however the facility was still hit
Marked Improperly	Ticket called in, facility and/or equipment was not marked properly
No Ticket	No contact was made to create a dig-request ticket

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Metropolitan Edison Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Metropolitan Edison Company ("Met-Ed" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Met-Ed serves more than 565,000 Pennsylvania customers and the service territory covers more than 3,000 square miles. From the physical field employees up to and including top management, Met-Ed is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Met-Ed utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way is underway.
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - Met-Ed first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Met-Ed submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Met-Ed's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Met-Ed's ~~proposed~~ revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise ~~is~~ consistent with its previously approved plan for ~~2021~~ 2023 and ~~2022~~ 2024 and proposes no substantive changes to its inspection cycles ~~or plan components~~.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Met-Ed's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Met-Ed will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Met-Ed performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application; low-volume foliage application; basal-herbicide applications; stump applications; frill application; aerial application; bare-soil treatment application; and cut-stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

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Further detailed information regarding Met-Ed's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Met-Ed has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

Met-Ed's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Met-Ed's rights-of-way.

As part of Met-Ed's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

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Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Met-Ed's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Met-Ed *11,510 total circuit miles*	Boyertown *768 total circuit miles*	192	337
	Easton *1,441 total circuit miles*	366	313
	Hanover *1,963 total circuit miles*	491	486
	Lebanon *1,494 total circuit miles*	350	388
	Reading *2,385 total circuit miles*	580	455
	Stroudsburg *1,107 total circuit miles*	275	306
	York *2,352 total circuit miles*	612	585

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Met-Ed shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper hydroxide and disodium octaborate

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tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding Met-Ed's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Met-Ed could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Met-Ed submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Met-Ed's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be reduced over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

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Met-Ed's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity or service reliability.

In addition to Met-Ed's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Met-Ed from conducting pole loading calculations as a part of its pole inspections. Met-Ed requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Met-Ed follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Met-Ed poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Pole Inspections Planned *Number of Poles*	
		2023	**2024**
Met-Ed *340,192 total poles*	Boyertown *22,126 total poles*	4,893	0
	Dillsburg *19,852 total poles*	5,163	4,960
	Easton *41,536 total poles*	4,509	7,108
	Gettysburg *14,376 total poles*	0	0
	Hamburg *21,894 total poles*	1,051	0
	Hanover *25,792 total poles*	3,914	1,861
	Lebanon *44,789 total poles*	6,603	7,335
	Reading *41,156 total poles*	6,345	2,791
	Stroudsburg *38,053 total poles*	14,323	2,733
	York *70,618 total poles*	2,612	11,554

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Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Met-Ed shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Met-Ed's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

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Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Met-Ed could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Met-Ed requests a continuation of the waiver for the currently proposed period.

Met-Ed's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* Met-Ed's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Met-Ed's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, Met-Ed may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

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Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Overhead Line Inspections Planned *Number of Circuits*	
		2023	**2024**
Met-Ed *787 Total Circuits*	Boyertown *30 total circuits*	6	6
	Dillsburg 19 *total circuits*	3	6
	Easton 113 *total circuits*	25	26
	Gettysburg 30 *total circuits*	4	7
	Hamburg 23 *total circuits*	3	4
	Hanover 60 *total circuits*	16	18
	Lebanon 103 *total circuits*	18	20
	Reading 168 *total circuits*	35	30
	Stroudsburg 34 *total circuits*	2	7
	York 207 *total circuits*	39	46

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Met-Ed inspects overhead distribution transformers as part of the overhead line inspection. Above-ground pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured

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- Equipment condition – visually inspect baffle

Further detailed information regarding Met-Ed's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Met-Ed requests a continuation of the waiver for the currently proposed period.

Met-Ed's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Met-Ed. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Met-Ed's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Met-Ed's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Type *(Total Number of Transformers)*	Transformer Inspections Planned *Total transformers*	
			2023	2024
Met-Ed *170,8244 total transformers*	Boyertown *14,802 total transformers*	Overhead Transformers *10,365 total transformers*	2,779	955
		Above-Ground Pad-mounted *4,354 total transformers*	1,789	711
		Below-Ground Transformers *83 total transformers*	35	20
	Dillsburg *11,378 total transformers*	Overhead Transformers *8,391 total transformers*	1,484	3,257
		Above-Ground Pad-mounted *2,958 total transformers*	752	1,106
		Below-Ground Transformers *29 total transformers*	9	12
	Easton *16,483 total transformers*	Overhead Transformers *12,032 total transformers*	1,843	2,764
		Above-Ground Pad-mounted *4,254 total transformers*	641	903
		Below-Ground Transformers *197 total transformers*	11	90
	Gettysburg 7,008 *total transformers*	Overhead Transformers *5,574 total transformers*	1,195	1,696
		Above-Ground Pad-mounted *1,406 total transformers*	275	272
		Below-Ground Transformers *28 total transformers*	1	3
	Hamburg *10,589 total transformers*	Overhead Transformers *8,091 total transformers*	1,007	2,050
		Above-Ground Pad-mounted *2,420 total transformers*	352	629
		Below-Ground Transformers *78 total transformers*	5	27
	Hanover *14,713 total transformers*	Overhead Transformers *9,906 total transformers*	3,746	2,729
		Above-Ground Pad-mounted *4,727 total transformers*	1,669	1,299

		Below-Ground Transformers *80 total transformers*	48	14
	Lebanon *21,096 total transformers*	Overhead Transformers *14,755 total transformers*	3,959	2,895
		Above-Ground Pad-mounted 6,003 total transformers	1,719	1,398
		Below-Ground Transformers *338 total transformers*	99	64
	Reading *21,054 total transformers*	Overhead Transformers *14,852 total transformers*	3,885	2,282
		Above-Ground Pad-mounted *5,921 total transformers*	1,980	810
		Below-Ground Transformers *281 total transformers*	87	82
	Stroudsburg 13,489 *total transformers*	Overhead Transformers *11,344 total transformers*	1,431	2,491
		Above-Ground Pad-mounted *2,081 total transformers*	54	513
		Below-Ground Transformers *64 total transformers*	0	0
	York *40,212 total transformers*	Overhead Transformers *26,645 total transformers*	7,462	5,583
		Above-Ground Pad-mounted *13,241 total transformers*	3,009	3.375
		Below-Ground Transformers *326 total transformers*	79	134

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Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Met-Ed visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Met-Ed's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Met-Ed's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Met-Ed. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in

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a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Met-Ed's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
Met-Ed *1,453 total reclosers*	Boyertown 88 *total reclosers*	Single Phase *28 total reclosers*	28	28
		Three Phase *60 total reclosers*	60	60
	Dillsburg *86 total reclosers*	Single Phase 27 *total reclosers*	27	27
		Three Phase *59 total reclosers*	59	59
	Easton 153 *total reclosers*	Single Phase 37 *total reclosers*	37	37
		Three Phase 116 *total reclosers*	116	116
	Gettysburg 67 *total reclosers*	Single Phase 20 *total reclosers*	20	20
		Three Phase 477 *total reclosers*	47	47
	Hamburg 103 *total reclosers*	Single Phase *47 total reclosers*	47	47
		Three Phase 56 *total reclosers*	56	56

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	Hanover 98 *total reclosers*	Single Phase 33 *total reclosers*	33	33
		Three Phase 65 *total reclosers*	65	65
	Lebanon 245 *total reclosers*	Single Phase *96 total reclosers*	96	96
		Three Phase 149 *total reclosers*	149	149
	Reading 191 *total reclosers*	Single Phase *77 total reclosers*	77	77
		Three Phase 114 *total reclosers*	114	114
	Stroudsburg 109 *total reclosers*	Single Phase 14 *total reclosers*	14	14
		Three Phase *95 total reclosers*	95	95
	York *313 total reclosers*	Single Phase *68 total reclosers*	68	68
		Three Phase *245 total reclosers*	245	245

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Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Met-Ed inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Met-Ed substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Met-Ed substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
   - General condition – read and record ambient temperature
   - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

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- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Met-Ed's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Met-Ed is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Substation Inspections Planned *Number of Substations*	
		2023	**2024**
Met-Ed *209 total substations*	Easton *43 substations*	516	516
	Lebanon 31 *substations*	372	372
	Reading *59 substations*	708	708
	York *76 substations*	912	912

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Pennsylvania Electric Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Penelec
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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Pennsylvania Electric Company ("Penelec" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024 in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Penelec serves more than 580,000 Pennsylvania customers and the service territory covers nearly 10,000 square miles. From the physical field employees up to and including top management, Penelec is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Penelec utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
    - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way was completed in 2019. Beyond 2019, any additional ash trees are addressed under Penelec's hazardous tree maintenance process.
    - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
    - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
    - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
    - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution-system reliability performance; protect equipment and facilities from overcurrent risks

that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
  - Penelec first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy, and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Penelec submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Penelec's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Penelec's ~~proposed~~ revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise ~~is~~ consistent with its previously approved plan for 2023~~1~~ and 2024~~2~~ and proposes no substantive changes to its inspection cycles ~~or plan components~~.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Penelec's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Penelec will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Penelec performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removal of off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil-treatment application, and cut stubble applications. All herbicides shall be applied in accordance with all state, local and federal laws governing the use of herbicides.

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Further detailed information regarding Penelec's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Penelec has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree related reliability on the selected line sections.

Penelec's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Penelec's rights-of-way.

As part of Penelec's approach to improving tree related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Penelec's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Penelec *18,113 total circuit miles*	Altoona *1,769 total circuit miles*	356	347
	Clearfield *1,628 total circuit miles*	314	320
	Dubois *1,623 total circuit miles*	326	329
	Erie *1,715 total circuit miles*	432	429
	Johnstown *1,773 total circuit miles*	354	357
	Lewistown *1,690 total circuit miles*	339	345
	Oil City *2,051 total circuit miles*	405	413
	Towanda *4,044 total circuit miles*	806	791
	Warren *1,819 total circuit miles*	371	361

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Penelec shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper hydroxide and disodium octaborate

tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding Penelec's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Penelec could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Penelec submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Penelec's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be reduced over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

Penelec's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Penelec from conducting pole loading calculations as a part of its pole inspections. Penelec requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Penelec follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Penelec poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole attachment guidelines, experience and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	**2024**
Penelec *498,980 total poles*	Altoona *58,775 total poles*	4,255	5,526
	Clearfield *39,007 total poles*	2,931	3,129
	Dubois *46,201 total poles*	4,876	3,986
	Erie *73,712 total poles*	6,398	7,851
	Johnstown *59,872 total poles*	4,417	4,839
	Lewistown *35,849 total poles*	2,632	4,159
	Oil City *57,091 total poles*	6,274	3,759
	Towanda *90,544 total poles*	7,607	5,654
	Warren *37,929 total poles*	2,191	2,679

Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Penelec shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of

abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Penelec's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Penelec could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Penelec requests a continuation of the waiver for the currently proposed period.

Penelec's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and*

maintained at such intervals as experience has shown to be necessary." Penelec's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst performing circuit performance. Lastly, Penelec may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Overhead Line Inspections Planned** *(Number of Circuits)*	
		2023	**2024**
Penelec *1,244 total circuits*	Altoona 175 *total circuits*	36	37
	Clearfield *64 total circuits*	12	14
	Dubois *95 total circuits*	23	19
	Erie *199 total circuits*	39	38
	Johnstown 134 *total circuits*	26	27
	Lewistown *81 total circuits*	15	15
	Oil City *141 total circuits*	27	28
	Towanda *256 total circuits*	52	53

	Warren *96 total circuits*	19	20

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Penelec inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured

- Equipment condition – visually inspect baffle

Further detailed information regarding Penelec's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Penelec requests a continuation of the waiver for the currently proposed period.

Penelec's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Penelec. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Penelec's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Transformer Inspections Planned *(Total Number of Transformers)*	
			2023	2024
Penelec *201,112 total transformers*	Altoona *29,473 total transformers*	Overhead Transformers *24,123 total transformers*	4,588	5,270
		Above-Ground Pad-mounted *5,070 total transformers*	983	1,013
		Below-Ground Transformers *280 total transformers*	57	49
	Clearfield *17,196 total transformers*	Overhead Transformers *15,616 total transformers*	2,911	2,591
		Above-Ground Pad-mounted *1,445 total transformers*	263	334
		Below-Ground Transformers *135 total transformers*	31	17
	Dubois *17,292 total transformers*	Overhead Transformers *14,907 total transformers*	3,283	2,922
		Above-Ground Pad-mounted *2,217 total transformers*	608	349
		Below-Ground Transformers *168 total transformers*	46	33
	Erie *27,956 total transformers*	Overhead Transformers *22,618 total transformers*	4,307	4.360
		Above-Ground Pad-mounted *5.221 total transformers*	1,230	854
		Below-Ground Transformers *117 total transformers*	31	21
	Johnstown *23,538 total transformers*	Overhead Transformers *19,997 total transformers*	3,773	4,325
		Above-Ground Pad-mounted *3,360 total transformers*	562	622
		Below-Ground Transformers *181 total transformers*	21	44
		Overhead Transformers *13,672 total transformers*	2,650	2,142

	Lewistown *16,560 total transformers*	Above-Ground Pad-mounted *2,721 total transformers*	511	496
		Below-Ground Transformers *167 total transformers*	41	39
	Oil City *21,134 total transformers*	Overhead Transformers *18,580 total transformers*	4,376	3,981
		Above-Ground Pad-mounted *2,390 total transformers*	582	579
		Below-Ground Transformers *164 total transformers*	14	57
	Towanda *34,512 total transformers*	Overhead Transformers *31,274 total transformers*	6,665	7,579
		Above-Ground Pad-mounted *3,024 total transformers*	570	656
		Below-Ground Transformers *214 total transformers*	28	32
	Warren *13,451 total transformers*	Overhead Transformers *12,296 total transformers*	1,970	2,142
		Above-Ground Pad-mounted *1,138 total transformers*	305	193
		Below-Ground Transformers *17 total transformers*	11	2

Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Penelec visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Penelec's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Penelec's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Penelec. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation

prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
Penelec 2,593 *total reclosers*	Altoona *353 total reclosers*	Single Phase *257 total reclosers*	257	257
		Three Phase *96 total reclosers*	96	96
	Clearfield *272 total reclosers*	Single Phase *223 total reclosers*	223	223
		Three Phase *49 total reclosers*	49	49
	Dubois *143 total reclosers*	Single Phase *80 total reclosers*	80	80
		Three Phase 63 total reclosers	63	63
	Erie *447 total reclosers*	Single Phase 318 *total reclosers*	318	318
		Three Phase *129 total reclosers*	129	129
	Johnstown *131 total reclosers*	Single Phase *42 total reclosers*	42	42
		Three Phase 89 *total reclosers*	89	89
	Lewistown *177 total reclosers*	Single Phase 140 *total reclosers*	140	140
		Three Phase *37 total reclosers*	37	37
	Oil City *414 total reclosers*	Single Phase *343 total reclosers*	343	343
		Three Phase *71 total reclosers*	71	71
	Towanda *419 total reclosers*	Single Phase *328 total reclosers*	328	328
		Three Phase *91 total reclosers*	91	91
	Warren *237 total reclosers*	Single Phase *198 total reclosers*	198	198
		Three Phase *39 total reclosers*	39	39

Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Penelec inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Penelec substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Penelec substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include but is not limited to the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include but is not limited to all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include but is not limited to all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Penelec's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Penelec is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Substation Inspections Planned *Number of Substations*	
		2023	**2024**
Penelec *392 total substations*	Altoona *63 substations*	756	756
	Clearfield *50 substations*	600	600
	Erie *41 substations*	492	492
	Indiana *11 substations*	132	132
	Lewistown *42 substations*	504	504
	Mansfield *21 substations*	252	252
	Oil City *35 substations*	420	420
	Richland *47 substations*	564	564
	Towanda *28 substations*	336	336
	Warren *26 substations*	312	312

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Pennsylvania Power Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Pennsylvania Power Company ("Penn Power" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Penn Power serves more than 166,000 Pennsylvania customers and the service territory covers more than 1,400 square miles. From the physical field employees up to and including top management, Penn Power is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Penn Power utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way was completed in 2018. Beyond 2018, any additional ash trees are addressed under Penn Power's hazardous tree maintenance process .
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data, and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution-system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

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- Long-Term Infrastructure Improvement Plans ("LTIIP")
  - Penn Power first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Penn Power submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Penn Power's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Penn Power's ~~proposed~~ revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise ~~is~~ consistent with its previously approved plan for 2023~~1~~ and 2024~~2~~ and proposes no substantive changes to its inspection cycles ~~or plan components~~.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Penn Power's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations, and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Penn Power will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Penn Power performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate, and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers, or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil-treatment application, and cut-stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

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Further detailed information regarding Penn Power's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Penn Power has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

Penn Power's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Penn Power's rights-of-way.

As part of Penn Power's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

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Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Penn Power's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Penn Power *4,573 total circuit miles*	Mercer *2,147 total circuit miles*	429	430
	New Castle *1,231 total circuit miles*	246	246
	Zelienople *1,195 total circuit miles*	239	239

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Penn Power shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper

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hydroxide and disodium octaborate tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding Penn Power's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Penn Power could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Penn Power submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Penn Power's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be maintained over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

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Penn Power's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Penn Power from conducting pole loading calculations as a part of its pole inspections. Penn Power requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Penn Power follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Penn Power poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	**2024**
Penn Power *128,975 total poles*	Clark *60,674 total poles*	5,000	5,000
	Zelienople *68,301 total poles*	5,600	5,600

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Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Penn Power shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Penn Power's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

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Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Penn Power could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Penn Power requests a continuation of the waiver for the currently proposed period.

Penn Power's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* Penn Power's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, Penn Power may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

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Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Overhead Line Inspections Planned** ***(Number of Circuits)***	
		2023	**2024**
Penn Power *183 total circuits*	Clark *57 total circuits*	12	12
	Zelienople *126 total circuits*	26	26

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Penn Power inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground, pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured
- Equipment condition – visually inspect baffle

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Further detailed information regarding Penn Power's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Penn Power requests a continuation of the waiver for the currently proposed period.

Penn Power's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Penn Power. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Penn Power's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Type	Transformer Inspections Planned *Total transformers*	
			2023	**2024**
Penn Power *64,048 total transformers*	Clark *26,638 total transformers*	Overhead Transformers *23,871 total transformers*	4,100	6,300
		Above-Ground Pad-mounted *2,767 total transformers*	400	700
		Below-Ground Transformers *0 transformers*	0	0
	Zelienople *38,410 total transformers*	Overhead Transformers *27,721 total transformers*	6,100	4,700
		Above-Ground Pad-mounted *10,689 total transformers*	2,300	1,900
		Below-Ground Transformers *0 total transformers*	0	0

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Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Penn Power visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes, but is not limited to, the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Penn Power's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Penn Power's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Penn Power. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

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In addition to Penn Power's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Type**	**Recloser Inspections Planned** ***Total number of Reclosers***	
			2023	**2024**
Penn Power 718 *total reclosers*	Clark 345 *total reclosers*	Single Phase *229 total reclosers*	229	229
		Three Phase 116 *total reclosers*	116	116
	Zelienople 373 *total reclosers*	Single Phase *274 total reclosers*	274	274
		Three Phase *99 total reclosers*	99	99

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Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Penn Power inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Penn Power substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Penn Power substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures, and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

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- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B).* In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A).* In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Penn Power's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Penn Power is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Substation Inspections Planned** ***(Number of Substations)***	
		2023	**2024**
Penn Power 74 *total substations*	New Castle 74 *total substations*	888	888

Biennial Inspection, Maintenance, Repair and Replacement Plan for West Penn Power Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. West Penn Power Company ("West Penn" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

West Penn serves more than 722,000 Pennsylvania customers and the service territory covers more than 6,300 square miles. From the physical field employees up to and including top management, West Penn is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, West Penn utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way is underway.
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - West Penn first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

West Penn submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that West Penn's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

West Penn's revised I&M Plan for 2023 and 2024 proposes the addition of a distribution pole treatment program but is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles. ~~to revise its inspection cycle for distribution overhead lines and equipment (including overhead distribution transformers) from a six-year cycle to a five-year cycle.~~

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

West Penn's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, West Penn will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

West Penn performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate, and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil treatment application, and cut stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

Further detailed information regarding West Penn's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. West Penn has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

West Penn's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on West Penn's rights-of-ways.

As part of West Penn's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to West Penn's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	**2024**
West Penn Power *19,939 total circuit miles*	Arnold *1,491 total circuit miles*	264	309
	Boyce 668 *total circuit miles*	67	107
	Butler *1,321 total circuit miles*	262	278
	Charleroi *1,416 total circuit miles*	337	289
	Clarion *562 total circuit miles*	154	83
	Hyndman *356 total circuit miles*	94	106
	Jeannette *1,219 total circuit miles*	226	218
	Jefferson *1,523 total circuit miles*	277	345
	Kittanning *981 total circuit miles*	154	240
	Latrobe *1,207 total circuit miles*	286	231
	McConnellsburg *943 total circuit miles*	275	65
	Pleasant Valley *1,128 total circuit miles*	250	242
	St. Marys *1,210 total circuit miles*	251	242
	State College *1,689 total circuit miles*	315	342
	Uniontown *1,265 total circuit miles*	302	213
	Washington *1,685 total circuit miles*	293	393
	Waynesboro *1,274 total circuit miles*	357	284

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

West Penn shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper

hydroxide and disodium octaborate tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding West Penn's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that West Penn could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] West Penn submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring West Penn's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be maintained over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020 at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

West Penn's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously exempted West Penn from conducting pole loading calculations as a part of its pole inspections. West Penn requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, West Penn follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to West Penn poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	**2024**
West Penn Power *502,925 total poles*	Arnold *42,881 total poles*	4,739	4,225
	Boyce *18,811 total poles*	1,323	1,894
	Butler *32,465 total poles*	1,957	4,836
	Charleroi *44,401 total poles*	4,888	4,201
	Clarion *11,782 total poles*	1,914	1,832
	Hyndman *6,111 total poles*	37	0
	Jeannette *36,092 total poles*	3,303	1,514
	Jefferson *32,716 total poles*	2,234	851
	Kittanning *20,791 total poles*	1,013	1,681
	Latrobe *30,665 total poles*	2,653	3,204
	McConnellsburg *18,480 total poles*	2,335	826
	Pleasant Valley *29,554 total poles*	5,143	1,526
	St. Marys *27,690 total poles*	2,606	2,492
	State College *39,099 total poles*	3,391	3,974
	Uniontown *35,738 total poles*	3,843	2,189
	Washington *44,129 total poles*	5,248	1,746
	Waynesboro *31,520 total poles*	2,318	2,103

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Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

West Penn shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding West Penn's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

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Corrective Maintenance

Supporting structures with recorded defects that West Penn could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

West Penn's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* West Penn's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, West Penn may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Overhead Line Inspections Planned *(Number of Circuits)*	
		2023	**2024**
West Penn Power *838 total circuits*	Arnold *76 total circuits*	12	21
	Boyce *47 total circuits*	7	12
	Butler *68 total circuits*	11	13
	Charleroi *77 total circuits*	12	18
	Clarion *17 total circuits*	3	5
	Hyndman *12 total circuits*	3	0
	Jeannette *67 total circuits*	14	15
	Jefferson *41 total circuits*	6	7
	Kittanning *30 total circuits*	5	6
	Latrobe *38 total circuits*	4	8
	McConnellsburg *26 total circuits*	5	9
	Pleasant Valley *42 total circuits*	10	10
	St. Marys *54 total circuits*	8	11
	State College *77 total circuits*	15	23
	Uniontown *53 total circuits*	12	12
	Washington *51 total circuits*	10	10
	Waynesboro *62 total circuits*	11	12

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

West Penn inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers and below-ground transformers are inspected on a five-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground, pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured
- Equipment condition – visually inspect baffle

Further detailed information regarding West Penn's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

West Penn's five-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of West Penn. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

West Penn's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Type	Transformer Inspections Planned *Total transformers*	
			2023	2024
West Penn Power *323,758 total transformers*	Arnold *26,631 total transformers*	Overhead Transformers *24,072 total transformers*	3,669	6,077
		Above-Ground Pad-mounted *2,559 total transformers*	630	385
	Boyce *18,279 total transformers*	Overhead Transformers *12,499 total transformers*	1,450	3,558
		Above-Ground Pad-mounted *5,780 total transformers*	1,202	1,456
	Butler *24,545 total transformers*	Overhead Transformers 20,268 *total transformers*	2,907	5,066
		Above-Ground Pad-mounted *4,277 total transformers*	856	870
	Charleroi *31,699 total transformers*	Overhead Transformers *28,466 total transformers*	5,638	5,028
		Above-Ground Pad-mounted *3,233 total transformers*	575	630
	Clarion *6,539 total transformers*	Overhead Transformers *5,839 total transformers*	1,054	1,552
		Above-Ground Pad-mounted *700 total transformers*	152	126
	Hyndman *3,036 total transformers*	Overhead Transformers *2,757 total transformers*	22	0
		Above-Ground Pad-mounted *279 total transformers*	0	137
	Jeannette *31,276 total transformers*	Overhead Transformers *25,739 total transformers*	6,768	4,215
		Above-Ground Pad-mounted *5,337 total transformers*	1,071	792
	Jefferson *15,371 total transformers*	Overhead Transformers *14,531 total transformers*	1,939	2,733
		Above-Ground Pad-mounted *840 total transformers*	152	160
		Overhead Transformers *10,425 total transformers*	1,056	2,088

	Kittanning *11,348 total transformers*	Above-Ground Pad-mounted *923 total transformers*	101	242
	Latrobe *19,826 total transformers*	Overhead Transformers *17,284 total transformers*	2,506	3,893
		Above-Ground Pad-mounted *2,542 total transformers*	594	374
	McConnellsburg *8,399 total transformers*	Overhead Transformers *7,486 total transformers*	1,665	1,780
		Above-Ground Pad-mounted *913 total transformers*	220	185
	Pleasant Valley *18,065 total transformers*	Overhead Transformers *16,358 total transformers*	6,016	1,672
		Above-Ground Pad-mounted *1,707 total transformers*	332	253
	St. Mary's *15,936 total transformers*	Overhead Transformers *14,756 total transformers*	2,378	3,900
		Above-Ground Pad-mounted *1,180 total transformers*	240	213
	State College *25,577 total transformers*	Overhead Transformers *19,146 total transformers*	4,077	4,831
		Above-Ground Pad-mounted *6,431 total transformers*	1,902	1,404
	Uniontown *21,189 total transformers*	Overhead Transformers *19,109 total transformers*	3,834	3,624
		Above-Ground Pad-mounted *2,080 total transformers*	186	434
	Washington *25,006 total transformers*	Overhead Transformers *21,742 total transformers*	4,722	4,248
		Above-Ground Pad-mounted *3,264 total transformers*	522	809
	Waynesboro *21,036 total transformers*	Overhead Transformers *15,795 total transformers*	2,057	4,155
		Above-Ground Pad-mounted *5,241 total transformers*	896	703

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Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

West Penn visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes, but is not limited to, the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding West Penn's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

West Penn's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of West Penn. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation

prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
West Penn Power *4,034 total reclosers*	Arnold *339 total reclosers*	Single Phase *335 total reclosers*	335	335
		Three Phase *4 total reclosers*	4	4
	Boyce *369 total reclosers*	Single Phase *366 total reclosers*	366	366
		Three Phase *3 total reclosers*	3	3
	Butler *337 total reclosers*	Single Phase *336 total reclosers*	336	336
		Three Phase *1 total reclosers*	1	1
	Charleroi *285 total reclosers*	Single Phase *281 total reclosers*	281	281
		Three Phase *4 total reclosers*	4	4
	Clarion *87 total reclosers*	Single Phase *86 total reclosers*	86	86
		Three Phase *1 total reclosers*	1	1
	Hyndman *65 total reclosers*	Single Phase *65 total reclosers*	65	65
		Three Phase *0 total reclosers*	0	0
	Jeannette *345 total reclosers*	Single Phase *343 total reclosers*	343	343
		Three Phase *2 total reclosers*	2	2
	Jefferson *206 total reclosers*	Single Phase *1999 total reclosers*	199	199
		Three Phase *7 total reclosers*	7	7
		Single Phase *130 total reclosers*	130	130

	Kittanning *132 total reclosers*	Three Phase *2 total reclosers*	2	2
	Latrobe *223 total reclosers*	Single Phase *223 total reclosers*	223	223
		Three Phase *0 total reclosers*	0	0
	McConnellsburg *155 total reclosers*	Single Phase *155 total reclosers*	155	155
		Three Phase *0 total reclosers*	0	0
	Pleasant Valley *164 total reclosers*	Single Phase *164 total reclosers*	164	164
		Three Phase *0 total reclosers*	0	0
	St. Marys *150 total reclosers*	Single Phase *147 total reclosers*	147	147
		Three Phase *3 total reclosers*	3	3
	State College *170 total reclosers*	Single Phase *158 total reclosers*	158	158
		Three Phase *12 total reclosers*	12	12
	Uniontown *247 total reclosers*	Single Phase *246 total reclosers*	246	246
		Three Phase *1 total reclosers*	1	1
	Washington *446 total reclosers*	Single Phase *444 total reclosers*	444	444
		Three Phase *2 total reclosers*	2	2
	Waynesboro *314 total reclosers*	Single Phase *313 total reclosers*	313	313
		Three Phase *1 total reclosers*	1	1

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Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

West Penn inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at West Penn substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at West Penn substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures, and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding West Penn's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, West Penn is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Substation Inspections Planned *Number of Substations*	
		2023	**2024**
West Penn Power *495 total substations*	Arnold *49 substations*	588	588
	Boyce *27 substations*	324	324
	Butler *41 substations*	492	492
	Charleroi *43 substations*	516	516
	Jeannette 28 *substations*	336	336
	Jefferson *52 substations*	624	624
	Kittanning *25 substations*	300	300
	Latrobe *26 substations*	312	312
	Pleasant Valley *46 substations*	552	552
	St. Marys *37 substations*	444	444
	State College *38 substations*	456	456
	Washington *28 substations*	336	336
	Waynesboro *35 substations*	420	420

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Metropolitan Edison Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

Met-Ed
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Met-Ed
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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Metropolitan Edison Company ("Met-Ed" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Met-Ed serves more than 565,000 Pennsylvania customers and the service territory covers more than 3,000 square miles. From the physical field employees up to and including top management, Met-Ed is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Met-Ed utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way is underway.
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

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- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - Met-Ed first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Met-Ed submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Met-Ed's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Met-Ed's revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Met-Ed's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Met-Ed will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Met-Ed performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application; low-volume foliage application; basal-herbicide applications; stump applications; frill application; aerial application; bare-soil treatment application; and cut-stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

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Further detailed information regarding Met-Ed's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Met-Ed has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

Met-Ed's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Met-Ed's rights-of-way.

As part of Met-Ed's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

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Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Met-Ed's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Met-Ed *11,510 total circuit miles*	Boyertown *768 total circuit miles*	192	337
	Easton *1,441 total circuit miles*	366	313
	Hanover *1,963 total circuit miles*	491	486
	Lebanon *1,494 total circuit miles*	350	388
	Reading *2,385 total circuit miles*	580	455
	Stroudsburg *1,107 total circuit miles*	275	306
	York *2,352 total circuit miles*	612	585

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Met-Ed shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper

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hydroxide and disodium octaborate tetrahydrate. The selected treatment method will be based on the best available information at the time.
Further detailed information regarding Met-Ed's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Met-Ed could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Met-Ed submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Met-Ed's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be reduced over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

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Met-Ed's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity or service reliability.

In addition to Met-Ed's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Met-Ed from conducting pole loading calculations as a part of its pole inspections. Met-Ed requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Met-Ed follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Met-Ed poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Pole Inspections Planned *Number of Poles*	
		2023	**2024**
Met-Ed *340,192 total poles*	Boyertown *22,126 total poles*	4,893	0
	Dillsburg *19,852 total poles*	5,163	4,960
	Easton *41,536 total poles*	4,509	7,108
	Gettysburg *14,376 total poles*	0	0
	Hamburg *21,894 total poles*	1,051	0
	Hanover *25,792 total poles*	3,914	1,861
	Lebanon *44,789 total poles*	6,603	7,335
	Reading *41,156 total poles*	6,345	2,791
	Stroudsburg *38,053 total poles*	14,323	2,733
	York *70,618 total poles*	2,612	11,554

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Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Met-Ed shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Met-Ed's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

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Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Met-Ed could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Met-Ed requests a continuation of the waiver for the currently proposed period.

Met-Ed's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* Met-Ed's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Met-Ed's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, Met-Ed may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

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Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Overhead Line Inspections Planned *Number of Circuits*	
		2023	**2024**
Met-Ed *787 Total Circuits*	Boyertown *30 total circuits*	6	6
	Dillsburg 19 *total circuits*	3	6
	Easton 113 *total circuits*	25	26
	Gettysburg 30 *total circuits*	4	7
	Hamburg 23 *total circuits*	3	4
	Hanover 60 *total circuits*	16	18
	Lebanon 103 *total circuits*	18	20
	Reading 168 *total circuits*	35	30
	Stroudsburg 34 *total circuits*	2	7
	York 207 *total circuits*	39	46

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Met-Ed inspects overhead distribution transformers as part of the overhead line inspection. Above-ground pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured

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- Equipment condition – visually inspect baffle

Further detailed information regarding Met-Ed's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Met-Ed requests a continuation of the waiver for the currently proposed period.

Met-Ed's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Met-Ed. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Met-Ed's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Met-Ed's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Type *(Total Number of Transformers)*	Transformer Inspections Planned *Total transformers*	
			2023	2024
Met-Ed *170,8244 total transformers*	Boyertown *14,802 total transformers*	Overhead Transformers *10,365 total transformers*	2,779	955
		Above-Ground Pad-mounted *4,354 total transformers*	1,789	711
		Below-Ground Transformers *83 total transformers*	35	20
	Dillsburg *11,378 total transformers*	Overhead Transformers *8,391 total transformers*	1,484	3,257
		Above-Ground Pad-mounted *2,958 total transformers*	752	1,106
		Below-Ground Transformers *29 total transformers*	9	12
	Easton *16,483 total transformers*	Overhead Transformers *12,032 total transformers*	1,843	2,764
		Above-Ground Pad-mounted *4,254 total transformers*	641	903
		Below-Ground Transformers *197 total transformers*	11	90
	Gettysburg 7,008 *total transformers*	Overhead Transformers *5,574 total transformers*	1,195	1,696
		Above-Ground Pad-mounted *1,406 total transformers*	275	272
		Below-Ground Transformers *28 total transformers*	1	3
	Hamburg *10,589 total transformers*	Overhead Transformers *8,091 total transformers*	1,007	2,050
		Above-Ground Pad-mounted *2,420 total transformers*	352	629
		Below-Ground Transformers *78 total transformers*	5	27
	Hanover *14,713 total transformers*	Overhead Transformers *9,906 total transformers*	3,746	2,729
		Above-Ground Pad-mounted *4,727 total transformers*	1,669	1,299

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		Below-Ground Transformers *80 total transformers*	48	14
	Lebanon *21,096 total transformers*	Overhead Transformers *14,755 total transformers*	3,959	2,895
		Above-Ground Pad-mounted 6,003 total transformers	1,719	1,398
		Below-Ground Transformers *338 total transformers*	99	64
	Reading *21,054 total transformers*	Overhead Transformers *14,852 total transformers*	3,885	2,282
		Above-Ground Pad-mounted *5,921 total transformers*	1,980	810
		Below-Ground Transformers *281 total transformers*	87	82
	Stroudsburg 13,489 *total transformers*	Overhead Transformers *11,344 total transformers*	1,431	2,491
		Above-Ground Pad-mounted *2,081 total transformers*	54	513
		Below-Ground Transformers *64 total transformers*	0	0
	York *40,212 total transformers*	Overhead Transformers *26,645 total transformers*	7,462	5,583
		Above-Ground Pad-mounted *13,241 total transformers*	3,009	3.375
		Below-Ground Transformers *326 total transformers*	79	134

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Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Met-Ed visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Met-Ed's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Met-Ed's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Met-Ed. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in

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a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Met-Ed's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
Met-Ed *1,453 total reclosers*	Boyertown 88 *total reclosers*	Single Phase *28 total reclosers*	28	28
		Three Phase *60 total reclosers*	60	60
	Dillsburg *86 total reclosers*	Single Phase 27 *total reclosers*	27	27
		Three Phase *59 total reclosers*	59	59
	Easton 153 *total reclosers*	Single Phase 37 *total reclosers*	37	37
		Three Phase 116 *total reclosers*	116	116
	Gettysburg 67 *total reclosers*	Single Phase 20 *total reclosers*	20	20
		Three Phase 477 *total reclosers*	47	47
	Hamburg 103 *total reclosers*	Single Phase *47 total reclosers*	47	47
		Three Phase 56 *total reclosers*	56	56

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	Hanover 98 *total reclosers*	Single Phase 33 *total reclosers*	33	33
		Three Phase 65 *total reclosers*	65	65
	Lebanon 245 *total reclosers*	Single Phase *96 total reclosers*	96	96
		Three Phase 149 *total reclosers*	149	149
	Reading 191 *total reclosers*	Single Phase *77 total reclosers*	77	77
		Three Phase 114 *total reclosers*	114	114
	Stroudsburg 109 *total reclosers*	Single Phase 14 *total reclosers*	14	14
		Three Phase *95 total reclosers*	95	95
	York *313 total reclosers*	Single Phase *68 total reclosers*	68	68
		Three Phase *245 total reclosers*	245	245

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Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Met-Ed inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Met-Ed substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Met-Ed substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
   - General condition – read and record ambient temperature
   - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

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- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Met-Ed's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Met-Ed is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

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	Area	Substation Inspections Planned *Number of Substations*	
		2023	**2024**
Met-Ed *209 total substations*	Easton *43 substations*	516	516
	Lebanon 31 *substations*	372	372
	Reading *59 substations*	708	708
	York *76 substations*	912	912

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Pennsylvania Electric Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Penelec
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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Pennsylvania Electric Company ("Penelec" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024 in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Penelec serves more than 580,000 Pennsylvania customers and the service territory covers nearly 10,000 square miles. From the physical field employees up to and including top management, Penelec is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Penelec utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
    - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way was completed in 2019. Beyond 2019, any additional ash trees are addressed under Penelec's hazardous tree maintenance process.
    - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
    - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
    - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
    - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution-system reliability performance; protect equipment and facilities from overcurrent risks

that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
  - Penelec first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy, and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Penelec submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Penelec's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Penelec's revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Penelec's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Penelec will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

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Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Penelec performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removal of off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil-treatment application, and cut stubble applications. All herbicides shall be applied in accordance with all state, local and federal laws governing the use of herbicides.

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Further detailed information regarding Penelec's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Penelec has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree related reliability on the selected line sections.

Penelec's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Penelec's rights-of-way.

As part of Penelec's approach to improving tree related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Penelec's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Penelec *18,113 total circuit miles*	Altoona *1,769 total circuit miles*	356	347
	Clearfield *1,628 total circuit miles*	314	320
	Dubois *1,623 total circuit miles*	326	329
	Erie *1,715 total circuit miles*	432	429
	Johnstown *1,773 total circuit miles*	354	357
	Lewistown *1,690 total circuit miles*	339	345
	Oil City *2,051 total circuit miles*	405	413
	Towanda *4,044 total circuit miles*	806	791
	Warren *1,819 total circuit miles*	371	361

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Penelec shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper hydroxide and disodium octaborate

tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding Penelec's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Penelec could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Penelec submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Penelec's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be reduced over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

Penelec's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Penelec from conducting pole loading calculations as a part of its pole inspections. Penelec requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Penelec follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Penelec poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole attachment guidelines, experience and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	**2024**
Penelec *498,980 total poles*	Altoona *58,775 total poles*	4,255	5,526
	Clearfield *39,007 total poles*	2,931	3,129
	Dubois *46,201 total poles*	4,876	3,986
	Erie *73,712 total poles*	6,398	7,851
	Johnstown *59,872 total poles*	4,417	4,839
	Lewistown *35,849 total poles*	2,632	4,159
	Oil City *57,091 total poles*	6,274	3,759
	Towanda *90,544 total poles*	7,607	5,654
	Warren *37,929 total poles*	2,191	2,679

Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Penelec shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of

abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Penelec's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Penelec could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Penelec requests a continuation of the waiver for the currently proposed period.

Penelec's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and*

maintained at such intervals as experience has shown to be necessary." Penelec's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst performing circuit performance. Lastly, Penelec may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Overhead Line Inspections Planned** *(Number of Circuits)*	
		2023	**2024**
Penelec *1,244 total circuits*	Altoona 175 *total circuits*	36	37
	Clearfield *64 total circuits*	12	14
	Dubois *95 total circuits*	23	19
	Erie *199 total circuits*	39	38
	Johnstown 134 *total circuits*	26	27
	Lewistown *81 total circuits*	15	15
	Oil City *141 total circuits*	27	28
	Towanda *256 total circuits*	52	53

	Warren *96 total circuits*	19	20

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Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Penelec inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured

- Equipment condition – visually inspect baffle

Further detailed information regarding Penelec's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Penelec requests a continuation of the waiver for the currently proposed period.

Penelec's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Penelec. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Penelec's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Transformer Inspections Planned *(Total Number of Transformers)*	
			2023	2024
Penelec *201,112 total transformers*	Altoona *29,473 total transformers*	Overhead Transformers *24,123 total transformers*	4,588	5,270
		Above-Ground Pad-mounted *5,070 total transformers*	983	1,013
		Below-Ground Transformers *280 total transformers*	57	49
	Clearfield *17,196 total transformers*	Overhead Transformers *15,616 total transformers*	2,911	2,591
		Above-Ground Pad-mounted *1,445 total transformers*	263	334
		Below-Ground Transformers *135 total transformers*	31	17
	Dubois *17,292 total transformers*	Overhead Transformers *14,907 total transformers*	3,283	2,922
		Above-Ground Pad-mounted *2,217 total transformers*	608	349
		Below-Ground Transformers *168 total transformers*	46	33
	Erie *27,956 total transformers*	Overhead Transformers *22,618 total transformers*	4,307	4.360
		Above-Ground Pad-mounted *5.221 total transformers*	1,230	854
		Below-Ground Transformers *117 total transformers*	31	21
	Johnstown *23,538 total transformers*	Overhead Transformers *19,997 total transformers*	3,773	4,325
		Above-Ground Pad-mounted *3,360 total transformers*	562	622
		Below-Ground Transformers *181 total transformers*	21	44
		Overhead Transformers *13,672 total transformers*	2,650	2,142

	Lewistown *16,560 total transformers*	Above-Ground Pad-mounted *2,721 total transformers*	511	496
		Below-Ground Transformers *167 total transformers*	41	39
	Oil City *21,134 total transformers*	Overhead Transformers *18,580 total transformers*	4,376	3,981
		Above-Ground Pad-mounted *2,390 total transformers*	582	579
		Below-Ground Transformers *164 total transformers*	14	57
	Towanda *34,512 total transformers*	Overhead Transformers *31,274 total transformers*	6,665	7,579
		Above-Ground Pad-mounted *3,024 total transformers*	570	656
		Below-Ground Transformers *214 total transformers*	28	32
	Warren *13,451 total transformers*	Overhead Transformers *12,296 total transformers*	1,970	2,142
		Above-Ground Pad-mounted *1,138 total transformers*	305	193
		Below-Ground Transformers *17 total transformers*	11	2

Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Penelec visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes but is not limited to the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Penelec's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Penelec's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Penelec. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation

prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

In addition to Penelec's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
Penelec 2,593 *total reclosers*	Altoona *353 total reclosers*	Single Phase *257 total reclosers*	257	257
		Three Phase *96 total reclosers*	96	96
	Clearfield *272 total reclosers*	Single Phase *223 total reclosers*	223	223
		Three Phase *49 total reclosers*	49	49
	Dubois *143 total reclosers*	Single Phase *80 total reclosers*	80	80
		Three Phase 63 total reclosers	63	63
	Erie *447 total reclosers*	Single Phase 318 *total reclosers*	318	318
		Three Phase *129 total reclosers*	129	129
	Johnstown *131 total reclosers*	Single Phase *42 total reclosers*	42	42
		Three Phase 89 *total reclosers*	89	89
	Lewistown *177 total reclosers*	Single Phase 140 *total reclosers*	140	140
		Three Phase *37 total reclosers*	37	37
	Oil City *414 total reclosers*	Single Phase *343 total reclosers*	343	343
		Three Phase *71 total reclosers*	71	71
	Towanda *419 total reclosers*	Single Phase *328 total reclosers*	328	328
		Three Phase *91 total reclosers*	91	91
	Warren *237 total reclosers*	Single Phase *198 total reclosers*	198	198
		Three Phase *39 total reclosers*	39	39

Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Penelec inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Penelec substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Penelec substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include but is not limited to the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include but is not limited to all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include but is not limited to all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Penelec's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

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Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Penelec is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Substation Inspections Planned *Number of Substations*	
		2023	**2024**
Penelec *392 total substations*	Altoona *63 substations*	756	756
	Clearfield *50 substations*	600	600
	Erie *41 substations*	492	492
	Indiana *11 substations*	132	132
	Lewistown *42 substations*	504	504
	Mansfield *21 substations*	252	252
	Oil City *35 substations*	420	420
	Richland *47 substations*	564	564
	Towanda *28 substations*	336	336
	Warren *26 substations*	312	312

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Biennial Inspection, Maintenance, Repair and Replacement Plan for Pennsylvania Power Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Pennsylvania Power Company ("Penn Power" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

Penn Power serves more than 166,000 Pennsylvania customers and the service territory covers more than 1,400 square miles. From the physical field employees up to and including top management, Penn Power is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, Penn Power utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way was completed in 2018. Beyond 2018, any additional ash trees are addressed under Penn Power's hazardous tree maintenance process .
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data, and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution-system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - Penn Power first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

Penn Power submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that Penn Power's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

Penn Power's revised I&M Plan for 2023 and 2024 proposes the addition of a distribution wood pole treatment program but is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

Penn Power's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration's rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations, and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, Penn Power will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

Penn Power performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate, and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers, or other devices. Removing incompatible vegetation may also include various herbicide application techniques—such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil-treatment application, and cut-stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

Further detailed information regarding Penn Power's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Penn Power has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

Penn Power's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on Penn Power's rights-of-way.

As part of Penn Power's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to Penn Power's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
Penn Power *4,573 total circuit miles*	Mercer *2,147 total circuit miles*	429	430
	New Castle *1,231 total circuit miles*	246	246
	Zelienople *1,195 total circuit miles*	239	239

Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

Penn Power shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper

hydroxide and disodium octaborate tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding Penn Power's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that Penn Power could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] Penn Power submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring Penn Power's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be maintained over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020, at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

Penn Power's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously exempted Penn Power from conducting pole loading calculations as a part of its pole inspections. Penn Power requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, Penn Power follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to Penn Power poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	**2024**
Penn Power *128,975 total poles*	Clark *60,674 total poles*	5,000	5,000
	Zelienople *68,301 total poles*	5,600	5,600

Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

Penn Power shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding Penn Power's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that Penn Power could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. Penn Power requests a continuation of the waiver for the currently proposed period.

Penn Power's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* Penn Power's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, Penn Power may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Overhead Line Inspections Planned *(Number of Circuits)*	
		2023	**2024**
Penn Power *183 total circuits*	Clark *57 total circuits*	12	12
	Zelienople *126 total circuits*	26	26

Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

Penn Power inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers are inspected on a five-year cycle and below-ground transformers are inspected on an eight-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground, pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured
- Equipment condition – visually inspect baffle

Further detailed information regarding Penn Power's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021, through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. Penn Power requests a continuation of the waiver for the currently proposed period.

Penn Power's five- and eight-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of Penn Power. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

Penn Power's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Transformer Inspections Planned *Total transformers*	
			2023	2024
Penn Power *64,048 total transformers*	Clark *26,638 total transformers*	Overhead Transformers *23,871 total transformers*	4,100	6,300
		Above-Ground Pad-mounted *2,767 total transformers*	400	700
		Below-Ground Transformers *0 transformers*	0	0
	Zelienople *38,410 total transformers*	Overhead Transformers *27,721 total transformers*	6,100	4,700
		Above-Ground Pad-mounted *10,689 total transformers*	2,300	1,900
		Below-Ground Transformers *0 total transformers*	0	0

Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

Penn Power visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes, but is not limited to, the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding Penn Power's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Penn Power's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of Penn Power. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to Penn Power's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Type**	**Recloser Inspections Planned** ***Total number of Reclosers***	
			2023	**2024**
Penn Power 718 *total reclosers*	Clark 345 *total reclosers*	Single Phase *229 total reclosers*	229	229
		Three Phase 116 *total reclosers*	116	116
	Zelienople 373 *total reclosers*	Single Phase *274 total reclosers*	274	274
		Three Phase *99 total reclosers*	99	99

Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

Penn Power inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at Penn Power substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at Penn Power substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures, and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding Penn Power's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, Penn Power is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	**Substation Inspections Planned** ***(Number of Substations)***	
		2023	**2024**
Penn Power 74 *total substations*	New Castle 74 *total substations*	888	888

Biennial Inspection, Maintenance, Repair and Replacement Plan for West Penn Power Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Table of Contents

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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. West Penn Power Company ("West Penn" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

West Penn serves more than 722,000 Pennsylvania customers and the service territory covers more than 6,300 square miles. From the physical field employees up to and including top management, West Penn is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, West Penn utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
    - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way is underway.
    - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
    - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
    - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
    - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - West Penn first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

West Penn submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that West Penn's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

West Penn's revised I&M Plan for 2023 and 2024 proposes the addition of a distribution pole treatment program but is otherwise consistent with its previously approved plan for 2023 and 2024 and proposes no substantive changes to its inspection cycles.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

West Penn's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must maintain records of inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.*

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs, West Penn will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

Vegetation Management

Section 57.198(n)(1). Vegetation Management. *The statewide minimum inspection and treatment cycle for vegetation management is between 4 – 8 years for distribution facilities. An EDC shall submit a condition-based plan for vegetation management for its distribution system facilities explaining its treatment cycle.*

Program Description

West Penn performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing off-corridor priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.

Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive inspection process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle not to exceed a total of eight years. This process involves inspection of the vegetation to evaluate the extent of potential for vegetation to interfere with energized conductors. Factors to consider in the evaluation are the voltage and height of the conductor, the type of tree, its growth rate, and branching habit. Trees that will impact safety or reliability will be maintained pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil treatment application, and cut stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

Further detailed information regarding West Penn's vegetation management program may be found in the Vegetation Management Distribution Specifications.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. West Penn has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

West Penn's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on West Penn's rights-of-ways.

As part of West Penn's approach to improving tree-related reliability, the Company continues to analyze circuit electrical protection schemes and gives added attention to select line sections, such as those that serve high numbers of customers. Three distinct line sections have been identified and defined under existing protection schemes, as shown in the table below.

Zone 1	Zone 2	Zone 3
Three-phase circuitry from the circuit breaker to the first protective device	Three-phase circuitry beyond the first protective device	Single-phase and two-phase circuitry
Serves entire customer load	Serves a large percentage of customer load	Serves smallest percentage of customer load

In addition to West Penn's Distribution Vegetation Management Program, there are other distribution equipment inspection programs (e.g., Distribution Pole Inspections, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include vegetation management situations that warrant further investigation.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
West Penn Power *19,939 total circuit miles*	Arnold *1,491 total circuit miles*	264	309
	Boyce 668 *total circuit miles*	67	107
	Butler *1,321 total circuit miles*	262	278
	Charleroi *1,416 total circuit miles*	337	289
	Clarion *562 total circuit miles*	154	83
	Hyndman *356 total circuit miles*	94	106
	Jeannette *1,219 total circuit miles*	226	218
	Jefferson *1,523 total circuit miles*	277	345
	Kittanning *981 total circuit miles*	154	240
	Latrobe *1,207 total circuit miles*	286	231
	McConnellsburg *943 total circuit miles*	275	65
	Pleasant Valley *1,128 total circuit miles*	250	242
	St. Marys *1,210 total circuit miles*	251	242
	State College *1,689 total circuit miles*	315	342
	Uniontown *1,265 total circuit miles*	302	213
	Washington *1,685 total circuit miles*	293	393
	Waynesboro *1,274 total circuit miles*	357	284

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Distribution Pole Inspections

Section 57.198(n)(2). Pole Inspections. *Distribution poles shall be inspected at least as often as every 10 – 12 years except for the new southern yellow pine creosoted utility poles which shall be initially inspected within 25 years, then within 12 years annually after the initial inspection. Pole inspections must include:*

i. Drill tests at and below ground level
ii. A shell test
iii. Visual inspection for holes or evidence of insect infestation
iv. Visual inspection for evidence of unauthorized backfilling or excavation near the pole
v. Visual inspection for signs of lightning strikes
vi. A load calculation

Program Description

West Penn shall visually inspect distribution wood poles on a twelve-year cycle. The purpose for inspecting distribution wood poles is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the state regulatory agencies and the NESC.

This preventative maintenance inspection for wood poles will include a visual inspection as well as hammer-sounding as needed. The inspection consists of the recording of abnormal conditions from the groundline to the top of the pole including but not limited to the following:

- Damage – broken or leaning
- Equipment – crossarms, insulators, conductors, oil leaking
- Testing for decayed internal wood

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

Serviceable poles that pass the visual and sounding testing may be treated for life extension, protection against fungal decay and insects and to interrupt degradation. Serviceable and reinforced poles shall also be treated. The internal preventative pole treatment product is the Cobra™ Rods, a diffusible rod composed of copper and boron. The internal void pole treatment product is the Genics™ CuB, a preservative solution containing copper

hydroxide and disodium octaborate tetrahydrate. The selected treatment method will be based on the best available information at the time.

Further detailed information regarding West Penn's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Section 57.198(n)(3). Inspection Failure. *If a pole fails the groundline inspection and shows dangerous conditions that are an immediate risk to public or employee safety or conditions affecting the integrity of the circuit, then the pole shall be replaced within 30 days of the date of inspection.*

Corrective Maintenance

Wood poles and supporting structures with recorded defects that West Penn could expect to create an immediate risk to public or employee safety or affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] West Penn submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring West Penn's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be maintained over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards set forth in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

[1] Opinion and Order entered January 16, 2020 at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

West Penn's twelve-year inspection cycle for wood poles is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary*." Twelve years between inspections allows enough time for proper planning and remediation prior to any problems negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Pole Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Overhead Line Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution pole situations that warrant further investigation.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously exempted West Penn from conducting pole loading calculations as a part of its pole inspections. West Penn requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, West Penn follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading Standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are designed consistent with NESC Heavy Loading Standard NESC C2-2012, Section 250. The Engineering Practices provide detailed guidance for both guying and pole loading, and additional engineering support is available to designers when more complex calculations are needed. Per the NESC, both of these resources include safety factors such that the deterioration of poles in service shall not reduce the strength capability of the pole below the required strength. Further, as the Company receives requests from other entities to attach their facilities to West Penn poles, an assessment, ranging from a visual inspection to a full-strength analysis, is performed based on pole-attachment guidelines, experience, and the situation encountered.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	2024
West Penn Power *502,925 total poles*	Arnold *42,881 total poles*	4,739	4,225
	Boyce *18,811 total poles*	1,323	1,894
	Butler *32,465 total poles*	1,957	4,836
	Charleroi *44,401 total poles*	4,888	4,201
	Clarion *11,782 total poles*	1,914	1,832
	Hyndman *6,111 total poles*	37	0
	Jeannette *36,092 total poles*	3,303	1,514
	Jefferson *32,716 total poles*	2,234	851
	Kittanning *20,791 total poles*	1,013	1,681
	Latrobe *30,665 total poles*	2,653	3,204
	McConnellsburg *18,480 total poles*	2,335	826
	Pleasant Valley *29,554 total poles*	5,143	1,526
	St. Marys *27,690 total poles*	2,606	2,492
	State College *39,099 total poles*	3,391	3,974
	Uniontown *35,738 total poles*	3,843	2,189
	Washington *44,129 total poles*	5,248	1,746
	Waynesboro *31,520 total poles*	2,318	2,103

Distribution Overhead Line Inspections

Section 57.198(n)(4). Distribution overhead line inspections. *Distribution lines shall be inspected by ground patrol a minimum of once every 1 – 2 years. A visual inspection must include checking for:*

i. Broken insulators
ii. Conditions that may adversely affect operation of the overhead transformer
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

West Penn shall visually inspect distribution overhead lines and equipment on a five-year cycle. The purpose for inspecting overhead lines and equipment is to identify and repair unsafe conditions or conditions that may adversely affect service reliability, and to comply with the requirements of state regulatory agencies and the NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle to levelize labor commitments and expenses. This preventative maintenance will consist of a visual inspection and recording of abnormal conditions including but not limited to the following types of overhead circuit equipment:

- Conductors (wire and cable) – excessive slack, condition, damage, clearances
- Supporting structures (wood poles) – deteriorated condition, sustained damage (lightning, vehicle, woodpecker holes)
- Pole hardware (including insulators) – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment (including overhead transformers) – condition, damage
- Switches
- Sectionalizers

Further detailed information regarding West Penn's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Section 57.198(n)(5). Inspection Failure. *If critical maintenance problems are found that affect the integrity of the circuits, they shall be repaired or replaced no later than 30 days from discovery.*

Corrective Maintenance

Supporting structures with recorded defects that West Penn could reasonably expect to affect the integrity of the circuit shall be repaired or replaced within thirty days. All remaining deficiencies will be evaluated and prioritized on a case-by-case basis.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

West Penn's five-year inspection cycle for overhead lines is based on accepted electric utility practices. The NESC Rule 12.121.A states "*Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* West Penn's experience has shown the five-year inspection cycle to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Overhead Line Inspection Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Transformer Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. Further, field personnel perform circuit assessments to address specific reliability concerns and to assess worst-performing circuit performance. Lastly, West Penn may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Overhead Line Inspections Planned *(Number of Circuits)*	
		2023	2024
West Penn Power *838 total circuits*	Arnold *76 total circuits*	12	21
	Boyce *47 total circuits*	7	12
	Butler *68 total circuits*	11	13
	Charleroi *77 total circuits*	12	18
	Clarion *17 total circuits*	3	5
	Hyndman *12 total circuits*	3	0
	Jeannette *67 total circuits*	14	15
	Jefferson *41 total circuits*	6	7
	Kittanning *30 total circuits*	5	6
	Latrobe *38 total circuits*	4	8
	McConnellsburg *26 total circuits*	5	9
	Pleasant Valley *42 total circuits*	10	10
	St. Marys *54 total circuits*	8	11
	State College *77 total circuits*	15	23
	Uniontown *53 total circuits*	12	12
	Washington *51 total circuits*	10	10
	Waynesboro *62 total circuits*	11	12

Distribution Transformer Inspections

Section 57.198(n)(6). Distribution transformer inspections. *Overhead distribution transformers shall be visually inspected as part of the distribution line inspection every 1 – 2 years. Above-ground pad-mounted transformers shall be inspected at least as often as every 5 years and below-ground transformers shall be inspected at least as often as every 8 years. An inspection must include checking for:*

i. Rust, dents or other evidence of contact
ii. Leaking oil
iii. Installation of fences or shrubbery that could adversely affect access to and operation of the transformer
iv. Unauthorized excavation or changes in grade near the transformer

Program Description

West Penn inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers and below-ground transformers are inspected on a five-year cycle. The purpose for inspecting distribution transformers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability and to comply with the requirements of state regulatory agencies and the NESC.

Overhead distribution transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, arresters, rust, dents or evidence of contact

Above-ground, pad-mounted equipment (transformers and switchgear) – inspection and recording of abnormal conditions including but not limited to the following:

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including the installation of fences or shrubbery that could adversely affect access to and operation of the transformer and unauthorized excavation or changes in grade near the transformer
- Warning labels – electrical hazard warning label and landscaping instructions notice

Below-ground transformers – visual inspection and recording of abnormal conditions including but not limited to the following:

- Accessibility – verify cover is secured
- Equipment condition – visually inspect baffle

Further detailed information regarding West Penn's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

West Penn's five-year inspection cycles for distribution transformers are based on accepted electric utility practices and the experience of West Penn. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."*

West Penn's experience has proven the inspection cycles above to be successful in addressing problems in a timely manner, allowing for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Transformer Inspections Planned *Total transformers*	
			2023	2024
West Penn Power *323,758 total transformers*	Arnold *26,631 total transformers*	Overhead Transformers *24,072 total transformers*	3,669	6,077
		Above-Ground Pad-mounted *2,559 total transformers*	630	385
	Boyce *18,279 total transformers*	Overhead Transformers *12,499 total transformers*	1,450	3,558
		Above-Ground Pad-mounted *5,780 total transformers*	1,202	1,456
	Butler *24,545 total transformers*	Overhead Transformers 20,268 *total transformers*	2,907	5,066
		Above-Ground Pad-mounted *4,277 total transformers*	856	870
	Charleroi *31,699 total transformers*	Overhead Transformers *28,466 total transformers*	5,638	5,028
		Above-Ground Pad-mounted *3,233 total transformers*	575	630
	Clarion *6,539 total transformers*	Overhead Transformers *5,839 total transformers*	1,054	1,552
		Above-Ground Pad-mounted *700 total transformers*	152	126
	Hyndman *3,036 total transformers*	Overhead Transformers *2,757 total transformers*	22	0
		Above-Ground Pad-mounted *279 total transformers*	0	137
	Jeannette *31,276 total transformers*	Overhead Transformers *25,739 total transformers*	6,768	4,215
		Above-Ground Pad-mounted *5,337 total transformers*	1,071	792
	Jefferson *15,371 total transformers*	Overhead Transformers *14,531 total transformers*	1,939	2,733
		Above-Ground Pad-mounted *840 total transformers*	152	160
		Overhead Transformers *10,425 total transformers*	1,056	2,088

	Kittanning *11,348 total transformers*	Above-Ground Pad-mounted *923 total transformers*	101	242
	Latrobe *19,826 total transformers*	Overhead Transformers *17,284 total transformers*	2,506	3,893
		Above-Ground Pad-mounted *2,542 total transformers*	594	374
	McConnellsburg *8,399 total transformers*	Overhead Transformers *7,486 total transformers*	1,665	1,780
		Above-Ground Pad-mounted *913 total transformers*	220	185
	Pleasant Valley *18,065 total transformers*	Overhead Transformers *16,358 total transformers*	6,016	1,672
		Above-Ground Pad-mounted *1,707 total transformers*	332	253
	St. Mary's *15,936 total transformers*	Overhead Transformers *14,756 total transformers*	2,378	3,900
		Above-Ground Pad-mounted *1,180 total transformers*	240	213
	State College *25,577 total transformers*	Overhead Transformers *19,146 total transformers*	4,077	4,831
		Above-Ground Pad-mounted *6,431 total transformers*	1,902	1,404
	Uniontown *21,189 total transformers*	Overhead Transformers *19,109 total transformers*	3,834	3,624
		Above-Ground Pad-mounted *2,080 total transformers*	186	434
	Washington *25,006 total transformers*	Overhead Transformers *21,742 total transformers*	4,722	4,248
		Above-Ground Pad-mounted *3,264 total transformers*	522	809
	Waynesboro *21,036 total transformers*	Overhead Transformers *15,795 total transformers*	2,057	4,155
		Above-Ground Pad-mounted *5,241 total transformers*	896	703

Recloser Inspections

Section 57.198(n)(7). Recloser inspections. *Three-phase reclosers shall be inspected on a cycle of 8 years or less. Single-phase reclosers shall be inspected as part of the EDC's individual distribution line inspection plan.*

Program Description

West Penn visually inspects distribution line reclosers annually. The purpose for inspecting distribution line reclosers is to identify and repair unsafe conditions or conditions that may adversely affect service reliability or system performance, and to comply with the requirements of state regulatory agencies and the NESC.

The annual preventative maintenance consists of counter readings and field inspection. The counter readings are obtained to assess system performance based on the number of operations. The field inspection includes, but is not limited to, the following:

- Type of recloser and current rating
- Counter reading
- Condition – rust, dents, physical damage, leaks, lightning damage
- Equipment – surge arresters, tank-ground connections, by-pass switches, control battery, pole
- Grounds – damage, condition

Further detailed information regarding West Penn's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

West Penn's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of West Penn. The NESC Rule 12.121.A states *"Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary."* One year between inspection cycles has proven to be successful in addressing problems in a timely manner, allowing for proper planning and remediation

prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

In addition to West Penn's Recloser Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management, Distribution Pole Inspections, Distribution Overhead Line Inspections, and Distribution Transformer Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include recloser equipment situations that warrant further investigation.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
West Penn Power *4,034 total reclosers*	Arnold *339 total reclosers*	Single Phase *335 total reclosers*	335	335
		Three Phase *4 total reclosers*	4	4
	Boyce *369 total reclosers*	Single Phase *366 total reclosers*	366	366
		Three Phase *3 total reclosers*	3	3
	Butler *337 total reclosers*	Single Phase *336 total reclosers*	336	336
		Three Phase *1 total reclosers*	1	1
	Charleroi *285 total reclosers*	Single Phase *281 total reclosers*	281	281
		Three Phase *4 total reclosers*	4	4
	Clarion *87 total reclosers*	Single Phase *86 total reclosers*	86	86
		Three Phase *1 total reclosers*	1	1
	Hyndman *65 total reclosers*	Single Phase *65 total reclosers*	65	65
		Three Phase *0 total reclosers*	0	0
	Jeannette *345 total reclosers*	Single Phase *343 total reclosers*	343	343
		Three Phase *2 total reclosers*	2	2
	Jefferson *206 total reclosers*	Single Phase *1999 total reclosers*	199	199
		Three Phase *7 total reclosers*	7	7
		Single Phase *130 total reclosers*	130	130

	Kittanning *132 total reclosers*	Three Phase *2 total reclosers*	2	2
	Latrobe *223 total reclosers*	Single Phase *223 total reclosers*	223	223
		Three Phase *0 total reclosers*	0	0
	McConnellsburg *155 total reclosers*	Single Phase *155 total reclosers*	155	155
		Three Phase *0 total reclosers*	0	0
	Pleasant Valley *164 total reclosers*	Single Phase *164 total reclosers*	164	164
		Three Phase *0 total reclosers*	0	0
	St. Marys *150 total reclosers*	Single Phase *147 total reclosers*	147	147
		Three Phase *3 total reclosers*	3	3
	State College *170 total reclosers*	Single Phase *158 total reclosers*	158	158
		Three Phase *12 total reclosers*	12	12
	Uniontown *247 total reclosers*	Single Phase *246 total reclosers*	246	246
		Three Phase *1 total reclosers*	1	1
	Washington *446 total reclosers*	Single Phase *444 total reclosers*	444	444
		Three Phase *2 total reclosers*	2	2
	Waynesboro *314 total reclosers*	Single Phase *313 total reclosers*	313	313
		Three Phase *1 total reclosers*	1	1

Substation Inspections

Section 57.198(n)(8). Substation inspections. *Substation equipment, structures and hardware shall be inspected on a cycle of 5 weeks or less.*

Program Description

West Penn inspects its distribution substations twelve times annually. The purpose of these monthly inspections of the distribution substations is to ensure that any developing substation problems are identified and addressed in a timely manner in support of system reliability and electrical safety.

There are three types of preventative maintenance inspections that are performed at West Penn substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

Inspection Type	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Safety and Security of Facilities/Visual Equipment Inspection/Reporting and Recording of Deficiencies and Relay Operations (Class C)	X	X	X	X	X	X	X	X	X	X	X	X
Safety/Security, Visual Equipment Inspection and Record Readings (Class B)			X			X			X			X
Seasonal Maintenance (Class A)			X						X			

The following is a summary of each type of inspection that is conducted at West Penn substations:

1. *Safety and Security of Facilities and Visual Equipment Inspection of Electrical Equipment and Reporting/Recording Identified Deficiencies and Relay Operations (Class C).* Monthly visual inspection of substation equipment, structures, and hardware that also includes the recording of abnormal conditions or deficiencies. This inspection may include, but is not limited to, the following:
    - General condition – read and record ambient temperature
    - Perimeter fence inspection (gate locks, fence and gate grounds, warning signs

[2] For illustrative purposes only.

- Yard and facility inspection (equipment grounds, vegetation condition, general yard condition, equipment condition, oil levels and leaks, structure/hardware condition, hotspots, conductors/switches/connections)
- Building inspection (security, integrity, indication lights)
- Visual inspection of major equipment (power transformers, circuit breakers, instrument transformers, etc.)
- Relays, electronic controls, and panel meters for alarms and targets
- Batteries and chargers

2. *Safety and Security, Visual Equipment Inspection and Record Readings (Class B)*. In addition to the safety and security and visual equipment inspection that is performed monthly, every three months an additional visual inspection that includes the recording of readings is performed. This inspection may include, but is not limited to, all items listed under the Class C inspection as well as the following types of substation equipment:
   - Recording of amps and load readings
   - Recording of counter and gauge readings
   - Inspection/test of carrier communication equipment
   - Inspection of microwave/radio sites and engine generators – generator alarms and battery

3. *Seasonal Maintenance - Summer and Winter Readiness (Class A)*. In addition to the monthly and three-month inspections, every six months a more comprehensive inspection of the substation and substation equipment is performed. This inspection may include, but is not limited to, all items listed under the Class C and B inspections as well as the following types of substation equipment:
   - Servicing fire protection equipment
   - Servicing eye wash stations
   - Yard lighting
   - Servicing filters and HVAC systems
   - Servicing of equipment cabinet heaters
   - Servicing engine generators

Further detailed information regarding West Penn's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n). However, an EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provided that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support an alternative approach that will support the level of reliability required by law.*

Program Justification

Patrol inspections of distribution substations are performed on a monthly, quarterly, and semi-annual basis, with a tiered approach to preventative maintenance. This tiered approach has proven effective in addressing emerging problems and allows for proper planning and remediation prior to the problem negatively impacting personal safety, equipment integrity, or service reliability.

Monthly inspections ensure a trained, physical presence within the substation. Frequent, in-person inspections have been effective in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. In addition to visual inspections, load and counter readings are recorded every three months to allow local engineering to conduct planning and load studies. Finally, an intensive inspection is conducted two times a year, in spring and fall.

Advancements in technology have refined how substation equipment inspections are performed, and those advancements have been leveraged to ensure the highest levels of safety and reliability of the substation and substation equipment. For example, results from equipment and patrol inspections are captured by field personnel on site and entered directly into the maintenance database where they can be tracked. Through the use of historical inspection data and enhanced software, West Penn is able to target specific equipment and trigger maintenance based on equipment condition. For example, counter readings that are obtained during the three-month inspection cycle are used to trigger condition-based maintenance. Both predictive and condition-based programs extend the operating life of the equipment. They also optimize the necessary maintenance interval, improve service reliability, and reduce downtime that is typically experienced when equipment is taken offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Substation Inspections Planned *Number of Substations*	
		2023	2024
West Penn Power *495 total substations*	Arnold *49 substations*	588	588
	Boyce *27 substations*	324	324
	Butler *41 substations*	492	492
	Charleroi *43 substations*	516	516
	Jeannette 28 *substations*	336	336
	Jefferson *52 substations*	624	624
	Kittanning *25 substations*	300	300
	Latrobe *26 substations*	312	312
	Pleasant Valley *46 substations*	552	552
	St. Marys *37 substations*	444	444
	State College *38 substations*	456	456
	Washington *28 substations*	336	336
	Waynesboro *35 substations*	420	420

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Joint 1st Quarter 2023 Reliability Report –	**:**	
Metropolitan Edison Company,	**:**	
Pennsylvania Electric Company	**:**	**Docket No. M-2016-2522508**
Pennsylvania Power Company and West	**:**	
Penn Power Company – Public Version	**:**	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true and correct copy of the foregoing document upon the individuals listed below, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

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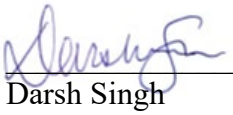

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