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PECO
An Exelon Company

April 30, 2018

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
P. O. Box 3265
Harrisburg, Pennsylvania 17120

Re: PECO 2017 Annual Electric Reliability Report - PUC Docket No. M-2016-2522508

Dear Secretary Chiavetta:

Enclosed is PECO's 2017 Annual Reliability Report for the period ending December 31, 2017, submitted pursuant to the Electric Service Reliability Regulations at 52 Pa. Code Chapter 57.

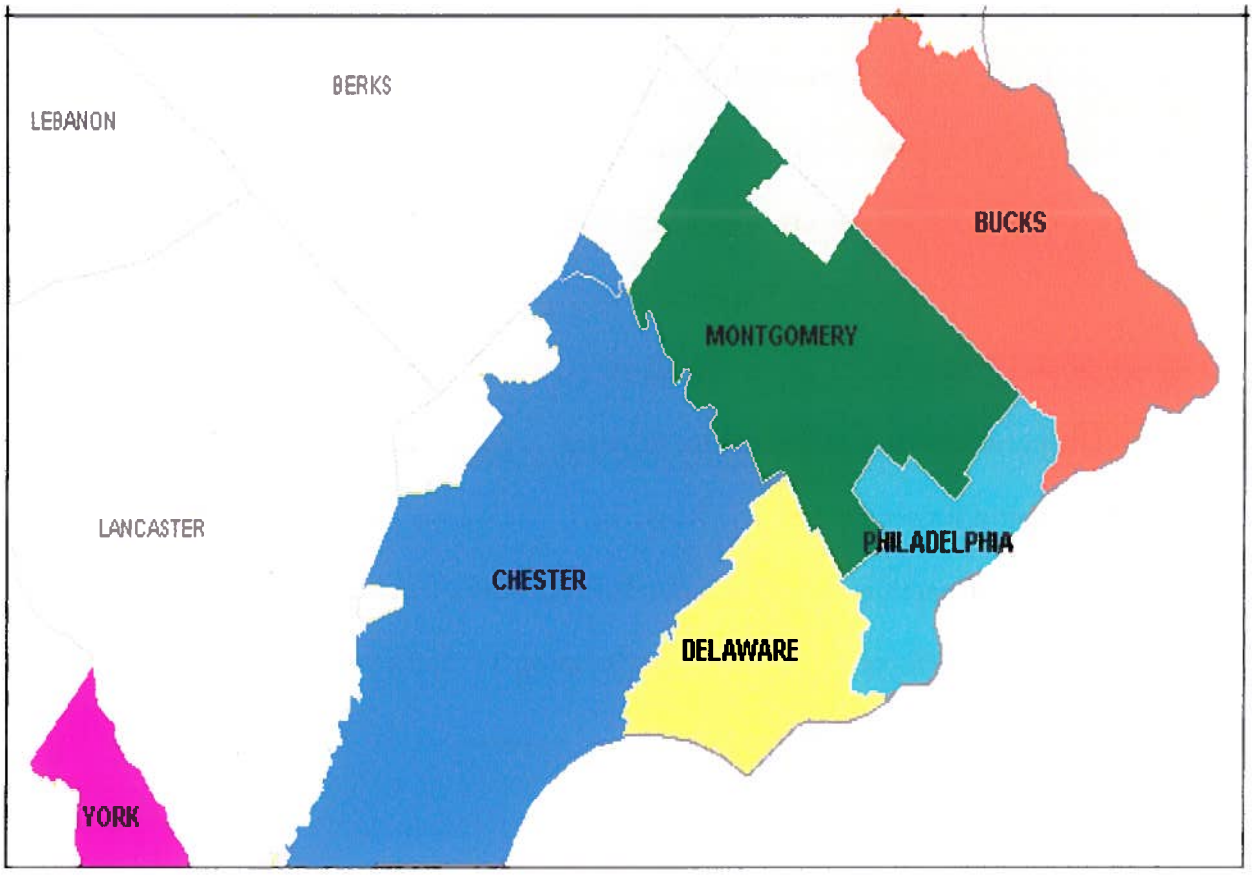
If you have any questions regarding this matter, please call me at 215-841-5777.

Sincerely,

Enclosure

PECO
An Exelon Company

2017
Electric Distribution Company
Annual Reliability Report



April 30, 2018

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INTRODUCTION

PECO Energy ("PECO") is submitting this report to the Pennsylvania Public Utility Commission (the "Commission") in accordance with 52 Pa Code 5.423.

PECO is committed to providing safe and reliable electric service to its customers. PECO serves approximately 1.6 million electric customers covering nearly 2,000 square miles in Bucks, Montgomery, Delaware, Chester, York and Philadelphia Counties, including the City of Philadelphia.

SAIFI, CAIDI and SAIDI for 2017 were all better than their respective Benchmarks and Standards established by the Commission for 12-month averages. The three-year average values of SAIFI, CAIDI, and SAIDI for 2015 through 2017 were all better than their respective levels since Benchmarks were established in 1999, and were all better than the Commission's Benchmarks and Standards for three-year averages.

B1: Section 57.195(b)(1)

"The annual reliability report shall include ... an overall current assessment of the state of the system reliability in the electric distribution company's service territory including a discussion of the electric distribution company's current programs and procedures for providing reliable electric service."

Current Assessment:

SAIFI, CAIDI and SAIDI for 2017 were all better than the Benchmarks and Standards established by the Commission for 12-month averages.

Programs and Procedures:

PECO Energy continues to stress excellence in fundamentals:
- Safety of our employees and the public
- Emergency response and daily operation
- Thorough preventive and corrective maintenance
- Appropriate capacity and design
- Adequate bulk supply
- Appropriate investment
- Enhanced use of automation and new technologies
- Integration of advanced meter infrastructure (AMI, smart meters) into reliability processes

PECO Energy's program for providing reliable electric service is multifaceted. It starts with a transmission and distribution system that is designed and built to reliable standards. Under a formal, comprehensive, predictive and preventive maintenance program, equipment receives maintenance to ensure its safe, reliable operation. Vegetation in the proximity of the system is pruned and controlled via a funded, well-managed program that protects the electric facilities while respecting the beauty and environmental importance of the vegetation. In response to invasive insects that cause ash tree deaths, PECO has increased its rate of removal of ash trees, and is planning an expanded mitigation program. In 2016, PECO launched its System 2020 Long-term Infrastructure Improvement Plan, with additional capital investments to construct reliability-related improvements over the period 2016 to 2020 focused on storm hardening and resiliency, cable replacements, and substation retirements with related distribution system upgrades.

The transmission and distribution system is operated around-the-clock, every day, from control centers where trained personnel use modern monitoring and control equipment to ensure that equipment is run within its load rating and other technical constraints.

When interruptions to electric service do occur, calls and instant reports from smart AMI meters are noted in a computer-aided outage management system, which associates calls and meter reports with information about the distribution system configuration to construct probable trouble groupings. These outage reports quickly appear on the screens for the operations center personnel. First response personnel are on the system at all times to make trouble locations safe and quickly restore service. The current outage management system has kept pace with technology through upgrades made available by the manufacturer and has been enhanced with information from the Advanced Meter Operating System.

PECO continues to install and upgrade the latest proven and cost-effective technology in support of reliability and safe, efficient operations. Recent examples include computers in the vehicles of field workers, smart electronic meters with communications and diagnostic capabilities, electronically-controlled switching and communication equipment to automatically reroute power around problem areas, a new geographic information system (GIS), and a state-of-the-art central distribution system management computer system.

Should a storm or other emergency arise, an appropriate emergency response team is assembled via group pager and cell-phone notification. The trained team performs per the specifications of a thorough, documented, tested emergency response procedure, quickly escalating the magnitude of the response when required, and communicating with the public and government agencies. If necessary, pre-established agreements with local contractors and neighboring utilities are exercised to augment PECO Energy's workforce. In 2012, PECO augmented its existing mutual assistance agreement with the Mid-Atlantic Mutual Assistance Group by joining the Southeastern Electric Exchange, increasing its ability to respond to major storms. After each significant emergency event, the groups involved evaluate the response. Strengths and weaknesses are identified, action plans are constructed, and individuals are tasked with bringing about the necessary changes to facilities, the organization, the procedures, and the understanding of the procedures by the work force. Management tracks each action item and demands timely completion to ensure continuous improvement.

Seasonal emergency response drills are carefully planned and carried out, followed by critiques and improvements to ensure that the entire organization can function properly when called upon for actual emergencies.

Management sets clearly-defined, challenging reliability goals, communicates them to the work force, demands meaningful action plans, monitors progress, holds the organization accountable for results, and attaches incentive compensation for employees to the achievement of the goals. Full-time engineering professionals monitor and analyze reliability trends and changes, and institute capital upgrades and improvements to maintenance, design, construction and/or operations to ensure that customers continue to enjoy reliable electric service.

B2: Section 57.195(b)(2)

"The annual reliability report shall include… a description of each major event that occurred during the year being reported on, 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."

PECO had no major events in 2017.

B3: Section 57.195(b)(3)

"The report shall include... a table showing the actual values of each of the reliability indices (SAIFI, CAIDI, SAIDI, and if available, MAIFI) for the electric distribution company's service territory for each of the preceding 3 calendar years. The report shall include the data used in calculating the indices, namely the average number of customers served, the number of sustained customer minutes interruptions, the number of customer affected, and the minutes of interruption. If MAIFI values are provided, the number of customer momentary interruptions shall also be reported"

	SAIFI	CAIDI	SAIDI	MAIFI
2017	0.83	99	82	0.54
2016	1.00	106	106	0.57
2015	0.72	84	61	0.42
2014	0.86	96	82	0.44

	SAIFI	CAIDI	SAIDI	MAIFI
2015 – 2017 Average	0.85	96	83	0.51
Benchmark	1.23	112	138	N/A
3-Year Average Standard	1.35	123	167	N/A

	2017	2016	2015	2014
Number of customers served *	1,635,159	1,623,365	1,703,911	1,718,220
Sustained customer minutes	134,008,559	171,632,179	103,264,966	141,648,235
Number of customers affected	1,351,668	1,623,883	1,231,426	1,481,044
Number of customer momentary interruptions	885,192	932,692	717,214	763,746

B4: Section 57.195(b)(4)

"The report shall include... a breakdown and analysis of outage causes during the year being reported on, 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."

Cause	Service Outages	% of Service Outages	Customer Interruptions	% of Customer Interruptions	Customer Minutes
Animal	1,182	9.90%	35,501	2.60%	2,422,216
Contact/Dig-In	121	1.00%	14,783	1.10%	1,198,735
Equipment Failure	4,440	37.30%	492,111	36.40%	45,156,671
Lightning	345	2.90%	47,870	3.50%	5,807,301
Other	1,367	11.50%	117,997	8.70%	7,135,850
T&S	17	0.10%	65,998	4.90%	13,763,588
Unknown	442	3.70%	47,733	3.50%	2,550,930
Vegetation-Broken/Uprooted	2,586	21.70%	345,489	25.60%	38,450,685
Vegetation-Ingrowth	967	8.10%	91,752	6.80%	9,045,995
Vehicles	451	3.80%	92,434	6.80%	8,556,587

The largest contributors to customer interruptions were equipment failure and tree-related interruptions. The leading groups within the equipment failure category were aerial equipment and underground equipment. Equipment is replaced based on observed trends under reliability programs and the System 2020 Long-term Infrastructure Investment Plan. Most customer interruptions caused by trees came from broken branches and tree trunks or uprooted trees (25.6% of all customer interruptions), as opposed to ingrowth (6.8% of all outage customer interruptions). PECO has continued to supplement its regularly scheduled vegetation management cycle with mid-cycle and a hazard tree removal program.

PECO has observed an increase in dead and declining ash trees near its electrical facilities. Emerald ash borers (invasive insects that cause ash tree deaths) are known to be concentrated in the eastern United States and have infested areas across the PECO territory. Limb and tree failures caused by emerald ash borers are expected to increase through this decade and into the next. PECO has begun to address this issue with its current vegetation management programs, and is planning an expanded program to mitigate the threat to its facilities and customer reliability.

B5: Section 57.195(b)(5)

"The reports shall include… a list of the major remedial efforts taken to date and planned for circuits that have been on the worst performing 5% of circuits list for a year or more."

See Appendix A

B6: Section 57.195(b)(6)

"The report shall include… a comparison of established transmission and distribution inspection and maintenance goals/objectives versus actual results achieved during the year being reported on. Explanations of any variances shall be included."

General Statement on Maintenance Programs Work Prioritization and Scheduling

PECO Energy develops its annual T&D maintenance plan to conform to company established maintenance cycles and based on current program priority determined by safety, risk and reliability evaluations. Resources may be reallocated during the maintenance period depending on impact of key performance areas. There is an adherence to schedule grace period equivalent to 25% of the maintenance cycle length to allow for scheduling and bundling of work.

PECO Energy's Distribution Inspection and Maintenance Plan vs. Actual Work for 2017

Maintenance Program	Planned Tasks	Completed Tasks
Recloser Inspections (Number of reclosers inspected)	200	518
Circuit Patrol & Thermography (Number of circuits inspected)	966	1,950
Pole Inspections (Number of poles inspected)	32,764	39,279
Padmount Transformer Inspections (Number of maintenance tasks performed (e.g. visual inspection, functional testing)	9,733	9,816
Below Ground Transformers (Number of maintenance tasks performed (e.g. visual inspection, functional testing)	1,738	3,478
Substation Inspections (Number of maintenance tasks performed (e.g. visual inspection, predictive/diagnostic maintenance, preventive maintenance) for a variety of substation components)	1,320	1,394
Unit Substations (Number of maintenance tasks performed (e.g. calibration, trip testing)	3,060	3,183

Vegetation Management Preventive Maintenance Program

Maintenance Program	Miles Planned	Miles Completed
Distribution Lift & Manual Trimming	2,636	3,383*
Transmission Trim & Removal	193	193

*PECO accelerated the 2017 trim miles by 747 miles, which included 273 miles originally planned to be completed in 2018

B7: Section 57.195(b)(7)

"The report shall include…a comparison of budgeted versus actual Transmission and Distribution operation and maintenance expenses for the year being reported on in total and detailed by the electric distribution company's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included."

Operation and Maintenance Expenses

Functional Account Code	Budget	Actual	Variance
New Business Connections	$1.6	$2.9	($1.3)
Capacity Expansion	$0.8	$0.5	$0.3
System Performance	$55.0	$47.1	$7.9
Facility Relocation	$1.4	$1.2	$0.2
Maintenance	$191.6	$197.0	($5.4)
Category Totals	$250.4	$248.7	$1.7
Budgeted T&D O&M Expenses		$250.4	
Actual T&D O&M Expenses		$248.7	
Variance		$1.7	
Percent Variance		0.7%	

"Explanations of any variances 10% or greater shall be included"

- **New Business Connections** – Over budget due to increased residential development and commercial projects as well as the addition of the solar division.
- **Capacity Expansion** – Under budget due to revised estimates for substation work.
- **System Performance** – Under budget due to renegotiated lease and prior reserve adjustment with SEPTA and revised estimates on various projects.
- **Facility Relocation –** Under budget due to reduced scope of work on various relocation projects.

B8: Section 57.195(b)(8)

"The report shall include… a comparison of budgeted versus actual Transmission and Distribution capital expenditures for the year being reported on in total and detailed by the electric distribution company's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included."

Capital Expenses

Functional Account Code	Budget	Actual	Variance
New Business Connections	$51.7	$55.5	($3.8)
Capacity Expansion	$98.9	$91.0	$7.9
System Performance	$215.7	$200.5	$15.2
Facility Relocation	$15.8	$15.9	($0.1)
Maintenance	$97.5	$97.8	($0.3)
Category Totals	$479.6	$460.7	$18.9
Budgeted Capital Expenses		$479.6	
Actual Capital Expenses		$460.7	
Variance		$18.9	
Percent Variance		3.9%	

"Explanations of any variances 10% or greater shall be included"

- No variances of 10% or greater.

B9: Section 57.195(b)(9)

"The report shall include... quantified Transmission and Distribution inspection and maintenance goals/objectives for the current calendar year detailed by system area (i.e., transmission, substation, and distribution)."

PECO Energy's 2018 Transmission and Distribution Inspection and Maintenance Plan
Per 52 Pa Code Chapter 57.198, PECO's Biennial Inspection, Maintenance, Repair and Replacement plan filed September 29, 2014.

Maintenance Program	Units (Planned) Annual
Recloser Inspections (Number of reclosers inspected)	216
Circuit Patrol & Thermography (Number of circuits patrolled)	972
Pole Inspections (Number of poles visually inspected)	32,833
Padmount Transformers (Number of transformers visually inspected)	9,617
Below Ground Transformers (Number of transformers visually inspected)	1,627
Substations (Number of substations inspections performed. (e.g. visual inspection, reading of currents, voltages, temperature etc) for a variety of substation components)	1,340
Unit Substations (Number of unit substations inspections performed. (e.g. visual inspection, reading of currents, voltages, temperature etc) for a variety of substation components)	3,030

Vegetation Management Preventive Maintenance Program

Maintenance Program	Miles Planned
Distribution Lift & Manual Trimming	2,816*
Transmission Trim & Removal	193

*Of the 2,816 miles planned **for 2018**, 273 miles were previously completed **on an accelerated basis** in 2017

B10: Section 57.195(b)(10)

"The report shall include… budgeted transmission and distribution operation and maintenance expenses for the current year in total and detailed by the electric distribution company's own functional account code or FERC account code as available".

Functional Account Code	2018 O&M Budget
New Business Connections	$2.3
Capacity Expansion	$0.7
System Performance	$64.6
Facility Relocation	$1.7
Maintenance	$193.2
Category Totals	$262.5

B11: Section 57.195(b)(11)

"The report shall include… budgeted transmission and distribution capital expenditures for the current year in total and detailed by the electric distribution company's own functional account code or FERC account code as available"

Functional Account Code	2018 Capital Budget
New Business Connections	$51.5
Capacity Expansion	$53.6
System Performance	$266.6
Facility Relocation	$16.6
Maintenance	$103.9
Category Totals	$492.2

B12: Section 57.195(b)(12)

"The report shall include… significant changes, if any, to the Transmission and Distribution inspection and maintenance programs previously submitted to the Commission."

- No changes to PECO maintenance programs in 2017

APPENDIX A

The following circuits were on our worst performing 5% of circuits list for a year or more:
As of the date of this report, analysis of these circuits continues. Information on remedial efforts taken and planned in addition to the details provided on the following pages will be included in future quarterly reliability reports.

BETHAYRES_002
BETHAYRES_135
BUCKINGHAM_346
BUCKINGHAM_351
COOPER _371
CONCORD_351
DALEVILLE_342
FLINT_144
FLINT_147
GLADWYNE_133
JARRETT_135
LENAPE_342
LENAPE_351
LINE_3308NT
LINE_3340
MACDADE_146
MIDDLETOWN_143
MIDDLETOWN_349
NESHAMINY_133
NEWLINVILLE_342
UPPER_DARBY_139
WARRINGTON_341
WAYNE_142
WAYNE_146
WRIGHT_000

Below are the efforts taken to date and planned for these circuits:

BETHAYRES_002
Montgomery County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Upgrade cable
Perform regularly scheduled tree clearance
Complete reliability corrective workorders
Update recloser settings

BETHAYRES_135
Montgomery County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Perform regularly scheduled tree clearance
Replace recloser
Install tree wire
Replace cable
Upgrade secondary wire

BUCKINGHAM_346
Bucks County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders
Replace recloser

BUCKINGHAM_351
Bucks County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders

COOPER_371
Chester County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Repaired switch
Planned:
Complete reliability corrective workorders
Circuit Under Analysis

CONCORD_351
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders
Install additional lightning protection
Upgrade cable

DALEVILLE_342
Chester County
Completed:
Inspected circuit and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Installed additional transformer
Planned:
Upgrade lightning protection
Complete reliability corrective workorders

FLINT_144
Delaware County
Completed:
Inspected circuit and with thermographic camera
Completed reliability corrective workorders
Performed regularly schedule tree clearance
Planned:
Complete reliability corrective workorders
Install tree wire
Install additional wildlife protection

FLINT_147
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Circuit under analysis

GLADWYNE_133
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Install 3 phase recloser
Complete reliability corrective workorders

JARRETT_135
Montgomery County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders
Install 2-3 phase reclosers

LENAPE_342
Chester County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Complete regularly scheduled tree trimming
Tested/ Inspected recloser operation
Repaired test switch operation
Planned:
Complete reliability corrective workorders

LENAPE_351
Chester County
Completed:
Completed reliability corrective workorders
Inspected selected areas of circuit for vegetation issues and corrected as needed
Inspected circuit visually and with thermographic camera
Upgraded transformer
Planned:
Complete reliability corrective workorders
Install additional fusing

LINE_3308NT
Chester County
Completed:
Inspected circuit visually and with thermographic camera
Completed reliability corrective workorders
Installed 3 phase recloser
Installed lightning protection
Installed wildlife protection
Upgraded transformer
Planned:
Circuit under analysis

LINE_3340
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders

MACDADE_146
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Install 1- 3 phase recloser
Install additional fuses
Install additional lightning protection
Complete reliability corrective workorders

MIDDLETOWN_143
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Upgraded wire
Completed reliability corrective workorders
Planned:
All reliability corrective tasks completed

MIDDLETOWN_349
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders
Replace cable

NESHAMINY_133
Bucks County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders

NEWLINVILLE_342
Chester County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Remedial efforts completed

UPPER DARBY_139
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Remedial efforts completed

WARRINGTON_341
Bucks County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Complete reliability corrective workorders
Install 3 phase recloser

WAYNE_142
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective workorders
Planned:
Circuit under analysis

WAYNE_146
Delaware County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective work orders
Planned:
Circuit under analysis

WRIGHT_000
Bucks County
Completed:
Inspected circuit visually and with thermographic camera
Inspected selected areas of circuit for vegetation issues and corrected as needed
Completed reliability corrective work orders
Planned:
Remedial efforts completed

APPENDIX B

New Business

This work category includes all the facility work required to add a new customer or to increase the load to an existing customer. The facility work will include the facilities required to directly connect the customer to the system and the upgrade/replacement of any existing facility to serve the requested additional load.

Capacity Expansion

This work category includes only capacity work generated by the system design engineer to prevent system failure and to assure the delivery of voltage as specified in the tariff. The addition of new substations and substation enlargements for future load growth will also be included in this project.

System Performance

This work category includes projects designed to upgrade, modify or improve the performance of the distribution system. Also included in this category are indirect costs in support of all categories and one-time accounting adjustment items.

Facility Relocation

This work category includes all requests for relocation of PECO facilities including municipal as well as customer related relocation requests.

Maintenance

This work category includes work performed to repair and restore equipment to its normal state of operation, along with planned preventive maintenance work such as visual and thermographic inspections and tree trimming around transmission and distribution lines.

Storm Funds

Incremental costs (primarily; overtime, contractors, mutual assistance, and meals) incurred while responding to major storms (storms that meet customer outage and duration criteria).