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An Exelon Company

September 29, 2014

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

Re: PUC Docket No. M-2009-2094773
Rulemaking Re: Inspection, Maintenance, Repair and Replacement Standards for Electric Distribution Companies
52 Pa. Code Chapter 57.198

Dear Secretary Chiavetta:

In accordance with the Electric Service Reliability Standards at 52 Pa. Code Chapter 57.198, enclosed is PECO's Biennial Inspection, Maintenance, Repair and Replacement Plan for January 1, 2016 through December 31, 2017.

Please acknowledge receipt of the foregoing on the enclosed copy of this letter. A business reply envelope is enclosed for your convenience.

Sincerely, Richard G. Webster, JR. /RAS

Cc: Office of Consumer Advocate
Office of Small Business Advocate
Darren Gill, Bureau of Technical Utility Services

Enclosures
SAN/mec

M-2009-2094773

Biennial Inspection, Maintenance, Repair and Replacement Plan of PECO

For the period of January 1, 2016 – December 31, 2017

Submitted by:
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Dated: October 1, 2014

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

The intent of PECO's Vegetation Management program is to ensure the safe and reliable delivery and operation of the primary electrical distribution system. PECO's Vegetation Management program is primarily composed of a Distribution Preventive Maintenance Routine Pruning program in which all circuits on the PECO system are trimmed to specification once every five years. This core program is complemented with a number of additional programs that are intended to improve reliability.

In addition to the core Distribution Preventive Maintenance Routine Pruning Program PECO uses the following programs to improve reliability:

- Hazard/Strategic Tree Removal Program – Primarily executed in conjunction with the Distribution Preventive Maintenance Routine Program and is intended to remove dead or declining trees along the conductor path and remove non compatible fast growing trees that are below or beside the line.
- Mid Cycle Program – Program targets circuits which have experienced higher than average vegetation related interruptions and are in year three of the five year cycle. The program focuses on trimming the circuit back to specification and removing any dead wood or declining trees along the conductor path.
- 34KV Overhang Program – Program targets 34KV circuits which have experienced higher than average vegetation related interruptions and are not due for Mid Cycle or Routine Preventive Maintenance Pruning. The program aggressively targets the removal of overhangs on the selected 34KV circuits.
- Distribution Herbicide Program – Program is on a three year cycle in which Distribution circuits are treated to keep brush down and remove new growth below the conductors.

PECO employs a third party utility line clearance company for all of its vegetation work. The non-herbicide work is executed through a combination of manual control methods using hand tools to mechanical means using mowers, equipment mounted saws and other devices. PECO's herbicide program uses selective basal herbicide applications, stem foliage applications and cut stubble applications.

Inspection Plan

	Area	Inspections and Treatments Planned (Total Line Miles – 12,985)	
		2016	2017
PECO Total Miles – 12,985	Bucks/Montgomery Co.	785	1,157
	Delaware/Chester/York Co.	1,339	1,007
	Philadelphia	584	472
	Total	**2,708**	**2,636**

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.*

Justification

Vegetation management activities are performed in accordance with the following:

- Generally accepted industry practices
- Compliant with ANSI Z133.1 and A-300 Standards

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

PECO visually inspects all distribution wood poles at least as often as every 10 – 12 years. This program is designed to extend the life of the wood pole infrastructure and to identify those poles that require replacement or reinforcement.

A full inspection will be performed on poles older than 12 years. The inspection includes:

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

Inspection Plan

1. PUC I&M program started on January 1st 2012
2. PECO completed 119,176 wood pole inspections since 2012 vs the plan of 96,779 inspections.
3. Since the 2012 submission, the number of wood poles has increased by 1,143 units to 393,159 units.
4. To account for the increase in units, PECO proposes to perform 32,763 inspections in 2016 and 32,764 in 2017.

	Area	Distribution Pole Inspections	
		2016	2017
PECO 393,159 total distribution wood poles	PECO Service Area 393,159 total distribution wood poles	32,763	32,764

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

If there is reason to believe that any pole presents an imminent hazard to the public, the inspector shall immediately report this condition to the PECO contract administrator and project manager. Such conditions shall be mitigated within 30 days. All remaining deficiencies will be scheduled and prioritized based on criticality.

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.*

Justification

The program cycle was determined based on industry practice. PECO is located in decay severity zone 3 per the U.S. Dept. of Agriculture's RUS Bulletin 1730B-121, 2013. Such industry data indicates that pole life extension is achieved if a pole requiring treatment is treated every 10 - 12 years. An effective treatment program will extend the life of a typical pole from 45 to 65 years.

A waiver is being requested for pole loading calculations. All poles are designed utilizing PECO standards based on NESC loading standards. Furthermore, when categorizing poles as reject or non-reject during inspections, poles are conservatively assumed to be fully loaded. Therefore, performing load calculations on poles would not provide any further beneficial information. Performing load calculations on every pole will increase the cost of inspection and treatment by 30-40%.

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 distribution line
iii. Other conditions that may adversely affect operation of the overhead distribution line

Program Description

PECO shall inspect primary distribution overhead lines and equipment up to fused rear property portions a minimum of once every 1 – 2 years. The purpose of this program is to identify and repair conditions that may adversely affect reliability, safety and/or environment. To support various analyses, additional data is gathered on an as needed basis. As referenced in sections 57.198(N)(6) and 57.198(N)(7), overhead transformers and single-phase reclosers are inspected as a part of this program.

The program will consist of visual inspections that identify defective equipment including:

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

Inspection Plan

1. The second cycle of the PUC I&M program started on January 1st 2014.
2. PECO completed all distribution circuits, 1,884, in 2014 vs the 2014 plan of 942 inspections.
3. Since the 2012 submission, the number of circuits to be inspected has increased by 48 to 1,932 circuits. This increased the total aerial miles inspected by 68 miles.
4. Next cycle for this program starts on January 1st 2016. PECO proposes to perform 966 inspections in 2016 and 966 inspections in 2017.

	Area	Overhead Line Inspections (1,932 total circuits)	
		2016	2017
PECO 1,932 total circuits	Bucks/Montgomery Co. 696 total circuits	348	348
	Delaware/Chester/York Co. 583 total circuits	291	292
	Philadelphia 653 total circuits	327	326
	Total	966	966

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

Maintenance problems vary in nature and criticality. Safety hazards and environmental issues are reported immediately to the Operations Center for emergent repair. An emergent repair is defined as Priority 10 or 20 work which shall be repaired or mitigated in a brief amount of time, less than 30 days.

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.*

Justification

Section 12.121 (A) of the National Electrical Safety code (NESC) states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." PECO's distribution system consists of many aerial and distribution cable devices, which are exposed to physical, electrical and environmental stresses. To ensure the safe and reliable operation of the system, it must be periodically maintained and inspected. Effectiveness reviews have shown that the established inspection program has successfully lowered customer outages caused by aerial equipment failures, therefore improving customer reliability.

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

PECO visually inspects overhead distribution transformers as part of the overhead line inspections, per section 57.198(N)(4). Pad-mounts are visually inspected at least as often as every 5 years and below-ground transformers are visually inspected at least as often as every 8 years. These inspections are designed to identify defective equipment and structures that could affect system reliability.

Visual inspections are intended to identify abnormal conditions including:

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

Inspection Plan

1. PUC I&M program started on January 1st 2012.
2. PECO 2014 year end forecast for transformer inspection completions since the inspection cycle start in 2012 is 35,033 vs the plan of 30,404 inspections.
3. Since the 2012 submission, the number of transformers has increased by 4,822 units to the total of 62,223 transformers.
4. PECO will perform 11,431 inspections in 2016 as well as in 2017.

	Area	Type	Pad-mount and Below-ground Transformer Inspections Planned 62,559 total transformers	
			2016	2017
PECO 62,559 total transformers	Bucks/Montgomery Co. 28,445 total transformers	Pad-mounted Trans. 23,630 total transformers	4,726	4,726
		Below-ground Trans. 4,815 total transformers	602	602
	Delaware/Chester/York Co.26,526 total transformers	Pad-mounted Trans. 21,738 total transformers	4,348	4,348
		Below-ground Trans. 4,788 total transformers	598	599
	Philadelphia 7,588 total transformers	Pad-mounted Trans. 3,295 total transformers	659	659
		Below-ground Trans. 4,293 total transformers	537	537
	Total		11,470	11,471

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.*

Justification

Section 12.121 (A) of the National Electrical Safety code (NESC) states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." The practice of performing the established cycles is based on effectiveness reviews and industry practice. Such reviews have confirmed that the transformer inspection program has a positive impact in customer reliability.

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

Single phase reclosers are visually inspected through the Distribution Overhead Line Inspection Program, per section 57.198(N)(4).

Three-phase reclosers will be inspected on a cycle of 8 years or less. Three-phase recloser programs require visual inspections and testing. Duty cycle readings, settings and circuit print accuracy are also verified.

Inspection Plan

1. PUC I&M program started on January 1st 2012.
2. PECO 2014 year end forecast is 1257 Recloser inspections since the start of the inspection cycle in 2012 vs the plan of 488 inspections.
3. Since the 2012 submission, the number of Reclosers has increased by 119 units to 1,595 Reclosers.
4. PECO proposes to perform 199 inspections in 2016 and 200 inspections in 2017.

		Three-Phase Recloser Inspections 1,595 total Reclosers	
	Area	**2016**	**2017**
PECO 1,595 total Reclosers	Bucks/Montgomery Co. 560 total Reclosers	70	70
	Delaware/Chester/York Co. 708 total Reclosers	88	89
	Philadelphia 327 total Reclosers	41	41
	Total	199	200

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.*

Justification

Section 12.121 (A) of the National Electrical Safety code (NESC) states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." The practice of performing the established cycles is based on PECO's experience on recloser performance. Inspecting three-phase reclosers per the established cycles can prevent misoperations and will save customer interruptions during events, thus improving reliability to the customers.

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

PECO inspects its substations every 5-weeks with an allowable grace period of 25% of the task interval which for this periodicity is 8 days. The grace period is provided to allow for scheduling efficiency and emergency response to equipment failures and storms. The purpose of these inspections is to capture and trend readings and perform visual inspections of the substation yard and equipment. These inspections help to ensure that any developing substation problems are identified and addressed in a timely manner to support system reliability and electrical safety. The data from these inspections is captured and trended in an equipment database.

Each inspection is customized to the equipment installed in the substation/switchyard and, based on the equipment, includes the following types of readings and inspections:

- Read and record currents, voltages, watts, vars, MVAs, temperatures, pressures, operations counters, run-hours, levels, and specific gravity readings.
- Substation control house inspection (security breaches, general house keeping).
- Substation yard and perimeter (gate, locks, fence, signage)
- Substation equipment
- Batteries and chargers
- Relays
- Station service power equipment

Inspection Plan

Inspections are divided into two basic categories for tracking purposes since they are completed by different work groups. Substations which represent PECO's transmission and distribution substations, these are typically larger and contain DC systems, and Unit Substations which represent smaller distribution substations 33 or 13 kV to 2.4, 4 or 13 kV, with no DC systems.

PECO	Area	Substation Inspections Planned	
		Total Substations 439/438	
		2016	**2017**
Substations (132)	Bucks/Montgomery Co (36 substations)	360	360
	Delaware/Chester/York / Hartford Co (MD) (44 substations)	440	440
	Philadelphia (52 substations)	520	520
	Total	**1320**	**1320**
*Unit Substations (307 in 2016, 306 in 2017)**	Bucks/Montgomery Co (136 unit substations)	1360	1360
	Delaware/Chester/York / Hartford Co (MD) (137 unit substations)	1370	1370
	Philadelphia (34/33 unit substations)	340	330
	Total	**3070**	**3060**

* Removal of one unit substation in 2017 due to retirement.

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 and EDC may propose a plan that, for a given standard, uses intervals outside the Commission standard, provide that the deviation can be justified by the EDC's unique circumstances or a cost/benefit analysis to support and alternative approach that will support the level of reliability required by law.*

Justification

The practice of performing 5-week substation inspections with an allowed grace period of 25% is based on accepted utility practices and the basis for the various inspection tasks are captured and documented on the individual PCM Templates associated with each substation component. Historically, a period of 5 to 6 weeks between substation inspections has been utilized and has proven to be effective at identifying and addressing developing substation or equipment issues in a timely manner in support of system reliability and electrical safety. The effectiveness of the inspections is periodically reviewed at a component level and as part of event investigations. Adjustments are made to the program as warranted to improve system reliability and safety as a result of the reviews. In addition, there are many opportunities for other PECO personnel or approved PECO vendors to view substation facilities in the course of their day to day work in and around the substations such as facilities maintenance inspections and switching and blocking being performed for scheduled and emergent work.

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