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October 1, 2013

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PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

VIA UNITED PARCEL SERVICE

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

**Re: *Biennial Inspection, Maintenance, Repair and Replacement Plan –
Pennsylvania Electric Company for the period January 1, 2015 –
December 31, 2016
Docket No. _____***

Dear Secretary Chiavetta:

M - 2009 - 2094773

In accordance with 52 Pa. Code § 57.198, enclosed for filing on behalf of Pennsylvania Electric Company (“Penelec”) is an original and one copy of the Biennial Inspection, Maintenance, Repair and Replacement Plan (the “Plan”) for the period January 1, 2015 through December 31, 2016. Please date stamp the extra copy and return it in the postage-prepaid envelope provided.

This Plan is designed consistent with the guidelines established by the National Electric Safety Code, the Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations, and the American National Standards Institute, Inc. The Plan also has been designed to reduce the risk of outages on Penelec’s system and form the basis of its inspection and maintenance goals and objectives as outlined in Penelec’s annual and quarterly reliability reports filed with the Pennsylvania Public Utility Commission (“Commission”).

Penelec respectfully requests that the Commission accept its Biennial Inspection, Maintenance, Repair and Replacement Plan. If you have any questions, please contact me or Tiffanne Cowan at (330) 761-4474.

Sincerely,

David J. Karafa/ms

David J. Karafa
President, Pennsylvania Operations

Enclosure

c: D. Searforce

**Biennial Inspection, Maintenance, Repair and Replacement
Plan of Pennsylvania Electric Company (“Penelec”)**

For the period of January 1, 2015 – December 31, 2016

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PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

**Submitted by:
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Revisions to Approved Plan

The Commission accepted Pennsylvania Electric Company's ("Penelec") current Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for 2013 and 2014 on April 23, 2012. The table below illustrates, in summary fashion, the proposed changes to the 2015 and 2016 plan that differ from the 2013-2014 I&M Plan.

Penelec <i>2013-2014 Plan</i>	Penelec <i>Proposed Program (effective January 1, 2015)</i>
Vegetation Management – page 1	
Standard specification to obtain 4 years of clearance.	Standard specification to obtain 5 years of clearance.
Substation Inspections – page 12	
Each monthly inspection consists of readings and patrol inspections.	Inspections will consist of three components: 1. <i>Monthly Safety & Security, Visual Equipment and Recording of Deficiencies and Relay Operations</i> 2. <i>Safety/Security, Visual Equipment Inspection and Record Readings</i> 3. <i>Seasonal Maintenance</i>

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

Pennsylvania Electric Company ("Penelec") performs vegetation management to promote the continued safe and reliable operation of the distribution system. Vegetation management may be performed utilizing one of three methods: Standard Specification, Inspect/Maintain or Enhanced techniques. The Standard Specification for vegetation management is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The Standard vegetation specification provides vegetation to be pruned to achieve five years of clearance, removal of selected incompatible trees within the clearing zone corridor, removal of certain defective limbs that are overhanging primary conductors, controlling selected incompatible brush mechanically and/or using herbicide, 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 receive the Standard Specification as well as enhanced vegetation removal techniques, which includes removal of certain healthy limbs, based on tree species and condition, which overhang primary conductors.

For portions of a circuit that have not experienced significant reliability issues due to vegetation-caused outages, a proactive Inspect/Maintain process will target selective vegetation removal for continued reliable system operation. This may include the extension of a cycle which will not exceed 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 to the Standard Specification.

Methods used to manage and control vegetation include manual control methods using *hand-operated tools, mechanical control using equipment mounted saws, mowers or other devices*, and various herbicide application techniques such as, selective basal herbicide applications, stem foliage applications and cut stubble applications.

For further detailed information regarding Penelec's vegetation management program, reference the [Vegetation Management Distribution Specifications](#).

Inspection Plan¹

	Area	Inspections and Treatments Planned	
		Total Circuit Miles	
		2015	2016
Penelec 18,458 total circuit miles	Oil City 2,566 total circuit miles	513	513
	Johnstown 2,414 total circuit miles	483	483
	Towanda 3,114 total circuit miles	622	622
	Altoona 2,014 total circuit miles	443	433
	Clearfield 2,610 total circuit miles	522	522
	Lewistown 1,446 total circuit miles	316	340
	Erie 2,299 total circuit miles	460	460
	Mansfield 1,642 total circuit miles	328	328

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

Distribution vegetation management activities are performed in accordance with the following:

- Generally accepted industry practices
- ANSI Z133.1 and A-300 Standards and according to the requirements given by OSHA and the National Electrical Safety Code (NESC)

The standard specification seeks to control all vegetation in the space defined as the "distribution clearing zone". The distribution clearing zone is a 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. In addition to the standard specification, Penelec may apply a practice described as "enhanced

¹ Subject to change.

maintenance” to select line sections. Enhanced maintenance is intended to improve tree related reliability. This practice involves removing overhanging limbs beyond the prescribed fifteen feet as well as aggressive hazard tree mitigation.

As part of Penelec's approach to improved tree related reliability, the Company continues to analyze the circuit electrical protection schemes and gives added attention to those line sections that serve high numbers of customers. While following the existing protection schemes, three distinct line sections have been identified and defined. Zone 1 is defined as the three-phase circuitry from the circuit breaker to the first protective device which serves the entire circuit customer load. Zone 2 is defined as the three-phase circuitry beyond the first protective device which typically serves a large percentage of the circuit customer load. Zone 3 is defined as all single phase and two-phase circuitry which serves smaller percentages of the circuit customer load.

Based on outage data from 2008 through 2012, Penelec has successfully improved tree-related reliability by applying enhanced maintenance on portions of Zone 1 and Zone 2. The next step in continuing to improve tree related reliability is to implement the same enhanced maintenance practices to portions of Zone 3 that are currently being utilized in portions of Zone 1 and Zone 2. Extending the effort to remove overhang and hazard trees into Zone 3 will have a similar positive impact to tree related reliability on these line sections.

The additional year of tree growth is not a concern for Penelec. Firelands Electric Cooperative, an Ohio Electric Cooperative, recently produced a study on the growth response of trees pruned by species. The species examined in the study are all common to the Penelec service territory. The maximum five year re-growth measured in the tree growth study is 14.4 feet. The minimum five year re-growth measured in the tree growth study is 5.2 feet. The re-growth of all species over a five year period averaged 9.19 feet on side trim and 10 feet on trees beneath conductors. The FirstEnergy specifications call for cycle length clearance or a minimum of twelve feet of clearance. Much of Penelec's overhead distribution maintenance achieves fifteen feet of clearance at the time of trimming which exceeds the 14.4 feet maximum five year re-growth of all species measured in the study.

In addition, Penelec has several other inspection programs in place that put trained utility personnel in a position to observe conditions on the entire distribution system. These observations include vegetation conditions that may warrant further investigation in individual circumstances.

Section 57.198(m). Record Keeping. *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.

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 National Electrical Safety Code.

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 (35) years old or older will be bored to further assess the condition of the pole. This inspection consists of the recording of tests performed and abnormal conditions detected including but not limited to the following:

- Boring – testing for internal decay
- Verification of shell thickness

For further detailed information regarding Penelec's inspection of wood poles, reference the Distribution Inspection & Maintenance Practice – Wood Poles.

Inspection Plan²

	Area	Pole Inspections Planned (Number of Poles)	
		2015	2016
Penelec 493,339 total poles	Altoona 60,905 total poles	3,730	3,730
	Clearfield 39,536 total poles	3,302	3,302
	Dubois 45,466 total poles	3,797	3,797
	Erie 72,261 total poles	7,070	7,070
	Johnstown 54,710 total poles	4,568	4,568
	Lewistown 39,544 total poles	3,520	3,520
	Oil City 50,663 total poles	4,238	4,238
	Towanda 98,963 total poles	8,275	8,275
	Warren 31,271 total poles	2,611	2,611

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 reasonably expect to endanger life or property shall be repaired/replaced within 30 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 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.*

Justification

The practice of performing wood pole inspections on a twelve (12) year cycle is based on accepted electric utility practices. National Electrical Safety Code (NESC) Rule 12.121.A states "lines and equipment shall be inspected at such intervals as experience has shown to be necessary." A periodicity of twelve (12) years between inspections

² Subject to change based on the addition or removal of equipment.

allows enough time for proper planning and remediation prior to any emergent problems having a negative impact on personal safety, equipment integrity or service reliability.

Regarding load calculations, Penelec's design personnel base line designs on FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices. The Company's Construction Standards are created based on NESC Heavy Loading (NESC C2-2007, Section 250) since the majority of FirstEnergy's service territory lies within this zone, and since these standards provide basic guidance for most designs encountered by distribution line design personnel. The Engineering Practices provide detailed guidance for both guying and pole loading to be used when designers encounter more complex design needs, again based on NESC Heavy Loading. 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 of the pole's ability to accommodate the new strength requirement is performed.

Section 57.198(m). Record Keeping. *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.

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

Pennsylvania Electric Company (“Penelec”) shall visually inspect 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 National Electrical Safety Code. This program shall be limited to overhead facilities.

Approximately one-fifth of all circuits will be inspected annually 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 – condition, damage
- Guying – condition, damage
- Pole-mounted distribution equipment – condition, damage

For further detailed information regarding Penelec's inspection of Distribution Overhead Lines, reference the Distribution Inspection & Maintenance Practice – Overhead Circuits and Equipment.

Inspection Plan³

	Area	Overhead Line Inspections Planned (Number of Circuits)	
		2015	2016
Penelec 1,252 total circuits	Altoona 173 total circuits	30	38
	Clearfield 65 total circuits	12	12
	Dubois 95 total circuits	24	11
	Erie 209 total circuits	41	45
	Johnstown 135 total circuits	23	31
	Lewistown 82 total circuits	17	15
	Oil City 141 total circuits	28	28
	Towanda 260 total circuits	50	50
	Warren 92 total circuits	23	15

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 endanger life or property shall be repaired/replaced within 30 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.

³ Subject to change based on the addition or removal of equipment.

Justification

The practice of performing overhead line inspections on a five-year cycle is based on accepted electric utility practices and the experience of Penelec. National Electrical Safety Code (NESC) Rule 12.121.A states "*lines and equipment shall be inspected at such intervals as experience has shown to be necessary.*" A periodicity of five years between inspections has historically been utilized and has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

In addition to an inspection every five years, there are many other opportunities for Penelec personnel to view the overhead line facilities and identify any potential issues. Penelec's overhead line inspection program coincides with other equipment inspections, such as the annual recloser inspections. In order to address specific reliability concerns and to assess some worst performing circuit performance, additional circuit assessments are performed in addition to Penelec's five-year inspection program. Any emergent priority overhead line problems identified during these other inspections are similarly addressed in a timely manner.

Section 57.198(m). Record Keeping. *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.

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 visually 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 National Electrical Safety Code.

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
- 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

For further detailed information regarding Penelec's inspection of distribution transformers, reference the Distribution Inspection & Maintenance Practice – Underground Equipment.

Inspection Plan⁴

		Area	Type	Transformer Inspections Planned (Total Transformers)	
				2015	2016
Penelec 193,860 total transformers	Altoona	Overhead Transformers <i>23,305 total transformers</i>	4,367	4,994	
		Above-Ground Pad-mounted <i>4,663 total transformers</i>	827	1,291	
		Below-Ground Transformers <i>322 total transformers</i>	40	40	
	Clearfield	Overhead Transformers <i>14,994 total transformers</i>	3,276	3,291	
		Above-Ground Pad-mounted <i>1,268 total transformers</i>	179	338	
		Below-Ground Transformers <i>156 total transformers</i>	20	20	
	Dubois	Overhead Transformers <i>14,395 total transformers</i>	3,806	1,530	
		Above-Ground Pad-mounted <i>2,050 total transformers</i>	623	147	
		Below-Ground Transformers <i>214 total transformers</i>	27	27	
	Erie	Overhead Transformers <i>22,844 total transformers</i>	4,270	5,019	
		Above-Ground Pad-mounted <i>4,997 total transformers</i>	856	987	
		Below-Ground Transformers <i>121 total transformers</i>	15	15	
	Johnstown	Overhead Transformers <i>19,599 total transformers</i>	2,813	5,080	
		Above-Ground Pad-mounted <i>3,174 total transformers</i>	551	1,046	
		Below-Ground Transformers <i>205 total transformers</i>	26	26	
	Lewistown	Overhead Transformers <i>13,431 total transformers</i>	2,917	2,371	
		Above-Ground Pad-mounted <i>2,534 total transformers</i>	401	662	
		Below-Ground Transformers <i>180 total transformers</i>	23	23	
	Oil City	Overhead Transformers <i>17,945 total transformers</i>	2,920	3,648	
		Above-Ground Pad-mounted <i>2,301 total transformers</i>	357	355	
		Below-Ground Transformers <i>177 total transformers</i>	22	22	
	Towanda	Overhead Transformers <i>29,758 total transformers</i>	5,242	5,744	
		Above-Ground Pad-mounted <i>2,695 total transformers</i>	536	484	
		Below-Ground Transformers <i>251 total transformers</i>	31	31	
	Warren	Overhead Transformers <i>11,248 total transformers</i>	4,244	1,570	
		Above-Ground Pad-mounted <i>1,006 total transformers</i>	270	114	
		Below-Ground Transformers <i>27 total transformers</i>	3	3	

⁴ Subject to change based on the addition or removal of 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.*

Justification

The practice of performing distribution overhead and above-ground pad-mounted transformers on a five-year cycle and below-ground transformers on an eight-year cycle is based on accepted electric utility practices and the experience of Penelec. National Electrical Safety Code (NESC) Rule 12.121.A states "lines and equipment shall be inspected at such intervals as experience has shown to be necessary." The above periodicities between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Section 57.198(m). Record Keeping. *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.

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 National Electrical Safety Code.

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

For further detailed information regarding Penelec's inspection of reclosers, reference the Distribution Inspection & Maintenance Practice – Line Reclosers.

Inspection Plan⁵

	Area	Type	Recloser Inspections Planned	
			Total Number of Reclosers	
			2015	2016
Penelec 2,571 total reclosers	Altoona 353 total reclosers	Single Phase 268 total reclosers	268	268
		Three Phase 85 total reclosers	85	85
	Clearfield 278 total reclosers	Single Phase 235 total reclosers	235	235
		Three Phase 43 total reclosers	43	43
	Dubois 140 total reclosers	Single Phase 81 total reclosers	81	81
		Three Phase 59 total reclosers	59	59
	Erie 464 total reclosers	Single Phase 381 total reclosers	381	381
		Three Phase 83 total reclosers	83	83
	Johnstown 126 total reclosers	Single Phase 37 total reclosers	37	37
		Three Phase 89 total reclosers	89	89
	Lewistown 180 total reclosers	Single Phase 149 total reclosers	149	149
		Three Phase 31 total reclosers	31	31
	Oil City 380 total reclosers	Single Phase 312 total reclosers	312	312
		Three Phase 68 total reclosers	68	68
	Towanda 435 total reclosers	Single Phase 356 total reclosers	356	356
		Three Phase 79 total reclosers	79	79
	Warren 215 total reclosers	Single Phase 183 total reclosers	183	183
		Three Phase 32 total reclosers	32	32

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 practice of performing annual recloser inspections is based on accepted electric utility practices and the experience of Penelec. National Electrical Safety Code (NESC) Rule 12.121.A states "lines and equipment shall be inspected at such intervals as experience has shown to be necessary." A periodicity of one year between inspections has proven to be successful in addressing emergent problems in a timely manner,

⁵ Subject to change based on the addition or removal of equipment.

allowing for proper planning and remediation prior to the emergent problem having a negative impact on personal safety, equipment integrity or service reliability.

Section 57.198(m). Record Keeping. *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.

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 the preventative maintenance inspections that are performed at Penelec substations during a twelve month period. The chart below illustrates the type of inspection performed each month⁶:

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 includes 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)
 - 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

⁶ For illustrative purposes only.

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 includes 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 includes 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 Section 20P – Substation Patrol Inspection of the Substation Practice Manual.

Inspection Plan⁷

	Area	Substation Inspections Planned ¹	
		Number of Substations	
		2015	2016
Penelec 414 total substations	Oil City 36 substations	432	432
	Warren 29 substations	348	348
	Erie 41 substations	492	492
	Towanda 32 substations	384	384
	Mansfield 22 substations	264	264
	Tunkhannock 28 substations	336	336
	Altoona 58 substations	696	696
	Richland 54 substations	648	648
	Clearfield 53 substations	636	636
	Lewistown 25 substations	300	300
	Indiana 13 substations	156	156
	Huntington 23 substations	276	276

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

Providing a trained, physical presence within the substation on a regular, periodic basis has proven very successful in detecting the degradation of facilities not always captured by existing local and remote surveillance and monitoring tools. A periodicity of one month between inspections has proven to be successful in addressing emergent problems in a timely manner, allowing for proper planning and remediation prior to the

⁷ Subject to change based on the addition or removal of equipment.

emergent problem having a negative impact on person safety, equipment integrity or service reliability.

Acceptance of this program would allow FirstEnergy to establish a uniform maintenance program across all FirstEnergy Pennsylvania Operating Companies. This includes enhancing the current program by adding a seasonal inspection (Class A) twice a year (spring and fall) for all substations.

As a result of advancement in today's technologies, substation equipment inspections have been refined to leverage these advancements in order to ensure the highest levels of safety and reliability of substations and substation equipment in a more efficient manner. With today's technology, equipment inspections along with patrol inspection results can now be captured by field personnel on site and integrated and tracked electronically in the maintenance database. Enhanced software programs allow condition-based maintenance to target specific equipment and trigger maintenance based on equipment condition. The counter readings that are obtained during the three-month inspection (Class B) are then utilized to trigger this condition-based maintenance. Predictive and condition-based programs not only extend the operating life of the equipment, they also optimize the necessary maintenance interval, improve service reliability, and reduce down time that is typically experienced when equipment is taken off line which reduces exposure of the grid, all with consistency and efficiency.

As part of this revised program, monthly patrol inspections of distribution substations will continue to be performed in order to focus on safety and security as well as in identifying equipment deficiencies that could have a negative impact on reliability. Load and counter readings will be recorded every three months in order to allow local engineering to conduct planning and load study activities. A seasonal inspection will be added for the spring and fall.

Section 57.198(m). Record Keeping. *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.