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October 1, 2015

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VIA UNITED PARCEL SERVICE

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

OCT 1 2015

PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

Re: **Biennial Inspection, Maintenance, Repair and Replacement Plan –  
Pennsylvania Power Company for the period January 1, 2017 –  
December 31, 2018**  
Docket No. M-2009-2094773

Dear Secretary Chiavetta:

In accordance with 52 Pa. Code § 57.198, enclosed for filing on behalf of Pennsylvania Power Company (“Penn Power”) is an original and one copy of the Biennial Inspection, Maintenance, Repair and Replacement Plan (the “Plan”) for the period January 1, 2017 through December 31, 2018. Please date stamp the additional 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 Penn Power’s system and form the basis of its inspection and maintenance goals and objectives as outlined in Penn Power’s annual and quarterly reliability reports filed with the Pennsylvania Public Utility Commission (“Commission”).

Penn Power 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,

*Tori L. Giesler* /dlm

Tori L. Giesler

dlm  
Enclosure

c: D. Searfoorce

**Biennial Inspection, Maintenance, Repair and Replacement  
Plan of Pennsylvania Power Company ("Penn Power")**

**For the period of January 1, 2017 – December 31, 2018**

**RECEIVED**

OCT 1 2015

PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

**Submitted by:  
Linda L. Moss  
President, Pennsylvania Operations  
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## Table of Contents

	<u>Page</u>
<b>1. Section 57.198(n)(1) Vegetation Management</b>	
<b>Program Description</b>	<b>1</b>
<b>Inspection Plan</b>	<b>2</b>
<b>Justification</b>	<b>2</b>
<b>2. Section 57.198(n)(2) Pole Inspections</b>	
<b>Program Description</b>	<b>4</b>
<b>Inspection Plan</b>	<b>5</b>
<b>Corrective Maintenance - Section 57.198(n)(3)</b>	<b>5</b>
<b>Justification</b>	<b>5</b>
<b>3. Section 57.198(n)(4) Distribution Overhead Line Inspections</b>	
<b>Program Description</b>	<b>7</b>
<b>Inspection Plan</b>	<b>7</b>
<b>Corrective Maintenance - Section 57.198(n)(5)</b>	<b>8</b>
<b>Justification</b>	<b>8</b>
<b>4. Section 57.198(n)(6) Distribution Transformer Inspections</b>	
<b>Program Description</b>	<b>9</b>
<b>Inspection Plan</b>	<b>10</b>
<b>Justification</b>	<b>10</b>
<b>5. Section 57.198(n)(7) Recloser Inspections</b>	
<b>Program Description</b>	<b>12</b>
<b>Inspection Plan</b>	<b>12</b>
<b>Justification</b>	<b>13</b>
<b>6. Section 57.198(n)(8) Substation Inspections</b>	
<b>Program Description</b>	<b>14</b>
<b>Inspection Plan</b>	<b>15</b>
<b>Justification</b>	<b>15</b>

Revisions to Approved Plan

The Commission accepted Pennsylvania Power Company's ("Penn Power") current Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for 2015 and 2016 on December 30, 2013. The table below illustrates, in summary fashion, the proposed additions to the 2017 and 2018 plan that were not in the 2015-2016 I&M Plan.

<b>Penn Power</b> <i>Proposed Program (effective January 1, 2017)</i>
<b>Distribution Overhead Line Inspections – page 7</b>
The Company has included switches and sectionalizers to the list of items to be inspected in the <i>Distribution Inspection &amp; Maintenance Practice – Overhead Circuits and Equipment</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

Penn Power performs vegetation management to help promote 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.

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

Inspection Plan<sup>1</sup>

	Area	Inspections and Treatments Planned Total Circuit Miles	
		2017	2018
<b>Penn Power</b> 4,560 total circuit miles	<b>Mercer</b> 2,145 total circuit miles	515	570
	<b>New Castle</b> 1,467 total circuit miles	369	376
	<b>Zelienople</b> 948 total circuit miles	230	238

**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 Electric 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, Penn Power may apply a practice described as enhanced 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 Penn Power'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

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<sup>1</sup> Subject to change

circuit customer load. Zone 3 is defined as all single phase and two-phase circuitry which serves smaller percentages of the circuit customer load.

**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, Penn Power 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

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 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 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

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

Inspection Plan<sup>2</sup>

	Area	Pole Inspections Planned (Number of Poles)	
		2017	2018
<b>Penn Power</b> 128,299 total poles	Clark 60,367 total poles	5,000	5,000
	Zelienople 67,932 total poles	5,600	5,600

**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.

**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 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 years between inspections 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, Penn Power's design personnel base line designs on FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices. The Company's Construction Standards are based and updated each time an updated NESC Heavy Loading standard is issued. The majority of FirstEnergy's service territory lies within this zone and these standards provide basic guidance for most designs encountered by distribution line design personnel. All new facilities are in line with NESC Heavy Loading standard NESC C2-2012, Section 250. 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

<sup>2</sup> Subject to change based on the addition or removal of equipment.

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 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, Penn Power 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

Penn Power 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 (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.

Inspection Plan<sup>3</sup>

	Area	Overhead Line Inspections Planned (Number of Circuits)	
		2017	2018
		<b>Penn Power</b> 177 total circuits	Clark 57 total circuits
	Zelienople 120 total circuits	28	24

<sup>3</sup> Subject to change based on the addition or removal of 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.*

Justification

The practice of performing overhead line inspections on a five-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 five years between inspections has historically been utilized by Penn Power 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, Penn Power has a unique opportunity that allows Company personnel to view the overhead line facilities and identify any potential issues. Penn Power'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 Penn Power'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, Penn Power 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

Penn Power 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, including 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.

Inspection Plan<sup>4</sup>

	Area	Type	Transformer Inspections Planned	
			Total transformers	
			2017	2018
<b>Penn Power</b> 62,714 total transformers	Clark 26,320 total transformers	Overhead Transformers 23,625 total transformers	4,800	4,600
		Above-Ground Pad-mounted 2,695 total transformers	550	500
		Below-Ground Transformers 0 transformers	0	0
	Zelienople 36,394 total transformers	Overhead Transformers 26,928 total transformers	6,700	5,400
		Above-Ground Pad-mounted 9,449 total transformers	2,200	1,800
		Below-Ground Transformers 17 total transformers	2	0

**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 as well as above-ground transformer inspections on a five-year and below-ground transformers on an eight-year cycle is based on accepted electric utility practices and the experience of Penn Power. 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 have 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.*

<sup>4</sup> Subject to change based on the addition or removal of equipment.

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.

**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 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

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

Inspection Plan<sup>5</sup>

	Area	Type	Recloser Inspections Planned	
			Total number of Reclosers	
			2017	2018
<b>Penn Power</b> 802 total reclosers	Clark 370 total reclosers	Single Phase 343 total reclosers	343	343
		Three Phase 27 total reclosers	27	27
	Zelienople 432 total reclosers	Single Phase 360 total reclosers	360	360
		Three Phase 72 total reclosers	72	72

<sup>5</sup> 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 annual recloser inspections is based on accepted electric utility practices and the experience of Penn Power. 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, 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, Penn Power 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

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 the 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<sup>6</sup>:

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	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, 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)
  - 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:

<sup>6</sup> For illustrative purposes only

- 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 Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

Inspection Plan<sup>7</sup>

	Area	Substation Inspections Planned (Number of Substations)	
		2017	2018
<b>Penn Power</b> <i>73 total substations</i>	<b>New Castle</b> <i>73 total substations</i>	876	876

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

<sup>7</sup> Subject to change based on the addition or removal of equipment.

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 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 occurs during 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, Penn Power will maintain inspection and maintenance records either electronically or in hard copy as required by state law.