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September 29, 2017

RECEIVED

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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 – Metropolitan Edison Company for the period January 1, 2019 – December 31, 2020
Docket No. M-2009-2094773

Dear Secretary Chiavetta:

In accordance with 52 Pa. Code § 57.198, enclosed for filing on behalf of Metropolitan Edison Company ("Met-Ed") is an original and one copy of the Biennial Inspection, Maintenance, Repair and Replacement Plan (the "Plan") for the period January 1, 2019 through December 31, 2020. 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 Met-Ed's system and form the basis of its inspection and maintenance goals and objectives as outlined in Met-Ed's annual and quarterly reliability reports filed with the Pennsylvania Public Utility Commission ("Commission").

Met-Ed 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
Enclosure

c: D. Searfoorce

Met-Ed
A FirstEnergy Company

Biennial Inspection, Maintenance, Repair and Replacement Plan of Metropolitan Edison Company ("Met-Ed")

For the period of January 1, 2019 – December 31, 2020

Submitted by:
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Met-Ed
A FirstEnergy Company

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Revisions to Approved Plan

The Commission accepted Metropolitan Edison Company's ("Met-Ed" or "Company") current Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for 2017 and 2018 on December 15, 2015. Met-Ed's proposed I&M Plan for 2019 and 2020 is consistent with its previously approved plan for 2017 and 2018 and proposes no substantive changes to its inspection cycles or plan components.

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

Program Description

Met-Ed performs vegetation management on its distribution circuits to promote the continued safe and reliable operation of its distribution system. Vegetation management may be performed utilizing one of three methods: standard specification, inspect and maintain, or enhanced specification. 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 specification prunes vegetation to achieve five years of clearance and includes the 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 enhanced specification vegetation removal techniques. This includes the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.

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

Inspection Plan[1]

Area		Inspections and Treatments Planned *(Total Circuit Miles)*	
		2019	2020
Met-Ed *11,456 total circuit miles*	Easton *1,415 total circuit miles*	283	283
	Hanover *1,972 total circuit miles*	394	394
	Lebanon *1,500 total circuit miles*	300	300
	Reading *3,153 total circuit miles*	631	631
	Stroudsburg *1,067 total circuit miles*	213	213
	York *2,349 total circuit miles*	470	470

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:

- Accepted industry practices
- ANSI Z133.1 and A-300 Standards and according to the requirements given by the Occupational Safety and Health Administration ("OSHA") and the National Electrical Safety Code ("NESC")

All vegetation management activities are designed to achieve cycle length clearances, regardless of method employed. The standard specification seeks to control all vegetation in the space defined as the distribution clearing zone. The distribution clearing zone is the right-of-way corridor measured at a horizontal distance of fifteen feet on either side of the pole line or the established large tree edge, whichever is greater in width. The corridor is measured vertically to fifteen feet above the highest conductor attached to the pole or structure. Enhanced specification techniques may be applied to select line sections. This

[1] The total number of circuit miles to be trimmed in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazard trees.

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

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

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

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, Met-Ed 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

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

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

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

In addition to the visual inspection, poles showing incipient decay or poles that are thirty-five years old or older will be 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 Met-Ed's inspection of wood poles may be found in the Distribution Inspection & Maintenance Practice – Wood Pole Groundline.

Inspection Plan[2]

Area		Pole Inspections Planned *(Number of Poles)*	
		2019	2020
Met-Ed *337,064 total poles*	Boyertown *17,691 total poles*	1,276	0
	Dillsburg *16,450 total poles*	0	0
	Easton *46,127 total poles*	3,533	3,195
	Gettysburg *16,266 total poles*	0	297
	Hamburg *19,897 total poles*	5,551	4,020
	Hanover *21,470 total poles*	5,389	5,353
	Lebanon *43,140 total poles*	5,572	6,442
	Reading *46,429 total poles*	2,966	8,810
	Stroudsburg *35,903 total poles*	4,654	0
	York *73,691 total poles*	5,393	2,464

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

Corrective Maintenance

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

[2] The total number of poles to be inspected in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

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

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

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

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

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, Met-Ed 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

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

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

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

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

Inspection Plan[3]

Area		Overhead Line Inspections Planned *(Number of Circuits)*	
		2019	2020
Met-Ed *779 Total Circuits*	Boyertown *40 total circuits*	11	8
	Dillsburg *19 total circuits*	0	6
	Easton *115 total circuits*	26	33
	Gettysburg *32 total circuits*	7	14
	Hamburg *25 total circuits*	5	2
	Hanover *60 total circuits*	18	7
	Lebanon *100 total circuits*	20	26
	Reading *151 total circuits*	34	28
	Stroudsburg *34 total circuits*	8	6
	York *203 total circuits*	44	47

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

Corrective Maintenance

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

Section 57.198(c). Time frames. *The plan must comply with the inspection and maintenance standards in subsection (n). A justification for the inspection and maintenance time frames selected shall be provided, even if the time frame falls within the intervals prescribed in subsection (n).*

[3] The total number of circuits to be inspected in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

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

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

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

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, Met-Ed 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

Met-Ed 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 ("NESC").

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

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

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

- Equipment condition – oil leakage, cabinet damage, holes, washout
- Security – locking mechanisms
- Accessibility – as required for operation and maintenance purposes, including 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 Met-Ed's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground Equipment.

Inspection Plan[4]

	Area	Type (Total Number of Transformers)	Transformer Inspections Planned (Total transformers) 2019	2020
Met-Ed *183,826 total transformers*	Boyertown *15,309 total transformers*	Overhead Transformers *11,156 total transformers*	2,029	3,855
		Above-Ground Pad-mounted *4,057 total transformers*	1,324	1,409
		Below-Ground Transformers *96 total transformers*	35	31
	Dillsburg *11,710 total transformers*	Overhead Transformers *8,885 total transformers*	134	3,444
		Above-Ground Pad-mounted *2,777 total transformers*	18	1,033
		Below-Ground Transformers *48 total transformers*	1	14
	Easton *18,043 total transformers*	Overhead Transformers *13,821 total transformers*	3,000	3,364
		Above-Ground Pad-mounted *3,979 total transformers*	803	1,576
		Below-Ground Transformers *243 total transformers*	97	75
	Gettysburg *7,678 total transformers*	Overhead Transformers *6,317 total transformers*	1,503	2,924
		Above-Ground Pad-mounted *1,330 total transformers*	504	519
		Below-Ground Transformers *31 total transformers*	16	8
	Hamburg *10,947 total transformers*	Overhead Transformers *8,566 total transformers*	2,049	466
		Above-Ground Pad-mounted *2,292 total transformers*	607	256
		Below-Ground Transformers *89 total transformers*	28	1
	Hanover *15,800 total transformers*	Overhead Transformers *11,240 total transformers*	3,094	1,966
		Above-Ground Pad-mounted *4,473 total transformers*	1,083	1,338
		Below-Ground Transformers *87 total transformers*	11	22

[4] The total number of distribution transformers to be inspected in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

	Area	Type *(Total Number of Transformers)*	Transformer Inspections Planned *(Total transformers)* 2019	2020
Met-Ed *183,826 total transformers*	Lebanon *22,764 total transformers*	Overhead Transformers *16,796 total transformers*	3,337	3,889
		Above-Ground Pad-mounted *5,593 total transformers*	1,257	943
		Below-Ground Transformers *375 total transformers*	56	67
	Reading *23,693 total transformers*	Overhead Transformers *17,647 total transformers*	3,179	4,072
		Above-Ground Pad-mounted *5,754 total transformers*	879	1,659
		Below-Ground Transformers *292 total transformers*	67	61
	Stroudsburg *13,996 total transformers*	Overhead Transformers *11,910 total transformers*	4,173	914
		Above-Ground Pad-mounted *2,018 total transformers*	595	134
		Below-Ground Transformers *68 total transformers*	1	10
	York *43,886 total transformers*	Overhead Transformers *30,845 total transformers*	6,823	6,522
		Above-Ground Pad-mounted *12,670 total transformers*	3,241	3,327
		Below-Ground Transformers *371 total transformers*	171	46

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

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

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

In addition to Met-Ed's Distribution Transformer Inspections Program, there are other distribution equipment inspection programs (e.g., Distribution Vegetation Management,

Distribution Pole Inspections, and Recloser Inspections) that allow trained utility personnel multiple opportunities to observe conditions on the distribution system. These conditions may include distribution transformer situations that warrant further investigation.

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, Met-Ed 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

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

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

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

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

Inspection Plan[5]

	Area	Type	Recloser Inspections Planned (Total Number of Reclosers) 2019	2020
Met-Ed *1,108 total reclosers*	Boyertown *62 total reclosers*	Single Phase *22 total reclosers*	22	22
		Three Phase *40 total reclosers*	40	40
	Dillsburg *79 total reclosers*	Single Phase *32 total reclosers*	32	32
		Three Phase *47 total reclosers*	47	47
	Easton *108 total reclosers*	Single Phase *22 total reclosers*	22	22
		Three Phase *86 total reclosers*	87	87
	Gettysburg *55 total reclosers*	Single Phase *16 total reclosers*	16	16
		Three Phase *39 total reclosers*	39	39
	Hamburg *67 total reclosers*	Single Phase *37 total reclosers*	37	37
		Three Phase *30 total reclosers*	30	30
	Hanover *88 total reclosers*	Single Phase *33 total reclosers*	33	33
		Three Phase *55 total reclosers*	55	55
	Lebanon *184 total reclosers*	Single Phase *84 total reclosers*	84	84
		Three Phase *100 total reclosers*	100	100
	Reading *131 total reclosers*	Single Phase *55 total reclosers*	55	55
		Three Phase *76 total reclosers*	76	76
	Stroudsburg *83 total reclosers*	Single Phase *12 total reclosers*	12	12
		Three Phase *71 total reclosers*	71	71
	York *251 total reclosers*	Single Phase *72 total reclosers*	72	72
		Three Phase *179 total reclosers*	179	179

[5] The total number of recloser units to be inspected in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

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

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

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

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, Met-Ed 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

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

There are three types of the preventative maintenance inspections that are performed at Met-Ed substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[6]:

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

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

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

[6] For illustrative purposes only.

includes the recording of readings is performed. This inspection may include but is not limited to all items listed under the Class C inspection as well as the following types of substation equipment:

- Recording of amps and load readings
- Recording of counter and gauge readings
- Inspection/test of carrier communication equipment
- Inspection of microwave/radio sites and engine generators – generator alarms and battery

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

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

Inspection Plan[7]

Area		Substation Inspections Planned *(Number of Substations)* 2019	2020
Met-Ed *211 total substations*	Easton *45 substations*	540	540
	Lebanon *29 substations*	348	348
	Reading *61 substations*	732	732
	York *76 substations*	912	912

[7] The total number of substations to be inspected in 2019 and 2020 was based on the current system configuration (as of 2017) and thus is subject to change by the time the 2019 and 2020 plans commence.

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

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

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

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

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, Met-Ed will maintain inspection and maintenance records either electronically or in hard copy as required by state law.