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October 27, 2021

VIA ELECTRONIC FILING

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 –West Penn Power Company for the period January 1, 2023 – December 31, 2024
Docket No. M-2009-2094773

Dear Secretary Chiavetta:

In accordance with 52 Pa. Code § 57.198, enclosed for filing on behalf of West Penn Power Company ("West Penn") is an original and one copy of the Biennial Inspection, Maintenance, Repair and Replacement Plan (the "Plan") for the period January 1, 2023 through December 31, 2024.

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 West Penn's system and form the basis of its inspection and maintenance goals and objectives as outlined in West Penn's annual and quarterly reliability reports filed with the Pennsylvania Public Utility Commission ("Commission").

West Penn respectfully requests that the Commission accept its Biennial Inspection, Maintenance, Repair and Replacement Plan. If you have any questions, please contact me or Laurel Klingensmith at (330) 374-6672.

Very truly yours,

Tori L. Giesler

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Enclosure

c: D. Searforce

Biennial Inspection, Maintenance, Repair and Replacement Plan for West Penn Power Company

For the period of January 1, 2023 – December 31, 2024

Submitted by:
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Introduction

Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Pennsylvania Public Utility Commission ("Commission") a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. West Penn Power Company ("West Penn" or "Company") hereby submits its Biennial Inspection, Maintenance, Repair and Replacement Plan ("I&M Plan") for the period January 1, 2023, through December 31, 2024, in accordance with the relevant parts of 52 Pa. Code § 57.198.

System Assessment

West Penn serves more than 722,000 Pennsylvania customers and the service territory covers more than 6,300 square miles. From the physical field employees up to and including top management, West Penn is committed to providing customers with safe and reliable electric service. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus and every employee has an investment in each of the Company's respective reliability metrics. In addition to the I&M Plan, West Penn utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
  - In response to damage caused by the Emerald Ash Borer, a program to proactively remove ash trees off rights-of-way is underway.
  - Post-storm vegetation circuit patrols target the areas with high tree-related outages. These patrols identify trees damaged in a storm that may eventually lead to a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as a part of the patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions ("CEMI")
  - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
  - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
  - The circuit protection practice is intended to provide a safe, secure distribution system; maximize distribution system reliability performance; protect equipment and facilities from overcurrent risks that may result in damage; and establish a consistent process and application standard for distribution system protection.

- Long-Term Infrastructure Improvement Plans ("LTIIP")
    - West Penn first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. Most recently, the Company filed its second LTIIP covering the period 2020 through 2024.

Plan Revisions

West Penn submitted its I&M Plan for the period January 1, 2021, through December 31, 2022, on October 1, 2019. The Commission concluded that West Penn's plan generally complied with the requirements in 52 Pa. Code § 57.198 and therefore approved it on January 15, 2020.

West Penn's I&M Plan for 2023 and 2024 proposes to revise its inspection cycle for distribution overhead lines and equipment (including overhead distribution transformers) from a six-year cycle to a five-year cycle.

Plan Consistency

Section 57.198(b). Plan Consistency. *The plan must be consistent with the National Electrical Safety Code, Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc.*

West Penn's I&M Plan and associated inspection activities are performed in accordance with the Occupational Safety and Health Administration rules and regulations, National Electrical Safety Code ("NESC"), Codes and Practices of the Institute of Electrical and Electronic Engineers, Federal Energy Regulatory Commission Regulations and the provisions of the American National Standards Institute, Inc., as applicable.

Record Keeping

Section 57.198(m). Record Keeping. *An electric distribution company ("EDC") must 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, West Penn will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

Vegetation Management

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

West Penn performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve five years of clearance and includes removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing 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 include 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 inspection 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 pursuant to the vegetation management program specification.

Methods used to manage and control vegetation include manual control methods using hand-operated tools and mechanical control using equipment-mounted saws, mowers or other devices. Removing incompatible vegetation may also include various herbicide application techniques such as, high-volume foliage application, low-volume foliage application, basal-herbicide applications, stump applications, frill application, aerial application, bare-soil treatment application, and cut stubble applications. All herbicides shall be applied in accordance with all state, local, and federal laws governing the use of herbicides.

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

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.*

Program Justification

In addition to complying with the provisions in Section 57.198(b), distribution vegetation management activities are performed in accordance with the Pennsylvania Pesticide Control Act, the Pennsylvania Administrative Code, and the Utility Arborist Association's Field Guide to Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry. All vegetation management activities are designed to achieve cycle-length clearances, regardless of method employed. The vegetation management program specification seeks to maintain and 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. West Penn has also applied a specific vegetation management approach to select line sections. This practice involves the removal of overhanging limbs outside the right-of-way as well as aggressive mitigation of hazardous trees, with the intent of improving tree-related reliability on the selected line sections.

West Penn's professional vegetation management staff performs inspections and approves all work conducted by vegetation management contractors. The Forestry personnel maintain an understanding of current and emerging techniques by attending industry trade conferences and maintaining memberships in industry trade organizations, such as Utility Arborist Association and the International Society of Arboriculture. The goal of the Vegetation Management department is to manage distribution corridors in a way that provides safe and reliable electricity while simultaneously working to make a sustainable habitat system on West Penn's rights-of-ways.

As part of West Penn'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 West Penn'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.

Inspection Plan

The total number of circuit miles to be trimmed in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Inspections and Treatments Planned *Total Circuit Miles*	
		2023	2024
West Penn Power *19,939 total circuit miles*	Arnold *1,491 total circuit miles*	264	309
	Boyce 668 *total circuit miles*	67	107
	Butler *1,321 total circuit miles*	262	278
	Charleroi *1,416 total circuit miles*	337	289
	Clarion *562 total circuit miles*	154	83
	Hyndman *356 total circuit miles*	94	106
	Jeannette *1,219 total circuit miles*	226	218
	Jefferson *1,523 total circuit miles*	277	345
	Kittanning *981 total circuit miles*	154	240
	Latrobe *1,207 total circuit miles*	286	231
	McConnellsburg *943 total circuit miles*	275	65
	Pleasant Valley *1,128 total circuit miles*	250	242
	St. Marys *1,210 total circuit miles*	251	242
	State College *1,689 total circuit miles*	315	342
	Uniontown *1,265 total circuit miles*	302	213
	Washington *1,685 total circuit miles*	293	393
	Waynesboro *1,274 total circuit miles*	357	284

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Distribution Pole Inspections

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

West Penn 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 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 inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.

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

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 West Penn 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.

In addition, pursuant to the Pennsylvania Public Utility Commission's Opinion and Order entered on January 16, 2020,[1] West Penn submitted a Distribution Pole Corrective Action Plan ("Pole CAP") on March 16, 2020, which was approved by the Commission on May 21, 2020. The Pole CAP is designed to bring West Penn's respective distribution pole replacement and reinforcement backlogs to no more than two years and is set forth in two parts. First, the Pole CAP outlines how the pole replacement/reinforcement backlog will be maintained over the period of 2020-2024 to achieve a steady state of no greater than a two-year backlog. Second, the Pole CAP outlines the quality management controls the Company will employ to ensure the Pole CAP is completed as designed and distribution poles are maintained at a no more than two-year backlog or better beginning on January 1, 2025.

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.*

Program Justification

West Penn'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.

In addition to West Penn'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

[1] Opinion and Order entered January 16, 2020 at Docket Nos. M-2019-3012618, M-2019-3012617, M-2019-3012615 and M-2019-3012614.

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.

Pole Loading Calculation

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously exempted West Penn from conducting pole loading calculations as a part of its pole inspections. West Penn requests a continuation of the exemption for the currently proposed period.

Rather than conducting load calculations as part of each pole inspection, West Penn follows the practice of creating base line designs using FirstEnergy's Distribution Line Construction Standards and Distribution Engineering Practices ("Construction Standards" or "Engineering Practices"). FirstEnergy's Construction Standards are based on NESC Heavy Loading Standards and are updated each time those standards are revised. The majority of the Company's service territory lies within the heavy loading zone. The NESC Heavy Loading 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 West Penn 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.

Inspection Plan

The total number of poles to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Pole Inspections Planned *(Number of Poles)*	
		2023	2024
West Penn Power *502,925 total poles*	Arnold *42,881 total poles*	4,739	4,225
	Boyce *18,811 total poles*	1,323	1,894
	Butler *32,465 total poles*	1,957	4,836
	Charleroi *44,401 total poles*	4,888	4,201
	Clarion *11,782 total poles*	1,914	1,832
	Hyndman *6,111 total poles*	37	0
	Jeannette *36,092 total poles*	3,303	1,514
	Jefferson *32,716 total poles*	2,234	851
	Kittanning *20,791 total poles*	1,013	1,681
	Latrobe *30,665 total poles*	2,653	3,204
	McConnellsburg *18,480 total poles*	2,335	826
	Pleasant Valley *29,554 total poles*	5,143	1,526
	St. Marys *27,690 total poles*	2,606	2,492
	State College *39,099 total poles*	3,391	3,974
	Uniontown *35,738 total poles*	3,843	2,189
	Washington *44,129 total poles*	5,248	1,746
	Waynesboro *31,520 total poles*	2,318	2,103

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Distribution Overhead Line Inspections

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

Program Description

West Penn 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 NESC. This program shall be limited to overhead facilities.

Circuits will be inspected on a five-year cycle 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 West Penn's inspection of Distribution Overhead Lines may be found in the Distribution Inspection & Maintenance Practice – Overhead Circuits and 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 West Penn 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.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for overhead circuit inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

West Penn'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."* West Penn'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 West Penn'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, West Penn may use infrared thermography on an as-needed basis on certain worst performing circuits or while performing circuit rehabilitation.

Inspection Plan

The total number of circuits to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Overhead Line Inspections Planned *(Number of Circuits)*	
		2023	2024
West Penn Power *838 total circuits*	Arnold *76 total circuits*	12	21
	Boyce *47 total circuits*	7	12
	Butler *68 total circuits*	11	13
	Charleroi *77 total circuits*	12	18
	Clarion *17 total circuits*	3	5
	Hyndman *12 total circuits*	3	0
	Jeannette *67 total circuits*	14	15
	Jefferson *41 total circuits*	6	7
	Kittanning *30 total circuits*	5	6
	Latrobe *38 total circuits*	4	8
	McConnellsburg *26 total circuits*	5	9
	Pleasant Valley *42 total circuits*	10	10
	St. Marys *54 total circuits*	8	11
	State College *77 total circuits*	15	23
	Uniontown *53 total circuits*	12	12
	Washington *51 total circuits*	10	10
	Waynesboro *62 total circuits*	11	12

Distribution Transformer Inspections

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

West Penn inspects overhead distribution transformers as part of the overhead line inspection. Above-ground, pad-mounted transformers and below-ground transformers are inspected on a five-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 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 the 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 West Penn's inspection of distribution transformers may be found in the Distribution Inspection & Maintenance Practice – Underground 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.*

Program Justification

As a part of the I&M Plan for the period January 1, 2021 through December 31, 2022, the Commission previously granted a waiver for distribution transformer inspection periodicity. West Penn requests a continuation of the waiver for the currently proposed period.

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

West Penn'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 West Penn'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.

Inspection Plan

The total number of distribution transformers to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Transformer Inspections Planned *Total transformers*	
			2023	2024
West Penn Power *323,758 total transformers*	Arnold *26,631 total transformers*	Overhead Transformers *24,072 total transformers*	3,669	6,077
		Above-Ground Pad-mounted *2,559 total transformers*	630	385
	Boyce *18,279 total transformers*	Overhead Transformers *12,499 total transformers*	1,450	3,558
		Above-Ground Pad-mounted *5,780 total transformers*	1,202	1,456
	Butler *24,545 total transformers*	Overhead Transformers 20,268 *total transformers*	2,907	5,066
		Above-Ground Pad-mounted *4,277 total transformers*	856	870
	Charleroi *31,699 total transformers*	Overhead Transformers *28,466 total transformers*	5,638	5,028
		Above-Ground Pad-mounted *3,233 total transformers*	575	630
	Clarion *6,539 total transformers*	Overhead Transformers *5,839 total transformers*	1,054	1,552
		Above-Ground Pad-mounted *700 total transformers*	152	126
	Hyndman *3,036 total transformers*	Overhead Transformers *2,757 total transformers*	22	0
		Above-Ground Pad-mounted *279 total transformers*	0	137
	Jeannette *31,276 total transformers*	Overhead Transformers *25,739 total transformers*	6,768	4,215
		Above-Ground Pad-mounted *5,337 total transformers*	1,071	792
	Jefferson *15,371 total transformers*	Overhead Transformers *14,531 total transformers*	1,939	2,733
		Above-Ground Pad-mounted *840 total transformers*	152	160
		Overhead Transformers *10,425 total transformers*	1,056	2,088

	Kittanning *11,348 total transformers*	Above-Ground Pad-mounted *923 total transformers*	101	242
	Latrobe *19,826 total transformers*	Overhead Transformers *17,284 total transformers*	2,506	3,893
		Above-Ground Pad-mounted *2,542 total transformers*	594	374
	McConnellsburg *8,399 total transformers*	Overhead Transformers *7,486 total transformers*	1,665	1,780
		Above-Ground Pad-mounted *913 total transformers*	220	185
	Pleasant Valley *18,065 total transformers*	Overhead Transformers *16,358 total transformers*	6,016	1,672
		Above-Ground Pad-mounted *1,707 total transformers*	332	253
	St. Mary's *15,936 total transformers*	Overhead Transformers *14,756 total transformers*	2,378	3,900
		Above-Ground Pad-mounted *1,180 total transformers*	240	213
	State College *25,577 total transformers*	Overhead Transformers *19,146 total transformers*	4,077	4,831
		Above-Ground Pad-mounted *6,431 total transformers*	1,902	1,404
	Uniontown *21,189 total transformers*	Overhead Transformers *19,109 total transformers*	3,834	3,624
		Above-Ground Pad-mounted *2,080 total transformers*	186	434
	Washington *25,006 total transformers*	Overhead Transformers *21,742 total transformers*	4,722	4,248
		Above-Ground Pad-mounted *3,264 total transformers*	522	809
	Waynesboro *21,036 total transformers*	Overhead Transformers *15,795 total transformers*	2,057	4,155
		Above-Ground Pad-mounted *5,241 total transformers*	896	703

Recloser Inspections

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

West Penn 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 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 West Penn's inspection of reclosers may be found in the Distribution Inspection & Maintenance Practice – Line Reclosers.

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.*

Program Justification

West Penn's annual inspection cycle for reclosers is based on accepted electric utility practices and the experience of West Penn. 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 West Penn'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.

Inspection Plan

The total number of recloser units to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Type	Recloser Inspections Planned *Total Number of Reclosers*	
			2023	2024
West Penn Power *4,034 total reclosers*	Arnold *339 total reclosers*	Single Phase *335 total reclosers*	335	335
		Three Phase *4 total reclosers*	4	4
	Boyce *369 total reclosers*	Single Phase *366 total reclosers*	366	366
		Three Phase *3 total reclosers*	3	3
	Butler *337 total reclosers*	Single Phase *336 total reclosers*	336	336
		Three Phase *1 total reclosers*	1	1
	Charleroi *285 total reclosers*	Single Phase *281 total reclosers*	281	281
		Three Phase *4 total reclosers*	4	4
	Clarion *87 total reclosers*	Single Phase *86 total reclosers*	86	86
		Three Phase *1 total reclosers*	1	1
	Hyndman *65 total reclosers*	Single Phase *65 total reclosers*	65	65
		Three Phase *0 total reclosers*	0	0
	Jeannette *345 total reclosers*	Single Phase *343 total reclosers*	343	343
		Three Phase *2 total reclosers*	2	2
	Jefferson *206 total reclosers*	Single Phase *1999 total reclosers*	199	199
		Three Phase *7 total reclosers*	7	7
		Single Phase *130 total reclosers*	130	130

	Kittanning *132 total reclosers*	Three Phase *2 total reclosers*	2	2
	Latrobe *223 total reclosers*	Single Phase *223 total reclosers*	223	223
		Three Phase *0 total reclosers*	0	0
	McConnellsburg *155 total reclosers*	Single Phase *155 total reclosers*	155	155
		Three Phase *0 total reclosers*	0	0
	Pleasant Valley *164 total reclosers*	Single Phase *164 total reclosers*	164	164
		Three Phase *0 total reclosers*	0	0
	St. Marys *150 total reclosers*	Single Phase *147 total reclosers*	147	147
		Three Phase *3 total reclosers*	3	3
	State College *170 total reclosers*	Single Phase *158 total reclosers*	158	158
		Three Phase *12 total reclosers*	12	12
	Uniontown *247 total reclosers*	Single Phase *246 total reclosers*	246	246
		Three Phase *1 total reclosers*	1	1
	Washington *446 total reclosers*	Single Phase *444 total reclosers*	444	444
		Three Phase *2 total reclosers*	2	2
	Waynesboro *314 total reclosers*	Single Phase *313 total reclosers*	313	313
		Three Phase *1 total reclosers*	1	1

Substation Inspections

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

West Penn 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 preventative maintenance inspections that are performed at West Penn substations during a twelve-month period. The chart below illustrates the type of inspection performed each month[2]:

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 West Penn 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

[2] For illustrative purposes only.

- 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:
   - 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 West Penn's inspection of substations may be found in Section 20P – Substation Patrol Inspection of the Substation Maintenance Practice and Methods.

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.*

Program 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 substation 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, West Penn 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 offline which reduces exposure of the grid, all with consistency and efficiency.

Inspection Plan

The total number of substations to be inspected in 2023 and 2024 is based on the current system configuration (as of 2021) and thus is subject to change by the time the 2023 and 2024 plans commence.

	Area	Substation Inspections Planned *Number of Substations*	
		2023	2024
West Penn Power *495 total substations*	Arnold *49 substations*	588	588
	Boyce *27 substations*	324	324
	Butler *41 substations*	492	492
	Charleroi *43 substations*	516	516
	Jeannette 28 *substations*	336	336
	Jefferson *52 substations*	624	624
	Kittanning *25 substations*	300	300
	Latrobe *26 substations*	312	312
	Pleasant Valley *46 substations*	552	552
	St. Marys *37 substations*	444	444
	State College *38 substations*	456	456
	Washington *28 substations*	336	336
	Waynesboro *35 substations*	420	420