Krysia M. Kubiak, Esq.
Director, State Regulatory Strategy
and Government Affairs

DUQUESNE LIGHT CO.

VIA EXPRESS MAIL

December 21, 2018

Ms. Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
2nd Floor, Room-N201
400 North Street
Harrisburg, PA 17120

RE: **Biennial Inspection, Maintenance, Repair and Replacement Plan of Duquesne Light Company Docket No. M-2009-2094773**

Dear Secretary Chiavetta:

Enclosed for filing and approval please find Duquesne Light Company's ("Duquesne Light") revised Biennial Inspection, Maintenance, Repair and Replacement Plan for the period of January 1, 2020 through December 31, 2021 ("I&M Plan"). Duquesne Light submits this filing in accordance with 52 Pa. Code §57.198 governing Inspection and Maintenance Standards, as well as the Commission's Implementation Order at Docket No. M-2009-2094773.

Based on discussions with Commission staff, the enclosed has been revised from what was originally submitted on September 28, 2018. The enclosed plan replaces the original submission in full.

Duquesne respectfully requests Commission review and consent to the waivers as detailed and further provided in the attached Inspection and Maintenance Plan. To allow Commission staff adequate time for review of the revised plan, Duquesne Light requests an extension until January 31, 2019.

If you have any questions regarding the information contained in this filing, please contact the undersigned.

Respectfully submitted,

Krysia Kubiak

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Director, State Regulatory Strategy and Government Affairs

Enclosure
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Daniel Searfoorce (dsearfoorc@pa.gov) w/enc.

DUQUESNE LIGHT CO.

Biennial Inspection, Maintenance, Repair and Replacement Plan of Duquesne Light Company For the period of January 1, 2020 – December 31, 2021

Submitted by:
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Dated: December 20, 2018

DUQUESNE LIGHT CO.

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Changes in the Biennial Plan from the 2018-2019 Plan

Duquesne Light is proposing the following changes to its Biennial Plan:

- The number of poles, circuits, and substations has been updated to reflect current company data.
- Duquesne Light is removing the waiver request for Section 57.198(n)(2)(i), which requires drill tests at and below ground level for pole inspections. Duquesne Light has changed its pole inspection procedure to include drill tests at and below ground level.

Record Keeping

Section 57.198(m). Recordkeeping. *An EDC shall maintain records of its inspection and maintenance activities sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair, and replacement programs as required by subsection (n). The records shall be made available to the Commission upon request within 30 days. Examples of sufficient records include:*

(1) Date-stamped records signed by EDC staff who performed the tasks related to inspection.

(2) Maintenance, repair, and replacement receipts from independent contractors showing when and what type of inspection, maintenance, repair, or replacement work was done.

In order to demonstrate compliance with its distribution facilities inspection, maintenance, repair, and replacement programs, Duquesne Light will maintain inspection and maintenance records either electronically or in hard copy as required by state law.

Waivers Requested

Consistent with the Company's existing plan, Duquesne Light is requesting the continuance of certain waivers for the following items:

- Pole Inspections Loading Calculations – Page 5~~6~~
- Distribution Overhead Line Inspection Time Interval – Page 7~~8~~
- Distribution Overhead Transformer Inspection Time Interval – Page 10~~1~~
- Distribution Pad-Mounted Transformer Inspection Time Interval – Page 11~~2~~

DUQUESNE LIGHT CO.

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

Duquesne Light professionally manages a comprehensive vegetation program utilizing industry best management practices to provide safe and reliable distribution service. This program is specifically defined for the management of vegetation on Duquesne Light's rights-of-way for the dependable operation of its distribution (4kV, 23kV, and 23TkV) system and includes: (i) select tree pruning and removal within the rights-of-way ("ROW"), (ii) hazard tree assessment and the removal of defective, dead, or diseased trees within or along the ROW, and (iii) the selective mechanical and/or chemical control of incompatible tall-growing brush within the ROW. Specific methods for line clearance are chosen based on the type of work involved while achieving it in a professional, economical, and environmentally sound manner.

This year-round operation ensures that the safety and reliability of approximately 7,000 distribution circuit miles complies with regulatory standards. The present frequency of vegetation management activities for the distribution system ranges between 4 - 6 years. Annually scheduled maintenance activities involve the application of the most recent Company specifications to achieve a clearance consistent with the clearing cycle of the circuit. Clearance varies with species of tree. Vegetation on the ROW floor is managed to ensure that incompatible species are selectively controlled and access is maintained.

The identification of conditions associated with individual circuits, or portions of circuits, helps to determine the proper frequency of scheduled maintenance efforts to ensure reliability. Dynamic vegetative factors that are considered include tree species, tree structural condition, growth rates, site characteristics, proximity to energized facilities, and time elapsed since the last maintenance effort. Factors such as legal maintenance rights, pole heights, conductor configurations, voltages, circuits involved, connected kVA, and critical customers are also identified and considered. Selection and prioritization of circuits for annual maintenance are analyzed considering all of these factors and derived by applying a combination of conditions and time-based cycles.

In areas where ROW²s are more developed and involve, for example, individual trees in street ROW, yards, and parks, cycle frequencies are generally shorter due to shorter pole heights, reliability concerns, tall-growing incompatible tree species planted beneath and adjacent to overhead utility lines, and concern over the impact of pruning on involved trees. These circuits, or portions of circuits, are typically managed on a 4 - 5 year cycle.

For those circuits, or portions of circuits, where vegetative growth can be managed to a more stable state and does not present a risk to the safety or reliability of the involved circuit(s), the maintenance cycle may potentially be extended out to the maximum length of up to 8 years. These

areas tend to be more remote, where the management sites are larger and involve forest stands rather than individually-owned trees typical of more populated areas. Stable areas are typically managed on a 4 - 6 year cycle.

For maintenance efforts, circuits are typically grouped according to geographical location and worked together as a "project" on an optimal schedule determined by the project's characteristics. However, sometimes certain ROW conditions impact the ability to manage a project to a specific frequency that will maintain reliability expectations. For example, individual trees or stands of trees specific to a particular location may require more frequent maintenance than the remainder of the project because these specific trees / sites result in higher interruptions due to their characteristics. Identification of these reliability-based conditions leads to the targeted inspection and identification of vegetative conditions for mitigation on an as-needed basis outside of the scheduled maintenance activities.

Inspection Plan	**Inspections and Treatments Planned** *(Distribution Circuit Miles)*	
	2020	**2021**
Duquesne Light Company *7,000 Total Distribution Circuit Miles*	1,300	1,300

Justification

Duquesne Light's vegetation management plan complies with the inspection and maintenance standards set forth in 52 Pa. Code § 57.198(n)(1).

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

Duquesne Light inspects distribution wood poles on a 12 year cycle. This inspection cycle meets the requirements stated in Section 57.198(n)(2) (i) through (v). The purpose of the inspection of distribution wood poles is to identify and repair wood poles that would affect the reliability and safety of the Company's distribution assets for its employees and customers.

Inspection Process

Duquesne Light's distribution wood pole inspection process includes visually inspecting from ground level to the top of the pole to identify any abnormal conditions, hammer-sounding at the ground level and drilling at and below the ground level. These techniques are useful for identifying the following conditions:

- Bird and insect infestation
- Damage – broken or leaning
- Holes
- Burn marks and lightning strikes
- Deteriorated pole tops
- Decay or shell rot
- Unauthorized backfilling or excavation

Any pole with abnormal shell depth or that fails the drill test will be scheduled for replacement. If the hammer-sounding is suspect, additional drill testing may be performed to determine if the pole needs to be replaced.

Inspection Plan	**Pole Inspections Planned** *(Number of Poles)*	
	2020	**2021**
Duquesne Light Company *Total Number of Poles is 212,115*	17,677	17,677

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

Corrective Maintenance

Duquesne Light replaces any pole within 30 days if it is determined that a pole meets the definition found in 52 Pa. Code §57.198(n)(3). All other poles identified as needing replacement or repair will be addressed under the Company's pole maintenance program.

Justification

Duquesne Light's proposed 12 year cycle for inspection and maintenance of wood poles complies with inspection and maintenance standards set forth in 52 Pa. Code § 57.198(n)(2) (i) through (v) and is within generally accepted utility practice.

Pole Loading Calculations (Waiver Request)

Duquesne Light is requesting a waiver of the pole loading calculation, which would be a continuation of the existing approved waiver for this requirement under its current plan under the PUC's Inspection and Maintenance Standards. Duquesne Light meets all of the pole inspection criteria set forth above other than this requirement. Duquesne Light does not perform such load calculations because of the conservative safety factors used in its engineering designs for heavy loading under the NESC, and the limited number of pole failures that affect the safety and reliability of the Company's distribution system. A review of Duquesne Light's pole failure data shows that pole failures contributed only 0.006 on average to the overall SAIFI Index during the last 8 years. Thus, pole failures have had a negligible effect on reliability, and failure data does not justify the considerable costs that the Company would incur to satisfy the load calculations requirement.

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

Duquesne Light uses infrared technology and visual inspections to inspect its distribution lines and associated equipment on a 5-year cycle. These inspection methods provide a vast amount of information on the operating condition of the Company's lines and equipment with specific focus on the following:

- Bad connections on transformers, secondary, and service lines
- Bad primary (automatic or compression) splice connections
- Bad connections on primary and secondary jumpers
- Defective transformers that are nearing failure
- Switches that have bad connections or are approaching failure
- Broken transformer arrestors
- Broken crossarms
- Cracked or broken insulators that are approaching failure
- Bad grounding and neutral connections

Duquesne Light has used infrared technology since 2000 and has been very successful at identifying potential distribution line and associated equipment issues before failure occurs to ensure the reliability and safety of the Company's overall distribution system. Moreover, the use of infrared technology in the inspection process provides information about the conditions of the assets that an ordinary visual inspection could not detect.

Inspection Process

Duquesne Light identifies approximately one-fifth of its distribution circuits for inspection each year. A crew inspects each circuit and records the information generated from the inspection. Work orders are created to address any repairs that are needed. The work orders are sent to field personnel to schedule repairs.

Inspection Plan	**Overhead Line Inspections Planned** *(Number of Circuits)*	
	2020	**2021**
Duquesne Light Company *Total Circuits (603)*	121	121

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

Problems identified in the distribution overhead line inspections that Duquesne Light reasonably expects will affect the integrity of the circuits will be repaired or replaced within 30 days. All other deficiencies are addressed on a case-by-case basis.

Justification

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 still support the level of reliability required by law.*

Time Interval (Waiver Request)

Duquesne Light is requesting a waiver of the distribution overhead line inspection time interval which would be a continuation of the existing approved waiver for this requirement under its current plan and requests the continued use of the Company's existing five (5) year cycle. The Company's five (5) year inspection cycle for distribution overhead lines and associated equipment is based on accepted utility practice, the Company's experience in inspecting and maintaining the distribution system and the Company's use of infrared technology to identify problems and perform repairs or replacements before they adversely affect the reliability and safety of the distribution system.

Section 121(A) of the NESC states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." Based on the historical operating experience of the Company and its current reliability indices, the Company's five year inspection cycle supports and maintains the reliability of its distribution system.

Finally, a more frequent inspection schedule does not warrant the considerable costs that would be incurred if a waiver is not granted. The additional cost to conduct these inspections does not justify the benefits that may be achieved. A review of the Company's failure statistics shows that the items that would be identified through this inspection process such as lightning arrestors, cutouts,

insulators, ground wires, crossarms, and connectors contributed only 0.105 on average to the overall SAIFI Index during the last 8 years.

For all the reasons described above, the Company requests a continuation of the existing waiver of the inspection time intervals for the overhead distribution line inspections and requests continued use of the Company's existing five (5) year cycle.

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

Duquesne Light inspects its overhead transformers by circuit on a five (5) year cycle at the same time the Company performs its overhead distribution line inspections. By conducting this inspection in conjunction with the Company's overhead distribution line inspections, the Company gains efficiencies in its inspection and maintenance plan. Moreover, and as described above, the use of infrared technology identifies deficiencies and issues that cannot be seen in a visual inspection and could potentially lead to reliability and safety issues that could adversely affect the operation of the distribution system.

With respect to above-ground pad-mounted transformers and below-ground transformers, Duquesne Light inspects these types of transformers by circuit on an eight (8) year cycle.

Inspection Process

a) **Overhead Transformers.** Duquesne Light's overhead transformer inspection program includes the use of infrared technology along with visual inspections to evaluate the overall condition of the transformers and to identify issues such as damaged arrestors, rust and leaking oil.

b) **Pad-Mounted Transformers.** Duquesne Light's pad-mounted transformer inspections include a visual inspection to identify rust, leaking oil, accessibility and unauthorized excavation or changes in grade.

c) **Below-Ground Transformers.** Duquesne Light's below-ground transformer inspections include a visual inspection to identify accessibility and unauthorized excavation near or around manhole covers.

Inspection Plan	Type	Transformer Inspections Planned by Circuit *(Number of Circuits)*	
		2020	2021
Duquesne Light Company *Total Circuits (603)*	Overhead Transformers (5-Year cycle by circuit)	121	121
	Pad-mounted and Below-Ground Transformers (8-Year Cycle by circuit)	76	76

Justification

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 still support the level of reliability required by law.*

Time Interval (Waiver Requests)

a) **Overhead Transformers.** Duquesne Light is requesting a waiver of the distribution overhead transformer inspection time interval which would be a continuation of the existing approved waiver under its current plan and requests that it continue to use a five (5) year cycle by circuit. The Company's five (5) year inspection cycle for distribution overhead transformers is based on accepted utility practice, the Company's experience in inspecting and maintaining the distribution overhead transformers and the Company's use of infrared technology to identify problems and perform repairs or replacements before they adversely affect the reliability and safety of its distribution overhead transformers.

Section 121(A) of the NESC states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." Based on the historical operating experience of the Company and its current reliability indices, the Company's five year inspection cycle supports and maintains the reliability of its distribution overhead transformers.

Finally, a more frequent inspection schedule does not warrant the considerable costs that would be incurred if a waiver is not granted. The additional cost to conduct these inspections does not justify the benefits that may be achieved. A review of the Company's failure statistics shows that all transformers (overhead, pad-mounted and below-ground), contributed less than 0.025 on average to the overall SAIFI Index during the last 8 years.

b) **Pad-Mounted Transformers.** Duquesne Light is requesting a waiver that would be a continuation of the existing approved waiver under its current plan for the above-ground pad-mounted transformer visual inspection time interval and requests that it continue to use an eight (8) year cycle by circuit. An eight year inspection cycle coincides with the below-ground distribution transformer inspection cycle as provided under the PUC's Inspection and Maintenance Standards, 52 Pa. Code §57.198(n)(6), and it is more cost effective to combine the inspection cycles of the Company's underground transformer plant by circuit into one program under the eight (8) year cycle by circuit requirement. The eight (8) year inspection cycle by circuit is based on accepted utility practice and the Company's experience with its underground transformer distribution assets.

Section 121(A) of the NESC states that "Electric equipment shall be inspected and maintained at such intervals as experience has shown to be necessary." Based on the historical operating experience of the Company and its current reliability indices, an 8 year cycle by circuit supports the continued reliability of these assets on the distribution system.

Moreover, the additional cost does not justify the benefit that would be gained in the Company's reliability indices as all transformers (overhead, pad-mounted and below-grade) contributed less than 0.025 on average to the overall SAIFI Index during the last 8 years.

For all the reasons described above, the Company requests a continuation of the existing waivers of the time intervals for the overhead distribution transformers and pad-mounted transformers inspections.

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

Duquesne Light's recloser inspection plan consists of single-phase and three-phase reclosers being inspected both visually and with the use of infrared technology as part of the overhead distribution line inspections described above. In addition, the three-phase reclosers on the system provide alarm status and health data back to the Company's SCADA system.

Inspection Process

Three-phase and single-phase reclosers are inspected both visually and with the use of infrared technology as part of the overhead distribution line inspections described above.

Inspection Plan	**Recloser Inspections Planned** *(Number of Circuits)*	
	2020	**2021**
Duquesne Light Company *Total Circuits (603)*	121	121

Justification

a) **Single-Phase.** Single-phase reclosers are inspected as part of Duquesne Light's distribution line inspections on a five (5) year cycle by circuit. Thus, the Company's single-phase recloser inspection program complies with the inspection and maintenance standards set forth in 52 Pa. Code § 57.198(n)(7).

b) **Three-Phase.** Three-phase reclosers regardless of voltage are both visually and infrared inspected as part of the Company's overhead distribution line inspections on a five (5) year cycle by circuit. Thus, the Company's three-phase recloser inspection program complies with the inspection and maintenance standards set forth in 52 Pa. Code § 57.198(n)(7). In addition, three-phase reclosers provide alarm status and health data back to the Company's SCADA system which allows the Company to identify and correct equipment issues before they adversely affect the reliability and safety of the distribution system and assets.

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

Duquesne Light inspects its distribution substations twelve times annually. The purpose of the substation inspections is to identify any emerging issues within the substation so they can be corrected in a timely manner.

Inspection Process

Duquesne Light qualified field personnel perform substation inspections. Inspection records are reviewed by company personnel and the inspection data is recorded. Any maintenance issues are prioritized and scheduled to be corrected. The Company reviews and validates that all substation inspection reports are accounted for and filled out properly twelve times annually.

Specific items that are checked during these inspections include the following:

- Stolen or defective grounds
- Abnormal readings on gauges, batteries, chargers, and valves
- Unauthorized entry and/or fencing, signage issues
- Relays, transformers, circuit breakers, and all other major equipment for any abnormal or unusual conditions
- Integrity of structures

Inspection Plan	**Substation Inspections Planned** *(Number of Company Stations x 12 times annually)*	
	2020	**2021**
Duquesne Light Company *Total Stations (163)*	1,956	1,956

Justification

Duquesne Light's inspections of its distribution substations twelve times annually is based on accepted utility standards and its experience with performing these inspections. Duquesne Light complies with the inspection and maintenance standards for substations set forth in 52 Pa. Code § 57.198(n)(8).

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