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**Shelby A. Linton-Keddie**  
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April 27, 2017

**E-FILED**

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

**Re: Duquesne Light Company 2016 Annual Electric Reliability Report  
Docket No. M-2016-2522508**

Dear Secretary Chiavetta:

Please find enclosed for filing Duquesne Light Company's 2016 Annual Electric Reliability Report.

If you have any questions regarding the information contained in this filing, please contact myself or Audrey Waldock at 412-393-6334 or [awaldock@duqlight.com](mailto:awaldock@duqlight.com).

Sincerely,

A handwritten signature in blue ink that reads 'Shelby Linton-Keddie /as'.

Shelby Linton-Keddie  
Manager, State Regulatory Affairs  
And Senior Legal Counsel

Enclosure

c (w/ enc):

Bureau of Technical Utility Services ([dgill@pa.gov](mailto:dgill@pa.gov), [dsearfoorc@pa.gov](mailto:dsearfoorc@pa.gov), [dawashko@pa.gov](mailto:dawashko@pa.gov))  
Office of Consumer Advocate ([TMcCloskey@paoca.org](mailto:TMcCloskey@paoca.org))  
Office of Small Business Advocate ([jorevan@pa.gov](mailto:jorevan@pa.gov), [swebb@pa.gov](mailto:swebb@pa.gov))



## **2016 Annual Electric Reliability Report**

**to the**

## **Pennsylvania Public Utility Commission**

Duquesne Light Company  
411 Seventh Avenue  
Pittsburgh, PA 15219

April 27, 2017

**DUQUESNE LIGHT COMPANY  
ANNUAL ELECTRIC RELIABILITY REPORT**

**Filed April 28, 2017**

**52 Pa Code §57.195 Reporting Requirements**

- (a)(2) The name, title, telephone number and e-mail address of the persons who have knowledge of the matters, and can respond to inquiries.**

Ken J. Kallis – Sr. Manager, Asset Management  
(412) 393-8613, kkallis@duqlight.com

Shelby A. Linton-Keddie – Manager, State Regulatory Affairs and Sr. Legal Counsel  
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- (b)(1) An overall current assessment of the state of the system reliability in the electric distribution company's service territory including a discussion of the electric distribution company's current programs and procedures for providing reliable electric service.**

Duquesne Light Company's ("Duquesne Light" or "the Company") service territory covers approximately 817 square miles, with a well-developed distribution system throughout. Electric service reliability remains very consistent across the service territory. The combination of an effective outage restoration process and significant distribution automation allows the Company to quickly restore power to large numbers of customers in outage situations.

Achieving outstanding performance in system reliability continues to be one of Duquesne Light's most important long-term objectives. The Asset Management Group performs ongoing analysis of reliability indices, root cause analysis of outages, and tracking and monitoring of other performance measures. This is a long-term process designed to optimize reliability and to identify improvement opportunities. This includes making recommendations for capital projects such as circuit rehabilitation, new substations and distribution circuits. It also includes implementation of new advanced protection and coordination schemes on the distribution system that better localize customer outages and reduce momentary operations.

Duquesne Light continues its Emergent Work Process, which is used to identify problems, set priorities, and resolve reliability issues as quickly as possible. Each day, field personnel perform field inspections and any abnormalities are logged into a database. This database is reviewed regularly by the Emergent Work Team and any high priority problems are identified and a course of action is determined. Analysis at the device level is used to identify small areas where customers have experienced multiple outages. System level and even circuit level indices may mask these isolated problems. This is the short-term process for real-time analysis and reliability improvement.

Scheduled preventative and predictive maintenance activities continue to reduce the potential for future service interruptions. Corrective maintenance is prioritized with the objective to reduce backlog in the most cost-efficient manner.

Several capital budget projects target distribution reliability improvements, including pole replacement, substation rehabilitation, circuit load relief and voltage improvement, URD rehabilitation, circuit rearrangement and installation of additional automated remotely controlled pole top devices.

Specific programs, procedures and ongoing maintenance activities that support Duquesne Light's commitment to service reliability include:

- An Infrared Inspection Program that systemically identifies circuit problems for remedial action in advance of failure.
- A Rights-of-Way Vegetation Management Maintenance Program with the goal of reducing tree and branch failures through proactive pruning and removal to manage proper clearances. Duquesne Light believes that this program will help to shorten the duration of outages by addressing targeted tree failure conditions that typically result in physical damage to our facilities.
- An all pulse-reclosing protection technology has been implemented on some 23kV circuits. This technology eliminates traditional "hard reclosing", thereby making it easier and faster to conduct repairs and restore circuits to normal operation, enabling customers to be restored more quickly. This technology also reduces stress and damage on the entire circuit since the breaker is no longer required to trip, also contributing to the reduction in momentary outages to customers.
- Line maintenance work of various types is regularly performed in order to maintain distribution plant. This work includes replacement of cross arms, arrestors, insulators, and other equipment on the overhead system as well as inspections and remedial work on the underground system.
- Storm Preparedness Training is conducted each year and Storm Review Meetings are held following major events. These meetings focus on the successes and failures of the most recent emergency service restoration effort. Service restoration process improvements are made as needed to improve response time and effectiveness during the next restoration effort.

On April 20, 2017, the Commission adopted the Recommended Decision<sup>1</sup> approving the Company's amended LTIIIP/DSIC and the Company has begun its accelerated infrastructure program.

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<sup>1</sup> Petition of Duquesne Light Company for Approval of Its Long-Term Infrastructure Improvement Plan for period January 1, 2017 through December 31, 2022, Docket No. P-2016-2540046

- (b)(2) A description of each major event that occurred during the year being reported on, including the time and duration of the event, the number of customers affected, the cause of the event and any modified procedures adopted in order to avoid or minimize the impact of similar events in the future.**

No major events occurred during 2016.

- (b)(3) A table showing the actual values of each of the reliability indices (SAIFI, CAIDI, SAIDI, and if available, MAIFI) for the electric distribution company’s service territory for each of the preceding 3 calendar years. The report shall include the data used in calculating the indices, namely the average number of customers served, the number of sustained customer minutes interruptions, the number of customers affected, and the minutes of interruption. If MAIFI values are provided, the number of customer momentary interruptions shall also be reported.

**RELIABILITY BENCHMARKS AND STANDARDS**  
**Duquesne Light Company**  
**System Performance Measures with Major Events Excluded**

	SAIDI	SAIFI	CAIDI	MAIFI
<b>2014</b>	63	0.62	102	*
<b>2015</b>	71	0.75	95	*
<b>2016</b>	70	0.85	82	*
<b>3 Year Average</b>	68	0.74	93	*
<b>Benchmark</b>	126	1.17	108	*

\* Sufficient information to calculate MAIFI is unavailable.

Formulas Used in Calculating the Indices

$$\text{SAIFI} = \frac{(\text{Total KVA interrupted}) - (\text{KVA impact of major events})}{\text{System Connected KVA}}$$

$$\text{SAIDI} = \frac{(\text{Total KVA-minutes interrupted}) - (\text{KVA-minute impact of major events})}{\text{System Connected KVA}}$$

$$\text{CAIDI} = \text{SAIDI/SAIFI}$$

Data used in calculating the indices

**2016**

Total KVA Interrupted for the Period	6,163,842	KVA
Total KVA-Minutes Interrupted	505,272,030	KVA Minutes
System Connected Load as of 12/31/16:	7,210,354	KVA

**2015**

Total KVA Interrupted for the Period	5,417,502	KVA
Total KVA-Minutes Interrupted	513,565,543	KVA Minutes
System Connected Load as of 12/31/15:	7,203,346	KVA

**2014**

Total KVA Interrupted for the Period	4,435,147	KVA
Total KVA-Minutes Interrupted	450,494,020	KVA Minutes
System Connected Load as of 12/31/14:	7,186,118	KVA

**(b)(4) A breakdown and analysis of outage causes during the year being reported on, including the number and percentage of service outages and customer interruption minutes categorized by outage cause such as equipment failure, animal contact, tree related, and so forth. Proposed solutions to identified service problems shall be reported.**

**January 1, 2016 through December 31, 2016 – No PUC Major Event Exclusions**

<b>CAUSE</b>	<b>NO. OF OUTAGES</b>	<b>OUTAGE PERCENTAGE</b>	<b>KVA TOTAL</b>	<b>KVA PERCENTAGE</b>	<b>KVA-MINUTE TOTAL</b>	<b>KVA-MINUTE PERCENTAGE</b>
<b>Storms</b>	498	17%	1,307,764	21%	137,796,470	27%
<b>Trees (Contact)</b>	28	1%	7,953	1%	660,024	1%
<b>Trees (Falling)</b>	670	24%	1,196,561	19%	116,466,468	23%
<b>Equipment Failures</b>	730	26%	1,779,714	29%	127,677,495	25%
<b>Overloads</b>	69	2%	111,367	2%	3,052,518	1%
<b>Vehicles</b>	191	7%	495,787	8%	50,093,181	10%
<b>Other</b>	665	23%	1,264,696	20%	69,525,874	13%
<b>TOTALS</b>	<b>2,851</b>	<b>100%</b>	<b>6,163,842</b>	<b>100%</b>	<b>505,272,030</b>	<b>100%</b>

**(b)(5) A list of remedial efforts taken to date and planned for circuits that have been on the worst performing 5% of circuits list for a year or more.**

Duquesne Light has 5 circuits that have been on the worst performing 5% of circuits list for four consecutive quarters. All of these circuits have received remedial actions or are scheduled for maintenance activities in 2017 that are expected to improve their reliability in 2017. The Company will continue to monitor these circuits closely during 2017 to verify that the remedial actions taken have been successful and that reliability has improved. Many of the circuits have already shown improvement as indicated in the following detailed descriptions and have not seen a repeat outage for one or more quarters.

Duquesne uses a sophisticated automated protection system on its 23kV circuits, which utilizes numerous 3-phase IntelliRupters, sectionalizers and reclosers on the main feeders and as ties to adjacent circuits. This automation technology with remote control generally allows circuit problems to be isolated and rerouted in less than 5 minutes. Generally, only a small portion of the customers on a worst performing circuit experience reliability issues.

<b>Rank, Circuit Name, Device</b>	<b>Outages</b>	<b>Remedial Actions Planned or Taken</b>
<p style="text-align: center;">1</p> <p>Midland-Cooks Ferry 22869</p> <p>FUSE-65K</p>	<p>Seven Total Outages:</p> <p>Fourth Quarter 2016 Outages:</p> <ul style="list-style-type: none"> <li>• One outage was due to cutout failure.</li> <li>• One outage was due to insulator failure.</li> <li>• The cause of five outages are unknown.</li> </ul> <p>Previous Outages:</p> <ul style="list-style-type: none"> <li>• No outages.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent repairs were made following each outage as necessary.</li> <li>• Routine vegetation maintenance was last performed in 2012 and is scheduled for 2017.</li> <li>• The Company will continue to monitor this circuit for reliability issues.</li> </ul>
<p style="text-align: center;">2</p> <p>Sewickley 23631</p> <p>WR723</p>	<p>Four Total Outages:</p> <p>Fourth Quarter 2016 Outages:</p> <ul style="list-style-type: none"> <li>• Two outages were due to tree fall-ins.</li> <li>• One outage was due to cutout failure.</li> </ul> <p>Previous Outages:</p> <ul style="list-style-type: none"> <li>• One outage was due to tree fall-in.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent repairs were made following each outage as necessary.</li> <li>• The Company's Asset Management Department is going to replace the last Scadamate sectionalizer with an IntelliRupter recloser, which will improve its protection and reduce future circuit damage during faults making restoration simpler and faster. The installation of the new IntelliRupter will be completed at the end of the third quarter of 2017.</li> <li>• Routine vegetation maintenance was last performed in 2013 and is scheduled for 2017.</li> </ul>

<p>3 Sewickley 23630  WA601</p>	<p>Three Total Outages: Fourth Quarter 2016 Outages:</p> <ul style="list-style-type: none"> <li>• One outage was due to tree fall-in.</li> </ul> <p>Previous Outages:</p> <ul style="list-style-type: none"> <li>• Two outages were due to tree fall-ins.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent repairs were made following each outage as necessary.</li> <li>• The Company's Asset Management Department recently converted this circuit to pulse-reclosing operation and is going to replace the Scadamate sectionalizer with IntelliRupter recloser, which should improve its protection and reduce future circuit damage during faults making restoration simpler and faster. The installation of the new IntelliRupter will be completed at the end of the second quarter of 2017.</li> <li>• Routine vegetation maintenance was last performed 2013 and is scheduled for 2017.</li> </ul>
<p>4 Mt. Nebo 23870  FUSE-80E</p>	<p>Three Total Outages: Fourth Quarter 2016 Outages:</p> <ul style="list-style-type: none"> <li>• The cause of one outage was unknown.</li> </ul> <p>Previous Outages:</p> <ul style="list-style-type: none"> <li>• Two outages were due to tree fall-ins.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent repairs were made following each outage as necessary.</li> <li>• The Company's Asset Management Department is going to replace three Scadamate sectionalizers with three IntelliRupter reclosers, which will improve its protection and reduce future circuit damage during faults making restoration simpler and faster. The installation of the new IntelliRupter will be completed at the end of the third quarter of 2017.</li> <li>• Routine vegetation maintenance was last performed in 2014 and is scheduled for 2017.</li> </ul>
<p>5 Arsenal 23840  FUSE-80E</p>	<p>Two Total Outages: Fourth Quarter 2016 Outages:</p> <ul style="list-style-type: none"> <li>• No outages.</li> </ul> <p>Previous Outages:</p> <ul style="list-style-type: none"> <li>• The cause of one outage was unknown.</li> <li>• One outage was due to tree fall-in during a storm.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent repairs were made following each outage as necessary.</li> <li>• The Company will continue to monitor this circuit for reliability issues.</li> </ul>

- (b)(6) A comparison of established transmission and distribution inspection and maintenance goals/objectives versus actual results achieved during the year being reported on. Explanations of any variances shall be included.

2016 Transmission and Distribution Goals and Objectives

Program Project	Unit of Measurement	Target for 2016	YTD Actuals for 2016	Percent Complete
<b>Communications Goals</b>				
Communication Battery Maintenance	Batteries <sup>2</sup>	96	123	128%
<b>Overhead Distribution Goals</b>				
Recloser Inspections	Circuits	130	132	102%
Pole Inspections	Poles	17,945	19,141	107%
OH Line Inspections	Circuits	130	132	102%
OH Transformer Inspections	Circuits	130	132	102%
Padmount & Below Grade Insp	Circuits	80	80	100%
<b>Overhead Transmission Goals</b>				
Helicopter Inspections <sup>3</sup>	Number of Structures	500	626	125%
Ground Inspections	Number of Structures	367	368	100%
<b>Substations Goals</b>				
Circuit Breaker Maintenance	Breakers	585	601	103%
Station Transformer Maintenance <sup>4</sup>	Transformers	84	130	155%
Station Battery Maintenance	Batteries	940	966	103%
Station Relay Maintenance	Relays	2,081	2,173	104%
Station Inspections	Sites	2,040	2,042	100%
<b>Underground Distribution Goals</b>				
Manhole Inspections	Manholes	700	706	101%
Major Network Insp (Prot Relay)	Ntwk Protectors	92	94	102%
Minor Network Visual Inspection (Transformer/Protector/Vault) <sup>3</sup>	Ntwk Transformers	573	640	112%
<b>Underground Transmission Goals</b>				
Pressurization and Cathodic Protection Plant Inspection <sup>5</sup>	Work Packages	52	64	123%
<b>Vegetation Management Goals</b>				
Overhead Line Clearance	Circuit Overhead Miles	1,300	1,307	101%

<sup>2</sup> The actuals reported in 2016 reflect batteries that were in business offices and not in the scope of the maintenance and inspection plan.

<sup>3</sup> The target for helicopter inspections and network transformers is based on the entire system. Once the circuits and transformers to be inspected are identified the actual work performed may result in more units being inspected.

<sup>4</sup> The Company outperformed its planned 2016 maintenance and inspection goals for substation transformer maintenance as a result of opportunities to perform these planned tasks during a combination of emergent work, corrective repair, and confined space/vault safety checks. The Company's opportunistic strategy improves workforce utilization by reducing scheduled outages, work station set up and travel time.

<sup>5</sup> During 2016, the Company transitioned from tracking this inspection as a "work package" to a "work order" system, which accounts for the variance.

- (b)(7) A comparison of budgeted versus actual transmission and distribution operation and maintenance expenses for the year being reported on. Explanations of any variances shall be included.**

**Budget Variance Recap – O&M Expenses  
For the Twelve Months Ending December 31, 2016  
Favorable/(Unfavorable)**

	<b>Total Actual</b>	<b>Total Budget</b>	<b>Variance</b>
<b>Customer Service<sup>6</sup></b>	60,290,202	52,500,875	(7,789,327)
<b>Human Resources</b>	15,280,790	15,584,747	303,956
<b>Operations/Operation Services</b>	64,759,085	66,039,896	1,280,811
<b>Technology</b>	48,185,327	57,401,689	9,216,362
<b>General Corporate*</b>	57,346,847	50,012,651	(7,334,197)
<b>Total</b>	245,862,253	241,539,858	(4,322,395)

\* Includes Finance, Office of General Counsel and Senior Management Costs

The O&M expense overspend for the twelve months ended December 31, 2016 is attributable to increases in bad debt expense and increased costs associated with customer service system optimization projects (Customer Service), increased hardware and software maintenance agreements offset by favorability within surcharge expenses (Technology) and increased maintenance and compliance costs associated with Duquesne Light Company's closed Warwick Mine facilities.

- (b)(8) A comparison of budgeted versus actual transmission and distribution capital expenditures for the year being reported on. Explanations of any variances shall be included.**

**Budget Variance Recap – Capital  
For the Twelve Months Ending December 31, 2016  
Favorable/(Unfavorable)**

	<b>Total Actual</b>	<b>Total Budget</b>	<b>Variance</b>
<b>Customer Service</b>	6,378,143	6,652,143	274,000
<b>Human Resources</b>	11,021,486	11,669,755	648,269
<b>Operations/Operation Services</b>	136,338,522	141,444,881	5,106,359
<b>Technology</b>	75,570,610	70,571,452	(4,999,158)
<b>General Corporate*</b>	26,448,210	20,107,287	(6,340,923)
<b>Total</b>	255,756,971	250,445,518	(5,311,453)

\* Includes Finance, Office of General Counsel and Senior Management Costs

The capital overspend for the twelve months ended December 31, 2016 is primarily attributable to the timing of the Company's spend on incentivized transmission projects partially offset by lower than historical restoration costs.

<sup>6</sup> Customer Care changed to Customer Service as part of an organizational change, the cost centers remain the same.

**(b)(9) Quantified transmission and distribution inspection and maintenance goals/objectives for the current calendar year detailed by system area (i.e., transmission, substation, and distribution).**

**2017 Transmission and Distribution Goals and Objectives**

<b>Program</b> Project	<b>Unit of Measurement</b>	<b>Target for Year 2017</b>
<b>Communications Goals</b>		
Communication Battery Maintenance	Batteries	100
<b>Overhead Distribution Goals</b>		
Recloser Inspections	Circuits	130
Pole Inspections	Poles	17,945
OH Line Inspections	Circuits	130
OH Transformer Inspections	Circuits	130
Padmount & Below Grade Insp	Circuits	81
<b>Overhead Transmission Goals</b>		
Helicopter Inspections	Number of Structures	625
Ground Inspections	Number of Structures	336
<b>Substations Goals</b>		
Circuit Breaker Maintenance	Breakers	501
Station Transformer Maintenance	Transformers	78
Station Battery Maintenance	Batteries	936
Station Relay Maintenance	Relays	1,580
Station Inspections	Sites	2,040
<b>Underground Distribution Goals</b>		
Manhole Inspections	Manholes	700
Major Network Insp (Prot Relay)	Network Protectors	92
Minor Network Visual Inspection (Transformer/Protector/Vault)	Network Transformers	562
<b>Underground Transmission Goals</b>		
Pressurization and Cathodic Protection Plant Inspection	Work Order	371
<b>Vegetation Management Goals</b>		
Overhead Line Clearance	Circuit Overhead Miles	1,300

**(b)(10) Budgeted transmission and distribution operation and maintenance expenses for the current year in total and detailed by FERC account.**

	<b>Total Budget</b>
Customer Service	\$ 55,816,676
Human Resources	16,335,411
Operations/ Operation Services	64,737,900
Technology	48,834,711
General Corporate*	\$ 53,897,359
<b>Total</b>	<b>\$ 239,622,058</b>

\*Includes Finance, Supply Chain, Office of General Counsel and Senior Management Costs

**(b)(11) Budgeted transmission and distribution capital expenditures for the current year in total and detailed by FERC account.**

	<b>Total Budget</b>
Customer Service	\$ 8,192,738
Human Resources	10,897,845
Operations/ Operation Services	149,606,229
Technology	83,432,478
General Corporate*	\$ 20,405,771
<b>Total</b>	<b>\$ 272,535,061</b>

\*Includes Finance, Supply Chain, Office of General Counsel and Senior Management Costs

**(b)(12) Significant changes, if any, to the transmission and distribution inspection and maintenance programs previously submitted to the Commission.**

Duquesne Light has not made any significant changes to its transmission and distribution inspection and maintenance programs.