M-2016-2522508

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FEDERAL EXPRESS

April 29, 2016

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, Pennsylvania 17120

Re: PPL Electric Utilities Corporation
2015 Annual Reliability Report
Docket No. ~~L-00030161~~

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation ("PPL Electric") is an original of PPL Electric's 2015 Annual Reliability Report to the Pennsylvania Public Utility Commission. This report is being filed pursuant to the Commission's regulations at 52 Pa. Code § 57.195(a).

As required by the Commission's regulations, copies of the enclosed report have been served upon the Office of Consumer Advocate ("OCA") and the Office of Small Business Advocate ("OSBA").

Pursuant to 52 Pa. Code § 1.11, the enclosed document is to be deemed filed on April 29, 2016, which is the date it was deposited with an overnight express delivery service as shown on the delivery receipt attached to the mailing envelope.

In addition, please date and time-stamp the enclosed extra copy of this letter and return it to me in the envelope provided.

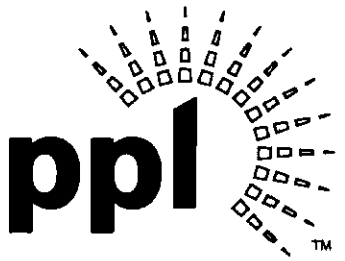
If you have any questions regarding the enclosed report, please call me or B. Kathryn Frazier, PPL Electric's Regulatory Affairs Manager at (610) 774-3372.

Very truly yours,

Paul E. Russell

Enclosures

cc: Tanya J. McCloskey, Esquire
Mr. John R. Evans
Mr. Daniel Searfoorce



PPL Electric Utilities

PPL Electric Utilities Corporation
2015 Annual Reliability Report
to the
Pennsylvania Public Utility Commission

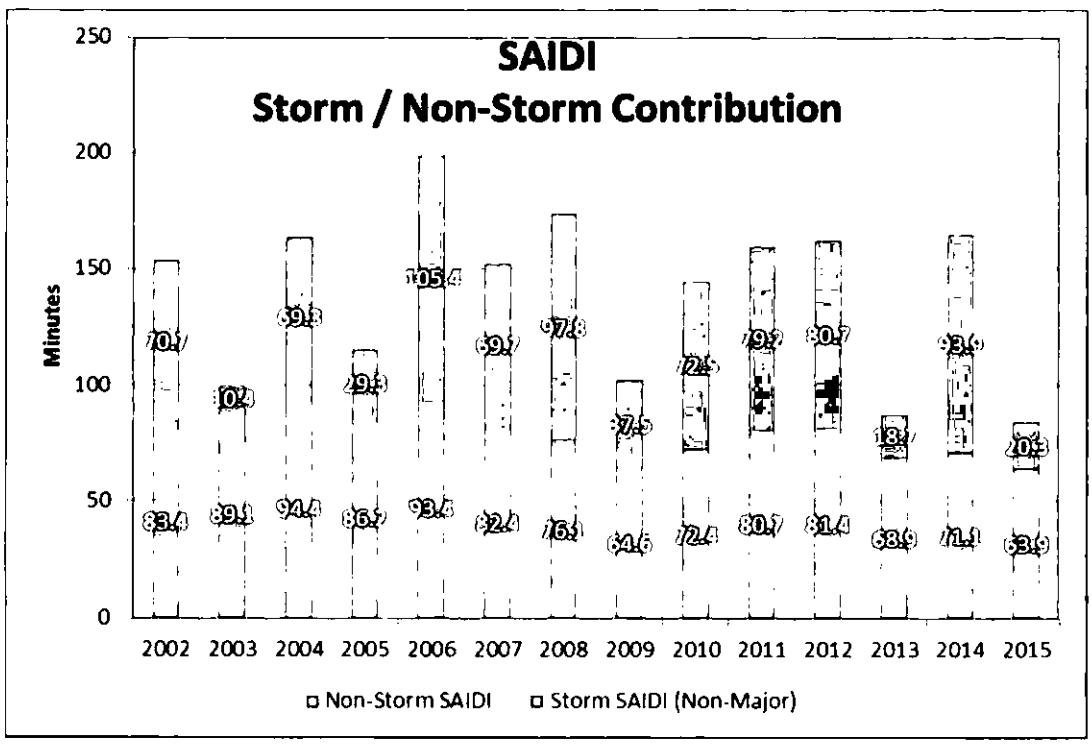
May 1, 2016

1) ***An overall current assessment of the state of the system reliability in the EDC's service territory including a discussion of the EDC's current programs and procedures for providing reliable electric service.***

In 2015, PPL Electric recorded its lowest SAIFI and SAIDI values as far back as records are kept (1994). SAIFI was 27% below the established benchmark level, SAIDI 41% below, and CAIDI 19% below. All metrics were well within the 12 and 36 month standards. While 2015 was generally a mild weather year, PPL Electric continues to see reliability improvement across the board.

With the exception of the 2014 ice storm, PPL Electric customers have generally enjoyed their best three years of reliability from 2013-2015. The company attributes this improved level of performance to:

- A more aggressive three-phase tree trimming standard implemented in 2013
- Significant investment in Distribution Automation technology
  - Continued investment in the Smart Grid Initiative
  - Increased leverage of our Distribution Management System (DMS)
  - The introduction of Fault Isolation and System Restoration (FISR) technology
- Other new, well-targeted reliability investments including fusing and storm hardening
- An increasing focus on remediating momentary outages before they become permanent outages
- A focus on making optimal, data-driven asset investment decisions



It is PPL Electric's mission to achieve and maintain first quartile levels of electric delivery service to its customers at a reasonable cost. Maintenance programs are one of the key elements that focus on maintaining system and circuit reliability, equipment performance, and interruption prevention. The scope of these maintenance programs, procedures, and activities covers all areas of the electrical infrastructure.

These programs include:

Transmission
Transmission inspection programs include aerial and foot patrols. These patrols focus on comprehensive inspections, routine inspections, and identification of emergency work. They also include inspection of all equipment, including poles, arms, line switches, interrupters, arresters, grounding, guying, anchors, and other key transmission components.

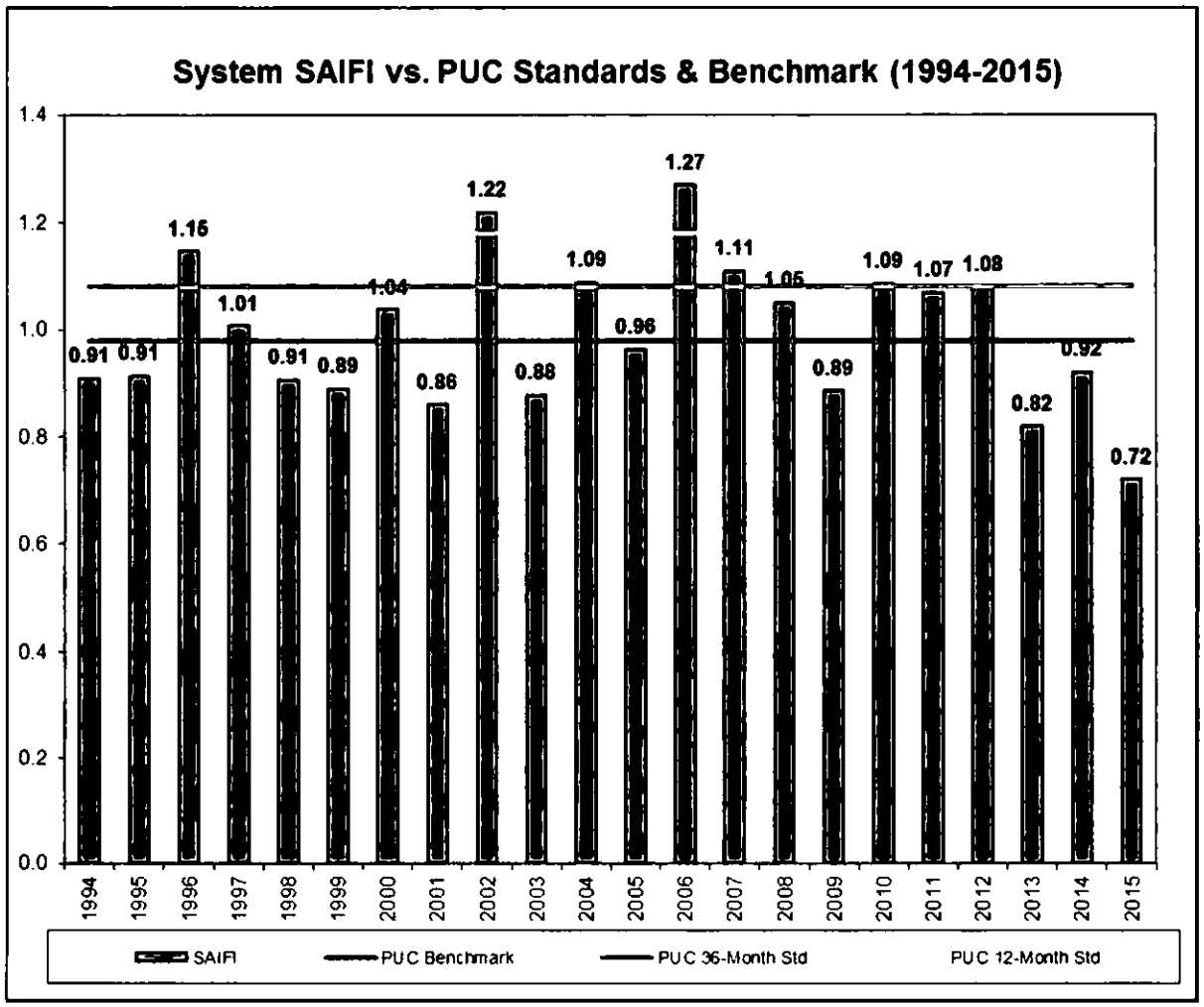
Substation
Substation maintenance programs include inspections and overhauls of equipment, such as breakers, disconnects, power cables, and security equipment. Some equipment is maintained on a time basis; other equipment is condition-monitored. These two methods help ensure that maintenance work is performed in a cost-effective manner. Besides time and condition-based maintenance, thermo-graphic inspections help ensure that substation equipment does not operate at elevated temperature levels for an extended period of time, which could lead to equipment failure

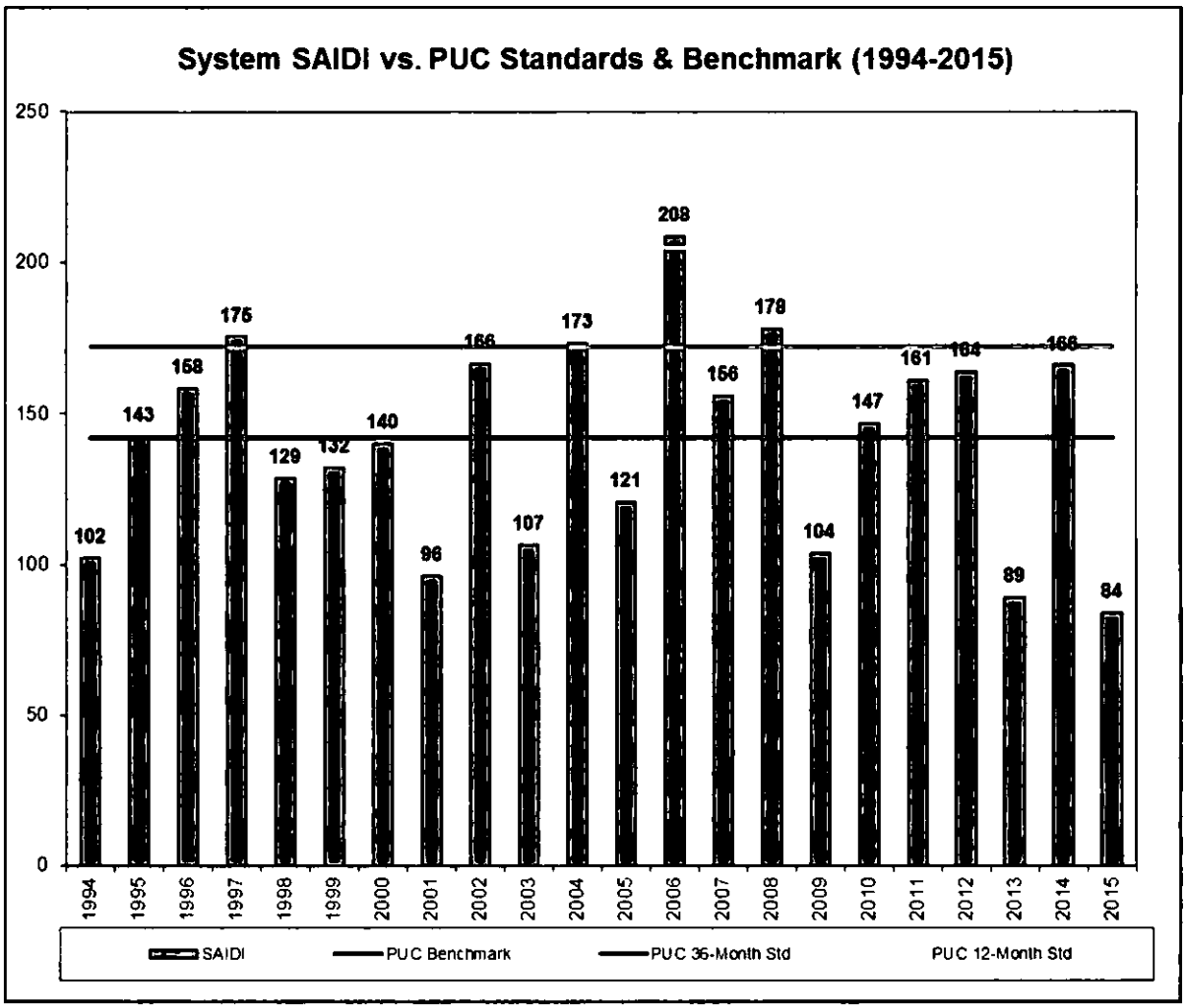
Distribution
Distribution programs encompass many maintenance aspects similar to transmission and substations, and also include load surveys that help engineers determine peak load requirements, circuit analyses for the identification of lines requiring maintenance work, voltage relief, or other capital improvements. Overhead line inspections can identify damaged or deteriorated equipment that can be repaired or replaced. In addition, distribution maintenance includes inspections of poles, voltage regulators, line switches, capacitors, and other key distribution equipment. PPL Electric also tests underground cable to determine if the cable needs to be replaced, repaired or cured to prevent future failures.

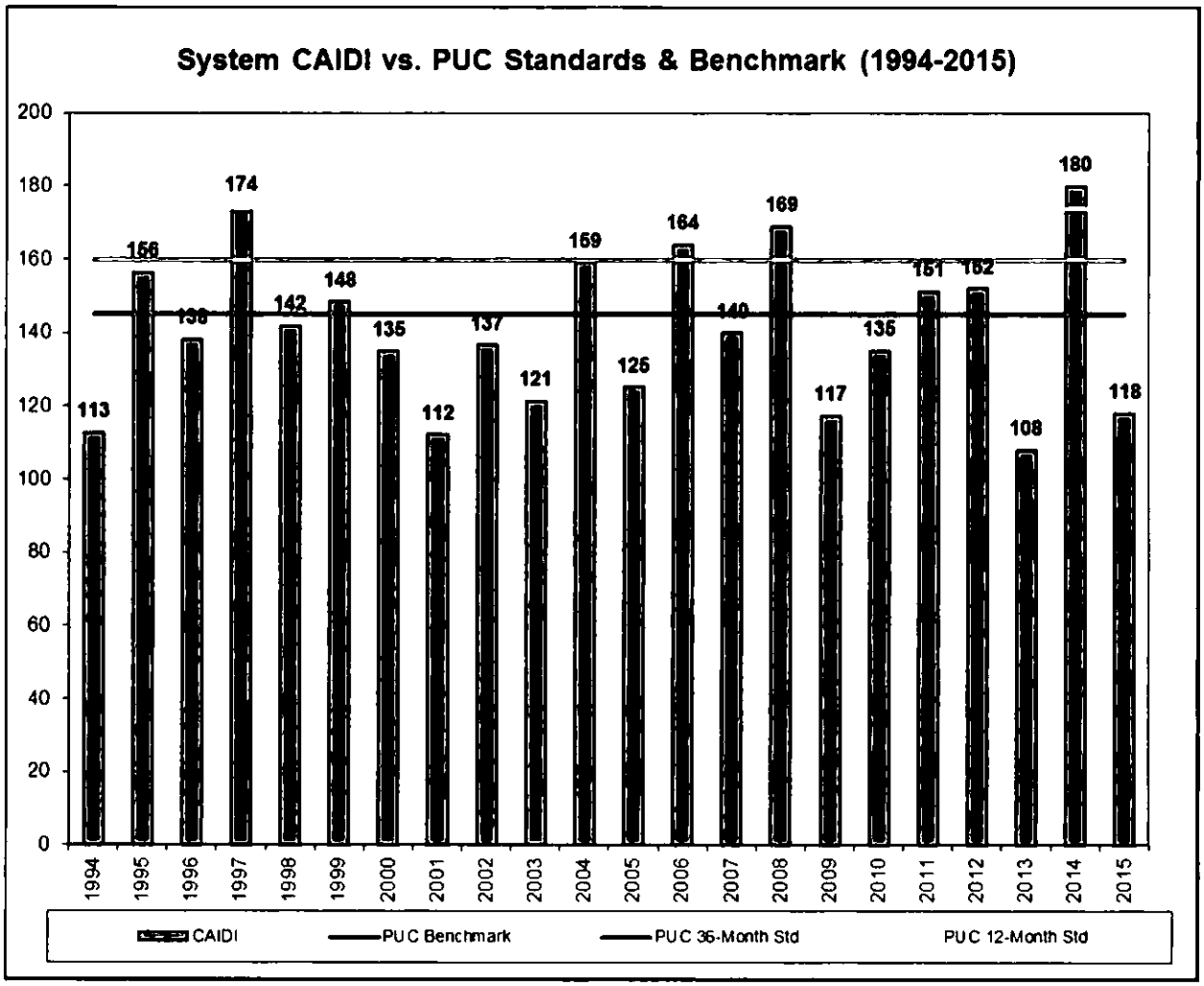
Vegetation
The vegetation on PPL Electric's transmission and distribution rights-of-way (ROW) is maintained utilizing a combination of several management techniques. These include tree pruning, tree removal, re-clearing and herbicide application. Lines are field-surveyed on a regular basis. The work is scheduled and budgeted based on the conditions observed and past performance.

Each of these programs is more fully described in Appendices A through D.

From 1999 through 2012, SAIFI, CAIDI and SAIDI generally have been maintained near benchmark levels and below the 36-month standard levels since the benchmark years of 1994 through 1998, as evidenced by the following three charts. Since 2013, marked improvement can be seen across all reliability measures, with 2014 somewhat distorted by ice storm Nika, which inflicted heavy damage but was not excludable because of its geographic concentration.




System SAIDI vs. PUC Standards & Benchmark (1994-2015)
250
200
150
100
50
0
102
143
158
175
129
132
140
96
166
107
173
121
208
156
178
104
147
161
164
89
166
84
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
SAIDI
PUC Benchmark
PUC 36-Month Std
PUC 12-Month Std


System CAIDI vs. PUC Standards & Benchmark (1994-2015)
200
180
160
140
120
100
80
60
40
20
0
113
156
138
174
142
148
135
112
137
121
159
125
164
140
169
117
135
151
152
108
180
118
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
CAIDI
PUC Benchmark
PUC 36-Month Std
PUC 12-Month Std

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 in 2015.

3) A table showing the actual values of each of the reliability indices (SAIFI, CAIDI, SAIDI, and if available, MAIFI) for the EDC'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 interruptions, the number of customers affected, and the customer minutes of interruption. If MAIFI values are provided, the number of customer momentary interruptions shall also be reported.

Year	2013	2014	2015[1]	3 Yr. Avg.
SAIFI (Benchmark = 0.98; Rolling 12-month Std. = 1.18; Rolling 3-yr. Std. = 1.08)	0.817	0.918	0.717	0.817
CAIDI (Benchmark = 145; Rolling 12-month Std. = 174; Rolling 3-yr. Std. = 160)	108.1	180.7	117.6	135.5
SAIDI (Benchmark = 142; Rolling 12-month Std. = 205; Rolling 3-yr. Std. = 172)	88.4	165.9	84.3	112.9
MAIFI[2]	3.5	3.3	4.2	3.7
Customers Served[3]	1,395,325	1,399,535	1,405,213	1,400,187
Number of Sustained Customer Interruptions (Trouble Cases)	14,400	17,389	14,973	15,587
Number of Customers Affected[4]	1,140,583	1,284,617	1,007,983	1,144,394
Customer Minutes of Interruptions	123,333,490	232,210,564	118,547,920	158,030,658
Number of Customer Momentary Interruptions	4,936,544	4,559,374	5,886,251	5,127,390

[1] Any slight variations from data provided previously are the result of error corrections.

[2] MAIFI data are obtained at the substation breaker and do not include momentaries at lower level devices.

[3] PPL Electric calculates the annual indices using customers served at the end of the period. This is consistent with the method used to calculate PPL Electric's benchmarks.

[4] The data reflects the number of customers interrupted for each interruption event summed for all events, also known as customer interruptions. If a customer is affected by three separate cases of trouble, that customer represents three customer interruptions, but only one customer interrupted.

4) ***A breakdown and analysis of outage causes during the year being reported on, including the number and percentage of service outages, the number of customers interrupted, 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.***

The table shows a breakdown of service outage causes for 2015.[5] The top three causes (Equipment Failure, Tree Related, and Animals), based on percent of cases, are highlighted in the table. Service interruption definitions are provided in Appendix E. PPL Electric has maintenance programs to address controllable service outages. Those programs are detailed in Appendices A through D.

Cause Description	Trouble Cases[6]	Percent of Trouble Cases	Customer Interruptions[7]	Percent of Customer Interruptions	Customer Minutes	Percent of Customer Minutes
Animals	3,311	22.1%	47,721	4.7%	3,920,788	3.3%
Contact/Dig-In	182	1.2%	15,750	1.6%	901,884	0.8%
Directed by Non-PPL Authority	189	1.3%	23,362	2.3%	2,200,404	1.9%
Equipment Failures	5,005	33.4%	311,581	30.9%	34,279,080	28.9%
Improper Design	3	0.0%	1,856	0.2%	245,849	0.2%
Improper Installation	3	0.0%	1,023	0.1%	81,632	0.1%
Improper Operation	4	0.0%	4,509	0.4%	429,290	0.4%
Nothing Found	1,102	7.4%	58,466	5.8%	4,899,228	4.1%
Other-Controllable	83	0.6%	8,412	0.8%	353,752	0.3%
Other-Non Control	257	1.7%	66,499	6.6%	5,568,006	4.7%
Other-Public	69	0.5%	13,411	1.3%	1,600,576	1.4%
Tree Related	4,006	26.8%	298,061	29.6%	48,851,318	41.2%
Vehicles	759	5.1%	157,332	15.6%	15,216,113	12.8%
TOTAL	**14,973**	**100.0%**	**1,007,983**	**100.0%**	**118,547,920**	**100.0%**

[5] Any slight variations from data provided previously are the result of error corrections.

[6] Cases of trouble are the number of sustained customer service interruptions (i.e., service outages).

[7] The data reflects the number of customers interrupted for each interruption event summed for all events, also known as customer interruptions. If a customer is affected by three separate cases of trouble, that customer represents three customer interruptions, but only one customer interrupted.

Analysis of causes contributing to the majority of service interruptions:

Weather Conditions: PPL Electric records weather conditions, such as wind or lightning, as contributing factors to service interruptions, but does not code them as direct interruption causes. Therefore, some fluctuations in cause categories, especially tree- and equipment-related causes, are attributable to weather variations. For the current reporting period, weather was considered a significant contributing cause in 39% of cases, 45% of customer interruptions, and 48% of CMI.

Tree Related: PPL Electric has recently increased funding to more aggressively address outside the right of way danger trees. For trees within the right-of-way, PPL Electric has implemented a more aggressive trimming strategy. We are in year four of a five year cycle for the new standard.

Animals: Animals accounted for approximately 22% of PPL Electric's cases of trouble. Although this represents a significant number of cases, the effect on SAIFI and CAIDI is small because approximately 80% of the number of cases of trouble was associated with individual distribution transformers. However, when animals contacts substation equipment, the effect may be widespread and potentially can interrupt thousands of customers on multiple circuits. In addition to guarding new distribution transformers and substations, in 2009, PPL Electric initiated distribution and substation animal guarding programs to focus systematically on protecting existing facilities most at risk of incurring animal-caused interruptions. All substations are scheduled to be animal guarded by 2017.

Vehicles: Although vehicles cause a small percentage of the number of cases of trouble, they accounted for a large percentage of customer interruptions and customer minutes, because main distribution lines generally are located along major thoroughfares with higher traffic densities. In addition, vehicle-related cases often result in extended repair times to replace broken poles. Service interruptions due to vehicles are on the rise as a result of an increasing number of drivers and vehicles on the road. PPL Electric has a program to identify and relocate poles that are subject to multiple vehicle hits.

Equipment Failure: Equipment failure is one of the largest single contributors to the number of cases of trouble, customer interruptions and customer minutes. However, approximately 40% of the cases of trouble, 41% of the customer interruptions and 46% of the customer minutes attributed to equipment failure were weather-related and, as such, are not considered to be strong indicators of equipment condition or performance.

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

Circuit 42201 -- SHENANDOAH 22-01

Performance Analysis

The SHENANDOAH 22-01 circuit experienced four outages of over 100,000 CMI between January 2015 and December 2015.

On March 14, 2015, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,020 customers for up to 248 minutes resulting in 207,453 CMI.

On April 21, 2015, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,020 customers for up to 712 minutes resulting in 294,149 CMI.

On October 28, 2015, during a period of heavy rain, an errant blimp tether made contact with an overhead transmission component causing a circuit breaker to trip to lockout. This outage affected 1,724 customers for up to 66 minutes resulting in 113,473 CMI.

On November 11, 2015, an equipment failure occurred on an overhead switch causing a recloser to trip to lockout. This outage affected 1,026 customers for up to 608 minutes resulting in 176,378 CMI.

In total, the SHENANDOAH 22-01 circuit had 27 outages between January 2015 and December 2015, with the causes breaking down as follows: animal contacts (10); equipment failure (8); tree related (5); other (2); contact or dig in (1); nothing found (1).

Remedial Actions

- In 2015, additional fusing was installed on several three-phase taps.
- In 2016, additional fusing will be installed on single-phase taps.
- In 2016, animal guarding installations will be evaluated in multiple locations.
- In 2017, a new manual switch will be installed on a section of single and three-phase line to improve sectionalizing capabilities.
- In 2017, full circuit tree trimming will be performed.

Circuit 47001 -- HUGHESVILLE 70-01

Performance Analysis

The HUGHESVILLE 70-01 circuit experienced three outages of over 100,000 CMI between January 2015 and December 2015.

On May 27, 2015, an animal interfered with a substation component causing a circuit breaker to trip to lockout. This outage affected 2,482 customers for up to 166 minutes resulting in 336,951 CMI.

On June 27, 2015, an improper operation occurred on an overhead switch. This outage affected 827 customers for up to 785 minutes resulting in 115,928 CMI.

On August 4, 2015, an improper operation occurred causing a recloser to trip to lockout. This outage affected 827 customers for up to 345 minutes resulting in 200,027 CMI.

In total, the HUGHESVILLE 70-01 circuit had 48 outages between January 2015 and December 2015, with the causes breaking down as follows: equipment failure (16); tree related (13); animal contacts (8); nothing found (4); Improper Operation (3); vehicles (2); contact or dig in (1); other (1).

Remedial Actions

- In 2015, a normally open switch between the HUGHESVILLE 70-01 and HUGHESVILLE 70-02 circuits was upgraded to a device with remote operational capability as part of the smart grid initiative.
- In 2015, the underground getaway for this circuit was proactively replaced.
- In 2015, animal guarding was installed at the HUGHESVILLE Substation.
- In 2015, a project increased the load that can be transferred from the HUGHESVILLE 70-01 to the MILLVILLE 32-02. Approximately 8,500 feet of larger capacity conductor was installed on the MILLVILLE 32-02.
- In 2015, additional transmission switches were installed to allow the HUGHESVILLE transmission tap to be fed by either the CLINTON – MUNCY #1 transmission line or the CLINTON – MUNCY #2 transmission line.
- In 2016, full circuit tree trimming will be performed.
- In 2016, fuses will be added to protect the three-phase backbone, and series fusing will be added at one location.
- In 2017, a project is planned to build one mile of new single-phase and remove one mile of difficult-to-access copper conductor.
- In 2017, a new manually operable switch will be installed to allow line crews to transfer the HUGHESVILLE 70-01 to the HUGHESVILLE 70-02 should the HUGHESVILLE 70-01 circuit breaker or getaway fail.
- In 2018, a project is planned to build 2,500 feet of new single-phase.

Circuit 25801 -- SULLIVAN TRAIL 58-01

Performance Analysis

The SULLIVAN TRAIL 58-01 circuit experienced two outages of over 100,000 CMI between January 2015 and December 2015.

On April 4, 2015, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a circuit breaker to trip to lockout. This outage affected 1,818 customers for up to 486 minutes resulting in 179,226 CMI.

On December 29, 2015, during a period of ice/sleet/snow, a tree made contact with an overhead conductor causing a recloser to trip to lockout. This outage affected 633 customers for up to 333 minutes resulting in 210,789 CMI.

In total, the SULLIVAN TRAIL 58-01 circuit had 42 outages between January 2015 and December 2015, with the causes breaking down as follows: tree related (23); animal contacts (9); equipment failure (9); nothing found (1).

Remedial Actions

- In 2016, full circuit tree trimming will be performed.
- In 2016, a new sectionalizing device with remote operational capability will be installed on this circuit as part of the Smart Grid initiative.
- In 2016, a manual switch will be replaced with a sectionalizing device with remote operational capability on this circuit as part of the Smart Grid initiative.
- In 2016, two three-phase solid-blade disconnect switch installations are being evaluated for this circuit.
- In 2016, locations for fault indicators on the SULLIVAN TRAIL 58-01 line were identified to improve troubleshooting during outages.
- In 2017, three-phase fusing will be installed in multiple locations.

Circuit 53602 -- DALMATIA 36-02

Performance Analysis

The DALMATIA 36-02 circuit experienced two outages of over 100,000 CMI between January 2015 and December 2015.

On May 31, 2015, an equipment failure occurred causing an interruption. This outage affected 814 customers for up to 440 minutes resulting in 145,867 CMI.

On June 12, 2015, during a period of heavy rain, an equipment failure occurred on a pole or pole arm causing a recloser to trip to lockout. This outage affected 672 customers for up to 676 minutes resulting in 123,518 CMI.

In total, the DALMATIA 36-02 circuit had 42 outages between January 2015 and December 2015, with the causes breaking down as follows: tree related (15); equipment failure (13); nothing found (6); animal contacts (4); other (2); vehicles (2).

Remedial Actions

- In 2015, four sectionalizing devices were upgraded with remote operational capability as part of the Smart Grid Initiative.
- In 2015, a problematic recloser was replaced.
- In 2015, two locations with aluminum crimps on copper conductor were replaced.
- In 2016, two additional single-phase fusing locations have been identified and will be installed.
- In 2016, three additional devices with remote operational capability will be installed as part of the Smart Grid Initiative.
- In 2016, 17 motor operated switches are scheduled to be installed on the SUNBURY-DAUPHIN and DAUPHIN-PINE GROVE transmission lines. The switches will allow

operators to quickly sectionalize transmission outages to no more than a single distribution substation.

- In 2017, a section of difficult-to-access line will be relocated to a more accessible location, and reconductored with spacer cable to minimize outage exposure.
- In 2018, full circuit trimming will be performed.

Circuit 67302 -- WYOMISSING 73-02

Performance Analysis

The WYOMISSING 73-02 circuit experienced one outage of over 100,000 CMI between January 2015 and December 2015.

On January 11, 2015, during a period of extreme temperatures, a vehicle contact occurred causing a circuit breaker to trip to lockout. This outage affected 1,850 customers for up to 390 minutes resulting in 338,386 CMI.

In total, the WYOMISSING 73-02 circuit had 15 outages between January 2015 and December 2015, with the causes breaking down as follows: equipment failure (6); animal contacts (3); tree related (3); vehicles (2); nothing found (1).

Remedial Actions

- In 2015, a new smart grid device was installed on this circuit.
- In 2015, a manual switch was replaced with an automated vacuum recloser as part of the Smart Grid Initiative.
- In 2015, all aluminum crimps on three-phase copper conductor were replaced.
- In 2015, animal guards were installed at the WYOMISSING substation.
- In 2015, a disconnect switch on a three-phase underground dip was installed.
- In 2016, an Expanded Operational Review will be performed.

- In 2017, two new Smart Grid devices will be installed on this circuit as part of the smart grid initiative.

Circuit 46602 -- LARRYS CREEK 66-02

Performance Analysis

The LARRYS CREEK 66-02 circuit experienced two outages of over 100,000 CMI between January 2015 and December 2015.

On January 5, 2015, during a period of strong wind, a tree made contact with a pole or pole arm causing a recloser to trip to lockout. This outage affected 647 customers for up to 328 minutes resulting in 212,216 CMI.

On March 31, 2015, during a period of ice/sleet/snow, a vehicle made contact with a pole causing a recloser to trip to lockout. This outage affected 666 customers for up to 261 minutes resulting in 173,826 CMI.

In total, the LARRYS CREEK 66-02 circuit had 41 outages between January 2015 and December 2015, with the causes breaking down as follows: tree related (24); nothing found (7); equipment failure (6); animal contacts (3); vehicles (1).

Remedial Actions

- In 2015, 10 spans of difficult-to-access line were relocated.
- In 2015, five additional fuses were installed on single-phase lines.
- In 2016, the power transformer at the LARRYS CREEK substation will be replaced with a new, larger capacity transformer.
- In 2016, a project is scheduled to install several fuses to add additional sectionalizing.

Circuit 40201 -- BEAR GAP 02-01

Performance Analysis

The BEAR GAP 02-01 circuit experienced one outage of over 100,000 CMI between January 2015 and December 2015.

On August 18, 2015, an unidentified issue occurred with a pole or pole arm causing a recloser to trip to lockout. This outage affected 1,642 customers for up to 475 minutes resulting in 168,936 CMI.

In total, the BEAR GAP 02-01 circuit had 51 outages between January 2015 and December 2015, with the causes breaking down as follows: tree related (21); equipment failure (14); animal contacts (7); nothing found (4); other (4); vehicles (1).

Remedial Actions

- In 2015, full circuit tree trimming was performed.
- In 2015, a new sectionalizing device with remote operational capability was installed as part of the Smart Grid initiative.
- In 2015, single and three-phase fusing was installed in multiple locations.
- In 2016, a manual sectionalizing switch will be replaced with an automated vacuum recloser as part of the Smart Grid initiative.
- In 2016, installing a solid-blade disconnect on a long span of single-phase line will be evaluated.

Circuit 45501 -- DERRY 55-01

Performance Analysis

The DERRY 55-01 circuit experienced one outage of over 100,000 CMI between January 2015 and December 2015.

On October 20, 2014, an equipment failure occurred on an underground conductor causing a temporary open point to be interrupted. This outage affected 347 customers for up to 1,148 minutes resulting in 298,420 CMI.

In total, the DERRY 55-01 circuit had 32 outages between January 2015 and December 2015, with the causes breaking down as follows: equipment failure (9); tree related (9); animal contacts (6); nothing found (4); vehicles (3); other (1).

Remedial Actions

- In 2015, a new manual disconnect switch was installed on this circuit.
- In 2015, a new sectionalizing device with remote operational capability was installed to improve sectionalizing as part of the Smart Grid initiative.
- In 2016, additional fusing will be installed.
- In 2016, solid blade disconnects will be installed on a three-phase tap.
- In 2017, full circuit trimming will be performed.
- In 2017, 500 feet of new single-phase will be built to replace a section of difficult-to-access conductor, and a new recloser will be installed.

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.***

Inspection & Maintenance Goals/Objectives	2015 Budget	2015 Actual	Variance (%)
Transmission			
Transmission C-tag poles (# of poles)	324	220	**-32.1%**
Transmission arm replacements (# of sets)	20	20	0.0%
Transmission air break switch inspections (# of switches)	13	11	**-15.4%**
Transmission lightning arrester installations (# of sets)	5,485	5,063	-7.7%
Transmission structure inspections (# of structures)	737	665	-9.8%
Transmission tree side trim-Bulk Power (linear feet)	N/A	N/A	N/A
Transmission herbicide-Bulk Power (# of acres)	N/A	N/A	N/A
Transmission reclearing (# of miles) BES Only	625	584	-6.6%
Transmission reclearing (# of miles) 69 kV	974	985	1.1%
Transmission reclearing (# of miles) 138 kV	293	310	5.8%
Transmission danger tree removals-Bulk Power (# of trees)	N/A	26,166	N/A
Substation			
Substation batteries (# of activities)	652	652	0.0%
Circuit breakers (# of activities)	582	529	-9.1%
Substation inspections (# of activities)	4,326	4,595	6.2%
Transformer maintenance (# of activities)	1,353	1,384	2.3%
Distribution			
Distribution C-tag poles replaced (# of poles)	1,234	1,194	-3.2%
C-truss distribution poles (# of poles)	5,254	5,254	0.0%
Capacitor (MVAR added)	-	-	N/A
OCR Replacements (# of)	106	110	3.8%
Distribution pole inspections (# of poles)	114,822	104,884	-8.7%
Distribution line inspections (hours)	8,820	8,473	-3.9%
Group re-lamping (# of lamps)	15,073	15,108	0.2%
Test sections of underground distribution cable	698	904	**29.5%**
Distribution tree trimming (# of miles)	6,334	6,264	-1.1%
Distribution herbicide (# of acres)	N/A	N/A	N/A
Distribution >18" removals within R/W (# of trees)	N/A	N/A	N/A
Distribution hazard tree removals outside R/W (# of trees)	N/A	19,105	N/A
LTN manhole inspections (# of)	313	312	-0.3%
LTN vault inspections (# of)	714	726	1.7%
LTN network protector overhauls (# of)	75	70	-6.7%
LTN reverse power trip testing (# of)	49	67	**36.7%**

Explanation of variances greater than 10%:

Transmission C-tag poles: Outage constraints deferred work into 2016.

Transmission air break switches: Outage constraints deferred work into 2016.

Test sections of underground distribution cable: Quantity of tests varies based on the needs of field personnel.

LTN reverse power trip testing: Additional testing was performed to support the LTN Automation program.

7) ***A comparison of budgeted versus actual transmission and distribution operation and maintenance expenses for the year being reported on in total and detailed by the EDC's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included.***

The following table provides operation and maintenance expenses for PPL Electric, as a whole, and includes the work identified in the response to Item (6).

Activity	2015 Budget ($000)	2015 Actual ($000)	Variance (%)
Provide Electric Service	7,880	7,979	1.3%
Vegetation Management	56,471	58,607	3.8%
Customer Response	73,075	53,681	**-26.5%**
Reliability Maintenance	54,453	58,938	8.2%
System Upgrade	496	3,008	**506.5%**
Customer Service/Accounts	135,140	136,726	1.2%
Others	35,023	43,065	**23.0%**
Total O&M Expenses	362,536	362,004	-0.1%

Explanation of variances of 10% or greater:

Customer Response: This activity was under budget due to lower than anticipated PUC storm classified work as a result of favorable weather.

System Upgrade: Over budget due to work related to equipment firmware updates for NERC CIP requirements that were not originally anticipated in the budget. Additionally there was expense related to the installation of temporary assets for a transmission line project that was unforeseen in the budget.

Others: Over budget due to a mix of activities that are not directly attributable to a certain category including overhead, planning of work, and general management.

8) ***A comparison of budgeted versus actual transmission and distribution capital expenditures for the year being reported on in total and detailed by the EDC's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included.***

The following table provides capital expenditures for PPL Electric, as a whole, which includes transmission and distribution activities.

	2015 Budget ($000)	2015 Actual ($000)	Variance (%)
New Service/Revenue	76,935	86,721	**12.7%**
System Upgrade	505,452	476,639	-5.7%
Reliability & Maintenance	418,681	457,018	9.2%
Customer Response	11,351	5,952	**-47.6%**
Other	31,191	29,312	-6.0%
Total	**1,043,611**	**1,055,643**	1.2%

Explanation of variances of 10% or greater:

New Service/Revenue: This activity was over budget primarily due to increases in commercial work.

Customer Response: This activity was under budget primarily due to lower storm costs.

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

Inspection & Maintenance Goals/Objectives	2016 Budget
Transmission	
Transmission C-tag poles (# of poles)	100
Transmission arm replacements (# of sets)	75
Transmission air break switch inspections (# of switches)	78
Transmission lightning arrester installations (# of sets)	1,716
Transmission structure inspections (# of structures)	1,862
Transmission tree side trim-Bulk Power (linear feet)	N/A
Transmission herbicide-Bulk Power (# of acres)	N/A
Transmission reclearing (# of miles) BES Only	326
Transmission reclearing (# of miles) 69 kV	769
Transmission reclearing (# of miles) 138 kV	59
Transmission danger tree removals-Bulk Power (# of trees)	N/A
Substation	
Substation batteries (# of activities)	654
Circuit breakers (# of activities)	579
Substation inspections (# of activities)	4,545
Transformer maintenance (# of activities)	1,430
Distribution	
Distribution C-tag poles replaced (# of poles)	1,424
C-truss distribution poles (# of poles)	4,102
Capacitor (MVAR added)	25
OCR Replacements (# of)	99
Distribution pole inspections (# of poles)	68,237
Distribution line inspections (hours)	12,944
Group re-lamping (# of lamps)	14,269
Test sections of underground distribution cable	N/A
Distribution tree trimming (# of miles)	6,123
Distribution herbicide (# of acres)	N/A
Distribution >18" removals within R/W (# of trees)	N/A
Distribution hazard tree removals outside R/W (# of trees)	N/A
LTN manhole inspections (# of)	553
LTN vault inspections (# of)	821
LTN network protector overhauls (# of)	91
LTN reverse power trip testing (# of)	51

10) Budgeted transmission and distribution operation and maintenance expenses for the current year in total and detailed by the EDC's own functional account code or FERC account code as available.

The following table provides budgeted operation and maintenance expenses for PPL Electric, as a whole, and includes the work identified in the response to Item (9).

Activity	2015 Budget ($1,000s)
Provide Electric Service	6,350
Vegetation Management	58,256
Customer Response	67,345
Reliability & Maintenance	47,998
System Upgrade	4,182
Customer Services/Accounts	130,661
Other	42,686
Total O&M Expenses	**357,478**

11) Budgeted transmission and distribution capital expenditures for the current year in total and detailed by the EDC's own functional account code or FERC account code as available.

The following table provides budgeted capital expenditures for PPL Electric, as a whole, and includes transmission and distribution activities.

Activity	2015 Budget ($1,000s)
Customer Response	12,335
New Service / Revenue	89,271
Reliability & Maintenance	423,058
System Upgrade	532,545
Other	28,636
Total	**1,085,846**

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

No significant changes were made to the Inspection, Maintenance, Repair and Replacement Plan submitted to the Commission.

Appendix A

PPL Electric Utilities Corporation
Transmission Programs & Procedures

Program	Activity
Helicopter Inspections – Routine	Aerial linemen perform annual routine transmission line patrols from a helicopter. They identify damaged or deteriorated equipment. Engineers review the findings and develop plans for repair or replacement.
Helicopter Inspections – Comprehensive	Aerial linemen perform an overhead comprehensive inspection of transmission line facilities on a four year cycle. Detailed condition reports with close up digital photos are prepared for each specific component problem found along the transmission line and right of way. Engineers review the findings and schedule corrective maintenance as needed.
Helicopter Inspections – Emergency	Aerial linemen perform patrols of transmission lines that operate abnormally. This inspection focuses on identifying damage that may have been caused by lightning, inclement weather, equipment failure or vandalism. Because of the nature of this work, corrective actions are usually expedited.
Field Inspections – Emergency	Line personnel perform emergency foot patrols to inspect transmission lines that operated abnormally. This inspection focuses on identifying damage that may have been caused by lightning, inclement weather, equipment failure or vandalism. Due to the nature of this damage, corrective actions are generally expedited.
Wood Pole – Inspection, Treatment, Replacement, Trussing (reinforcement)	Line personnel examine wood poles for deterioration and measure the degree of rot. Based on the results, the pole is either scheduled for a future inspection, reinforcement for extended life, or replacement.
Equipment Maintenance	During helicopter and foot patrols, equipment and facilities are identified that require repairs. Based on need and criticality, repairs are either scheduled or completed as soon as possible.
Planned Replacement Programs	Line personnel and aerial linemen have completed the planned replacement of all deteriorated spacers and dampers on 500kV circuits. Line personnel also replace deteriorated wood arms identified during condition monitoring inspections.
Line Switches – Maintenance & Inspection	Line personnel inspect, maintain, and perform operational tests on 138kV and 69kV line air break switches to assure proper operation.

Program	Activity
Line Switch Upgrades	Line personnel install lightning arresters on 138kV and 69kV line switches to increase system reliability.
Circuit Analysis	Engineers analyze circuit loading and performance to identify areas needing increased line capacity or improved line reliability.

Appendix B

PPL Electric Utilities Corporation
Substation Programs & Procedures

Program	Activity
Load Survey	Automatic monitoring devices such as Supervisory Control and Data Acquisition (SCADA) provide continuous, real-time loading information. Engineers review equipment loading and identify facilities and transfer capabilities approaching capacity limits. A portion of the load may be supplied from a different source, the existing facilities may be upgraded, new lines and equipment may be added, or a new substation may be built to address capacity deficiencies.
Substation Inspection/Repair	Electricians inspect substations for security and equipment reliability on a time based maintenance cycle. They attempt to identify and correct potential equipment problems before a failure or interruption of service occurs.
Equipment Service	Electricians perform operational tests on power transformers, load tap changers (LTC), voltage regulators, circuit breakers, circuit switchers, vacuum switches, air break switches and transformer protective switches on a time based maintenance cycle to assure that equipment is operating within established parameters. Equipment serviced includes batteries, battery chargers, protective relays, HV fuses and high-speed automatic grounding switches. Depending on the type of equipment, "service" can include actions other than operational testing.
Inspection & Overhaul	Electricians inspect and overhaul circuit breakers, wave traps, ground switches, stick-operated disconnects, gang-operated disconnects and motor-operated disconnects on a time based maintenance cycle to assure proper operation.
Insulation Testing	Electricians perform power factor testing on power transformer, potential transformers, lightning arresters, current transformers, circuit breakers and power cables on a time based maintenance cycle. Testing also includes other instrument transformers (CCVTs, coupling capacitors, potential devices, etc.). They also perform high-potential testing on air and vacuum circuit breakers to assure proper operation.
Condition Monitoring of Station Equipment	Technicians perform dissolved gas-in-oil, dielectric, oxygen, and oil acidity tests for oil in power transformers and impedance and capacity tests on station batteries to assure equipment is within normal parameters. Periodically, AC power factor tests, hi-potential tests, contact resistance tests and motion tests are performed on circuit breakers. Oil dielectric testing is conducted for oil circuit breakers.

Appendix B

Program	Activity
Thermographic Inspections	Technicians perform thermography surveys of substation facilities to identify components operating at elevated temperature. Based on the findings, engineers develop plans to repair or replace the component(s) prior to failure.
Minor Improvements	Maintenance activities may identify conditions where additions or upgrades are needed to assure reliability. Engineers evaluate the need and develop action plans and schedules to complete the work.
DC Station Service Improvements	Repairmen identify deteriorated station batteries, battery chargers and battery components. Engineers schedule repair or replacement as necessary.
Capacitor Bank Protection	Engineers monitor the need for synchronous closing schemes on vacuum switches on 69kv capacitor banks. They plan and schedule installations as needed.
Area/Regional Supply	Engineers develop specific projects aimed at improving capacity shortfalls or replacing deteriorated or substandard station equipment.
SCADA Replacement	Engineers identify deteriorating substation SCADA equipment and develop plans to repair or replace it.

PPL Electric Utilities Corporation
Distribution Programs & Procedures

Program	Activity
Load Survey – of equipment that is not continuously monitored	Line personnel measure the loading of facilities during peak periods. Engineers use this data for system studies.
Load Survey – by automatic monitoring devices	Automatic monitoring devices such as SCADA provide continuous, real-time loading information. Operators use this data to assure that loads do not exceed design limits. Engineers use this data for system studies.
Circuit Analysis	Engineers analyze circuit voltage profiles to balance loads and to identify areas requiring voltage support to maintain required voltage at the customer facility.
Voltage Regulator – Inspection & Maintenance	Line personnel inspect existing equipment for potential failure, and inspect and maintain controls and tap changers to assure proper operation. Line personnel repair or replace any defective equipment.
Overhead Line Switch – Inspection & Maintenance	Line personnel inspect switch installations to identify cracked or broken insulators / bushings, stuck or misaligned blades, insulation or gasket deterioration or other operational problems. Line personnel repair or replace any defective equipment.
Transformer Maintenance	Engineers analyze customer usage data to identify overloaded transformers. Transformers that are heavily loaded are replaced with higher capacity units or part of the load is transferred to other nearby transformers.
Wood Pole – Inspection, Maintenance, Replacement, Trussing, Fiber Wrap (reinforcement)	Inspectors examine wood poles for deterioration and measure the degree of rot. Based on the results, the pole is either scheduled for a future inspection, reinforcement for extended life or replacement.
Overhead Line Inspection	Line inspectors examine overhead facilities to identify damaged, deteriorated or substandard equipment. Line personnel repair or replace any defective equipment. Includes visual and thermo-graphic inspections.
Circuit Performance Review	Engineers use the PPL Electric's Circuit Performance Index to ascertain the need for additional circuit reviews / inspections.

Program	Activity
Underground Primary Cable – Testing, Maintenance, Replacement, Curing	Line personnel perform insulation and neutral tests on cable in residential developments with potential problems to identify deteriorated cable. Based on the results, the cable is placed back in service, repaired or replaced.
LTN Maintenance	Electricians will inspect, service, maintain and overhaul LTN vaults, manholes, cables, transformers, low voltage network protectors and primary transformer disconnect switches. Based on results, defective equipment is either repaired or replaced.
Public Damaged Facilities Review	A program aimed at identifying the locations of facilities that have been damaged by public contact more than once. Technicians evaluate those installations and, if relocation is possible, schedule work to move the facilities.
Underground Service Cable	Engineers resolve customer service problems that are due to deteriorated service conductors.
Oil Circuit Reclosers	Line personnel replace in-service oil circuit reclosers on a time based maintenance cycle. Removed units are overhauled, tested and returned to service.
Line Protection Equipment	Engineers perform load calculations to identify line protection devices that are approaching their capacity limits. Devices are replaced or upgraded to assure that they function properly.
Capacitor Installation	Engineers perform voltage profiles to determine the need, location and size of any new voltage support equipment required to maintain adequate service voltage levels at customer facilities and provide needed reactive support for system stability. Line personnel install the required equipment.
Upgrade System Facilities	Engineers determine the need for additional capacity and design new and upgraded facilities to assure system reinforcements are constructed by the time they are needed.

Appendix D

PPL Electric Utilities Corporation
Vegetation Programs & Procedures

Program	Activity
Tree Pruning	Tree pruning is scheduled based on field conditions observed and/or a system prioritization process. All pruning is done in accordance with American National Standard for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (ANSI A300).
Tree Removal	Trees located both within the right-of-way corridor and outside the right-of-way that may be a threat to line performance/ safety are removed when it is feasible to do so.
Herbicide Application	Tall-growing, undesirable vegetation growing within the rights-of-way corridors is selectively treated with herbicides. Low-growing vegetation that does not represent a hazard to the safe, reliable operation of PPL Electric's facilities is preserved wherever possible.
Reclearing	Tall-growing, undesirable vegetation growing within the rights-of-way corridors is selectively removed in those situations where herbicides can't be utilized. Low-growing vegetation that does not represent a hazard to the safe, reliable operation of PPL Electric's facilities is preserved wherever possible.

Appendix E

PPL Electric Utilities Corporation
Service Interruption Definitions

Trouble Definitions: After field investigations and repairs are complete, PPL Electric linemen report the cause of each case of trouble. This information is electronically recorded as a "cause code" number when the job record is closed. PPL Electric cause codes are subdivided into four general classifications: Controllable, Non-Controllable, Public and Non-PPL. The definitions of the cause codes are:

10 – Improper Design	Controllable	• When an employee or agent of PPL Electric is responsible for an error of commission or omission in the engineering or design of the distribution system.
11 – Improper Installation	Controllable	• When an employee or agent of PPL Electric is responsible for an error of commission or omission in the construction or installation of the distribution system.
12 – Improper Operation	Controllable	• When an employee or agent of PPL Electric is responsible for an error of commission or omission in the operation or maintenance of the distribution system.
30 – Trees –Trimming Related[8]	Controllable	• Outages resulting from conductors contacted by tree growth within the clearance zone defined by the current trimming specification (within the Right-of-Way).
35 – Trees – Not Trimming Related	Non-Controllable	• Outages due to trees, but not related to lack of proper tree trimming maintenance. This includes danger timber blown into PPL Electric facilities, and trees or limbs felled by the public.
40 – Animals	Controllable	• Any outage caused by an animal directly or indirectly coming in contact with PPL Electric facilities. This includes birds, squirrels, raccoons, snakes, cows, etc.
41 – Vehicles	Public	• When cars, trucks or other types of vehicles or their cargoes strike facilities causing a problem.

[8] The title and description of this code have been revised for clarity. The purpose and application of the code have not changed.

51 – Contact/Dig-in	Public	• When work in the vicinity of energized overhead facilities results in interruptions due to accidental contact by cranes, shovels, TV antennas, construction equipment (lumber, siding, ladders, scaffolding, roofing, etc.). • When contact is made by a non-employee with an underground facility causing interruption.
60 – Equipment Failure	Controllable	• Outages resulting from equipment failures caused by corrosion or contamination from build-up of materials, such as cement dust or other pollutants. • Outages resulting from a component wearing out due to age or exposure, including fuse tearing or breaking. • Outages resulting from a component or substance comprising a piece of equipment failing to perform its intended function. • Outages resulting from a failure that appears to be the result of a manufacturer's defect or cannot be described by any other code indicating the specific type of failure.
77 – Non-PPL Problem – Other	Non-PPL	• Where no PPL Electric or customer facilities were affected, and no repair or restoration was carried out on PPL Electric equipment.
78 – Non-PPL Problem – Customer Facility	Non-PPL	• Where no PPL Electric facilities were affected, and no repair or restoration was carried out on PPL Electric equipment.
80 – Scheduled Outage[9]	Controllable	• Interruptions under the control of a PPL Electric switchman or direction of a PPL Electric System Operator for the purpose of performing scheduled maintenance, repairs and capacity replacements for the safety of personnel and the protection of equipment. • Includes requests from customers for interruption of PPL Electric facilities.

[9] Interruptions under the control of a PPL Electric switchman or the direction of a PPL Electric System Operator for the purpose of isolating damaged facilities to make repairs are reported using the initial cause of the damage when the interruption is taken immediately, but are reported as scheduled outage when the interruption is postponed.

85 – Directed by Non-PPL Authority[10]	Non-Controllable	• Interruptions under the control of a PPL Electric switchman or direction of a PPL Electric System Operator for the purpose of dropping load or isolating facilities upon request during emergency situations. • Interruptions which cannot be postponed or scheduled for a later time, and include situations like load curtailment during system emergencies, and requests of civil authorities such as fire departments, police departments, civil defense, etc. for interruption of PPL Electric facilities.
90 – Other – Controllable (Lineman provides explanation)	Controllable	• Interruptions caused by phase to phase or phase to neutral contacts, resulting from sleet or ice dropping off conductors, galloping conductors, or any other phase to phase or phase to neutral contact where weather is a factor. • Interruptions resulting from excessive load that cause that facility to fail. • When restoration of service to a facility, which had been interrupted for repairs or other reasons, causes an additional interruption to another facility which had not been involved in the initial interruptions. • Controllable interruptions or Power Service Problems whose cause is not described by one of the previous controllable cause codes.
96 – Nothing Found	Non-Controllable	• When no cause for the interruption can be found. • When there is no evidence of equipment failure, damage or contact after line patrol is completed. This could be the case during a period of heavy thunder and lightning, when a line fuse blows or a single phase OCR locks open. • When closed for test, the fuse holds or the OCR remains closed. A patrol of the tap reveals nothing.
98 – Other Public (Lineman provides explanation)	Public	• All outages resulting from gunfire, civil disorder, objects thrown, or any other act intentionally committed for the purpose of disrupting service or damaging company facilities.

[10] The title of this code has been revised for clarity. The purpose and application of the code has not changed.

99 – Other – Non-Controllable (Lineman provides explanation)	Non-Controllable	• Any outage occurring because of a fire, flood or a situation that develops as a result of a fire or flood. Do not use when facilities are de-energized at the request of civil authorities. • When an interruption is caused by objects other than trees, such as kites, balls, model airplanes, roofing material, or fences, being accidentally blown or thrown into overhead facilities. • All problems caused by contact of energized equipment with facilities of other attached companies or by trouble on customer owned equipment. • Interruptions or Power Service Problems whose cause is not described by one of the previous non-controllable cause codes, but is not affected by a PPL Electric employee's decisions.