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July 1, 2019

Ms. Brinda Westbrook-Sedgwick
Commission Secretary
Public Service Commission
of the District of Columbia
1325 G Street N.W., Suite 800
Washington, DC 20005

Re: PEPACR-2019-01 and Formal Case Nos. 766 and 1119

Dear Ms. Westbrook-Sedgwick:

Enclosed please find Potomac Electric Power Company's 2019 Repeat Priority Feeder Improvement Plan compliance filing to its Annual Consolidated Report, filed April 1, 2019.

Please feel free to contact me if you have any questions regarding this matter.

Sincerely,

Dennis P. Jamouneau

Enclosures

cc: All Parties of Record

Repeat Priority Feeder Improvement Plan

July 1, 2019

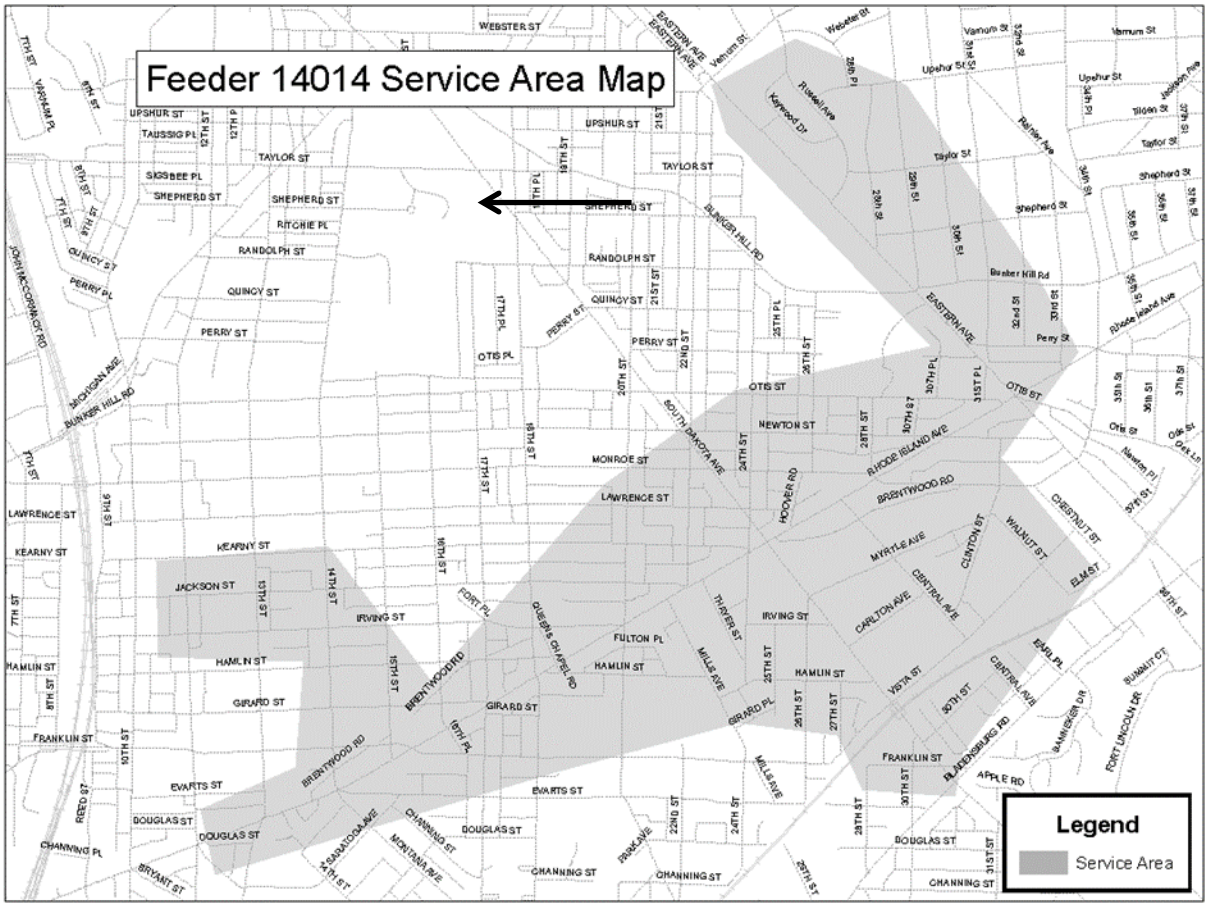
This report is provided in accordance with paragraphs 13 and 17 of Order No. 15941 ("Order"), which was issued August 18, 2010, in Formal Case Nos. 766 and 991.

The relevant paragraphs from the Order are replicated below, with bolded requirement identifiers added. The identifiers are used for reference throughout the report to indicate the requirement with which each section of the report is intended to comply.

> 13. Beginning with the 2011 Consolidated Report, Pepco shall identify any feeders that have appeared more than once on the Priority Feeder List, by year from the first Priority Feeder List in 2002, so that it shall be apparent how many times each feeder has appeared on the Priority Feeder List. If any 4 kV feeder has appeared on the list three times, or any 13 kV feeder four times, we believe it is apparent that the feeder is among the very least reliable and deserving of special attention. Pepco shall, no later than ninety days after the submission of the Consolidated Report, submit a proposal for each such feeder indicating Pepco's recommended solution to improve feeder performance.
>
> Such submission shall include: **[1]** a detailed description of outages, including **[a]** causes and **[b]** corrective actions taken; **[2]** the **[a]** SAIDI, **[b]** SAIFI, **[c]** the number of interruptions and **[d]** the number of hours of customer interruptions for that feeder for each year beginning with the year the feeder first appeared on the Priority Feeder List; **[3]** a map showing the feeder service area; **[4]** and an analysis of why past corrective actions failed. **[5]** The submission shall also describe Pepco's proposed solution to the feeder's reliability problem, including **[a]** an explanation of options considered with a cost/benefit analysis of each and **[b]** a justification for the option recommended. **[6]** The description shall also include a cost/benefit analysis of the solution, including **[a]** budget and cash flows by year, as well as **[b]** any impact on the revenue requirement.
>
> 17. Pepco IS DIRECTED to submit, no later than ninety days after the submission of its annual Consolidated Report, a proposal in accordance with Paragraph 13 herein for any 4kV feeder that has appeared three times on the Priority Feeder List, or any 13 kV feeder that has appeared four times on the Priority Feeder List since the first Priority Feeder List in 2002.

Based on the specified criteria, seven 13kV feeders, 14014, 14717, 14786, 14900, 15013, 15172, and 15197 are addressed in this report. No 4kV feeders meet the criteria in the Order's Paragraph 13 directive.

Recommended Solution to Improve Feeder Performance
13kV Feeder 14014
12th & Irving Substation No. 133



2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 89% of the total number of customer interruptions (CI) (4,124 CI) were associated with two mainline feeder events.

- On March 2, 2018, a mainline feeder event occurred, affecting 1,912 customers due to weather that occurred as a result of Winter Storm Riley this event was excluded.
- On June 2, 2018, a mainline feeder event occurred, affecting 2,212 customers due to squirrel contact with a Gang Operated Switch

Fuse Events: 8% of the total number of customer interruptions (424 CI) were associated with three fused lateral events.

- On February 19, 2018, a fused lateral event occurred, affecting 142 customers due to an unknown cause.
- On April 5, 2018, a fused lateral event occurred, affecting 141 customers due to an error by an employee/contractor.
- On June 13, 2018, a fused lateral event occurred, affecting 141 customers due to squirrel contact at a spacer cable bracket.

Transformer Events: 2% of the total number of customer interruptions (69 CI) were associated with seventeen localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline Work:

Due to ongoing work taking place under the 12th and Irving Area Reliability Improvement Plan, no work is planned on this feeder under the 2019 Priority Feeder Program.

Lateral Work:

NA

Total Project Cost Estimate: N/A

Corrective Action Plan Benefits

Feeder 14014 has ongoing work occurring as part of its inclusion in the 12th and Irving Area Reliability Improvement Plan and it is primarily through this work that the benefits will be seen.

The 12th and Irving Area Reliability Improvement Plan is a holistic approach to address an underperforming group of feeders that are fed from the 12th and Irving substation. The overall work includes extending a new feeder which will then be used to redistribute load off of existing feeders reducing both customers and load off resulting in better service for all. Additionally, ASR schemes will be optimized in order to account for the additional feeder and greater switching/isolating opportunities.

Past Outages and Corrective Actions

Priority Feeder in 2004

Description of Major Event Exclusive Outages (October 1, 2002 through September 30, 2003):

Data is unavailable.

Corrective actions performed in 2004:

Performed tree trimming; upgraded 24 line fuses and secondary wire on 4 spans; replaced 11 cross arms; installed 3 animal guards, 7 line fuses, and 2 lightning arrestors.

Priority Feeder in 2006

Description of Major Event Exclusive Outages (October 1, 2004 through September 30, 2005):

Data is unavailable.

Corrective actions performed in 2006:

Installed 16 animal guards, installed 11 lightning arrestors, reattached spacer cable, replaced 1 transformer, inspected and trimmed trees as necessary, upgraded 1 fuse.

Priority Feeder in 2013

Description of Major Event Exclusive Outages (October 1, 2011 through September 30, 2012):

Mainline Events: 90% of the total number of customer interruptions (4,219 CI) was associated with six mainline feeder events.

- On October 29, 2011, a mainline feeder event (identified by two different event IDs) occurred, affecting 1,916 customers due to a wire down.
- On November 12, 2011, a mainline feeder event occurred, affecting 230 customers due to defective sleeve.
- On May 6, 2012, a mainline feeder event occurred, affecting 113 customers due to uprooted tree.
- On July 19, 2012, a mainline feeder event (identified by two different event IDs) occurred, affecting 1,960 customers due to a wire down.

Fuse Events: 4% of the total numbers of customer interruptions (185 CI) was associated with four fused lateral events.

- On October 3, 2011, a fused lateral event occurred affecting 20 customers due to animal.

- On November 19, 2011, a fused lateral event occurred affecting 59 customers due to burnt tap.
- On May 7, 2012, a fused lateral event occurred affecting 32 customers due to downed tree.
- On June 13, 2012, a fused lateral event occurred affecting 74 customers due to animal.

Transformer Events: 6% of the total numbers of customer interruptions (270 CI) was associated with twenty-nine localized transformer events.

Corrective actions performed in 2013:

Install/Replace 9,610 feet of primary tree wire, 935 feet of primary bare wire, 50,856 feet of mainline secondary, 25,666 feet of secondary service, 291 poles, 132 crossarms, 1 ACR, 1 SF6 switch, 2 gang switches, 159 fuse cutouts, 111 transformers, 42 lightning arrestors, and 360 animal guards.

Priority Feeder in 2017

Description of Major Event Exclusive Outages (October 1, 2015 through September 30, 2016):

Mainline Events: 90% of the total number of customer interruptions (CI) (3,716 CI) was associated with three mainline feeder events.

- On May 1, 2016, a mainline feeder event occurred, affecting 562 customers due to a broken head guy.
- On August 15, 2016, a mainline feeder event occurred, affecting 2,019 customers due to weather/ lightning.
- On August 22, 2016, a mainline feeder event occurred, affecting 1,135 customers due to a downed guy wire.

Fuse Events: 7% of the total number of customer interruptions (308 CI) was associated with four fused lateral events.

- On April 7, 2016, a fused lateral event occurred, affecting 11 customers due to animal.
- On June 18, 2016, a fused lateral event occurred, affecting 23 customers due to tree limb.
- On July 27, 2016, a fused lateral event occurred, affecting 251 customers due to animal.
- On August 21, 2016, a fused lateral event occurred, affecting 23 customers due to animal.

Transformer Events: 3% of the total number of customer interruptions (122 CI) was associated with thirteen localized transformer events.

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during 2004, 2006, 2013, 2017:

- Performing tree trimming in accordance with the Vegetation Management plan will reduce tree-related outages caused by falling limbs/branches.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing lightning arrestors prevent outages caused by lightning.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.
- Installing ACR reduces total feeder outages caused by momentary contacts by attempting to clear the temporary fault conditions automatically.
- Installing switches improve overall restoration duration of the feeder by utilizing automatic and/ or remote switching capabilities.
- Replacing primary (13kV) bare copper wires with jacketed 477kcm ACSR conductors (tree wire) provides protection against animal contact and incidental contact with tree branches.
- Replacing mainline secondary (low voltage) bare wires and secondary service bare wires with jacketed triplex provides protection against incidental tree branches and enables faster restoration after storms.
- Replacing cracked cross arms prevent outages related to deteriorated cross arms.
- Replacing deteriorating equipment such as poles, transformers proactively prevent from future failures.

Analysis of Why Past Corrective Actions Failed

The major driver of Feeder 14014 inclusion as a Priority Feeder was due to an animal contacting the getaway switch coming out of the substation. Work as part of the 2017 priority feeder program included hardening cable in the breaker zone addressing concerns stemming from weather; however, the getaway switch was not identified to be hardened during this work. Pepco has found in recent years that the older configurations of some getaway poles lead them to experience higher than normal animal contact rates. This Getaway switch hardening was completed as part of Pepco's Outage Follow-up Process.

As part of the proposed 12th and Irving Area Reliability plan the outages for the customers that are served by Feeder 14014 will be severely reduced as they will be fed by a new proposed feeder. This will increase customer reliability drastically as less customers impacted by outages on that feeder.

MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

Priority Feeder Years 2004 to Present

Feeder 14014 - Year 2004 - 2018 (IEEE MED Exclusive)															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	4.21	1.40	1.39	1.17	1.48	1.17	2.28	1.13	2.38	3.43	2.80	1.09	2.04	5.53	1.31
SAIDI	2.85	3.12	14.08	15.30	2.70	2.42	1.04	4.60	9.06	7.58	4.92	1.01	3.07	6.77	1.02
CHI	4,380	46,147	21,023	22,589	3,876	3,767	1,908	8,919	17,765	15,837	10,106	2,047	6,255	13,846	2,089
NI	13	30	18	10	18	18	25	28	39	24	33	13	20	29	18

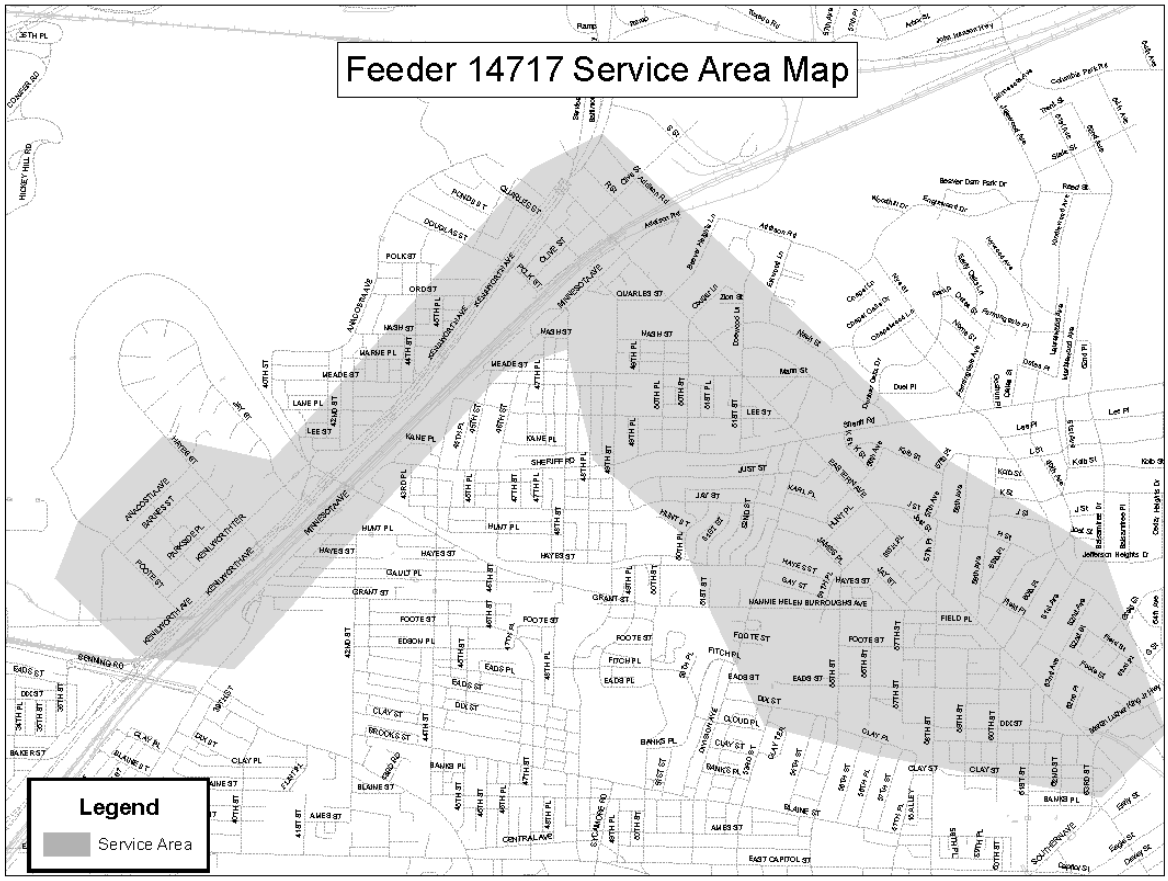
SAIFI - System Average Interruption Frequency Index

SAIDI - System Average Interruption Duration Index

CHI - Customer Hours of Interruption

NI - Number of Interruptions

Recommended Solution to Improve Feeder Performance
13kV Feeder 14717
Benning Substation No. 007



2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 96% of the total number of customer interruptions (CI) (5,253 CI) were associated with five mainline feeder events.

- On October 26, 2017, a mainline feeder event occurred, affecting 793 customers due to a motor vehicle accident.
- On March 2, 2018, a mainline feeder event occurred, affecting 127 customers due to windy weather.
- On March 5, 2018, a mainline feeder event occurred, affecting 2,062 customers due to equipment failure of a burnt tap.

- On June 3, 2018, a mainline feeder event occurred, affecting 1,743 customers due to equipment failure of a burnt tap.
- On August 9, 2018, a mainline feeder event occurred, affecting 528 customers due to an unknown cause.

Fuse Events: 2% of the total number of customer interruptions (152 CI) were associated with two fused lateral events.

- On October 30, 2017, a fused lateral event occurred, affecting 143 customers due to a tree limb on wires.
- On March 5, 2018, a fused lateral event occurred, affecting 9 customers due to a tree limb on wires.

Transformer Events: 2% of the total number of customer interruptions (143 CI) were associated with nineteen localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline Work:

Due to ongoing work taking place under Benning Area Reliability Improvement Plan, no work is planned on this feeder under the 2019 Priority Feeder Program.

Lateral Work:

NA

Total Project Cost Estimate: N/A

Corrective Action Plan Benefits

Feeder 14717 has ongoing work occurring as part of its inclusion in the Benning Area Reliability Improvement Plan and it is primarily through this work that the benefits will be seen. These benefits include but are not limited to: Aggressive reconductoring that includes upgrading the existing cable to tree-wire and PAC. Implementing an ASR scheme and extending an additional feeder to transfer load and customers off of Feeder 14717.

Past Outages and Corrective Actions

Priority Feeder in 2003

Description of Major Event Exclusive (October 1, 2001 through September 30, 2002):

Data is unavailable.

Corrective actions preformed in 2003:

Installed 21 fuses, 21 animal guards, 6 spacers and 5 cross arms.

Priority Feeder in 2007

Description of Major Event Exclusive Outages (October 1, 2005 through September 30, 2006):

Mainline Event: 95% of the total number of customer interruptions (1,703 CI) was associated with one mainline feeder event.

- On June 9, 2006, a mainline feeder event occurred, affecting 1,703 customers due to an uprooted tree.

Fuse Event: 3% of the total number of customer interruptions (54 CI) was associated with one fuse event.

- On December 18, 2005, a fused lateral event occurred, affecting 54 customers due to animal contact.

Transformer Events: 2% of the total number of customer interruptions (44 CI) was associated with fifteen localized transformer events.

Corrective actions performed in 2007:

Installed 1 Automatic Circuit Recloser (ACR), 18 animal guards, 13 lightning arrestors, and 1 pole. Performed tree trimming as needed.

Priority Feeder in 2009

Description of Major Event Exclusive Outages (October 1, 2007 through September 30, 2008):

Mainline Events: 85% of the total number of customer interruptions (7,463 CI) was associated with five mainline feeder events.

- On June 5, 2008, a mainline feeder event occurred, affecting 885 customers due to weather/lightning.

- On July 27, 2008, a mainline feeder event occurred, affecting 1,832 customers due to vandalism on Quarles St.
- On August 18, 2008, a mainline feeder event occurred, affecting 964 customers due to a motor vehicle accident.
- On August 19, 2008, a mainline feeder event occurred, affecting 1,897 customers wherein the specific cause was unknown.
- On September 6, 2008, a mainline feeder event occurred, affecting 1,885 customers wherein the specific cause was unknown.

Fuse Events: 13% of the total number of customer interruptions (1,137 CI) was associated with two fused lateral events.

- One June 11, 2008, a fused lateral event occurred, affecting 59 customers due to weather/lightning.
- On July 1, 2008, a fuse lateral event occurred, affecting 1,078 customers due to equipment failure.

Transformer Events: 2% of the total number of customers affected were associated with 14 localized transformer events affecting approximately 147 customers.

Corrective actions performed in 2009:

Installed one animal guard, one lighting arrester, one pole and one cross arm. Transferred 2,900 feet of overhead exposure to adjacent area feeder. Trimmed trees as needed.

Priority Feeder in 2012

Description of Major Event Exclusive Outages (October 1, 2010 through September 30, 2011):

Mainline Events: 90% of the total number of customer interruptions (3,938 CI) was associated with five mainline feeder events.

- On December 21, 2010, four mainline feeder events occurred, affecting 1,972 customers due to an employee.
- On December 27,2010, a mainline feeder event occurred, affecting 1,966 customers due to weather.

Fuse Events: less than 1% of the total numbers of customer interruptions (1 CI) was associated with one fused lateral event.

- On April 19, 2011, a fuse lateral event occurred affecting 1 customer due to equipment failure.

Transformer Events: 10% of the total numbers of customer interruptions (455 CI) was associated with 49 localized transformer events.

Corrective actions performed in 2012:

Installed/replaced 24,132’ of mainline secondary, 7,737' of secondary service, 65 poles, 62 transformers, 2 manually operated load break switches, 105 fuses, 3 remote control load break switches, and 1 ACR, performed thermal vision of overhead facilities and necessary upgrades, and performed inspection and tree trimming in accordance with the VM Plan.

Priority Feeder in 2014

Description of Major Event Exclusive Outages (October 1, 2012 through September 30, 2013):

Mainline Events: 94% of the total number of customer interruptions (CI) (6,424 CI) was associated with seven mainline feeder events.

- On October 13, 2012, a mainline feeder event (identified by five different event IDs) occurred, affecting 2,431 customers due to equipment failure.
- On May 13, 2013, a mainline feeder event occurred, affecting 1,994 customers due to equipment failure.
- On July 10, 2013, a mainline feeder event occurred, affecting 1,999 customers due to foreign contact.

Fuse Events: 4% of the total number of customer interruptions (275 CI) was associated with seven fused lateral events.

- On October 16, 2012, a fused lateral event occurred, affecting one customer due to an animal.
- On April 19, 2013, a fused lateral event occurred, affecting 111 customers due to a tree.
- On June 11, 2013, a fused lateral event occurred, affecting 50 customers due to weather / lightning.
- On June 13, 2013, a fused lateral event occurred, affecting 54 customers due to weather / lightning.
- On July 20, 2013, two fused lateral events occurred, affecting 50 customers due to equipment failure.
- On September 15, 2013, a fused lateral event occurred, affecting nine customers wherein the specific cause was unknown.

Transformer Events: 2% of the total number of customer interruptions (105 CI) was associated with twenty localized transformer events.

C**orrective actions performed in 2014:**

Installed/ replaced 331 feet of primary tree wire, 2,255 feet of secondary wire, 1,365 feet of bare wire, 21 poles, 35 cross arms, 6 transformers, 38 fuses, 1 gang switch, 70 lightning arresters, 393 animal guards; performed thermal vision of overhead facilities and necessary upgrades; performed inspection and tree trimming in accordance with the EIVM Plan.

Priority Feeder in 2017

Description of Major Event Exclusive Outages (October 1, 2015 through September 30, 2016):

Mainline Events: 97% of the total number of customer interruptions (CI) (9,327 CI) was associated with eleven mainline feeder events.

- On January 12, 2016, a mainline feeder event occurred, affecting 1,526 customers due to weather/ wind.
- On January 23, 2016, a mainline feeder event occurred, affecting 639 customers due to connection failure.
- On May 2, 2016, a mainline feeder event (identified by two different event IDs) occurred, affecting 2,250 customers due to connection failure.
- On June 12, 2016, a mainline feeder event (identified by two different event IDs) occurred, affecting 2,249 customers due to connection failure.
- On July 20, 2016, a mainline feeder event (identified by five different event IDs) occurred, affecting 2,663 customers due to a connection failure.

Fuse Event: 1% of the total number of customer interruptions (70 CI) was associated with three fuse events.

- On June 12, 2016, a fused lateral event occurred, affecting 1 customer due to an unknown cause.
- On July 10, 2016, a fused lateral event occurred, affecting 9 customers due to an unknown cause.
- On August 18, 2016, a fused lateral event occurred, affecting 149 customers due to a tree limb down on wires.

Transformer Events: <1% of the total number of customer interruptions (49 CI) was associated with seven localized transformer events.

Corrective actions performed in 2017:

- Installed Replaced approximately:
    - 385 feet of primary tree wire
- Installed/Replaced 2 reclosers
- Installed/Replaced 14 fuse cutouts

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during, 2003, 2007, 2009, 2012, 2014, 2017:

- Performing tree trimming will reduce tree-related outages caused by falling limbs/branches.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing lightning arrestors prevents outages caused by lightning.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.
- Installing ACR reduces total feeder outages caused by momentary contacts by attempting to clear the temporary fault conditions automatically.
- Installing switches improves overall restoration duration of the feeder by utilizing automatic and/or remote switching capabilities.
- Replacing primary (13kV) bare copper wires with jacketed 477kcm ACSR conductors (tree wire) provides protection against animal contact and incidental contact with tree branches.
- Replacing mainline secondary (low voltage) bare wires and secondary service bare wires with jacketed triplex provides protection against incidental tree branches and enables faster restoration after storms.
- Replacing cracked Cross-arms prevents outages related to Cross-arms.
- Replacing deteriorated and overloaded transformers prevents outages due to equipment failure or load.
- Replacing deteriorated poles prevents outages due to equipment failure and public safety hazards.
- Installing fuse cutouts and replacing existing fuse cutouts that are deteriorated mitigates the impact of outages that occur on the lateral sections of the feeder

Analysis of Why Past Corrective Actions Failed

While there were five mainline outages that occurred in the 2017-2018 selection period. Three of those outages accounted for approximately 80% of the overall Feeder SAIFI. Those three major outages that occurred consisted of; a motor vehicle striking the pole, and two equipment failures. Pepco unfortunately is unable to do much to prevent motor vehicle accidents other than evaluating the feasibility of relocating the pole line however relocation is not always feasible.

As for the failed equipment it was immediately replaced as part of the outage restoration process. The failed equipment was unable to be identified or addressed due to the lack of visual indicators of the status.

The Benning Area Reliability Improvement Plan was implemented due to the need of a holistic approach of improving the reliability of an entire area opposed to a singular feeder. The BARP will not only address Feeder 14717 individually by reconductoring existing bare wire to Tree wire as well as replacing and upgrading equipment but there will also be added switching and isolating opportunities to help reduce both the duration as well as the customers affected by future outages. Also an additional feeder will be extended in order to lessen the number of customers and load on Feeder 14717 resulting in less customers impacted by outages as well as decreased strain on equipment.

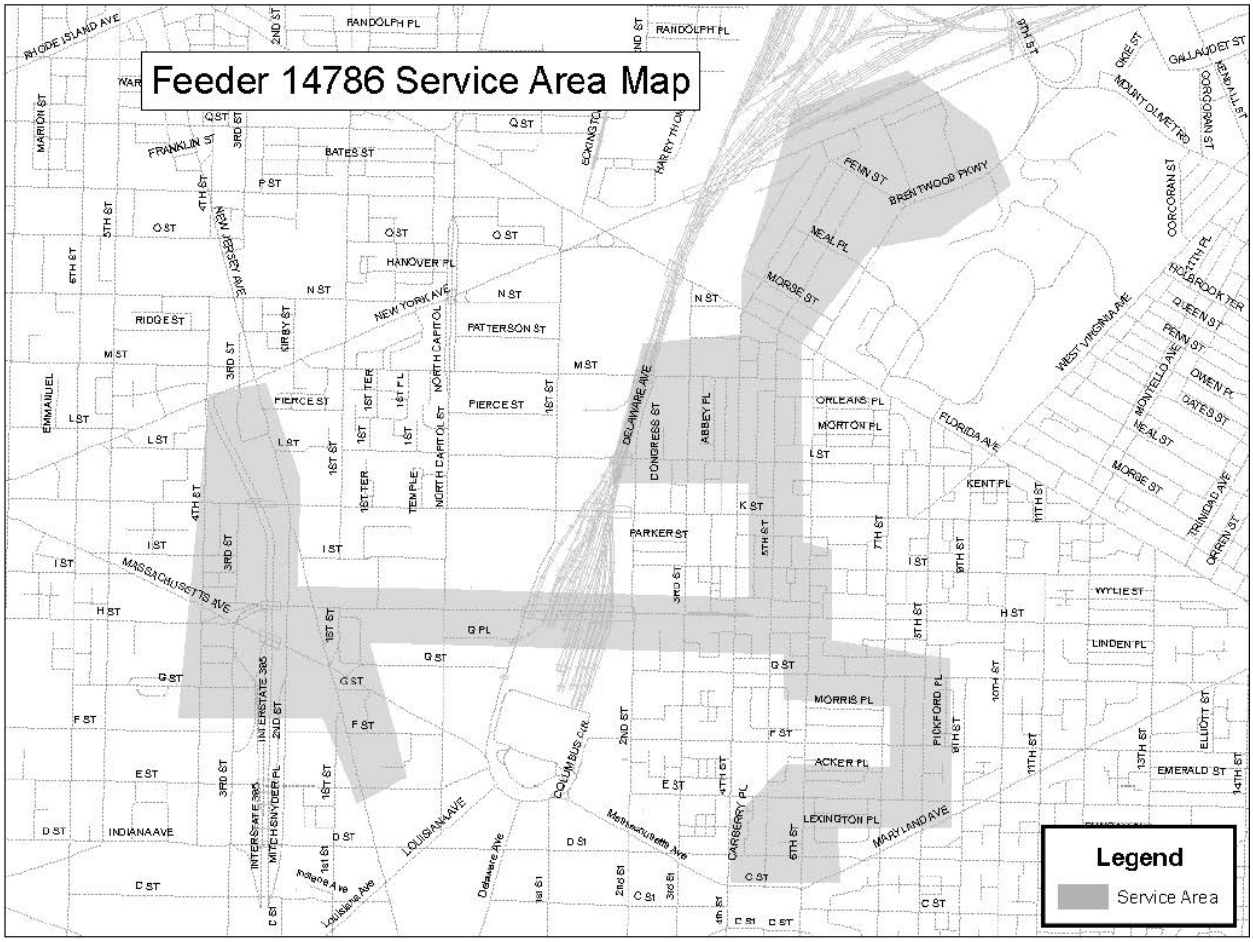
MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

Priority Feeder Years 2004 to Present

Feeder 14717 - Year 2004 - 2018 (IEEE MED Exclusive)															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	6.15	2.08	1.05	2.25	5.48	0.23	3.98	2.23	12.38	3.38	2.62	1.44	4.42	5.01	3.08
SAIDI	0.24	3.31	9.11	6.25	9.28	0.49	3.21	7.14	7.07	6.90	1.08	6.35	9.25	3.85	3.32
CHI	402	5,699	15,639	11,783	17,893	1,207	6,239	14,043	23,817	13,954	2,212	13,958	20,299	9,538	8,162
NI	22	15	21	28	24	25	43	54	53	35	35	27	35	29	27

SAIFI - System Average Interruption Frequency Index
SAIDI - System Average Interruption Duration Index
CHI - Customer Hours of Interruption
NI - Number of Interruptions

Recommended Solution to Improve Feeder Performance
13kV Feeder 14786
New Jersey Substation No. 161



2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 58% of the total number of customer interruptions (CI) (649 CI) were associated with four mainline feeder events.

- On November 9, 2017, a mainline feeder event occurred, affecting 40 customers due to equipment failure.
- On June 24, 2018, a mainline feeder event occurred, affecting 45 customers due to equipment failure.
- On August 9, 2018, a mainline feeder event occurred, affecting 518 customers due to equipment failure.

- On August 16, 2018, a mainline feeder event occurred, affecting 46 customers due to equipment failure.

Fuse Events: 17% of the total number of customer interruptions (191 CI) were associated with two fused lateral events.

- On June 24, 2018, a fused lateral event occurred, affecting 9 customers due to an unknown cause.
- On August 9, 2018, a fused lateral event occurred, affecting 182 customers due to an employee.

Transformer Events: 25% of the total number of customer interruptions (278 CI) were associated with nine localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline Work:

Work on Feeder 14786 will be occurring under the proposed New Jersey Area Reliability Improvement Plan which is still in the planning stages. As such, no work will be occurring under the Priority Feeder Program.

Lateral Work:

NA

Total Project Cost Estimate: N/A

Corrective Action Plan Benefits

Feeder 14786 has planned work to occur under the New Jersey Area Reliability Improvement plan and it is primarily through this project that the benefits will be seen. The New Jersey Area Reliability Improvement plan is a holistic approach meant to improve the reliability of the area as well as individual feeders. This will include installing switches to allow for more isolation of outages. Customers and loads will be balanced between feeders in the area, as well as extensive cable replacement and upgrades throughout the area.

Past Outages and Corrective Actions

Priority Feeder in 2007

Description of Major Event Exclusive Outages (October 1, 2005 through September 30, 2006):

Mainline Events: 6% of the total number of customer interruptions (CI) (108 CI) was associated with one mainline feeder events.

- Date unknown cause was unknown.

Fuse Event: 74% of the total number of customer interruptions (1,328 CI) was associated with three fuse events.

- Date unknown cause unknown.
- Date unknown cause unknown.
- Date unknown cause load.

Transformer Events: 20% of the total number of customer interruptions (360 CI) was associated with seven localized transformer events.

Corrective actions performed in 2007:

- Performed Manhole Inspection.
- Performed VLF Cable Testing.
- Performed Thermal Scanning.

Priority Feeder in 2013

Description of Major Event Exclusive (October 1, 2011 through September 30, 2012):

Mainline Events: 64% of the total number of customer interruptions (3,700 CI) were associated with eight mainline feeder events.

Fuse Events: 26% of the total number of customer interruptions (1,503 CI) were associated with five fused lateral events.

- On December 8, 2011, a fused lateral event occurred, affecting 581 customers due to an equipment failure.
- On May 3, 2012, a fused lateral event occurred, affecting 587 customers due to an equipment failure.
- On July 13, 2012, a fused lateral feeder event occurred, affecting 23 customers due to an equipment failure.
- On September 1, 2012, a fused lateral feeder event occurred, affecting 201 customers due to an equipment failure.
- On September 2, 2012, a fused lateral feeder event occurred, affecting 111 customers due to an equipment failure.

Transformer Events: 10% of the total number of customer interruptions (578 CI) were associated with twenty localized transformer events.

Corrective actions preformed in 2013:

- Injected 13,700 feet of Underground Cable.

Priority Feeder in 2016

Description of Major Event Exclusive Outages (October 1, 2014 through September 30, 2015):

Mainline Event: 98% of the total number of customer interruptions (2,790 CI) was associated with three mainline feeder events.

- On October 22, 2014, a mainline feeder event occurred, affecting 160 customers due to equipment failure of a cable.
- On July 21, 2015, a mainline feeder event occurred, affecting 1,322 customers due to equipment failure of a cable.
- On August 28, 2015, a mainline feeder event occurred, affecting 1,308 customers due to equipment failure of a cable.

Fuse Event: 0% of the total number of customer interruptions were associated with zero fuse events.

Transformer Events: 2% of the total number of customer interruptions (62 CI) was associated with eleven localized transformer events.

Corrective actions performed in 2017:

- Replaced approximately:
    - 3,300 feet of underground primary cable
    - 11,260 feet of Underground Residential Distribution cable

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during, 2007, 2013, and 2016:

- Replacing aging Underground Primary Cable will reduce the total outages on the feeder as a result of cable faults.
- Replacing Underground Residential Distribution cable will reduce the total outages on the feeder as a result of cable faults.

- Manhole Inspection is a preventative maintenance measure in order to attempt to identify issues with underground cable and devices in order before they result into an outage.

Analysis of Why Past Corrective Actions Failed

As Feeder 14786 is an 100% Underground feeder it is difficult to identify the condition of underground cables that are carried in conduit between manholes. Additionally, if a fault does occur the outage restoration time suffers due to a due to the time it takes to identify and isolate the fault. This hurdle is readily apparent when comparing Feeder's 14786 extremely high SAIDI numbers to other primarily overhead feeders.

As a result of this a New Jersey Area Reliability Improvement Plan has been implemented which will address the area holistically by: Replacing and upgrading existing underground cable, adding additional switching locations to better isolate the outage and reduce the number of customers affected, and redistributing and rebalancing customers and load between feeders.

MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

Priority Feeder Years 2006 to Present

Feeder 14786 - Year 2006 - 2018 (IEEE MED Exclusive)													
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	1.54	3.17	1.61	0.51	0.95	0.66	4.56	1.20	1.37	3.99	1.27	0.05	2.30
SAIDI	16.65	30.89	6.69	3.71	5.28	3.38	11.73	2.93	3.33	6.52	7.19	0.17	5.95
CHI	19,435	36,542	7,953	4,593	6,403	4,208	14,878	3,698	4,192	8,317	9,596	220	7,621
NI	11	13	11	9	9	23	33	12	11	14	16	6	15

SAIFI - System Average Interruption Frequency Index
SAIDI - System Average Interruption Duration Index
CHI - Customer Hours of Interruption
NI - Number of Interruptions

13kV Feeder 14900

Harrison 13 Substation No. 38

2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 83% of the total number of customer interruptions (CI) (1,344 CI) were associated with one mainline feeder event.

- On September 4, 2018, a mainline feeder event occurred, affecting 1,344 customers due to equipment failure.

Fuse Events: 9% of the total number of customer interruptions (173 CI) were associated with eight fused lateral events.

- On November 12, 2017, a fused lateral event occurred, affecting 32 customers due to an unknown cause.
- On December 06, 2017, a fused lateral event occurred, affecting 18 customers due to equipment failure.
- On April 16, 2018, a fused lateral event occurred, affecting 9 customers due to equipment failure.
- On April 19, 2018, a fused lateral event occurred, affecting 4 customers due to a tree contact.
- On May 22, 2018, a fused lateral event occurred, affecting 32 customers due to an unknown cause.
- On June 15, 2018, a fused lateral event occurred, affecting 14 customers due to equipment failure.
- On June 18, 2018, a fused lateral event occurred, affecting 32 customers due to animal contact.
- On September 30, 2018, a fused lateral event occurred, affecting 32 customers due to an unknown cause.

Transformer Events: 8% of the total number of customer interruptions (80 CI) were associated with eighteen localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline Work:

- No major mainline remediation work at this time. See below for corrective action plan benefits.

Lateral Work:

- No major mainline remediation work at this. See below for corrective action plan benefits.

Total Project Cost Estimate: N/A

Corrective Action Plan Benefits

The primary driver of Feeder 14900 inclusion as a 2019 Priority Feeder was due to the underground cable fault in the Getaway section of the feeder. As a result of that outage the cable in the getaway section was upgraded from PILC to 500 flat strap cable. This work was determined to be a priority and unable to wait for the Priority Feeder selection process.

Past Outages and Corrective Actions

Priority Feeder in 2002

Description of Major Event Exclusive Outages (October 1, 2000 through September 30, 2001):

Data is unavailable.

Corrective actions performed in 2002:

- Installed 20 line fuses, cross-arms, and lighting arresters.
- Corrected wire slack.
- Relocated regulators.
- Performed tree trimming as needed.

Priority Feeder in 2007

Description of Major Event Exclusive Outages (October 1, 2005 through September 30, 2006):

Mainline Events: 97% of the total number of customers affected was associated with eight mainline feeder events affecting approximately 989 to 993 customers.

- On November 29, 2005, a mainline feeder event occurred, affecting 989 customers wherein the specific cause was unknown.
- On January 16, 2006, six mainline feeder events occurred, affecting 993 customers due to a cable joint failure.
- On June18, 2006, a mainline feeder event occurred, affecting 991 customers wherein the specific cause was unknown.

Fuse Events: 1% of the total number of customers affected were associated with two fuse events affecting approximately 45 customers.

- On June 29, 2006, a fused lateral event occurred, affecting 14 customers due to an uprooted tree.
- On July 6, 2006, a fused lateral event occurred, affecting 31 customers due to a tree limb.

Transformer Events: 2% of the total number of customers affected were associated with 14 localized transformer events affecting approximately 39 customers.

Corrective actions performed in 2007:

- Installed 3 animal guards
- Installed 4 cross-arms

- Installed 1 ACR
- Installed 9 fuses
- Installed tree wire
- Performed tree trimming as needed

Priority Feeder in 2009

Description of Major Event Exclusive Outages (October 1, 2007 through September 30, 2008):

Mainline Events: 98% of the total number of customers affected was associated with ten mainline feeder events.

- On January 17, 2008, two mainline feeder events occurred affecting 702 customers due to a tree limb.
- On January 20, 2008, a mainline feeder event occurred affecting 592 customers due to an uprooted tree.
- On February 5, 2008, four mainline feeder events occurred affecting 1,931 customers due to an uprooted tree.
- On April 20, 2008, a mainline feeder event occurred affecting 990 customers due to a cable fault.
- On April 20, 2008, a mainline feeder event occurred affecting 14 customers due to an uprooted tree.
- On June20, 2008, a mainline feeder event occurred affecting 662 customers due to an uprooted tree.

Fuse Events: 1% of the total number of customers affected were associated with three fuse events affecting approximately 50 customers.

- On March 9, 2008, two fused lateral events occurred affecting 38 customers due to an uprooted tree.
- On June 8, 2008, a fused lateral event occurred affecting 12 customers due to an equipment failure.

Transformer Events: 1% of the total number of customers affected were associated with nine localized transformer events affecting approximately 44 customers.

Corrective actions performed in 2009:

- Installed 2 animal guards
- Installed 2 lighting arresters

- Installed 3 cross-arms
- Installed wire spacers at 2 locations
- Installed 1 ACR
- Re-tensioned primary wire at 2 locations
- Performed tree trimming as needed

Priority Feeder in 2011

Description of Major Event Exclusive Outages (October 1, 2009 through September 30, 2010):

Mainline Events: 95% of the total number of customers affected were associated with ten mainline feeder events.

- On December 2, 2009, two mainline feeder events occurred, affecting 15 customers due to an equipment failure.
- On December 24, 2009, a mainline feeder event occurred, affecting 988 customers due to a motor vehicle accident.
- On March 13, 2010, two mainline feeder events occurred, affecting 987 customers due to an uprooted tree.
- On July 6, 2010, a mainline feeder event occurred, affecting 2,398 customers due to a faulted PAC.
- On July 8, 2010, 341 customers were affected by an outage due to a load transfer to isolate and fix an outage on an adjacent feeder.
- On August 4, 2010, a mainline feeder event occurred, affecting 985 customers due to a faulted PAC.
- On August 13, 2010, a mainline feeder event occurred, affecting 6 customers due to an uprooted tree.

Fuse Events: 3% of the total number of customers affected were associated with seven fuse events affecting approximately 185 customers.

- On May 2, 2010, a fused lateral event occurred, affecting 14 customers due to a cable fault.
- On July 13, 2010, two fused lateral events occurred, affecting 58 customers due to weather/lighting.
- On July 29, 2010, a fused lateral event occurred, affecting 31 customers due to a tree limb.
- On August 3, 2010, a fused lateral event occurred, affecting 2 customers due to a cable fault
- On August 10, 2010, a fused lateral event occurred, affecting 41 customers due to a tree limb.
- On August 13, 2010, a fused lateral event occurred, affecting 31 customers due to an uprooted tree.

Transformer Events: Approximately 1% of the total number of customers affected were associated with 21 localized transformer events affecting approximately 85 customers.

Corrective actions performed in 2011:

- Installed/replaced 11,000' of primary wire
- Installed/replaced 12,000' of secondary wire
- Installed/replaced 14,000' of PAC cable
- Installed/replaced 188 poles
- Installed/replaced 4 switches
- Installed/replaced 80 transformers

Performed tree trimming as needed

Priority Feeder in 2016

Description of Major Event Exclusive Outages (October 1, 2014 through September 30, 2015):

Mainline Event: 90% of the total number of customer interruptions (2,688 CI) was associated with two mainline feeder events.

- On July 9, 2015, a mainline feeder event occurred, affecting 1,347 customers due to a tree limb down on wires.
- On August 30, 2015, a mainline feeder event occurred, affecting 1,344 customers due to equipment failure.

Fuse Event: 7% of the total number of customer interruptions (211 CI) was associated with nine fuse events.

- On February 2, 2015, a fused lateral event occurred, affecting two customers due to a tree limb
- On March 30, 2015, a fused lateral event occurred, affecting ten customers due to equipment failure of a cable.
- On April 2, 2015, a fused lateral event occurred, affecting 25 customers due to a tree limb down on wires.
- On April 20, 2015, a fused lateral event occurred, affecting 13 customers due to an employee cause.
- On April 24, 2015, a fused lateral event occurred, affecting three customers due to equipment failure of a UG transformer.
- On May 24, 2015, a fused lateral event occurred, affecting 31 customers due to an unknown cause.
- On June 7, 2015, a fused lateral event occurred, affecting one customer due to squirrel contact.
- On June 23, 2015, a fused lateral event occurred, affecting nine customers due to equipment failure of a cable.
- On July 9, 2015, a fused lateral event occurred, affecting 117 customers due to a tree limb down on wires.

Transformer Events: 3% of the total number of customer interruptions (70 CI) was associated with eleven localized transformer events.

Corrective actions performed in 2016:

- Installed/Replaced 3 phase primary riser:
- Installed/Replaced fuses, cutouts, and crossarms
- Performed Tree Trimming along Oregon Ave

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during 2002,2007,2009, 2013, and 2016:

- Installing spacers and tree trimming reduces outages caused by excessive wind or rain.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing lightning arrestors prevent outages caused by lightning.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.
- Installing ACR reduces total feeder outages caused by momentary contacts by attempting to clear the temporary fault conditions automatically.
- Installing switches improve overall restoration duration of the feeder by utilizing automatic and/ or remote switching capabilities.
- Replacing primary (13kV) bare copper wires with PAC provide protection against animal contact and incidental contact with tree branches.
- Replacing primary (13kV) bare copper wires with jacketed 477kcm ACSR conductors (tree wire) provides protection against animal contact and incidental contact with tree branches.
- Replacing primary (13kV) bare copper wires with jacketed 477kcm ACSR conductors (bare wire) provides additional load carrying capacity to maximize switching/restoration options.
- Replacing mainline secondary (low voltage) bare wires and secondary service bare wires with jacketed triplex provides protection against incidental tree branches.
- Replacing primary (13kV) bare concentric neutral URD cables with jacketed #2 EPR cables provides protection against underground faults due to deteriorated equipment.
- Replacing cracked cross arms prevent outages related to cross arms.
- Replacing deteriorating equipment such as poles, transformers, capacitor banks proactively prevent from future failures.

Analysis of Why Past Corrective Actions Failed

The primary driver of this feeder being included as a priority feeder is due to a single cable fault in the underground getaway section between the substation and the getaway switch. This single event affected all customers on the feeder and resulted in a 55-minute outage. The previous corrective actions tended to focus

on the overhead portions of the lines as they were where the majority of the outages occurred, and no issues were seen on the section of getaway cable.

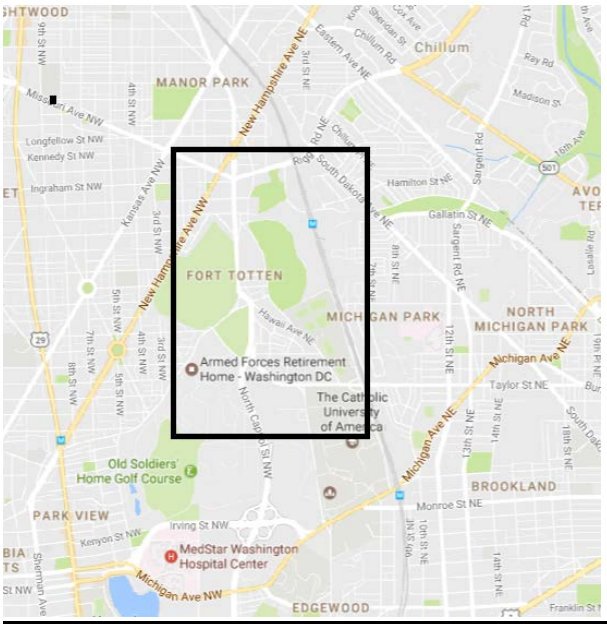
MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

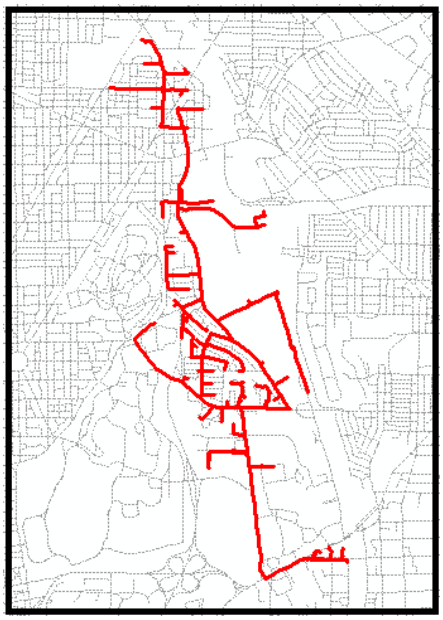
Priority Feeder Years 2004 to Present

Feeder 14900 - Year 2004 - 2018 (IEEE MED Exclusive)															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	1.08	2.10	3.07	1.80	5.05	1.44	6.09	2.99	2.46	2.42	0.29	2.21	1.21	0.89	1.52
SAIDI	0.62	5.96	7.44	2.55	9.01	2.20	11.50	5.28	5.83	2.26	1.11	1.37	0.92	1.53	1.74
CHI	602	5,913	7,394	2,511	8,902	2,167	11,302	5,199	7,964	3,053	1,492	1,840	1,241	2,053	2,345
NI	10	22	24	27	22	18	38	45	35	19	14	25	22	13	31

13kV Feeder 15013

Ft. Slocum Substation No. 190





2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 91% of the total number of customer interruptions (CI) (4,215 CI) were associated with three mainline feeder events.

- On December 25, 2017, a mainline feeder event occurred, affecting 1,929 customers due to windy weather.
- On January 12, 2018, a mainline feeder event occurred, affecting 353 customers due to equipment failure of a connection.
- On March 2, 2018, a mainline feeder event occurred, affecting 1,933 customers due to windy weather.

Fuse Events: 3% of the total number of customer interruptions (154 CI) were associated with one fused lateral event.

- On July 17, 2018, a fused lateral event occurred, affecting 154 customers due to weather/lightning.

Transformer Events: 6% of the total number of customer interruptions (271 CI) were associated with twenty-two localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Mainline:

- Kennedy ST NW (From New Hampshire Ave, NW to Alley East of Blair Rd, NE)
  - Upgrade approx. 560' of 1/0 Bare CU to 477 ACSR Treewire
- Pole 797409-820050
  - Replace Gang Switch
  - Replace Pole
- Pole 797409-950050
  - Replace Pole
  - Replace Transformer
- Additional mainline work includes fused cutouts, lightning arrestors, animal guards, guys, cross arms, pole stenciling, and insulated jumpers and taps

Lateral:

- Minor lateral work includes lightning arrestors, animal guards, guys, cross arms, pole stenciling, and insulated jumpers and taps

Total Project Cost Estimate: $123,000

Corrective Action Plan Benefits

Many of the mainline feeder outages occurred during periods of moderate to heavy wind and rain. After further investigation it was determined that feeder was contacting phases of a feeder that ran on the same pole line. As part of the outage follow up process, Pepco installed spacers to prevent conductor gallop and the additional heavying up and adding insulation is expected to prevent phase to phase contact of Feeder 15013 as well as phase contact between different feeders in close proximity, particularly Feeder 15014. These improvements should reduce the number of customers experiencing both momentary and prolonged outages

Past Outages and Corrective Actions

Priority Feeder in 2003

Description of Major Event Exclusive Outages (October 1, 2001 through September 30, 2002):

Data is unavailable.

Corrective actions performed in 2003:

Upgraded 48 fuses and replaced 4 cross-arms.

Priority Feeder in 2006

Description of Major Event Exclusive Outages (October 1, 2004 through September 30, 2005):

Data is unavailable.

Corrective actions performed in 2006:

Installed 27 animal guards, six lightning arrestors, and tree wire, straightened one pole, removed slack from wires, and trimmed vegetation.

Priority Feeder in 2017

Description of Major Event Exclusive Outages (October 1, 2015 through September 30, 2016):

Mainline Event: 91% of the total number of customer interruptions (1,766 CI) was associated with one mainline feeder event.

- On December 19, 2015, a mainline feeder event occurred, affecting 1,766 customers due to a motor vehicle accident.

Fuse Event: 2% of the total number of customer interruptions (46 CI) was associated with one fuse event.

- On May 29, 2016, a fused lateral event occurred, affecting 46 customers due to a cable fault.

Transformer Events: 7% of the total number of customer interruptions (114 CI) was associated with three localized transformer events.

Corrective actions performed in 2017:

- No work was performed under the priority feeder program in 2017 due to the nature of the outage (motor vehicle striking pole) that caused the inclusion of this feeder to the Priority Feeder program.

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during, 2003, 2006, and 2017:

- Performing tree trimming will reduce tree-related outages caused by falling limbs/branches.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing lightning arrestors prevents outages caused by lightning.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.

- Replacing primary (13kV) bare copper wires with jacketed 477kcm ACSR conductors (tree wire) provides protection against animal contact and incidental contact with tree branches.
- Replacing mainline secondary (low voltage) bare wires and secondary service bare wires with jacketed triplex provides protection against incidental tree branches and enables faster restoration after storms.
- Replacing cracked Cross-arms prevents outages related to Cross-arms.
- Replacing deteriorated poles prevents outages due to equipment failure and public safety hazards.
- Installing fuse cutouts and replacing existing fuse cutouts that are deteriorated mitigates the impact of outages that occur on the lateral sections of the feeder

Analysis of Why Past Corrective Actions Failed

Due to the nature of the outages in 2017 the feeder and that the feeder's reliability performance over the last 18 years, Feeder 15013 was never truly considered a poor performer; however, in the last few years there has been a decrease in the feeder 15013's performance. Pepco has initiated and completed significant improvement work as part of the 2019 Priority Feeder Program.

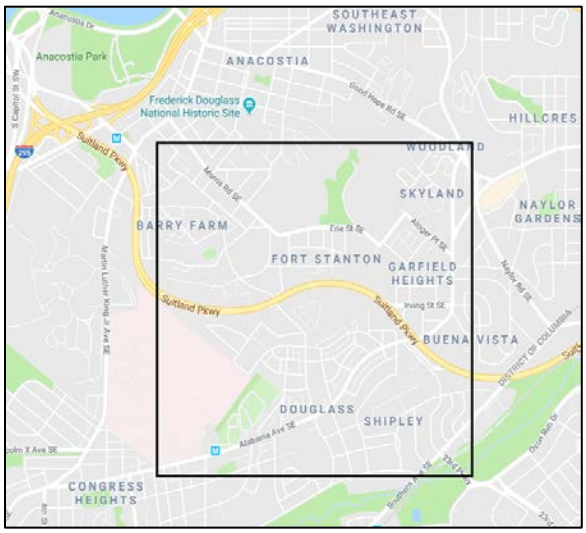
MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

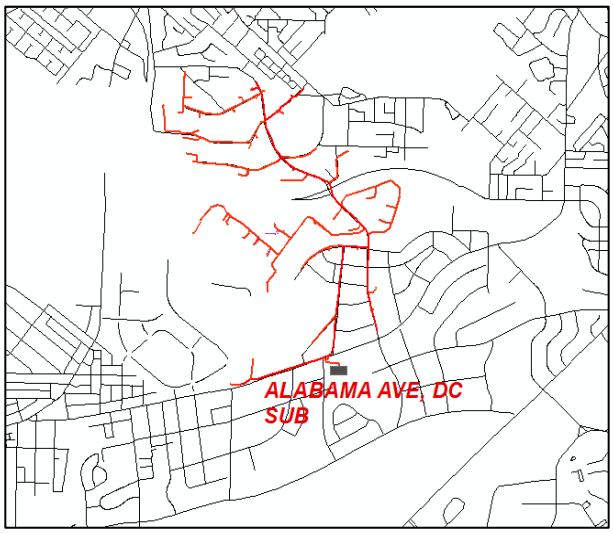
Priority Feeder Years 2004 to Present

Feeder 15013 - Year 2004 - 2018 (IEEE MED Exclusive)															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	7.13	0.63	1.09	1.76	1.04	0.80	1.43	0.19	0.07	0.03	0.26	2.98	2.05	2.90	1.88
SAIDI	0.52	6.60	3.05	2.53	2.58	1.16	4.78	0.52	0.12	0.07	0.98	1.03	3.16	2.75	1.81
CHI	1,160	14,906	6,880	5,666	2,522	1,145	4,823	521	123	69	983	1,809	5,572	5,647	3,832
NI	23	23	26	11	10	13	13	21	15	7	12	15	8	9	12

13kV Feeder 15172

Alabama Ave. Substation No. 136





2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 79% of the total number of customer interruptions (CI) (1,750 CI) were associated with two mainline feeder events.

- On August 21, 2018, a mainline feeder event occurred, affecting 352 customers due to weather and lightning.
- On September 11, 2018, a mainline feeder event occurred, affecting 1,398 customers due to equipment failure.

Fuse Events: 15% of the total number of customer interruptions (349 CI) were associated with six fused lateral events.

- On January 1, 2018, a fused lateral event occurred, affecting 12 customers due to equipment failure.
- On May 15, 2018, a fused lateral event occurred, affecting 122 customers due to a cable fault.
- On June 14, 2018, a fused lateral event occurred, affecting 24 customers due to animal contact.
- On July 2, 2018, a fused lateral event occurred, affecting 16 customers due to foreign contact by balloons.
- On September 11, 2018, a fused lateral event occurred, affecting 47 customers due to a cable fault.
- On September 11, 2018, a fused lateral event occurred, affecting 128 customers due to a cable fault.

Transformer Events: 6% of the total number of customer interruptions (107 CI) were associated with eleven localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline Work:

- Pole 804372-070850
    - Lifting Taps to de-energize unused 3ph primary to NE
- Pole 804371-350640
    - 3-100a Fuse Cutouts
- Pole 803372-520970
    - 3-100a Fuse Cutouts
- Additional mainline work includes pole stenciling

Total Project Cost Estimate: $30,000

Corrective Action Plan Benefits

The two main incidents that affected feeder 15172 and caused it to be selected as a Priority Feeder were due to the following: A failed URD splice at a cable pole, and a tree down event that caused a conductor to come off an insulator. As part of the troubleshooting process that occurred due to the tree down event, Pepco discovered that there was a failed piece of equipment in the substation that prevented the breaker from reclosing.

These issues were addressed at the time of the outage and during the Priority Feeder investigation no additional items were found. The minor work being performed as part of the priority feeder program will further sectionalize the mainline trunk and provide added resiliency and more reliable service to the customers served by this feeder.

Past Outages and Corrective Actions

Priority Feeder in 2006

Description of Major Event Exclusive Outages (October 1, 2004 through September 30, 2005):

Data is unavailable

Corrective actions performed in 2006:

Install 6 animal guards, 8 lightning arrestors, upgrade 14 fuses, removed slack, replaced bare wire with tree wire, and trimmed vegetation

Priority Feeder in 2010

Description of Major Event Exclusive Outages (October 1, 2008 through September 30, 2009):

Mainline Event: 68% of the total number of customer interruptions (1,503 CI) was associated with three mainline feeder events.

- On November 13, 2008, a mainline feeder event occurred, affecting 9 customers due to an unknown cause.
- On August 28, 2009, a mainline feeder event occurred, affecting 1,494 customers due to inclement weather and lightning.

Fuse Event: 18% of the total number of customer interruptions (399 CI) were associated with four fuse events.

- On July 11, 2009, a fused lateral event occurred, affecting 71 customers due to a fire.
- On August 16, 2009, a fused lateral event occurred, affecting 197 customers due to tree contact with primary.
- On August 23, 2009, a fused lateral event occurred, affecting 86 customers due to equipment failure by cable fault.
- On August 23, 2009, a fused lateral event occurred, affecting 45 customers due to equipment failure by cable fault.

Transformer Events: 14% of the total number of customer interruptions (308 CI) was associated with fourteen localized transformer events.

Corrective actions performed in 2010:

- Installed 4 load break switches,
- Installed tree wire

- Replaced two poles
- Replaced two transformers
- Performed inspection and tree trimming
- Performed thermal vision of overhead facilities to identify necessary upgrades

Priority Feeder in 2012

Description of Major Event Exclusive Outages (October 1, 2010 through September 30, 2011):

Mainline Event: 82% of the total number of customer interruptions (5,992 CI) was associated with four mainline feeder events.

- On March 17, 2011, a mainline feeder event occurred affecting 1,507 customers due to equipment failure of a crossarm.
- On March 17, 2011, a mainline feeder event occurred, affecting 1,507 customers due to equipment failure of a splice connection.
- On September 20, 2011, a mainline feeder event occurred, affecting 1,480 customers due to a motor vehicle accident.
- On September 35, 2011, a mainline feeder event occurred, affecting 1,498 customers due to bird contact.

Fuse Event: 15% of the total number of customer interruptions (1163 CI) were associated with eight fuse events.

- On January 04, 2011, a fused lateral event occurred, affecting 136 customers due to an underground cable fault
- On January 26, 2011, a fused lateral event occurred, affecting 195 customers due to tree limbs on wires
- On February 9, 2011, a fused lateral event occurred, affecting 149 customers due to an equipment failure of a fuse
- On May 14, 2011, a fused lateral event occurred, affecting 184 customers due to tree limbs on wires.
- On June 4, 2011, a fused lateral event occurred, affecting 133 customers due to an unknown cause.
- On August 31, 2011, a fused lateral event occurred, affecting 181 customers due to windy weather.
- On September 26, 2011, a fused lateral event occurred, affecting 185 customers due to tree related contact.

Transformer Events: 4% of the total number of customer interruptions (284 CI) was associated with ten localized transformer events.

Corrective actions performed in 2012:

- Upgraded 10,422’ of primary mainline copper with 1/0 aluminum

- Upgraded 5,400’ of primary mainline copper with 477 tree wire
- Upgraded 5,830 of secondary mainline with triplex
- Upgraded/Replaced 66 poles
- Upgraded Replaced 27 transformers
- Installed an ACR
- Replaced 19 Fuses
- Performed inspection and tree trimming

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during, 2006, 2010, and 2012:

- Performing tree trimming will reduce tree-related outages caused by falling limbs/branches.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing lightning arrestors prevents outages caused by lightning.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.
- Installing ACR reduces total feeder outages caused by momentary contacts by attempting to clear the temporary fault conditions automatically.
- Installing switches improves overall restoration duration of the feeder by utilizing automatic and/or remote switching capabilities.
- Replacing primary (13kV) bare copper wires with jacketed 477 kcm ACSR conductors (tree wire) provides protection against animal contact and incidental contact with tree branches.
- Replacing mainline secondary (low voltage) bare wires and secondary service bare wires with jacketed triplex provides protection against incidental tree branches and enables faster restoration after storms.
- Replacing cracked Cross-arms prevents outages related to Cross-arms.
- Replacing deteriorated and overloaded transformers prevents outages due to equipment failure or load.
- Replacing deteriorated poles prevents outages due to equipment failure and public safety hazards.
- Installing fuse cutouts and replacing existing fuse cutouts that are deteriorated mitigates the impact of outages that occur on the lateral sections of the feeder.

Analysis of Why Past Corrective Actions Failed

The two main incidents that affected feeder 15172 and caused it to be selected as a Priority Feeder were due to the following: A failed URD splice at a cable pole, and a tree down/weather event that caused a conductor to come off an insulator. As part of the troubleshooting process that occurred

due to the tree down event, Pepco discovered that there was a failed piece of equipment in the substation that prevented the breaker from reclosing.

For each incident it is extremely difficult to identify issues with these types of equipment until they fail. They tend to operate within standards until the point that they fail and visual inspections tend to not identify any advance notifications that they may be nearing the end of their usable life.

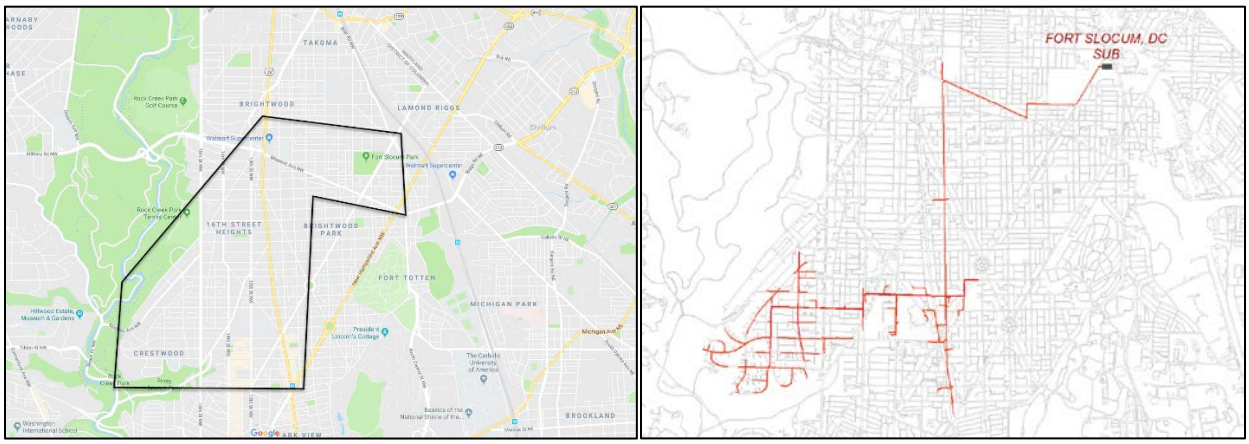
MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

Priority Feeder Years 2005 to Present

Feeder 15172 - Year 2005 - 2018 (IEEE MED Exclusive)														
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	1.62	0.10	1.51	1.10	2.42	0.44	4.83	3.28	0.30	1.23	0.34	0.14	0.34	1.57
SAIDI	5.92	0.33	6.18	3.04	10.98	1.55	10.82	1.75	0.94	5.40	2.42	1.10	0.54	3.32
CHI	9,418	518	8,258	3,809	16,367	2,418	16,220	2,543	1,347	7,525	3,772	1,705	810	4,952
NI	11	10	25	14	22	15	26	11	9	9	19	11	15	22

13kV Feeder 15197

Ft. Slocum Substation No. 190



2019 Priority Feeder – Outages and Corrective Actions

Description of Major Event Exclusive Outages (October 1, 2017 through September 30, 2018):

Mainline Events: 96% of the total number of customer interruptions (CI) (2,205 CI) were associated with three mainline feeder events.

- On December 25, 2017, a mainline feeder event occurred, affecting 1,284 customers due to windy weather.
- On January 29, 2018, a mainline feeder event occurred, affecting 597 customers due to equipment failure of a regulator.
- On May 8, 2018, a mainline feeder event occurred, affecting 324 customers due to squirrel contact.

Fuse Events: <1% of the total number of customer interruptions (191 CI) were associated with one fused lateral event.

- On May 1, 2018, a fused lateral event occurred, affecting 9 customers due to equipment failure of a lightning arrestor.

Transformer Events: 3% of the total number of customer interruptions (189 CI) were associated with eleven localized transformer events.

Corrective Actions Addressed by the Priority Feeder Program:

Review of the outage history, feeder map, past corrective actions, and detailed field investigation identified the following option for consideration:

Mainline:

- Missouri Ave NW and 9th St NW:
  - Replace Gang Switch Drops
- Miscellaneous upgrades would include, animal guards, insulated taps, lightning arrestors.

Lateral Work:

- No major reliability work to take place at this time

Total Project Cost Estimate: $5,300

Corrective Action Plan Benefits

The two major events that caused Feeder 15197 to be selected to the Priority Feeder program were a failed regulator and a bus lockout that was caused by Feeder 15003. As the regulator has been replaced and the primary cause of the bus lockout was addressed per the 15003 Priority Feeder Report. Pepco addressed a concern with a tie gang switch nearing the end of its lifespan. As this repair will improve the switching capabilities of Pepco to isolate outages and restore customers' power quicker, it was decided to proceed with the work.

Past Outages and Corrective Actions

Priority Feeder in 2001

Description of Major Event Exclusive Outages (October 1, 1999 through September 30, 2000):

Data is unavailable.

Corrective actions performed in 2001:

Data is unavailable.

Priority Feeder in 2005

Description of Major Event Exclusive Outages (October 1, 2003 through September 30, 2004):

Data is unavailable.

Corrective actions performed in 2005:

- Install 1 ACR
- Installed 59 animal guards
- Replaced 20 fuses
- Installed 15 fuses
- Adjusted wires away from Tree

Priority Feeder in 2007

Description of Major Event Exclusive Outages (October 1, 2005 through September 30, 2006):

Data is unavailable.

Corrective actions performed in 2007:

- Replacing 8,000 feet of underground cable along 9th St between Allison St and Nicholson St
- Rerouted main trunk of Feeder and installed PAC along Madison St, 4th St, and Missouri Ave
- Replaced main trunk of open wire with PAC along Allison St between 9th St to 14th St
- Replaced main trunk of open wire with PAC along 14th St between Allison St to Webster St
- Replaced Main trunk of open wire with PAC along Webster St from 14th St to 17th St
- Replaced main trunk of open wire with PAC along 17th St from Webster St to Decatur St
- Replaced four existing manually operated gang switches with SF6 switches
- Relocated ACR to Webster St between 17th St and 18th St

Analysis of Past Corrective Actions

Following are the expected benefits of the corrective actions implemented during, 2001, 2005, and 2007:

- Performing tree trimming will reduce tree-related outages caused by falling limbs/branches.
- Installing animal guards reduces outages caused by animal contact with distribution equipment.
- Installing fuses reduces outages on the mainline of the circuit, thereby reducing the number of customers affected by each event.
- Installing ACR reduces total feeder outages caused by momentary contacts by attempting to clear the temporary fault conditions automatically.
- Installing switches improves overall restoration duration of the feeder by utilizing automatic and/or remote switching capabilities.

- Installing PAC improves overall feeder resiliency by reducing outages cause by animal contact, vegetation, and weather.
- Installing fuse cutouts and replacing existing fuse cutouts that are deteriorated mitigates the impact of outages that occur on the lateral sections of the feeder

Analysis of Why Past Corrective Actions Failed

The two drivers of 15197 being included as a priority feeder was due to a failed regulator and as a result of an issue with feeder 15003 locking out all feeders on the shared bus including 15197. The work performed under the 15003 Priority Feeder program addressed spacing issues between Feeder 15003 and feeder 15197 where their close proximity had the potential to cause conductors slap between phases in the event of heavy winds. As a result, there was no way to ascertain how the conductors would perform in above +35 mph conditions.

The failed regulator was unable to be addressed as visual inspection do not give any indication of a regulator's performance nor whether it may be approaching the end of its lifespan. As such this equipment was unable to be proactively replaced.

MED Exclusive SAIFI, SAIDI, CHI, and NI Summary for

Priority Feeder Years 2004 to Present

Feeder 15197 - Year 2004 - 2018 (IEEE MED Exclusive)															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SAIFI	5.96	5.52	4.17	2.89	1.41	0.51	3.72	0.76	0.23	1.27	0.30	0.37	0.33	0.98	2.68
SAIDI	2.75	11.42	36.15	6.91	2.56	0.90	4.35	2.87	1.37	1.45	1.15	1.44	1.06	1.46	3.84
CHI	4,603	22,643	63,622	12,416	4,598	1,613	7,863	5,216	2,504	2,183	1,715	2,206	1,515	2,222	4,927
NI	28	26	35	24	30	21	39	25	30	18	20	16	15	17	16

CERTIFICATE OF SERVICE

I hereby certify that a copy of Potomac Electric Power Company's 2019 Repeat Priority Feeder Improvement Plan compliance filing to its Annual Consolidated Report was served this July 1, 2019 on all parties in Formal Case No. 1119 by electronic mail.

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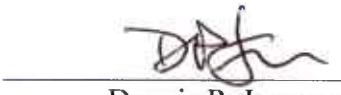

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