

1026-E-44



A PHI Company

Paul H. Harrington
Associate General Counsel

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OFFICE OF THE COMMISSIONER
April 27, 2007

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Ms. Dorothy Wideman
Commission secretary
Public Service Commission
of the District of Columbia
1333 H Street, N.W.
2nd Floor West Tower
Washington, D.C. 20005

Re: Formal Case Nos. 1026

Dear Ms. Wideman:

Enclosed for filing in the above matter are the original and fifteen (15) copies of the Report Of Potomac Electric Power Company In Response to Commission Order No. 14209.

Very truly yours,

A handwritten signature in black ink that reads 'Paul H. Harrington'.

Paul H. Harrington

PHH/sar

cc: All Parties in Formal Case No. 1026

BEFORE THE
PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA

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DISTRICT OF COLUMBIA
PUBLIC SERVICE COMMISSION

IN THE MATTER OF)
)
The Investigation of the) Formal Case No. 1026
Feasibility of Removing Pre-existing)
Aboveground Utility Lines and Cables,)
and Relocating Them Underground)
in the District of Columbia)

REPORT OF
POTOMAC ELECTRIC POWER COMPANY
IN RESPONSE TO COMMISSION ORDER NO. 14209

On June 5, 2006, Potomac Electric Power Company (Pepco; Company) filed its Report on the Feasibility of Undergrounding Pre-existing Aboveground Utility Lines and Cables in Selected Areas in the District of Columbia (2006 Undergrounding Study; Report) in response to District of Columbia Public Service Commission (Commission) Order No. 13831 issued in Formal Case No. 1026 and Order No. 13877 issued in Formal Case No. 766. With the issuance of Order No. 13976 on June 15, 2006, the Commission invited interested parties to submit comments regarding Pepco's 2006 Undergrounding Report. Comments were received, and as a result, Order No. 14209 was issued on February 12, 2007. On page 11 of the Order No. 14209, paragraph 29, the Commission ordered:

- 29. Within 60 days of the date of the Order, Pepco is directed to submit a new filing addressing

whether converting its overhead lines to an underground system in communities and neighborhoods susceptible to power outages would lead to better, more reliable, and less outage-prone electric service than what exists in those areas at this time.

On April 11, 2007, the Company filed a Motion for Enlargement of Time from April 13, 2007 to April 27, 2007 in which to file its response to the Commission's Order. By Order No. 14263, issued April 23, 2007, the Commission granted Pepco's Motion.

Background

Paragraphs 2 through 5 of Order No. 14209, at 1, 2 and 3, provide the background for the Commission's directive. In addition, the scope of the Commission's directive is defined on page 10, paragraph 24 of Order No. 14209, which states:

24. *Pepco may not know to an absolute certainty whether an underground system in outage-prone communities and neighborhoods would lead to more reliable electric service, or it may believe its conclusions to be too speculative to be useful. However, in order to supplement the record and aid us in our deliberation, we shall request that Pepco provide us with a direct and candid a response to this question. Therefore, we direct Pepco to revisit its most recent study and address in a new filing whether converting its overhead lines to an underground system in outage-prone areas of the District would lead to better and more reliable electric service than what exists in those areas at this time.*

Discussion

As recognized by the Commission, by no means can Pepco respond to the Commission's question with absolute certainty. However, the Company has performed an analysis that should assist the Commission. Pepco first reviewed the data for the Least Performing Feeders in the District of Columbia during the past three reporting years, 2005 through 2007. The Company then narrowed its focus to the feeders listed in the 2006 Undergrounding Study and performed an analysis as discussed in the "Analysis" section of this filing.

Data Overview - Least Performing Feeders in the District of Columbia During the Past Three Years (Reporting Years 2005 - 2007)

For reporting years 2005 through 2007, two (2), three (3), and four (4) feeders respectively, of the top five (5) feeders for each year (15 in total), have been located completely underground. Further, one (1) additional feeder in the top five is predominantly located underground (89% UG / 11% OH). See Attachment No. 1. The data clearly illustrate that simply having an entirely underground system in various locations within the District does not prevent the Company from experiencing reliability issues.

Analysis

The Company began its analysis by selecting five (5) feeders from the Report which met the following criteria:

(1) The feeder system must be at least 85% overhead; (2) more than 160 customers are served per feeder; and (3) the construction design for the feeders is that of a radial system. Based on these criteria, the selected feeders were Feeder 14007, Feeder 14014, Feeder 14017, Feeder 14200 and Feeder 15021.

Pepco then considered feeders from its entire system that (1) are located completely (100%) underground, (2) are radial feeders, (3) are not listed as "Least Reliable Feeders" for reporting years 2005 through 2007, and (4) have similar characteristics as the five feeders selected from the Report, such as number of customers served and total feeder mileage. Once again, five feeders were selected based on these criteria. The selected feeders were Feeder 14001, Feeder 14382, Feeder 14732, Feeder 15206 and Feeder 15997. See Attachment No. 2.

Next, a feeder performance comparison analysis was developed for these ten (10) feeders. The objective of the comparative analysis was to project the outcome of converting the overhead feeders to underground although, as stated previously, there can be no guarantee that the "projected" results will in fact materialize. The results show that if the

five District of Columbia feeder systems that were selected from the Report were relocated underground, one might expect on average a 48% reduction in the number of outages overall (60 fewer outages), or on average 12 fewer outages per feeder. Under this concededly "stacked deck" analysis, this would result in an improvement in reliability for the five selected feeders if converted to underground. See Attachment No. 2. It should however be noted that although the results show a decrease in the projected outage duration, typically, the time it takes to restore service to underground feeders increases as a result of locating faults, excavating, etc. The causes of underground-related outages that may occur as a result of the conversion include but are not limited to equipment failures.

Using the "Total Cost" figures contained on page 19 in the Report, the approximate costs to underground the selected feeders would be:

Feeder 14007 - \$108 million

Feeder 14014 - \$104 million

Feeder 14017 - \$53 million

Feeder 14200 - \$19 million

Feeder 15021 - \$108 million

Based on the results of the analysis, costs range from \$4 million to \$5 million to reduce each outage for the feeders selected for undergrounding. See Attachment 2.

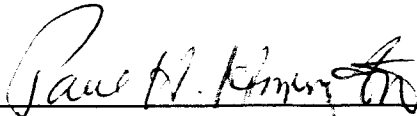
Conclusion

In addressing the Commission's question of whether converting its overhead lines to an underground system in communities and neighborhoods susceptible to power outages would lead to better, more reliable, and less outage-prone electric service than what exists in those areas at this time, this analysis shows that such a conversion could lead to less outage-prone electric service. However, as shown in this filing, simply having an entirely underground system in various locations within the District of Columbia does not make the underground system impervious from experiencing reliability issues.

The Company has also shown that the estimated costs to convert existing overhead electric service to underground are sufficiently high that wholesale undergrounding is not considered to be economically feasible. Specific, limited areas may be candidates for partial undergrounding where other methods fail to achieve the desired results.

Respectfully submitted,

POTOMAC ELECTRIC POWER COMPANY

By 

Paul H. Harrington
Associate General Counsel

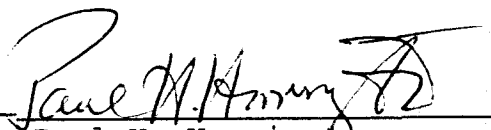
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Of Counsel For Potomac Electric Power Company

Washington, D.C.
April 27, 2007

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Report Of Potomac Electric Power Company In Response To Commission Order No. 14209 was served, this 27th day of April, 2007, on all parties in Formal Case No. 1026 by hand or first class mail, postage prepaid.



Paul H. Harrington
Of Counsel For
Potomac Electric Power Company

FC No. 1026, In the Matter of the Investigation of the Feasibility of Removing Pre-existing Aboveground Utility Lines and Cables, and Relocating Them Underground in the District of Columbia

Potomac Electric Power Company

Least Reliable Feeders 2005 - 2007 a/

Overhead (OH) vs Underground (UG)

Ranking	2005		2006		2007			
	Feeder Number	OH UG	Ranking	Feeder Number OH UG	Ranking	Feeder Number OH UG		
1	14787	0% 100%	1	14004	11% 89%	1	15197	67% 33%
2	15762	0% 100%	2	14729	0% 100%	2	15295	0% 100%
3	15012	88% 12%	3	15204	0% 100%	3	14786	0% 100%
4	15009	97% 3%	4	30	0% 100%	4	14712	0% 100%
5	15016	59% 41%	5	15013	61% 39%	5	27	0% 100%
6	15801	90% 10%	6	14766	52% 48%	6	14054	2% 98%
7	14007	93% 7%	7	15703	2% 98%	7	15707	88% 12%
8	15197	68% 32%	8	251	99% 1%	8	14788	0% 100%
9	15021	92% 8%	9	15170	78% 22%	9	14717	87% 13%
10	15701	24% 76%	10	252	95% 5%	10	15207	0% 100%
11	15171	60% 40%	11	15172	85% 15%	11	82	52% 48%
12	467	85% 15%	12	14023	41% 59%	12	14769	83% 17%
13	15702	5% 95%	13	14017	94% 7%	13	14896	89% 11%
14	14146	48% 52%	14	15709	84% 17%	14	14768	78% 22%
15	14768	78% 22%	15	14014	97% 3%	15	14900	72% 28%

a/ Feeders and their respective rankings are from the past three years Least Reliable Feeders List. See 2005, 2006 and 2007 Consolidated Reports filed with the District of Columbia Public Service Commission in FC No. 766.

FC No. 1026, In the Matter of the Investigation of the Feasibility of Removing Pre-Existing Aboveground Utility Lines and Cables, and Relocating them Underground in the District of Columbia

Attachment No. 2 – Undergrounding Analysis

Underground Conversion of Selected Feeders

Five feeders were selected from the June 5, 2006 Report (Report) – 13th & Irving Substation 133 that had the following characteristics:

1. Construction is more than 85% overhead;
2. More than 160 customers are served per feeder; and
3. The construction design for the feeders is that of a radial system.

Table 1: Five Feeders Selected From the June 5, 2006 Report

Feeder Off Sub. 133	Total Mileage	OH Mileage	UG Mileage	OH %	UG %	Customers Served	2005 Outages ^{a/}	2006 Mileage		
								SAFF	SAFD (miles)	CAFD (miles)
14007	9.98	9.28	0.70	93%	7%	1,629	47	2.56	275	108
14014	10.01	9.72	0.29	97%	3%	1,493	29	2.39	902	378
14017	4.02	3.75	0.27	93%	7%	914	16	1.82	347	191
14200	2.83	2.52	0.31	89%	11%	182	5	0.16	348	2,111
15021	7.40	6.71	0.69	91%	9%	2,028	29	2.34	214	92
Group Avg	6.85	6.40	0.45	93%	6.6%	1,249	25	2.27	418	184

a/ Not all customers experienced all outages.

In addition to selecting five overhead feeders to convert to underground, five feeders were selected to conduct an underground construction comparison analysis. For this analysis, all of Pepco’s distribution feeders were taken into consideration in which only 49 feeders, met the requirement based on the 100% underground design. Of the 49 feeders, five feeders were chosen for the Overhead (OH) to Underground (UG) performance comparison. The selection criteria are summarized below.

Selected Feeders for Underground Comparison

Five feeders were selected from the Pepco distribution system to compare with the five feeders selected from the Report. The criteria for selection were as follows:

1. Construction is 100% underground;
2. The construction design for the feeders is that of a radial system;
3. The feeder was not listed as a “Least Reliable Feeder”¹ for reporting years 2005 through 2007.
4. Similar feeder mileage as the five underground conversion feeders selected from the Report; and

¹ FC No. 766, In the Matter of the Commission’s Fuel Adjustment Clause Audit and Review Program, 2005, 2006 and 2007 Consolidated Reports filed with the Commission on March 1, 2005, March 1, 2006 and February 15, 2007 respectively.

FC No. 1026, In the Matter of the Investigation of the Feasibility of Removing Pre-Existing Aboveground Utility Lines and Cables, and Relocating them Underground in the District of Columbia

Attachment No. 2 – Undergrounding Analysis

5. Similar number of customers served as the five underground conversion feeders selected from the Report.

Feeders 15206, 14001, 14382, 15997 and 14732 were selected based on the criteria.

Table 2: Five Selected Underground Feeders

Feeders Selected	Total Mileage	OH Mileage	UG Mileage	OH %	UG %	Customers Served	2008 Outages a/	2006 MEDs Inc		
								SAIFI	SAIDI (mins)	CAIDI (mins)
15206	7.60	0.00	7.60	0%	100%	1,982	18	0.82	528	644
14001	8.29	0.00	8.29	0%	100%	1,553	32	1.66	382	230
14382	8.87	0.00	8.87	0%	100%	493	4	0.55	321	584
15997	2.77	0.00	2.77	0%	100%	579	5	0.21	19	89
14732	8.09	0.00	8.09	0%	100%	2,581	7	0.11	53	496
Group Avg	7.12	0.00	7.12	0%	100%	1,438	13	0.68	271	399

a/ Not all customers experienced all outages.

A feeder performance comparison analysis was conducted for the five feeders selected from the Report and the five feeders selected based on specified criteria. The objective of the comparison analysis was to project the outcome of converting the overhead feeders to underground.

Comparison Methodology:

Performance Comparison Analysis

1. Feeders: 14007, 14014, 14017, 14200 and 15021 (selected feeders), indices were calculated only for the overhead portions of each feeder. The statistical average was calculated for each feeder.
Note – The calculation included major event days.
2. Feeders: 15206, 14001, 14382, 15997 and 14732 (comparison feeders), indices were calculated. The statistical average was calculated for each feeder.
Note – The calculation included major event days.

Table 3: OH to UG Conversion - Impacts on Reliability

Feeders		2006 MEDs Inc		
Convert	Compare	SAIFI	SAIDI (mins)	CAIDI (mins)
14007	15206	73%	2%	-116%
14014	14001	72%	70%	-5%
14017	14382	63%	22%	-109%
14200	15997	-312%	22%	81%
15021	14732	71%	-27%	-336%
Difference Average		70%	35%	-116%

An estimated 70% average decrease (improvement) in outage frequency (SAIFI) and a 35% average decrease (improvement) in outage duration (SAIDI), including Major Event Days (storm days and non-storm days included), will be achieved as a group, if the feeders are converted to underground. This will result in an improvement in reliability for the five selected feeders if converted to

FC No. 1026, In the Matter of the Investigation of the Feasibility of Removing Pre-Existing Aboveground Utility Lines and Cables, and Relocating them Underground in the District of Columbia

Attachment No. 2 – Undergrounding Analysis

underground. Note that although the results show a decrease in the projected outage duration, typically, the time it takes to restore service to underground feeders increases as a result of locating faults, excavating, etc.

The actual outage reduction impact is shown in Table 4. If the five feeders selected from the Report were converted to underground, a 48% reduction in the number of outages overall (60 fewer outages) or on average, 12 fewer outages per feeder is projected.

Table 4: Impact of Undergrounding on Outage Occurrences (OH vs UG)

Convert Feeders	2005				
	Actual Outages (OH) a/	Compare Feeders	Actual Outages (UG) a/	Outage Difference (OH - UG)	% Improvement
14007	47	15206	18	29	62%
14014	29	14001	32	-3	-10%
14017	16	14382	4	12	75%
14200	5	15997	5	0	0%
15021	29	14732	7	22	76%
Total	126	Total	66	60	48%
Average	25	Average	13	12	48%

a/ MEDs Inclusive

The causes of underground-related outages that may occur as a result of the conversion include but are not limited to equipment failures and vandalism.

Conclusion

Based on the results of this analysis, it appears that an estimated 70% average decrease (improvement) in SAIFI and a 35% average decrease (improvement) in SAIDI, including Major Event Days (storm days and non-storm days included), will be achieved as a group, if the feeders are converted to underground. This will result in an improvement in reliability for the five selected feeders if converted to underground. However, note that although the results show a decrease in the projected outage duration, typically, the time it takes to restore service to underground feeders increases as a result of locating faults, excavating, etc. If the five feeders selected from the Report were converted to underground, a 48% reduction in the number of outages or 12 fewer outages on average per feeder is projected.

The outage reduction costs per feeder selected for undergrounding are shown in Table 5. The costs range from \$4 million to \$5 million per outage reduced.

FC No. 1026, In the Matter of the Investigation of the Feasibility of Removing Pre-Existing Aboveground Utility Lines and Cables, and Relocating them Underground in the District of Columbia

Attachment No. 2 – Undergrounding Analysis

Table 5: Outage Reduction Costs

Current Feeders	Cost to Underground (\$ million) a/	Outage Difference	Cost Per Outage Reduced (\$ million)
14007	108	29	4
14014	104	-3	NA b/
14017	53	12	4
14200	19	0	NA c/
15021	108	22	5

a/ "Total Cost" figures contained on page 19 in the June 5, 2006 Report.

b/ The number of outages is projected to increase for this feeder.

c/ The number of outages is projected to remain unchanged for this feeder.

Pepeco hopes that this analysis will assist the Commission in its deliberation on the matter of undergrounding in the District of Columbia.