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COMMISSION

March 30, 2012

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HAND DELIVERED

Kyle Willard
Director of Engineering
Public Service Commission of Kentucky
211 Sower Boulevard
Frankfort, Kentucky 40601

RE: Kentucky Power Company – Electric Distribution Utility Annual Reliability Report

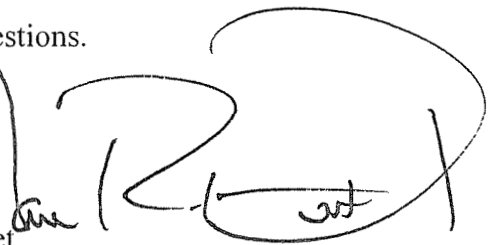
Dear Mr. Willard:

Enclosed please find Kentucky Power Company's filing in response to the Commission's October 26, 2006 Order in Case No. 2006-00494.

Please do not hesitate to contact me if you have any questions.

Very truly yours,

Mark R. Overstreet



cc: Jennifer B. Hans

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME	1.1	Kentucky Power Company
REPORT PREPARED BY	1.2	Everett G. Phillips
E-MAIL ADDRESS OF PREPARER	1.3	egphillips@aep.com
PHONE NUMBER OF PREPARER	1.4	606-929-1463

SECTION 2: REPORT YEAR

CALENDAR YEAR OF REPORT	2.1	2012
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SECTION 3: MAJOR EVENT DAYS

T_{MED}	3.1	29.2414
FIRST DATE USED TO DETERMINE T_{MED}	3.2	1-Jan-07
LAST DATE USED TO DETERMINE T_{MED}	3.3	31-Dec-11
NUMBER OF MED IN REPORT YEAR	3.4	9 days

NOTE: Per IEEE 1366 T_{MED} should be calculated using the daily SAIDI values for the five prior years. If five years of data are not available, then utilities should use what is available until five years are accumulated.

SECTION 4: SYSTEM RELIABILITY RESULTS

Excluding MED

SAIDI	4.1	457.99
SAIFI	4.2	2.4173
CAIDI	4.3	189.46

Including MED (Optional)

SAIDI	4.4	2503.9
SAIFI	4.5	3.602
CAIDI	4.6	695.1

Notes:

- 1) All duration indices (SAIDI, CAIDI) are to be reported in units of minutes.
 - 2) Reports are due on the first business day of April of each year
 - 3) Reports cover the calendar year ending in the December before the reports are due.
 - 4) IEEE 1366 (latest version) is used to define SAIDI, SAIFI, CAIDI, and T_{MED}
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KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 5: OUTAGE CAUSE CATEGORIES

Excluding MED

CAUSE CODE DESCRIPTION	SAIDI VALUE	CAUSE CODE DESCRIPTION	SAIFI VALUE
Veg Outside R/W 5.1.1	134.75	Veg Outside R/W 5.2.1	0.560
Veg Inside R/W 5.1.2	66.44	Equipment Failure 5.2.2	0.445
Equipment Failure 5.1.3	64.39	Scheduled 5.2.3	0.311
Scheduled 5.1.4	42.17	Veg Inside R/W 5.2.4	0.257
Generation & Transmi: 5.1.5	29.27	Generation & Transmi: 5.2.5	0.168
Vehicle Accident 5.1.6	17.50	Station-Distribution 5.2.6	0.136
Station-Distribution 5.1.7	17.03	Vehicle Accident 5.2.7	0.104
High Winds 5.1.8	16.91	Weather - Unknown 5.2.8	0.088
Weather - Unknown 5.1.9	14.55	Unknown 5.2.9	0.074
Lightning 5.1.10	12.51	Lightning 5.2.10	0.068

SECTION 6: WORST PERFORMING CIRCUITS

CIRCUIT IDENTIFIER	SAIDI VALUE	MAJOR OUTAGE CATEGORY
3309901	6.1.1 1989.53	Tree Out of ROW
3150502	6.1.2 1860.92	Tree Out of ROW
3103103	6.1.3 1785.21	Tree Inside ROW
3000201	6.1.4 1503.32	Equipment Failure
3308503	6.1.5 1454.60	Equipment Failure
3010601	6.1.6 1431.53	Tree Inside ROW
3007904	6.1.7 1313.25	Tree Out of ROW
3202203	6.1.8 1305.84	Tree Out of ROW
3000202	6.1.9 1293.16	Tree Out of ROW
3307301	6.1.10 1284.69	Tree Out of ROW

CIRCUIT IDENTIFIER	SAIFI VALUE	MAJOR OUTAGE CATEGORY
3309901	6.2.1 9.795	Unknown (Non Weather)
3202202	6.2.2 7.425	Tree Inside ROW
3409301	6.2.3 7.090	Scheduled Company
3202201	6.2.4 6.350	Tree Out of ROW
3312202	6.2.5 5.868	Equipment Failure
3307301	6.2.6 5.566	Tree Out of ROW
3308503	6.2.7 5.514	Equipment Failure
3303902	6.2.8 5.350	Tree Out of ROW
3007904	6.2.9 5.335	Tree Out of ROW
3309001	6.2.10 5.221	Scheduled Company

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Electric Distribution Utility Annual Reliability Report

Additional pages may be attached as necessary

SECTION 7: VEGETATION MANAGEMENT PLAN REVIEW

See attachments for details of Kentucky Power's Vegetation Management Plan:

Attachment 1- 2013 Kentucky Power Vegetation Management Plan

Attachment 2 - 2013 KPCo Forestry PLAN

Attachment 3 - 2012 VM Plan Recap

SECTION 8: UTILITY COMMENTS

System Reliability Results for each of the past 5 years is attached separately:

Attachment 4- System Reliability 5-Year Summary - Kentucky Power - 2012

Worst Performing Circuit (WPC) analysis and plans are attached separately:

Attachment 5 - 2012 KPCo WPC Analysis and Plans Ashland District

Attachment 6 - 2012 KPCo WPC Analysis and Plans Hazard District

Attachment 7 - 2012 KPCo WPC Analysis and Plans Pikeville District

2013 Kentucky Power Distribution Vegetation Management Plan

The 2013 Vegetation Management Plan will continue to focus on Full-Circuit Reclearing. Full-Circuit Reclearing is an integral part of our efforts to transition from a reactive-based maintenance program to a cycle-based maintenance approach that we began in July of 2010. Reclearing work will be prioritized and scheduled based on past tree-related reliability performance, field inspection of the right-of-way conditions, and the number of customers impacted. Approximately \$814,837 will be budgeted to address reactive reliability issues that develop throughout the year. This Unscheduled/Reactive funding represents about five percent of the total Vegetation Management O&M Budget. The 2012 O&M under expenditure of \$214,280 has been added to the 2013 O&M budget.

Kentucky Power's service territory is heavily forested. Our spray program is a vital component of our Vegetation Management Plan. ULV (Ultra Low Volume), high-volume foliar, basal, cut-surface, and aerial application techniques will be utilized depending on the brush conditions. The goal is to treat 3,207 acres of brush in 2013.

The 2013 Vegetation Management Plan also includes \$2,550,000 of forestry capital. This funding will be utilized to remove trees larger than 18 inches in diameter, widen rights-of-way, and for TGR (Tree Growth Regulator) application.

The 2013 Kentucky Power Distribution Management Plan projection for the three districts in its service territory is:

2013 KY POWER DISTRIBUTION VEGETATION MANAGEMENT PLAN

DISTRICT	PLANNED RECLEAR MILES	PLANNED SPRAY ACRES	UNSCHEDULED REACTIVE O&M FUNDING	SCHEDULED O&M FUNDING	TOTAL O&M FUNDING	FORESTRY CAPITAL FUNDING
HAZARD	439	1,620	\$314,917	\$ 5,540,100	\$ 5,855,017	\$ 945,152
PIKEVILLE	396	1,087	\$277,513	\$ 7,080,772	\$ 7,358,285	\$ 912,692
ASHLAND	274	500	\$222,407	\$ 4,016,536	\$ 4,238,943	\$ 692,156
TOTALS	1109	3,207	\$814,837	\$ 16,637,408	\$ 17,452,245	\$ 2,550,000

2013 KYPSCO DISTRIBUTION VEGETATION MANAGEMENT PLAN										
RECLEARING PLAN										
DISTRICT	STATION NAME	CIRCUIT NAME	CIRCUIT NUMBER	LINE MILES	MILES PLANNED	O&M	Forestry Capital associated with Reclearing	PROJECTED O&M COST per MILE	TOTAL COST	COMMENTS
PKV	Lovely	Wolf Creek	3202202	58.7	28.2	\$507,600	\$71,064	\$18,000	\$578,664	Begin Full Circuit Reclear. To be completed in 2014.
PKV	Lovely	Mt. Sterling	3202203	12.6	12.6	\$113,400	\$15,876	\$9,000	\$129,276	Full circuit reclear
PKV	Middle Burning Crk.	Naugatuck	2163502	1.3	1.3	\$10,400	\$1,456	\$8,000	\$11,856	Full circuit reclear (KY Power Side)
PKV	Springg	Springg	2160103	8.1	8.1	\$145,800	\$20,412	\$18,000	\$166,212	Full circuit reclear (KY Power Side)
PKV	Betsy Layne	Mud Creek	3400301	77.0	50.0	\$800,000	\$112,000	\$15,000	\$912,000	Finish Full Circuit Reclear-started in 2012
PKV	Beaver Creek	Ligon	3403201	80.0	70.0	\$1,041,400	\$137,683	\$15,000	\$1,179,083	Finish Full Circuit Reclear-started in 2012
PKV	South Pikeville	Island Creek	3410502	41.0	41.0	\$615,000	\$86,100	\$15,000	\$701,100	Finish Full Circuit Reclear-started in 2012
PKV	Weeksbury	Distribution	3412901	30.0	15.0	\$240,000	\$33,600	\$16,000	\$273,600	Finish Full Circuit Reclear-started in 2012
PKV	Burton	Ligon	3400601	21.0	15.0	\$225,000	\$31,500	\$16,000	\$256,500	Finish Full Circuit Reclear-started in 2012
PKV	Burton	Wheelwright	3400602	21.0	12.0	\$192,000	\$26,880	\$16,000	\$218,880	Finish Full Circuit Reclear-started in 2012
PKV	McKinney	Gibson	3402202	44.0	44.0	\$792,000	\$110,880	\$18,000	\$902,880	Full circuit reclear
PKV	Salisbury	Martin	3408103	56.0	50.0	\$700,000	\$98,000	\$14,000	\$798,000	Full circuit reclear
PKV	Lovely	Lovely	3202201	41.0	20.0	\$360,000	\$50,400	\$18,000	\$410,400	Finish Full Circuit Reclear-started in 2012
PKV	Johns Creek	Meta	3411801	158.0	10.0	\$180,000	\$25,200	\$18,000	\$205,200	Finish Reclear of Recloser Zone - lower Johns Creek
PKV	Draffin	Belcher	3400701	22.0	2.0	\$36,000	\$5,040	\$18,000	\$41,040	Finish Full Circuit Reclear-started in 2012
PKV	New Camp	Southside	3417601	10	10	\$140,000	\$19,600	\$14,000	\$159,600	Full circuit reclear
PKV	South Pikeville	Hospital	3410503	7	7	\$63,000	\$8,820	\$9,000	\$71,820	Full circuit reclear
ASH	47th Street	49th Street	3008001	26.0	18.0	\$243,000	\$30,375	\$13,500	\$273,375	Finish Full Circuit Reclear-started in 2012
ASH	10th Street	West Central	3002107	17.0	17.0	\$221,000	\$27,625	\$13,000	\$248,625	Full circuit reclear
ASH	Russell	Kenwood	3010601	21.0	21.0	\$315,000	\$39,375	\$15,000	\$354,375	Full circuit reclear
ASH	South Shore	Siloam	3002001	35.2	5.0	\$67,500	\$8,438	\$13,500	\$75,938	begin Full Circuit Reclear - to be completed in 2014
ASH	Belhaven	Argillite	3116703	27.5	14.0	\$182,000	\$22,750	\$13,000	\$204,750	Partial circuit reclear
ASH	Wurmland	Greenup	3110902	51.0	51.0	\$663,000	\$82,875	\$13,000	\$745,875	Full circuit reclear
ASH	Cannonsburg	Route 3	3008702	101.0	10.0	\$130,000	\$16,250	\$13,000	\$146,250	Finish Full Circuit Reclear-started in 2012
ASH	Hayward	Haldeman	3000801	118.0	67.7	\$812,400	\$101,650	\$12,000	\$913,950	Full circuit reclear - To be completed in 2014
ASH	Big Sandy	Fallsburg South	3000201	158.0	32.0	\$320,000	\$40,000	\$10,000	\$360,000	Finish Full Circuit Reclear-started in 2012
ASH	Bussyville	Walbridge	3007906	112.0	38.0	\$494,000	\$61,750	\$13,000	\$555,750	Full circuit reclear - To be completed in 2014
HAZ	Leslie	Hals Fork	3303903	75.4	37.0	\$370,000	\$66,600	\$10,000	\$436,600	Finish Full Circuit Reclear-started in 2012
HAZ	Leslie	Wootton	3303902	158.4	36.3	\$362,500	\$66,250	\$10,000	\$427,750	Begin Full Circuit Reclear
HAZ	Beckham	Carr Creek	3308402	116.1	53.0	\$503,500	\$90,630	\$9,500	\$594,130	Finish Full Circuit Reclear-started in 2012
HAZ	Jeff	Viper	3309001	47.4	47.4	\$450,300	\$81,054	\$9,500	\$531,354	Full Circuit Reclear
HAZ	Jeff	Jeff	3309002	1.2	1.2	\$11,400	\$2,062	\$9,500	\$13,462	Full Circuit Reclear
HAZ	Daisy	Leatherwood	3301701	81.3	81.3	\$813,000	\$146,340	\$10,000	\$959,340	Full Circuit Reclear
HAZ	Bonnyman	Hazard	3308502	47.7	47.7	\$477,000	\$65,860	\$10,000	\$542,860	Full Circuit Reclear
HAZ	Jenkins	Jenkins	3312902	24.8	24.8	\$248,000	\$29,760	\$10,000	\$277,760	Full Circuit Reclear
HAZ	Burdine	Jenkins	3403503	8.4	8.4	\$100,800	\$12,096	\$12,000	\$112,896	Full Circuit Reclear
HAZ	Beeffine	Dunham	3451202	9.9	9.9	\$89,100	\$10,692	\$9,000	\$99,792	Full Circuit Reclear
HAZ	Whitesburg	Hospital	3309102	8.0	8.0	\$96,000	\$11,520	\$12,000	\$107,520	Full Circuit Reclear
HAZ	Bulan	Ajax Dwarf	3307302	43.9	43.9	\$526,800	\$63,216	\$12,000	\$590,016	Full Circuit Reclear
HAZ	Bulan	Lofts Creek	3307303	2.0	2.0	\$24,000	\$2,880	\$12,000	\$26,880	Full Circuit Reclear
HAZ	Shamrock	Shamrock	3311701	38.3	38.3	\$421,300	\$50,556	\$11,000	\$471,856	Full Circuit Reclear
RECLEARING TOTALS									\$0	\$0
Totals									\$14,103,200	\$2,004,005
									\$16,107,205	

DISTRIBUTION VEGETATION MANAGEMENT SPRAY PLAN
KYPCO 2013

DISTRICT	SPRAY MILES	ACRES	O&M BUDGET
PKV	539	1087	\$451,000
HAZ	347	1620	\$686,208
ASH	143	500	\$295,000
Totals	1029	3207	\$1,432,208

Kentucky Power Company				
2013				
Distribution Vegetation Management O&M Forestry Plan-Summary				
<u>ACTIVITY</u>	<u>Total O&M</u>	<u>Pikeville</u>	<u>Hazard</u>	<u>Ashland</u>
RECLEARING	\$14,103,200	\$6,161,600	\$4,493,700	\$3,447,900
TOTAL SPRAY	\$1,432,208	\$451,000	\$686,208	\$295,000
AERIAL SAW	\$68,000	\$68,000	\$0	\$0
Unscheduled/Reactive Maintenance	\$814,837	\$277,513	\$314,917	\$222,407
CONTRACT FORESTERS	\$255,000	\$95,625	\$95,625	\$63,750
STUMP GRINDING PROGRAM	\$3,000	\$0	\$2,000	\$1,000
TREE REPLACEMENT PROGRAM	\$6,000	\$0	\$5,000	\$1,000
KPI INCENTIVE PROGRAM-Asplundh Field Personnel	\$540,000	\$227,880	\$180,900	\$131,220
INTERNAL-Existing KY Forestry Staff	\$230,000	\$76,667	\$76,667	\$76,666
TOTAL	\$17,452,245	\$7,358,285	\$5,855,017	\$4,238,943
September 30, 2009 O&M Test Year Level	\$7,237,965			
2012 Under expenditures	\$214,280			
Settlement O&M Incremental Level	\$10,000,000			
Total Annual O&M Distribution Vegetation	\$17,452,245			
Forestry Capital	\$2,550,000			
Total KYPKO Forestry Budget	\$20,002,245			
<u>MILES</u>	<u>Total O&M</u>	<u>Pikeville</u>	<u>Hazard</u>	<u>Ashland</u>
RECLEARING MILES	1,109	396	439	274
TOTAL SPRAY & AERIAL SAW MILES	1,046	556	347	143
TOTAL MILES PLANNED	2,155	952	786	417

2012 KENTUCKY POWER DISTRIBUTION VEGETATION MANAGEMENT RECAP

DISTRICT	PLANNED RECLEAR MILES	ACTUAL RECLEAR MILES	PLANNED SPRAY ACRES	ACTUAL SPRAY ACRES	FORESTRY CAPITAL FUNDING	FORESTRY CAPITAL EXPENDITURES	UNSCHEDULED REACTIVE O&M FUNDING	UNSCHEDULED REACTIVE O&M EXPENDITURES
HAZARD	502	437	1100	797	\$ 940,793	\$ 988,360	\$ 212,655	\$ 558,560
PIKEVILLE	397	220	800	685	\$ 904,030	\$ 600,493	\$ 235,138	\$ 322,117
ASHLAND	258	238	540	782	\$ 705,177	\$ 747,696	\$ 370,736	\$ 159,807
TOTALS	1157	895	2440	2264	\$ 2,550,000	\$ 2,336,549	\$ 818,529	\$ 1,040,484

DISTRICT	SCHEDULED O&M FUNDING	SCHEDULED O&M EXPENDITURES	TOTAL O&M FUNDING	TOTAL O&M EXPENDITURES	TOTAL VMP FUNDING	TOTAL VMP EXPENDITURES
HAZARD	\$ 5,740,089	\$ 5,450,801	\$ 5,952,744	\$ 6,009,361	\$ 6,893,537	\$ 6,997,721
PIKEVILLE	\$ 7,077,424	\$ 6,640,570	\$ 7,312,562	\$ 6,962,687	\$ 8,216,592	\$ 7,563,180
ASHLAND	\$ 3,601,923	\$ 3,891,830	\$ 3,972,659	\$ 4,051,637	\$ 4,677,836	\$ 4,799,333
TOTALS	\$ 16,419,436	\$ 15,983,201	\$ 17,237,965	\$ 17,023,685	\$ 19,787,965	\$ 19,360,234

Kentucky Power Company

5-Year System Performance

(Excluding Major Events as defined by IEEE Std 1366)

Calendar Year	SAIFI	CAIDI	SAIDI
2008	2.904	170.9	496.3
2009	2.556	194.5	497.1
2010	2.470	169.4	418.4
2011	3.085	195.4	602.8
2012	2.417	189.5	458.0

Kentucky Power Company

2012 WORST PERFORMING CIRCUITS

Analysis of Causes/Corrective Actions

Ashland District

Olive Hill - West Carter Elementary 12kV Circuit (3103103 – SAIDI #3)

Over 93% of the Total Customer Minutes Interrupted for this circuit result from four cause codes: Tree Inside ROW (38.9%), Weather - Lightning (24.8%), Tree Out of Right-of-Way (15.5%), and Weather – High Winds (Exceeding 60 mph) (14.1%).

Storms rolled through the Ashland District on July 8 and July 27 creating multiple outages that were not large enough to qualify as a Major Event Day. On July 8, Ashland had over 100+ sustained outages. The sheer number of outages on this day resulted in extended outage times. The outage on this circuit on July 8 resulted from lightning and accounted for 24% of the customer minutes for the year. On July 27, Ashland had 75 sustained outages - with multiple outages on this circuit (2 Tree Inside ROW and 1 Tree Outside of ROW). Outages on these 2 days accounted for 50% of the customer outage minutes on this circuit for the year.

Corrective Actions

The Forestry Department will field check this circuit in 2013 to identify spot trimming opportunities and will schedule a full circuit re-clear for 2014.

Big Sandy - Fallsburg South 12kV Circuit (3000201 – SAIDI #4)

Over 92% of the Total Customer Minutes Interrupted can be accounted for due to four cause codes for this circuit: Equipment Failure (37.8%), Tree Outside of ROW (36.1%), Tree Inside of ROW (13.5%), and Weather – Unknown (5.3%).

Approximately 34% of the Customer Minutes Interrupted are due to an outage on July 13, where crews found a problem with a tie wire and insulator on the main line which damaged the cross arms.

Corrective Actions:

Work was completed in late 2012 which helps reduce line exposure in the station zone and splits the circuit up into two large sections. This split is now only 1.9 miles from the station. This will reduce SAIFI by reducing the number of customers affected on certain future outages. SAIDI will be reduced not only by reducing SAIFI, but switches were installed that will allow either side of the split to be picked up off the other side

(depending on where the fault occurs). This circuit is presently being re-cleared with completion scheduled for mid-2013.

Russell - Kenwood 12kV Circuit (3010601 – SAIDI #6)

Over 92% of the Total Customer Minutes Interrupted on this circuit can be accounted for by three cause codes: Tree Inside of ROW (66.4%), Tree Outside of ROW (19.2%), and Weather – High Winds (6.5%).

Approximately 74% of the Total Customer Minutes Interrupted occurred between July 2 and July 4. Ashland had over 175+ sustained outage cases during this period, while work continued on the outages resulting from the Major Event Days starting on June 29.

Corrective Actions:

This circuit is on the 2013 Forestry work plan for a full circuit re-clear.

Busseyville - Torchlight 34kV Circuit (3007904 – SAIDI #7, SAIFI #9)

Over 80% of the Total Customer Minutes Interrupted on this circuit resulted from three cause codes for this circuit: Tree Outside of ROW (58.7%), Scheduled (12.3%), and Tree Inside the ROW (9.3%). Over 85% of the Total Customers Affected on this circuit can be accounted for due to two cause codes: Tree Outside the ROW (64.9%) and Scheduled (20.1%).

Approximately 11% of the Total Customer Minutes Interrupted resulted from a scheduled outage on March 13 for permanent repairs at a two pole structure. This two pole structure was damaged during the March 2 tornado (a Major Event Day.) The two-pole structure was temporarily repaired at that time, allowing crews to restore service at other locations during the outage.

Also in 2012, five Tree Outside of the ROW occurred on the first recloser zone outside of the station between June 29 and July 14. This recloser zone serves over 96% of the customers on this circuit and has no alternate tie. All five interruptions came within a two week period and during multiple Major Event Days. Two of the Tree Outside the ROW outages were during Major Event Days. The other three outages accounted for 81.1% of the Total Customer Minutes Interrupted as a result of trees outside of the ROW, and accounted for 47.6% of the Total Customer Minutes Interrupted for all outages on the circuit.

Corrective Actions:

The circuit was patrolled after July 14, 2012. No additional concerns involving trees outside the ROW in the first recloser zone were noted. There were no Tree Outside the ROW outages on this recloser zone since July 14, 2012. Plans are being prepared to construct a 4.5 mile tie line that will allow for customer transfers. Approximately one-

half of the work will be completed in 2013, with the balance to be completed by the end of 2014.

The Company also is investigating the possibility of relocating inaccessible sections of the main line to the road along guard rails and widening the ROW for selected sections of the line that cannot be relocated. The Company expects to complete some widening by the end of 2013.

Big Sandy - Burnaugh 12kV Circuit (3000202 -- SAIDI #9)

Approximately 90% of the Total Customer Minutes Interrupted resulted from three cause codes for this circuit: Tree Outside of ROW (49.9%), Weather – High Winds (24.4%), and Weather – Lightning (15.75%).

Approximately 39% of the Total Customer Minutes Interrupted occurred between July 2 and July 4. During this time, Ashland had over 175 sustained outage cases, while still completing the outages from the MED that started on June 29. The largest customer outage ticket during this time had 46 customers interrupted for this circuit.

Another 16% of the Total Customer Minutes Interrupted occurred July 8, when the Ashland District had over 100 outages.

Approximately 36% of the Total Customer Interrupted happened outside the two dates mentioned above but were caused by Tree Outside the ROW.

Corrective Actions:

The Company plans to review portions of the R/W where Trees Outside the ROW have been an issue to determine if corrective work is required.

Kentucky Power Company

2012 WORST PERFORMING CIRCUITS

Analysis of Causes/Corrective Actions WPC by SAIFI and SAIDI

Hazard District

Slemp Station – Defeated Creek 34.5kV Circuit (3309901 – SAIDI #1, SAIFI #1)

In 2012, 52% of the Total Customer Minutes of Interruption on this circuit was due to Unknown causes and 41% was due to Tree related causes. The Unknown causes also resulted in 50% of the Total Customers Affected in 2011. A total of six breaker outages were caused by an unknown event. Each of these six outages (depicted in the table below) contributed to Slemp Defeated Creek achieving the top rank on both the WPC lists.

Interruption Start Date	Minor Cause Code Desc	Outage Duration	Total Cust Affected	Total Cust Min
01/23/2012	UNKNOWN (NON WEATHER)	738	78	28,782
01/23/2012	WEATHER - UNKNOWN	478	78	18,642
05/28/2012	UNKNOWN (NON WEATHER)	278	84	11,676
06/21/2012	UNKNOWN (NON WEATHER)	88	83	7,304
11/02/2012	WEATHER - ICE (1/2 INCH OR > 6 " SNOW)	40	78	3,120
11/12/2012	WEATHER - UNKNOWN	774	33	12,771

Corrective Actions:

Work recently completed to improve reliability on the Slemp -Defeated Creek included:

- The first few miles of line of the Slemp -Defeated Creek circuit travels through a wooded area. Roughly 3.5 miles of this line were aerial sprayed in 2012 to limit tree related issues.
- In 2012 a tie line to an adjacent circuit was constructed. A little over 60% of customers were moved to this circuit resulting in fewer and shorter outages for the customers that were moved.
- A recloser was added to sectionalize the main line. The shorter line segments minimize the time required to patrol the area and locate the fault.

During an aerial patrol, several deteriorated structures were identified, including one with a bad cross arm. These structures were replaced. Although not the cause of these outages, this preventive maintenance should limit future structure-based outages.

A second aerial patrol identified a phase to neutral spacing problem. The problem will be corrected in 2013, through replacement of several additional older structures.

Bonnyman Station – Big Creek 34.5kV Circuit (3308503 – SAIDI #5, SAIFI #7)

The Bonnyman - Big Creek circuit was not on either the SAIFI or SAIDI list in 2011. It nevertheless experienced four unpredictable outages in 2012 which accounted for 50% of the Total Customer Minutes of Interruption and 72% of the Total Customers Affected on this circuit

Interruption Start Date	Minor Cause Code Desc	Outage Duration	Total Cust Affected	Total Cust Min
01/21/2012	EQUIPMENT FAILURE	345	1,532	476,862
04/06/2012	TREE REMOVAL (NON AEP)	229	1,519	132,721
10/25/2012	EQUIPMENT FAILURE	101	1,515	153,015
12/10/2012	WEATHER - FLOOD/SLIDE	802	1,528	363,212

On January 21, 2013 defective insulators caused the station breaker to open. In addition to replacing the defective insulators, the Company constructed a tie line between the Bonnyman - Big Creek circuit and the Leslie - Wooton circuit. This allows the easy transfer of customers to the Leslie circuit during certain outages on the Big Creek circuit.

On December 10, rain caused a pole on the side of a bank to slide off the hill. During this outage this section of line was relocated closer to the road. Moving this section of line made it more accessible to the line crews and should improve reliability in the future.

The remaining two outages, like the one involving the slide, were unpredictable outages and unrelated to any unique characteristics of the Bonnyman -Big Creek circuit. One was caused by a customer accidentally knocking a tree into Kentucky Power’s line. The other outage was caused when a switch malfunctioned within the station. These types of outages are rare and can cause the CMI to rapidly accumulate.

Corrective Actions:

In 2012, the Forestry Department began a full circuit re-clear of the Bonnyman - Big Creek circuit that will be completed in 2013. Because of the unique nature of the outage causes, which have been repaired, there are no present plans for additional future work.

Engle Station – Grapevine 34.5kV Circuit (3312202 – SAIFI #5)

This circuit suffered three separate breaker outages which affected 50% of the Total Customers Affected by outages on this circuit in 2012. Another 25% were affected by tree related outages. A brief summary of these station breaker outages can be seen in the table below.

Interruption Start Date	Minor Cause Code Desc	Outage Duration	Total Cust Affected	Total Cust Min
02/24/2012	WEATHER - LIGHTNING	66	1,192	78,672
05/14/2012	EQUIPMENT FAILURE	228	1,295	293,516
10/04/2012	SCHEDULED COMPANY	73	1,291	94,243

Two of these outages were due to lightning and a failed lightning arrester. The October 4 outage was scheduled to replace several deteriorated insulators which were identified on this circuit.

Corrective Actions:

The Engle Grapevine circuit will be inspected in full in early 2013. Any critical deficiencies found during this inspection will be corrected.

The Company plans to begin a full circuit re-clear in 2013 of the Engle Grapevine circuit. This work is expected to be finished in 2014. This includes clearing the main line as well as the side taps, and eliminating ‘Danger Trees’ that pose a threat of falling onto the power lines.

Bulan Station – Ary-Heiner 12.47kV Circuit (3307301 – SAIDI #10, SAIFI #6)

Approximately 66% of the Total Customer Minutes of Interruption and 59% of Total Customers Affected by outages on this circuit in 2012 were the result of tree-related outages.

Corrective Actions:

A full circuit re-clear of the Bulan Ary-Heiner circuit was completed in January 2013. This included clearing the main line as well as the side taps, and eliminating ‘Danger Trees’ that pose a threat of falling onto the power lines. This work is expected to significantly reduce tree related outages.

Cut-out replacements on this circuit during 2012 helped keep equipment failure outages at a very low level for the year.

No further actions are required.

Leslie Station – Wooten 34.5kV Circuit (3303902 – SAIFI #8)

The Leslie Wooten Circuit is a large circuit serving over 1,800 customers. This circuit has experienced multiple tree related outages affecting a large number of customers (49% of Total Customers Affected). The only other significant outage cause was Weather-Unknown which affected 26% of the customers outaged on this circuit. The chart below summarizes these outages.

Cause	Customers Affected
Tree Out of ROW	3292
Weather - Unknown	2502
Tree Inside ROW	1417

Corrective Actions:

In 2012, a coordination issue between the station breaker and a first zone recloser was discovered. The station breaker settings have since been corrected, thereby reducing outages by preventing unnecessary breaker lock outs.

An electronic recloser has also been ordered to replace this first zone recloser. This will further ensure that there is superior coordination between the breaker and this device. The electronic recloser will also provide information that can be used to help improve reliability.

In addition, vegetation management plans to begin a full circuit re-clear of the Leslie-Wooten circuit in 2013. This work is expected to be finished in 2014. This includes clearing the main line as well as the side taps, and eliminating ‘Danger Trees’ that pose a threat of falling onto the power lines. Tree related outages experienced by this circuit will be addressed with this re-clear, and is expected to significantly reduce tree related outages.

Jeff Station – Viper 12.47kV Circuit (3309001 – SAIFI #10)

Tree related outages affected 36% of the Total Customers Affected by outages on this circuit in 2012. Scheduled Company Outage was the next highest cause with 26% of the customers and Transmission Outage with 19%. There were 2 outages affecting the station breaker and these are shown in the table below.

Interruption Start Date	Minor Cause Code Desc	Outage Duration	Total Cust Affected	Total Cust Min
06/26/2012	SCHEDULED COMPANY	300	741	222,300
07/24/2012	TRANSMISSION INFORMATION NEEDED	19	746	14,174

The June 26th scheduled outage was taken to allow the highway department to safely drive steel. This type of outage cannot efficiently be prevented without endangering highway department employees.

The Jeff - Viper SAIFI was increased in 2012 beyond what it otherwise would have been as a result of two unusual outages that resulted in the entire circuit losing power.

Corrective Actions:

In 2013, the Company will begin converting the Jeff station to a 34.5kV station. This will have a positive impact on circuit reliability:

This conversion will provide a tie line between Hazard - Blackgold and Jeff - Viper as well as other circuits, allowing the Company to restore service more quickly to customers in the event of an outage by switching them to a different power source.

The Company will rebuild several miles of line to accommodate the higher voltage. In completing this task, several poles on this circuit will be replaced. This will help reduce outages caused by equipment failures, loose connections, or other issues where aged equipment was the culprit.

The Company will begin a full circuit re-clear of the Jeff-Viper in 2013. This work is expected to be finished in 2014. This includes clearing the main line as well as the side taps, and eliminating 'Danger Trees' that pose a threat of falling onto the power lines. Tree related outages experienced by this circuit will be addressed with this re-clear, and is expected to significantly reduce tree related outages.

Kentucky Power Company

2012 WORST PERFORMING CIRCUITS

Analysis of Causes/Corrective Actions WPC by SAIFI and SAIDI

Pikeville District – These five circuits on the 2012 Worst Performing Circuits list in the Pikeville District were not on the 2011 Worst Performing Circuits list. The following summarizes our analysis and proposed corrective actions.

Lovely- Wolfcreek 34kV Circuit (3202202) (SAIFI #2)

Circuit: 2022-02				
Nbr of Customers: 858				
Major Cause Name	Major Cause Name	Occurrences	Total Cust Minutes Interr	Total Customer Affected
DISTRIBUTION LINE	ANIMAL - BIRD	3	579	5
DISTRIBUTION LINE	EQUIPMENT FAILURE	8	107,897	903
DISTRIBUTION LINE	OTHER	1	5,052	12
DISTRIBUTION LINE	SCHEDULED COMPANY	2	20,890	137
DISTRIBUTION LINE	SCHEDULED OUTSIDE REQUEST > 1 CUS	3	199,740	680
DISTRIBUTION LINE	TREE INSIDE ROW	24	212,720	1,251
DISTRIBUTION LINE	TREE OUT OF ROW	10	152,288	1,136
DISTRIBUTION LINE	TREE REMOVAL (NON AEP)	1	2,028	12
DISTRIBUTION LINE	UNKNOWN (NON WEATHER)	5	1,709	17
DISTRIBUTION LINE	VINE	12	113,048	871
DISTRIBUTION LINE	WEATHER - HIGH WINDS (EXCEEDING 60	8	164,839	124
DISTRIBUTION LINE	WEATHER - LIGHTNING	1	6,090	10
DISTRIBUTION LINE	WEATHER - UNKNOWN	4	87,434	1,012
PARTIAL POWER	EQUIPMENT FAILURE	1	56	1
Sum:		83	1,074,370	6,371

The Lovely-Wolfcreek Circuit experienced 83 outages in 2012. Tree Inside ROW, Tree Out of ROW, Weather-Unknown, Equipment Failure and Scheduled Outside Request were the outage causes which affected the most customers on the circuit.

- Tree Inside ROW and Tree Out of ROW caused 37.5% of the customers affected by outages during the year.
- 16% of customers' outages were due to Weather-unknown, some of which may actually be due to vegetation.
- Equipment Failure caused 14% of customers' outages.
- 13.8% of the customers affected were due to scheduled outage. Request caused by KYDOT driving steel on the side of the road.

Corrective Actions

- The Forestry Department has scheduled this circuit for a Full Circuit Reclear in 2013. These actions should prevent tree related outages on this circuit in the coming year.
- Improve sectionalizing to limit outages to as few customers as possible.

Lovely- Lovely 34kV Circuit (3202201) (SAIFI #4)

Circuit: 2022-01		Nbr of Customers: 1,027			
Major Cause Name	Minor Cause Name	Occurrences	Total Cust Minutes Interr	Total Customer Affected	
DISTRIBUTION LINE	ANIMAL - BIRD	1	136	4	
DISTRIBUTION LINE	ANIMAL - NON BIRD	1	75	1	
DISTRIBUTION LINE	EQUIPMENT FAILURE	5	13,784	77	
DISTRIBUTION LINE	ERROR - FIELD	3	13,775	212	
DISTRIBUTION LINE	FIRE - AEP, OR AFFECTING > 1 CUSTOMER	1	100	1	
DISTRIBUTION LINE	SCHEDULED COMPANY	4	50,971	945	
DISTRIBUTION LINE	TREE INSIDE ROW	28	134,151	1,068	
DISTRIBUTION LINE	TREE OUT OF ROW	7	209,094	3,621	
DISTRIBUTION LINE	UNKNOWN (NON WEATHER)	2	7,884	67	
DISTRIBUTION LINE	VEHICLE ACCIDENT (NON AEP)	1	44,604	413	
DISTRIBUTION LINE	VINE	16	5,861	31	
DISTRIBUTION LINE	WEATHER - HIGH WINDS (EXCEEDING 60	3	183,791	171	
DISTRIBUTION LINE	WEATHER - UNKNOWN	2	6,573	20	
PARTIAL POWER	EQUIPMENT FAILURE	2	173	2	
PARTIAL POWER	OTHER	1	138	1	
Sum:		77	671,110	6,634	

The two major contributors of outages for this circuit are Tree Inside ROW and Tree Out of ROW. These causes affected 71% of the total customers affected by outages on this circuit in 2012

Corrective Actions

The Forestry Department began a full circuit reclear on this circuit in 2012 and is about 65% completed. The remainder of the circuit will be reclear in 2013.

Lovely-12kV Mount Sterling 34kV Circuit (3202203) (SAIDI #8)

Circuit: 2022-03		Nbr of Customers: 210			
Major Cause Name	Minor Cause Name	Occurrences	Total Cust Minutes Interr	Total Customer Affected	
DISTRIBUTION LINE	ANIMAL - NON BIRD	1	207	3	
DISTRIBUTION LINE	EQUIPMENT FAILURE	4	2,611	12	
DISTRIBUTION LINE	TREE INSIDE ROW	7	23,146	172	
DISTRIBUTION LINE	TREE OUT OF ROW	3	245,369	232	
DISTRIBUTION LINE	VINE	2	282	4	
DISTRIBUTION LINE	WEATHER - LIGHTNING	1	82	1	
Sum:		18	271,697	424	

The two major causes of outages on this circuit accounted for 98.8% of the total CMI. These outages were due to Tree Out of ROW and Tree Inside ROW.

Corrective Actions

The Forestry Department has scheduled this circuit for a full circuit Reclear in 2013.

Kenwood-West Van Lear 12kV Circuit (3409301) (SAIFI #3)

Circuit: 4093-01				
Nbr of customers: 1,506				
Major Cause Name	Minor Cause Name	Occurrences	Total Cust Minutes Interr	Total Customer Affected
DISTRIBUTION LINE	ANIMAL - BIRD	2	141	2
DISTRIBUTION LINE	ANIMAL - NON BIRD	8	1,602	13
DISTRIBUTION LINE	EQUIPMENT FAILURE	15	5,324	42
DISTRIBUTION LINE	ERROR - FIELD	1	36	1
DISTRIBUTION LINE	FOREIGN OBJECT (NON ANIMAL)	1	61	1
DISTRIBUTION LINE	SCHEDULED COMPANY	16	376,413	3,747
DISTRIBUTION LINE	SCHEDULED OUTSIDE REQUEST - 1 CUS	1	145	1
DISTRIBUTION LINE	TREE INSIDE ROW	5	61,792	488
DISTRIBUTION LINE	TREE OUT OF ROW	6	323,957	1,142
DISTRIBUTION LINE	TREE REMOVAL (NON AEP)	1	3,104	8
DISTRIBUTION LINE	UNKNOWN (NON WEATHER)	3	154,633	2,459
DISTRIBUTION LINE	VANDALISM	1	88	1
DISTRIBUTION LINE	VINE	2	416	2
DISTRIBUTION LINE	WEATHER - HIGH WINDS (EXCEEDING 60	1	12,339	1,371
DISTRIBUTION LINE	WEATHER - LIGHTNING	1	1,088	8
DISTRIBUTION LINE	WEATHER - TORNADO	4	1,073	7
PARTIAL POWER	EQUIPMENT FAILURE	1	58	1
PARTIAL POWER	UNKNOWN (NON WEATHER)	1	2,815	1
TRANSMISSION LINE	EQUIPMENT FAILURE	1	94,644	956
TRANSMISSION LINE	ERROR - FIELD	1	22,048	416
Sum:		72	1,061,777	10,667

The following outage causes were the largest contributors to Customers Interrupted in 2012: Scheduled Company 35%; Unknown (non-weather) 23%; Weather-High Winds 12.8%; Tree Out of ROW 10.7%. The Scheduled Company outages were high due to a line rebuild project which enabled the company to shift about half of this circuit's load to a new circuit in an adjacent station. This work not only relieves a loading problem but provides another source to transfer loads to during certain outage situations and will provide for improved reliability for this circuit in the future.

Corrective Actions

The Forestry Department has reviewed this circuit and indicates that no other vegetation management work is required at this time.

Borderland-Chattaroy 12kV Circuit (2150502) (SAIDI #2)

Circuit: 1505.02				
Nbr of Customers: 280				
Major Cause Name	Minor Cause Name	Occurrences	Total Cust Minutes Interr	Total Customer Affected
DISTRIBUTION LINE	EQUIPMENT FAILURE	1	16,146	299
DISTRIBUTION LINE	SCHEDULED COMPANY	2	15,060	89
DISTRIBUTION LINE	TREE INSIDE ROW	2	2,311	14
DISTRIBUTION LINE	TREE OUT OF ROW	3	459,931	121
DISTRIBUTION LINE	VINE	1	174	1
DISTRIBUTION LINE	WEATHER - UNKNOWN	1	25,814	284
PARTIAL POWER	EQUIPMENT FAILURE	1	1,592	4
Sum:		11	521,050	812

The major contributor to outages for this circuit is Tree Out of ROW. This cause (with only 3 occurrences) contributed to 88% of the total CMI related to this circuit during 2012.

Corrective Actions

Forestry has reviewed this circuit and has determined that there is no need to schedule any work at this time.