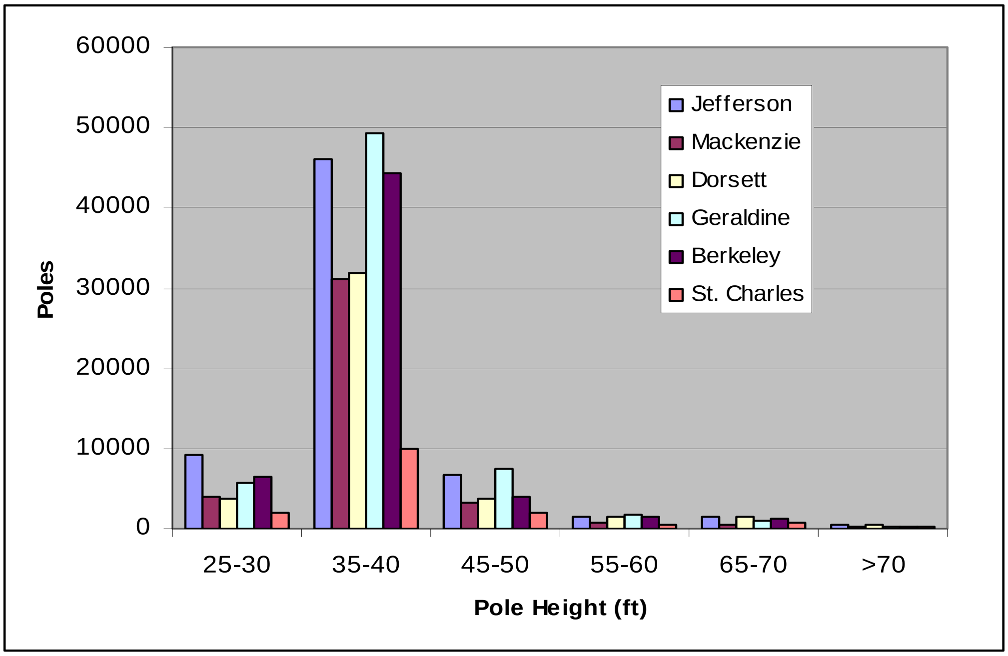


Exhibit 3-7: Pole Height by District

The average pole height as provided in Exhibit 3-7 is provided as a geographical map in Exhibit 3-8.

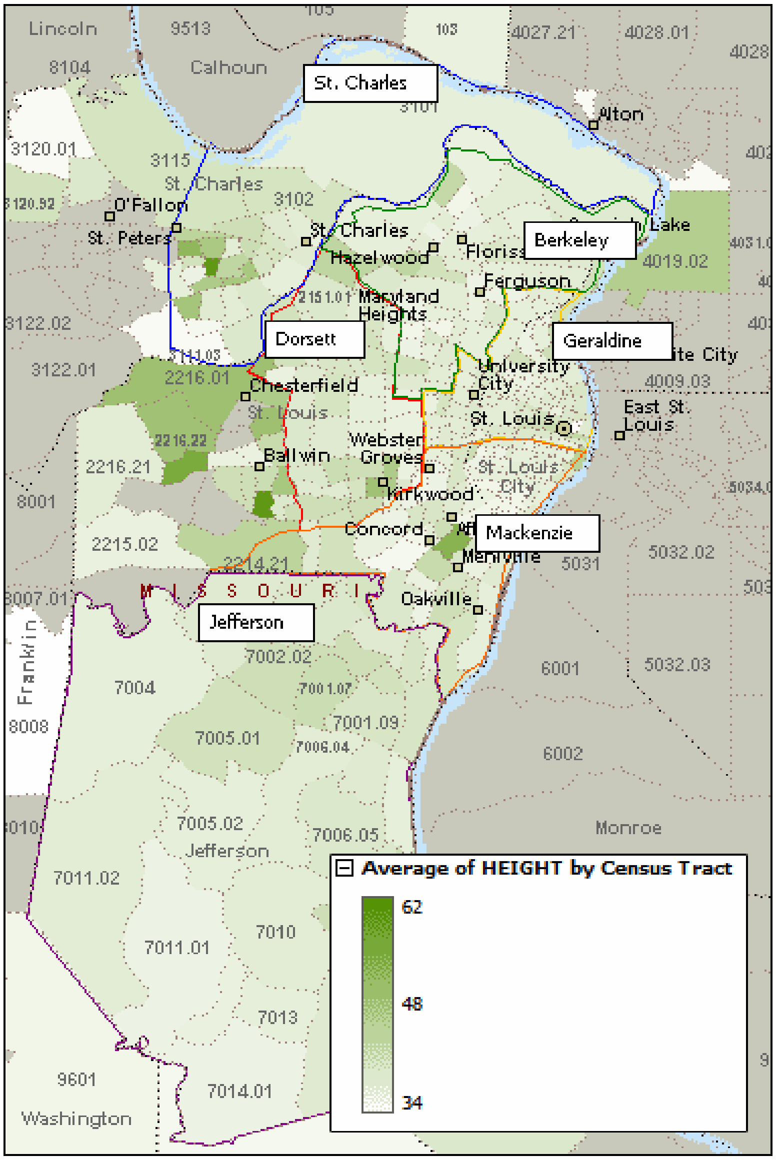


Exhibit 3-8: Average Pole Height (ft)

The areas with lower pole class (stronger poles) coincide with taller poles. This phenomenon exists in the St. Charles, Dorsett and Jefferson districts.

The average pole age tends to correlate positively with pole failure rates. As poles age, they potentially weaken and become more susceptible to the elements. It is therefore beneficial to determine the age of the poles (and later condition of the poles) in the areas affected by the storm. Exhibit 3-9 provides the results. St. Charles and Jefferson appear to have a relatively younger age distribution of poles, indicating that they, assuming all else is equal, should experience relatively less structural damage. The fact that Jefferson did have weaker poles on average may be negated by the fact that these poles were younger on average as well.

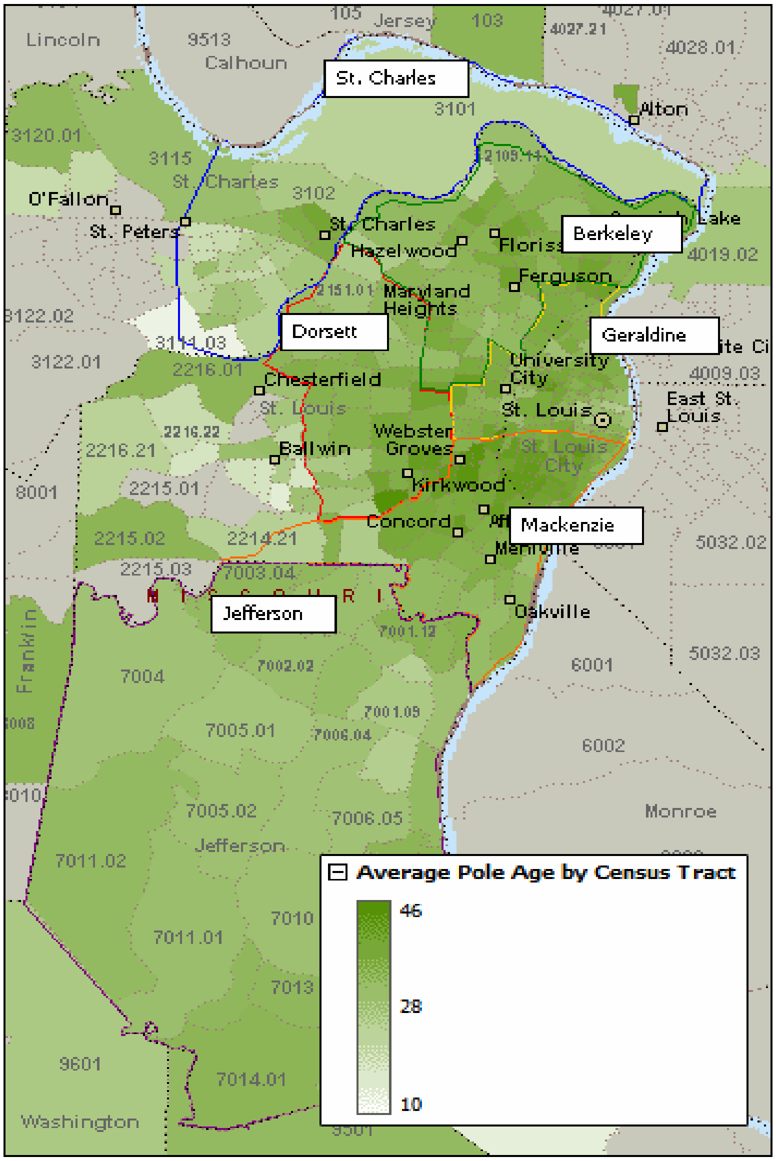


Exhibit 3-9: Average Pole Age (yr)

Depending on the region of interest, vegetation is often a significant factor in wind related storms. Nearby trees (both in and outside of the easement) may make contact with or fall on power lines or impact structures and lines in the form of debris (loosened branches) at high wind speeds. Vegetation density, as shown in Exhibit 3-10, is determined by a weighted average of the subjective vegetation assessments as per pole audit. This weighted average is divided by the square miles for the area of interest. The St. Charles district appears to have less vegetation relative to other districts; therefore, expected to experience less damage, assuming all other factors are equal.

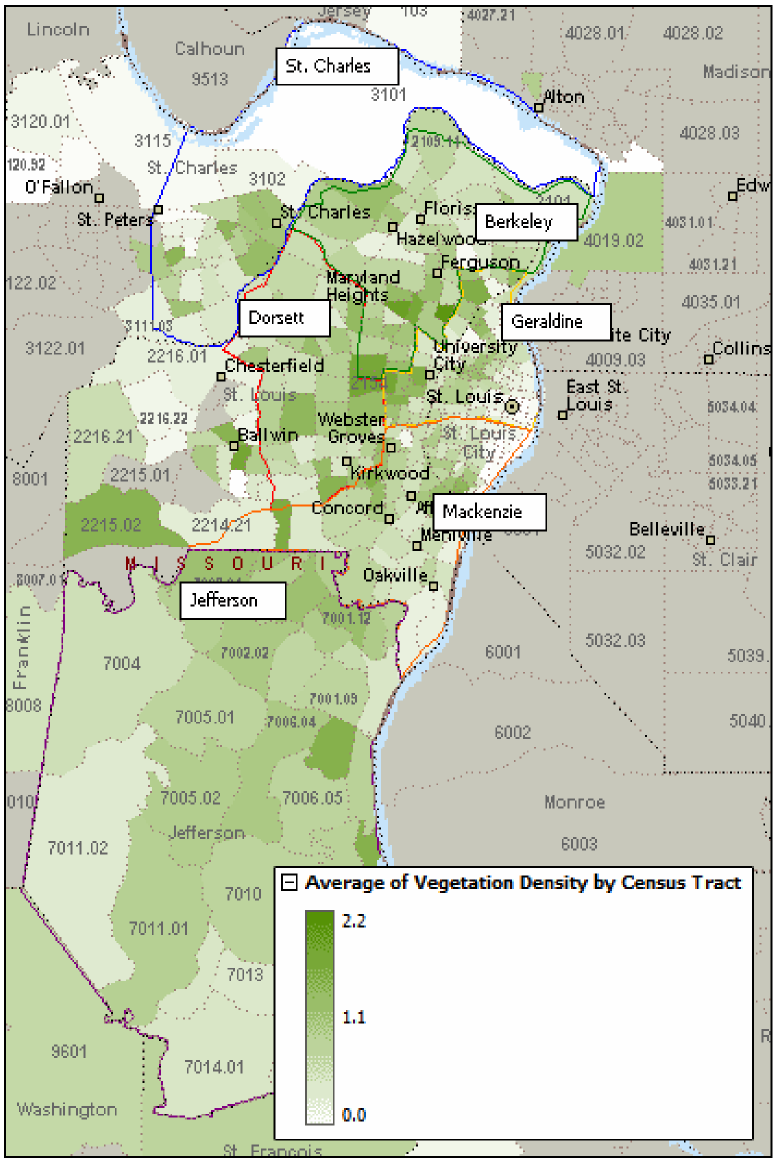


Exhibit 3-10: Average Vegetation Density

(Units are subjective, High = 3, Med = 2, Low = 1, None = 0, per pole averaged on a per census area basis)

In order to determine which areas are at risk for outages caused by vegetation it is important to capture the amount of vegetation and the amount of customers in the areas of interest. Vegetation densities are weighted by pole densities (as a proxy for customer density), as displayed in Exhibit 3-11. Because Berkeley, Geraldine, Mackenzie and to an extent Dorsett are densely populated with trees and have high pole (customer) densities, it is expected that these areas are more susceptible to damage and (impact of) outages by trees.

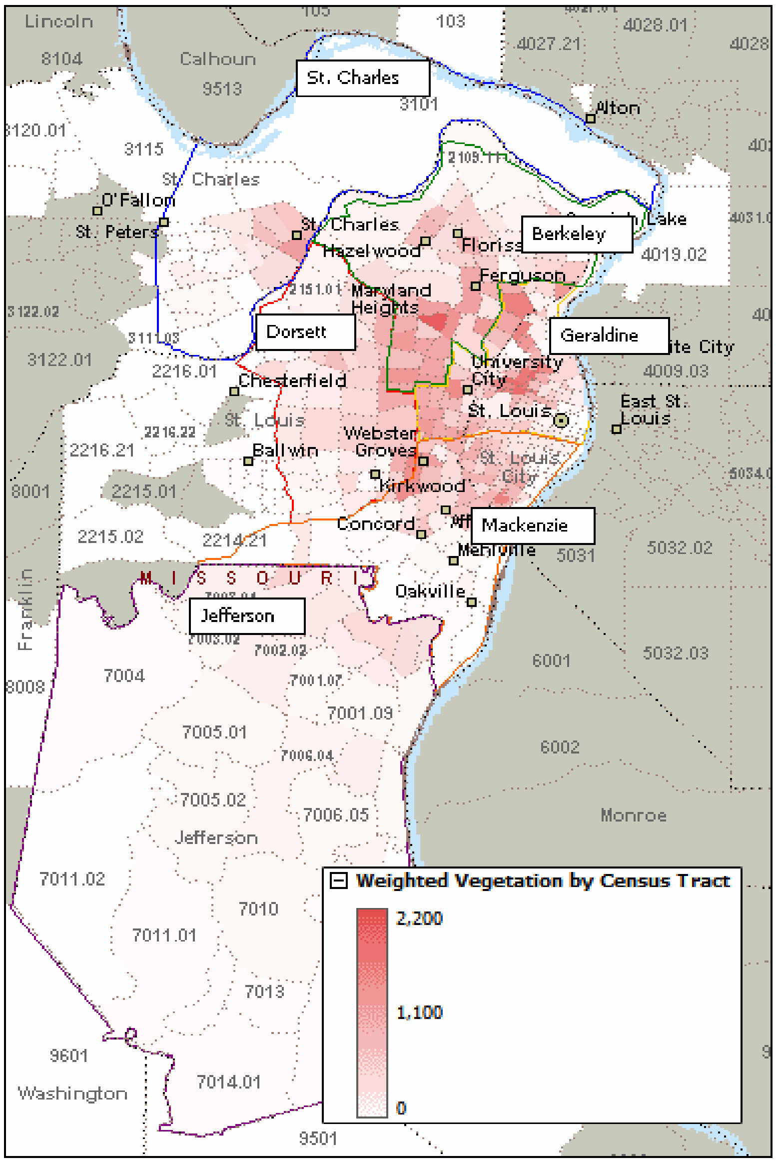


Exhibit 3-11: Vegetation Density Weighted by Pole Density

Units are subjective, the product of the Average Vegetation Density (see Exhibit 3-10) and poles/square mile (see Exhibit 3-4), on a per census area basis.

To better understand the condition of the system leading up to the storm events, AmerenUE's pole inspection and treatment program and vegetation management program have been investigated.

- From 1991 to 1997 AmerenUE performed pole inspections by maps at a rate of approximately 10% of the total sub-transmission and feeder backbone poles (200,000 poles). The selection of poles to inspect was largely based on its being a cyclical program. No data was available from this period.

- From 1997 to 2003 AmerenUE changed the program to a targeted selection and performed the inspections by circuit. AmerenUE started with electronic data capturing in the year 1999.

- In 2003 there was an apparent budget cut resulting in a negligible amount of pole inspections in the area under investigation.

- From 2004 to 2007 Utilimap took over from Osmose and again reverted to a cyclical selection of poles. Data up to 2006 was available but due to reporting differences, some of the analysis performed on the 1999-2002 could not be repeated for the 2004-2006 data. Exhibit 3-12 provides the relevant data and analysis results.

- Before 2003 auditing was conducted on a part-time basis while after 2003 two full-time AmerenUE employees were dedicated to that function.

	General		Pole inspections 1999-2002					Pole inspections 2004-2006			
District	Poles	Avg. Age (2007)	Inspections	% of Total	% Reject	% Decay	Avg. Age	Inspections	% of Total	% Reject	Avg. Age
Berkeley	58,099	35.80	6,780	11.67%	6.15%	18.22%	28.53	2,528	4.35%	3.24%	32.52
Dorsett	42,785	35.56	7,224	16.88%	4.11%	18.30%	23.97	906	2.12%	1.32%	29.42
Geraldine	65,674	35.95	6,674	10.16%	9.21%	20.77%	30.16	2,559	3.90%	3.79%	33.80
Jefferson	66,309	31.92	4,186	6.31%	2.72%	16.91%	26.41	1,205	1.82%	4.81%	26.42
Mackenzie	39,940	39.62	5,723	14.33%	5.21%	15.20%	29.31	4,993	12.50%	3.81%	36.26
St. Charles	15,590	31.77	1,615	10.36%	4.52%	10.77%	22.75	808	5.18%	5.57%	34.14
Total	288,397		32,202					12,999			
Average	48,066	35.10	5,367	11.62%	5.32%	16.70%	26.85	2,167	4.98%	3.76%	32.10

Exhibit 3-12: Pole Inspection and Treatment Program results

The average pole age in 2007 is 35.1 years in the six districts. The average in the Midwest ranges from 33 to 36 years.

The pole rejection rates (poles that did not pass inspections as a function of total poles inspected) before and after the program changed are different. With the targeted approach the average reject rate was higher (5.32%) than the cyclical approach afterwards (3.76%). The average age of inspected poles was comparable.[3] This indicates that the targeted poles must have been selected based on criticality (impact of failure) and perceived condition, independent of age.

The inspection rate represents the average number of poles inspected annually as a function of the total number of poles in each respective district (percentage of total). This number needs adjustment over the time periods reported here (four years and three years, respectively) and a correction for the total number of poles versus poles inspected (the total number of poles include lateral poles). It is assumed that a ratio of three lateral poles to one sub-transmission and feeder backbone pole exists. "Back-calculating" against this assumption results in inspection rates of 11% (1999-2002) and 6% (2004-2006). The inspection rate after the budget cut in 2003 is ramping up to the target level of 10% (being 8.5% in 2006).

As seen from Exhibit 3-12, there is a strong positive correlation between average pole age at inspection and the rejection and decay rates for the data between 1999 and 2002. The rates are higher at elevated average ages per district. This is also true for the general trend per pole as can be seen from Exhibit 3-13.

[3] Important to note here is the difference between the average age now (2007) and the average age at inspection. It is impossible to reconstruct the average age of the entire population at inspection but it can be approximated by adding the difference between now and then (i.e. the average age has gone up by 1 year a year as the number of poles added and replaced by pro-active programs, road widening projects or as a result of weather events is relatively small).

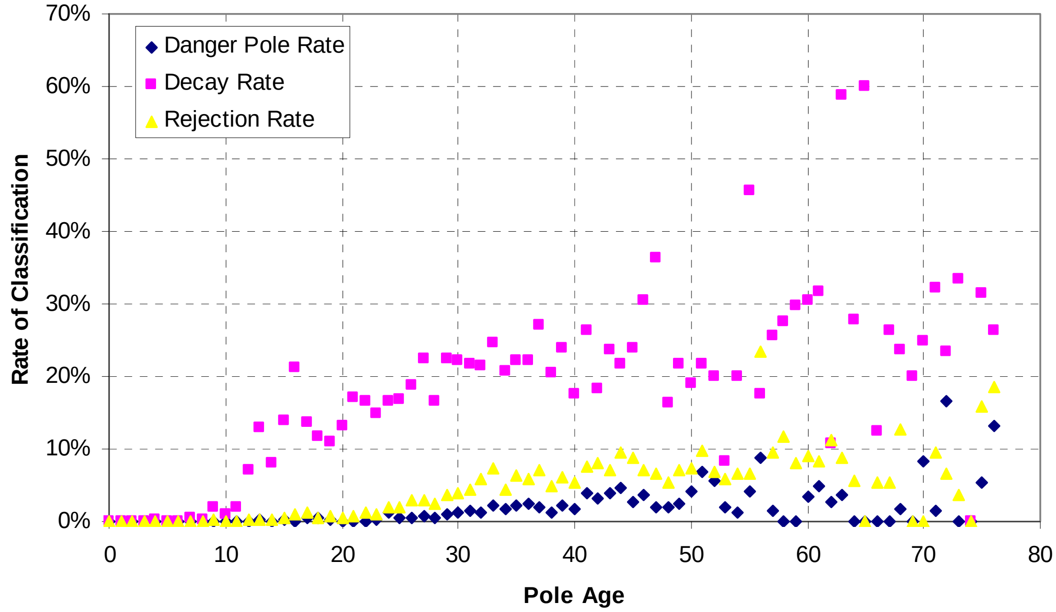


Exhibit 3-13: Pole inspection and treatment results as a function of pole age (1999-2002 data).

Evaluation of AmerenUE's vegetation management budget and spending results in the apparent absence of a storm reserve (refer to Exhibit 3-14). AmerenUE does not maintain reserves for any storm related spending as severe storms rarely occurred in the area. Prior to the 2006 July storm, AmerenUE had experienced only a maximum of 3.5 storm days. The restoration time target is less than 72 hours.

It can be observed that the budget is not fully used except for the most recent year (2006). This could lead to the interpretation that AmerenUE may withhold a storm reserve throughout the year within the business lines and consequently does not spend the full budget on cycle work. This coincides with the fact that cycle work backlog exists and was growing until 2005. However, the true interpretation of the under-spending has to do with resource unavailability, storm expenditures (including resources) and mutual aid. AmerenUE's vegetation management budget has been ramping up since 2004 (after a budget cut in 2003 that coincided with the budget cut related to the pole inspection program) and has reduced the growth of cycle work backlog since then but has been hampered by increasing storm related spending and a loss of available labor resources due to hurricane assistance as part of the mutual aid arrangements.

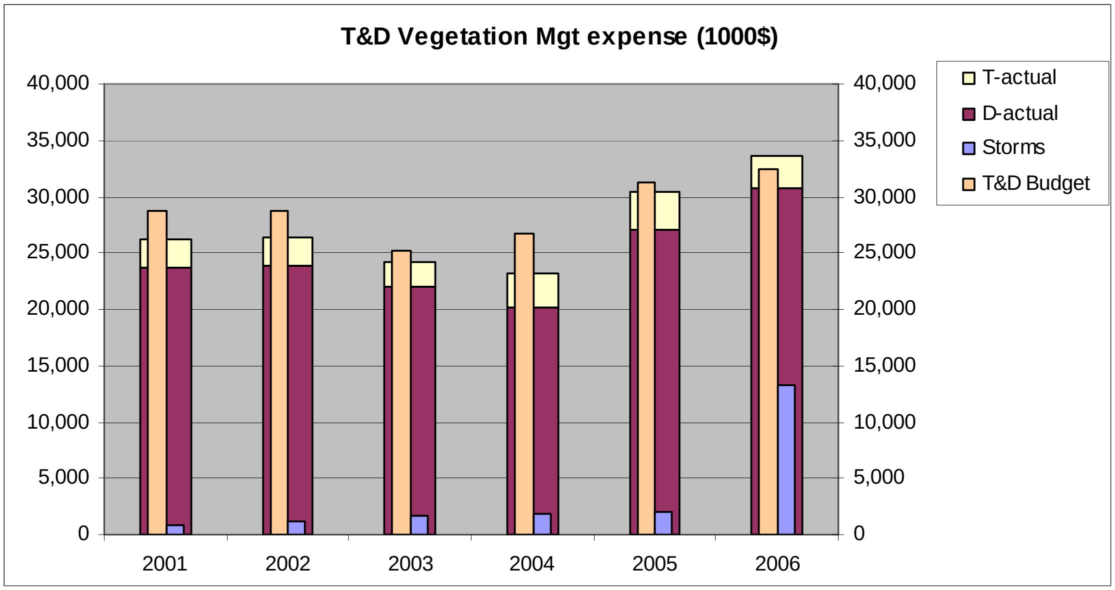


Exhibit 3-14: Trend in Vegetation Management budget and spend

The extremely high storm expense in 2006 is noted as well as the fact that, even with the high storm incidence that year, the company was still able to complete more cycle work than in previous years.

Further independent references indicated the data captured in Exhibit 3-15.

	Missouri	National Average
Urban trees per capita	21	17
Urban tree cover	30.60%	27.10%

Exhibit 3-15: Benchmark data from the year 2000 [4]

Another factor is that most of the urban areas have gained tree canopy. This situation was identified and quantified by a study performed by a local government agency [5] comparing the tree canopy in 1964/1965 with that in 1996. Saint Louis county gained more than 30% new canopy area, retained 13% of the total area and lost less than 5%, resulting in a net gain of 25%.

[4] From: "Connecting people with ECO systems in the 21st Century; an assessment of our nation's urban forests".
[5] From: "Urban Choice Coalition"

From these two references it can be concluded that vegetation management spending requires more attention with respect to trees in the urban areas under review and that funding for cycle work may need to increase along with growing vegetation density.

3.2.2 July Storm Event

3.2.2.1 July Storm Event Severity

A deadly heat wave swept across the United States during the third week of July 2006. Each afternoon temperatures topped out near or above the century mark with heat indices reaching above 115° F in some locations. In all, 22 deaths in 10 states were blamed on the excessive heat during that week.

19 July 2006: Round One of Severe Weather

On July 19th, after reaching a high temperature of 100 degrees, a cluster of thunderstorms, also known as a mesoscale convective system, formed across Northern Illinois and propagated southwest across West Central Illinois and Eastern Missouri. The outflow boundary and the thunderstorm complex produced straight-line winds and downbursts that created widespread wind damage from Central Illinois across the St. Louis Metropolitan Area and into the Eastern Ozarks. The damage sustained in the St. Louis Metropolitan Area was consistent with wind speeds between 70 and 80 mph. Areas of damage across Illinois suggested that wind speeds could have approached 90 mph. Two tornado tracks were also uncovered across Southwest Illinois near the towns of Bunker Hill and Edwardsville. Over 500,000 customers lost power, and thus no air conditioning.

A State of Emergency was declared for the St. Louis Area, and the Governor called in the National Guard to help with heat evacuations and clean-up efforts from the severe thunderstorms. The temperature rose near 100 degrees once again on Thursday and heat index values were as high as 115 degrees in the affected region.

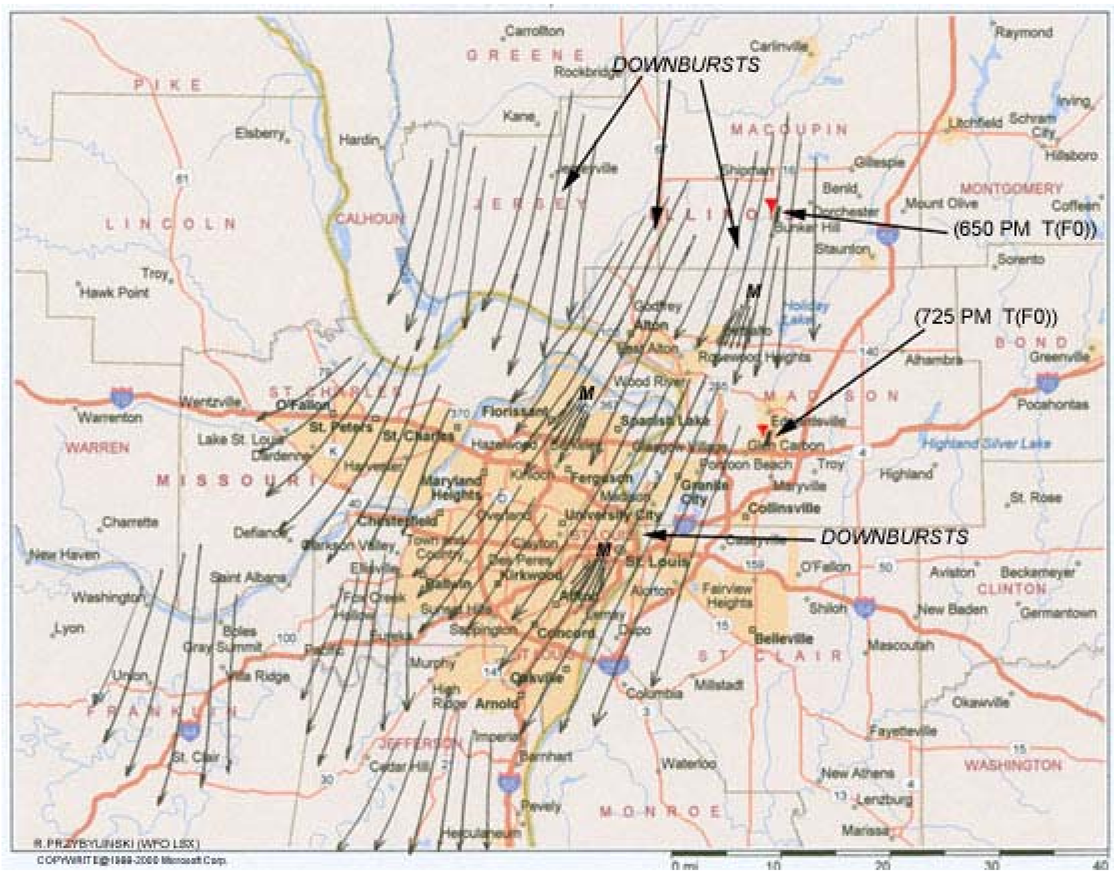


Exhibit 3-16: STORM DAMAGE MAP: Wednesday, July 19, 2006. M represents locations of microbursts and T signifies locations of tornado touchdowns.

21 July 2006: Round Two of Severe Weather

Another complex of severe thunderstorms formed across Central Missouri during the morning of July 21st on the trailing end of an outflow boundary from overnight convection across Southern Iowa and Northern Missouri. This cluster of thunderstorms formed into a bow echo as they pushed across the St. Louis Metropolitan Area producing another swath of wind damage from Central Missouri to Central Illinois. To the north of the apex of the bow a strong circulation produced several tornadoes. This led to many additional power outages and complicated clean up efforts from the July 19th storm damage. Some people who had just gotten their power back from the previous storm suddenly found themselves in the dark once again. The number of customer outages once again rose above 500,000.

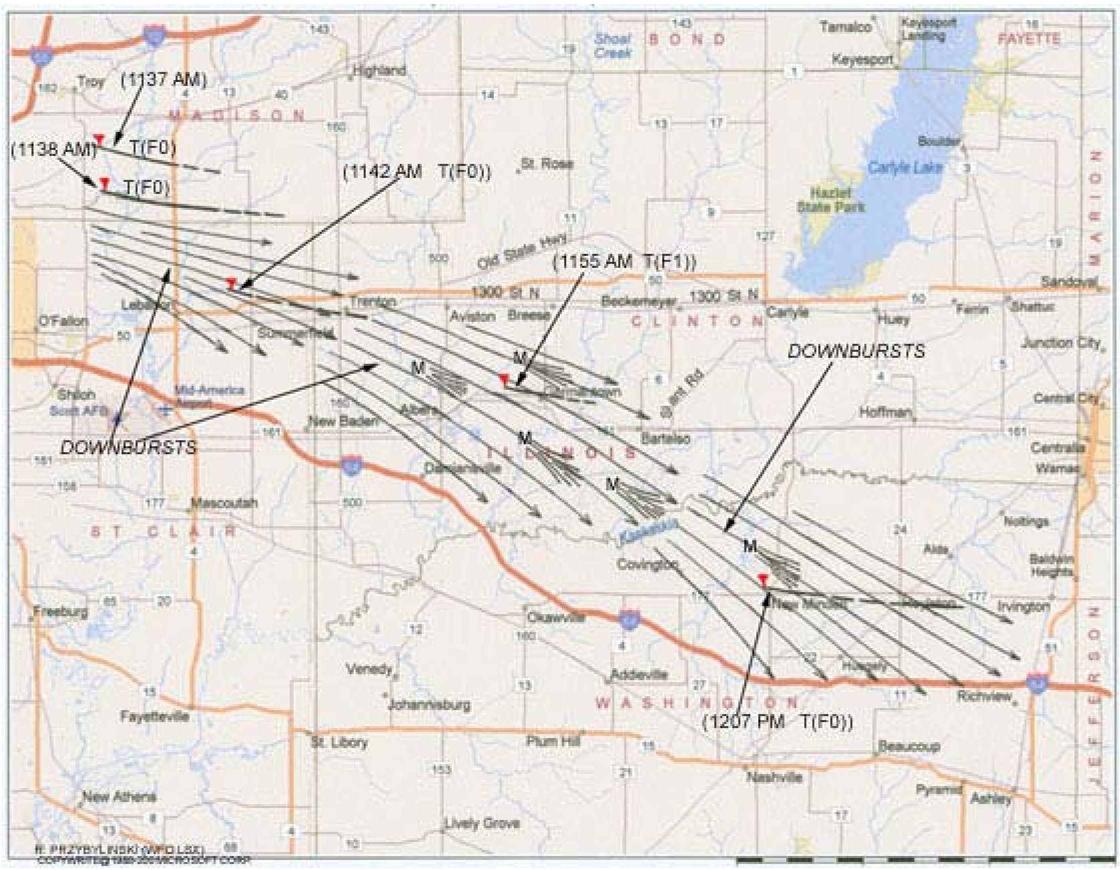


Exhibit 3-17: STORM DAMAGE MAP: Friday, July 21, 2006. M represents locations of microbursts and T signifies locations of tornado touchdowns.

The storm's summary along with local storm reports that contain measured wind speed in miles per hour along with latitude and longitude to define the location, reference Exhibit 3-18. Larger circles indicate higher wind speeds. The green storm path and associated wind speeds relate to the July 19th storm, the orange is the July 21st event. In the area of review we see higher reported wind speeds in Berkeley, on the edge of Dorsett and Jefferson. Downbursts, denoted by red and purple arrows for the July 19th and 21st storms respectively, were experienced in small areas within the Berkeley and Mackenzie districts. Note, that this graph only represents recorded wind speeds. The number of locations is limited by the lack of additional weather stations and trained spotters. Most likely, there are other areas affected by high wind speeds that went unrecorded.

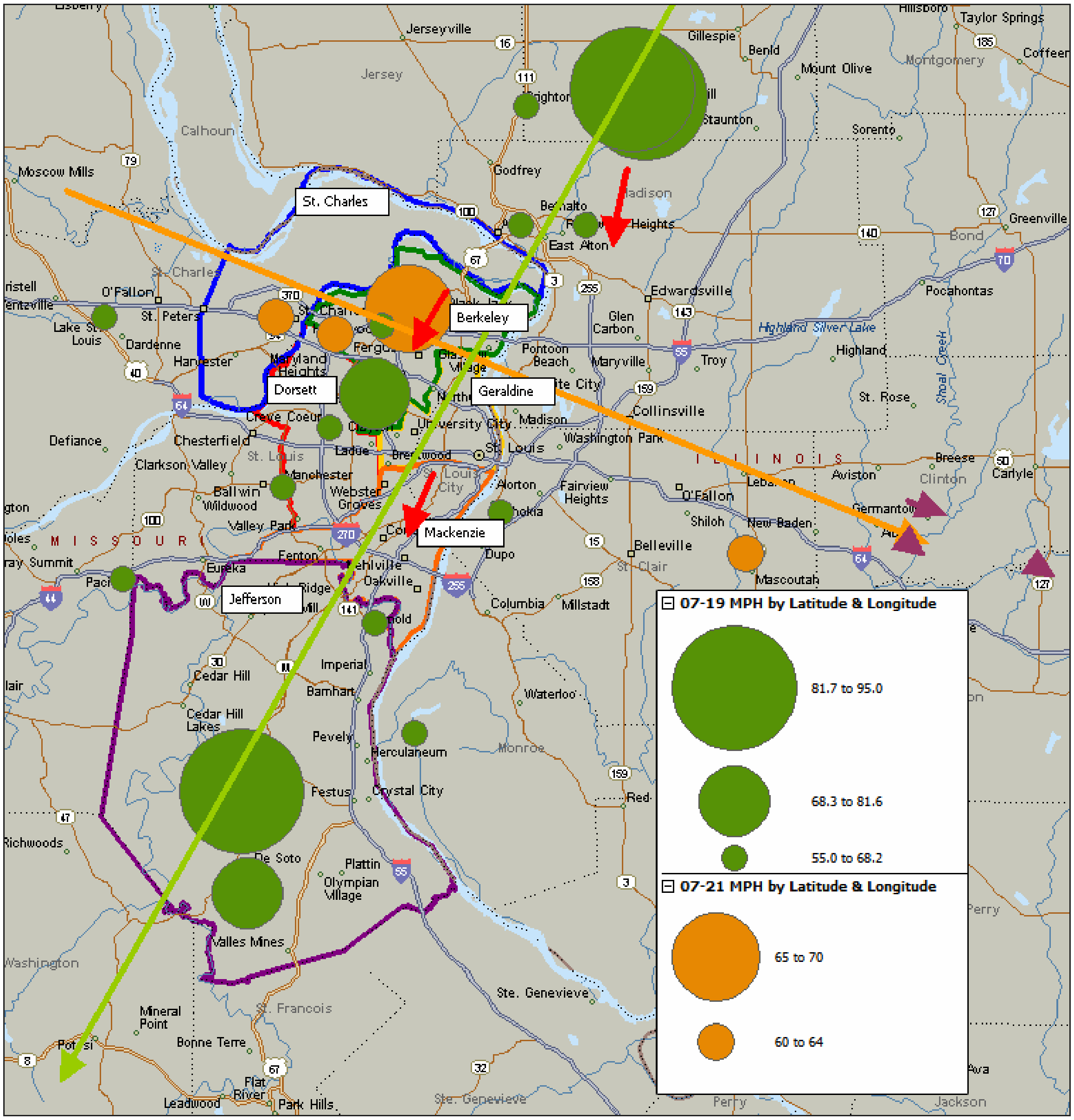


Exhibit 3-18: July Storm Events

3.2.2.2 July Storm Outages

The areas reviewed sustained a large number of outages. Exhibit 3-19 provides a summary of these outages per district. The outage data, coming from the OAS, per incident (components involved and corresponding root cause) is summarized on a per feeder basis. Subsequent analysis focused on a per feeder basis, with the aggregated results summarized to the district level.

	General		Lockout Statistics			
District	Feeders	Customers	Feeders	% Lockout	Customers	Outage Events
Berkeley	221	136,419	164	74.21%	118,326	3,123
Dorsett	148	99,677	58	39.19%	36,648	676
Geraldine	358	140,347	163	45.53%	87,625	2,309
Jefferson	103	88,033	27	26.21%	24,522	380
Mackenzie	294	192,779	120	40.82%	93,014	1,686
St. Charles	56	58,794	26	46.43%	24,636	444
Total	1,180	716,049	558	47.29%	384,771	8,618

Exhibit 3-19: July Storm, Outage Summary by District

Berkeley experienced the highest percentage of feeders locked out during the storm (74%). The average among all the districts is approximately 47%.

The number of poles and miles of conductor issued during the storm represent the number of failed poles and downed conductor. As part of the forensic analysis these two data points provide a glimpse of the pole and wire failure rates. The failure rate for storms can be compared as a function of the area exposed (number of poles and circuit length) and wind speeds. The results are compiled from AmerenUE's work and materials management system, abbreviated as DOJM, and presented in Exhibit 3-20.

District	Poles Down	%	Conductor Down (mi)	%
Berkeley	55	0.09%	2.19	0.06%
Dorsett	20	0.05%	1.40	0.05%
Geraldine	78	0.12%	26.58	0.91%
Jefferson	20	0.03%	0.67	0.01%
Mackenzie	103	0.26%	5.72	0.15%
St. Charles	14	0.09%	0.90	0.06%
Total	290	0.10%	37.46	0.18%

Exhibit 3-20: July Storm, Pole and conductor installation data from DOJM

The total number of poles issued and assumed to have failed is 290 and is relatively low. From this Exhibit it appears that the highest pole failure rate occurred in Mackenzie and the highest wire failure rate was in Geraldine (although this may be because most of the conductor was issued and not necessarily used in Geraldine). The pole failure rate by district correlates positively with average pole age provided in Exhibit 3-12 (correlation factor 0.8). The total overall pole failure rate of 0.10% for this storm is comparable or lower than the failure rate expected based on the given wind speeds and KEMA's storm damage model which results in rates between 0.10% and 0.28%). Note this model only provides calibrated results for poles during windstorms. Downbursts may have had additional local impact on increased pole failure rates, bringing the total average even lower and this indicating better system performance (in terms of storm resilience).

There are several approaches to define the root cause of the damage or failure resulting in a customer outage. The root causes employed in this investigation are tree (further categorized by tree broken, tree contact, tree other and tree unknown), equipment (mechanical and/or electrical failure), and lightning, other and unknown as shown in Exhibit 3-21. Exhibit 3-22 provides a graphical summary of outage event root causes by district. The size of each pie chart is relative to the number of outage events. As implied by this Exhibit, the dominant root cause for the July storm is tree related, approximately an average of 62% (from Exhibit 3-21). Comparing these results with the vegetation density weighted by pole density, as provided in Exhibit 3-11, confirms what should be expected based on exposure: Berkeley sustained the highest amount of tree related outages, approximately 67% and Jefferson experienced the least amount, approximately 44%.

District	Tree Broke	Tree Contact	Tree Other	TREE (total)	Lightning	Equipment	Others	Unknown
Berkeley	27.70%	21.40%	17.80%	66.90%	1.44%	7.88%	3.97%	19.10%
Dorsett	22.20%	20.60%	11.90%	54.70%	2.51%	10.06%	10.21%	22.50%
Geraldine	20.20%	22.30%	18.50%	61.00%	3.59%	8.66%	2.04%	22.50%
Jefferson	11.80%	23.20%	8.90%	43.90%	4.47%	5.26%	7.11%	39.20%
Mackenzie	20.60%	19.60%	18.60%	58.80%	2.43%	10.02%	3.20%	25.10%
St. Charles	25.10%	21.70%	9.40%	56.20%	1.80%	5.41%	3.38%	32.90%
Average	23.40%	21.60%	16.80%	61.80%	2.45%	8.44%	3.90%	23.00%

Exhibit 3-21: July Storm, Root Cause by District

- KEMA re-analyzed the data to identify the distinction between Tree Broke, Tree Contact and Tree Other. These tree related root causes were deduced from root cause codes TB, TC and 'tree other', which refers to any other tree related code. Tree total is a summation of all tree related root causes.

- There is a substantial percentage of root causes, 23%, defined as unknown. If unknowns were removed from the analysis, the average root causes for all districts would be approximately 81% tree, 3% lightning, 11% equipment and 5% others.

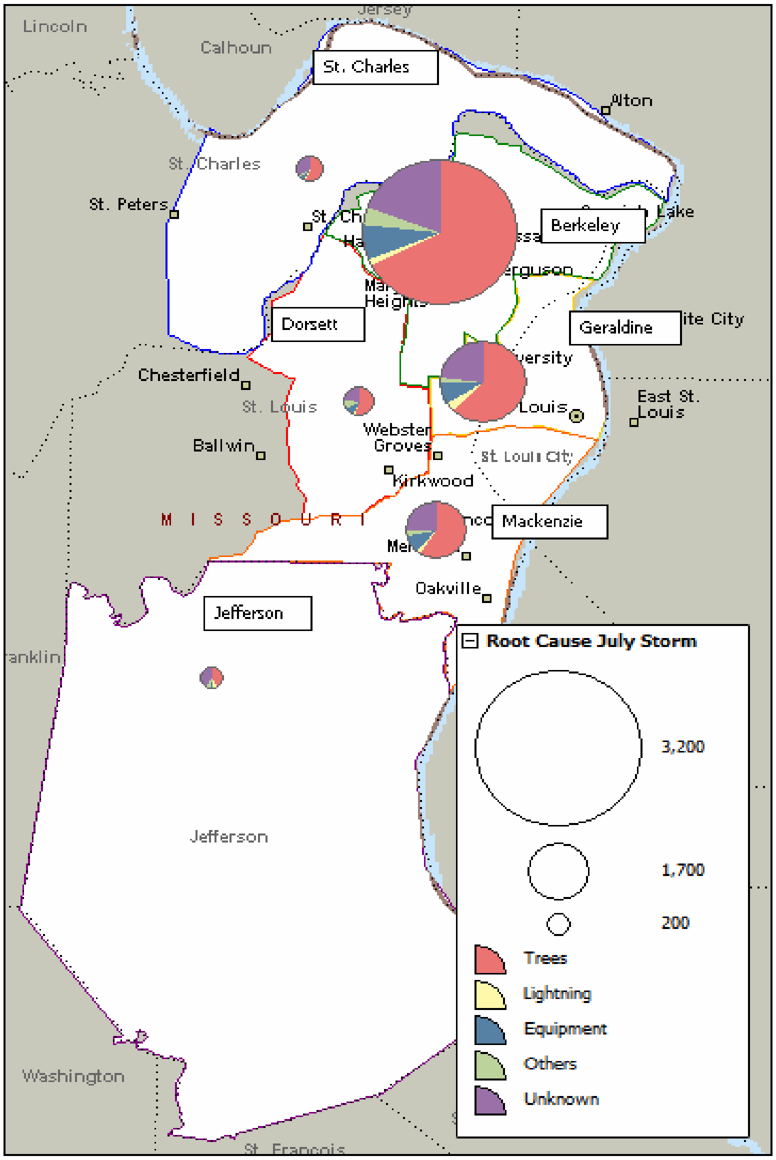


Exhibit 3-22: July Storm, Root Cause by District

(Number of outage events, on a district basis)

It is important to understand what components are affected due to the respective root causes. This may help define whether the damage was preventable or not, and to what extent. Damage was primarily to wire or equipment related (i.e. transformer). There appears to be little structural damage; minimal pole breakage due to wind only. As the recorded wind speeds did not exceed 92 mph, this indicates that pole overloading and/or pole deterioration did not play a role; however, this assessment has some uncertainty as the large group of unknown outage causes may contain pole breakages to a larger extent as it was reported within the equipment category. Assuming that the total 11% equipment category (after correction for the unknown category) is comprised of a maximum of 4% pole breakages, this would yield a potential 4% improvement in case a 100% effective pole inspection and treatment program can be implemented and/or 100% adherence to pole loading calculations can be achieved at any time. Therefore, there is no evidence of these being relevant root causes.

The applied estimate of a maximum of 4% pole breakages within the equipment category can be verified against dedicated root component data in the OAS. Exhibit 3-23 shows such data. It can be seen that outages with structure as root component are limited by 2.19% of the total and 2.4% as an approximated maximum after correcting for the unknowns. This further assumes that there are no pole related outages within the equipment category.

District	Structures	Trees	Wire	Equipment	Unknown
Berkeley	2.31%	23.41%	33.46%	29.78%	11.05%
Dorsett	2.96%	27.66%	21.75%	39.94%	7.69%
Geraldine	2.08%	21.00%	33.78%	34.65%	8.49%
Jefferson	2.89%	26.32%	13.42%	33.95%	23.42%
Mackenzie	1.78%	22.72%	31.67%	35.29%	8.54%
St. Charles	1.80%	21.62%	27.25%	38.96%	10.36%
Average	2.19%	23.00%	31.07%	33.62%	10.12%

Exhibit 3-23: July Storm, Root Components

- Note that root component “trees” is ambiguous and may imply a root cause rather than a system component.

The next line of analysis relates the vegetation management program’s results to the feeders that were locked out during the storm (as reported in Exhibit 3-19). The average period since last cycle trim for each feeder has been analyzed per district. Also the average circuit length and spending per mile (over the period 2004-2006) has been analyzed related to the tripped feeders. The results are provided in Exhibit 3-24.

District	Avg. Yrs. Since Trim (Tripped Fdrs.)	Avg. Yrs. Since Trim (Non-tripped Fdrs.)	Avg. OH (mi) (Tripped Fdrs.)	Avg. OH (mi) (Non-tripped Fdrs.)	Avg Trim $/OH mile (Tripped Fdrs.)	Avg Trim $/OH mile (Non-tripped Fdrs.)
Berkeley	3.25	2.19	6.14	2.82	$13,047	$9,448
Dorsett	3.20	2.42	8.55	6.54	$10,476	$10,488
Geraldine	3.39	2.77	3.70	1.63	$9,629	$6,724
Jefferson	2.80	2.49	25.36	23.95	$6,228	$5,960
Mackenzie	1.89	2.15	4.98	3.56	$8,453	$8,543
St. Charles	2.23	2.47	11.68	8.25	$8,377	$5,594
Average	2.79	2.42	10.07	7.79	$9,368	$7,793

Exhibit 3-24: July Storm, Vegetation Management related

The average time between the last cycle trim and the July storm, 2.79 years (tripped feeders) and 2.42 years (feeders not tripped) show the presence of cycle work backlog. The average time since last cycle trim in these urban areas is expected to be approximately two years plus a portion of the average time required to trim the feeders. Based on a four year cycle, some feeders will have a period since last trim approaching four years while others were just trimmed. On average this will result in two years. The analysis further shows that the average time between the last cycle trim and the July storm for tripped feeders is higher than for feeders not tripped. The difference is not much but it is present. This may indicate the need for enhanced backlog reduction to revert to cycle work and/or the attention for danger trees during cycle work.

The tripped feeders have on average longer circuit lengths than the non-tripped feeders that have less exposure to the impact of trees. The application of mid-point reclosers to lengthy circuits, where not already available, may provide benefit under storm circumstances as well as daily reliability metrics.

The average spend per circuit mile indicates vegetation density (and to a certain extent catching up with cycle work over this period). According to this indicator, the vegetation density is highest in Berkeley, Dorsett and Geraldine. This corresponds well with the findings based on the pole audit data (related to vegetation density –

refer to Exhibit 3-10). Typically, the average vegetation management spending per circuit mile is higher for tripped feeders indicating that vegetation plays a dominant role as outage root cause.

Lastly, other data points, qualified as anecdotal information ('field observations'), have been collected for analysis: approximately 15% of the total trees were down after the storm (in particular areas) and 85% of the broken trees were out of easement.

3.2.3 December Storm Event

3.2.3.1 December Storm Event Severity

A very powerful early season winter storm produced significant amounts of snow and ice across large areas within the Midwest on November 30th and December 1st. Over a foot of snow fell from Oklahoma to southeastern Wisconsin and accumulations of sleet and freezing rain in excess of two inches were common across eastern Missouri and western Illinois. "The last winter weather event of this magnitude occurred on January 1st of 1999."[6]

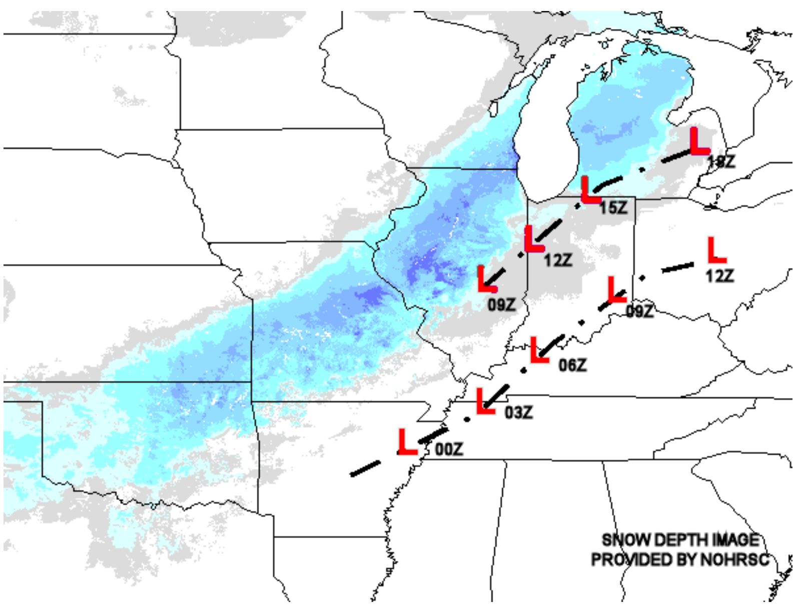


Exhibit 3-25: MODIS Polar Orbiting Satellite Snowfall Detail

[6] The quote was taken from the NOAA's write up regarding the severity of the of the December storm event. This is for a Midwest storm.
http://www.ncdc.noaa.gov/oa/climate/extremes/1999/january/blizzard99.html

The precipitation changed over to all-snow during the evening hours of November 30th over central and northeast Missouri as well as west central Illinois. A band of very heavy snow set up over this region with several reports of "Thundersnow" [7] received. Exhibit 3-18 below provides a map with the storm's total sleet and snowfall with the most significant ice accumulation area outlined with the blue dash line.

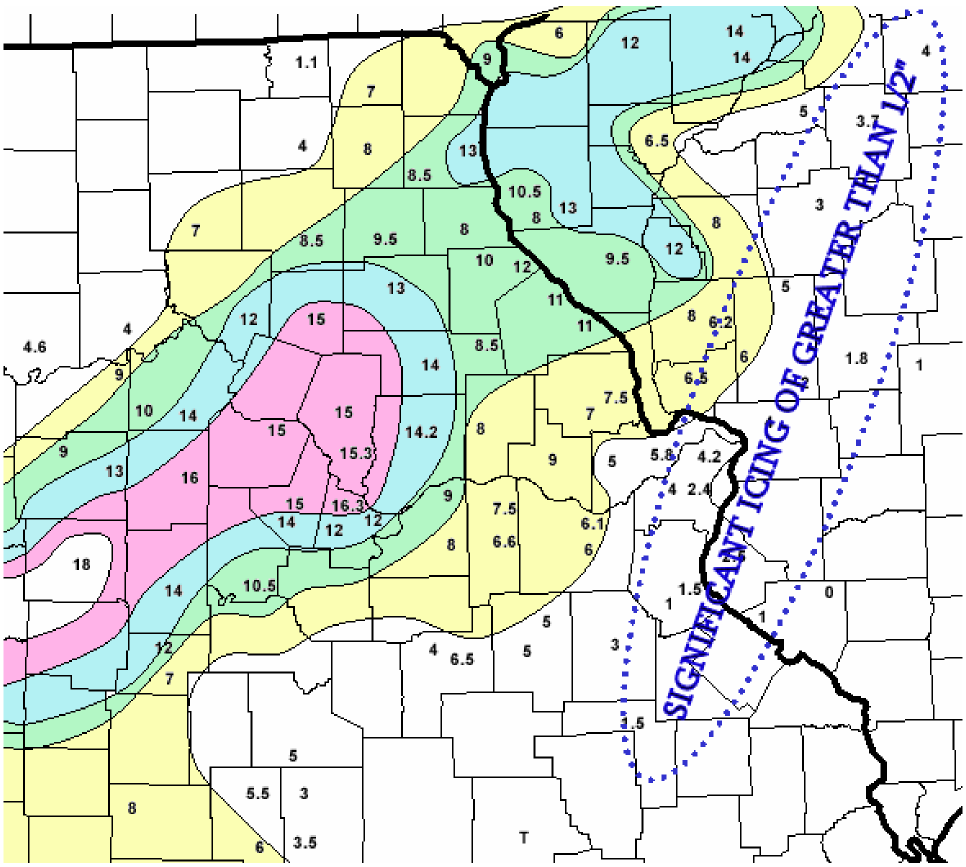


Exhibit 3-26: Snowfall Totals

There is no official wind speed data available for this storm for detailed analysis. However, it can be stated that the impact of wind is amplified by the increased surface area due to ice deposits on vegetation and system components. The combination of accumulated

[7] NOAA definition http://www.crh.noaa.gov/lsx/?n=11_30_06

ice on trees and power lines and gusty northwest winds produced widespread downed trees and power outages.

3.2.3.2 December Storm Outages

The December storm event affected nearly the same area as the July storm event (the damage in St. Charles district was not as substantial as compared to the July event and is omitted from the analysis). A summary of outages by district is given in Exhibit 3-27.

	General		Lockout Statistics			
District	Feeders	Customers	Feeders	% Lockout	Customers	Outage Events
Berkeley	221	136419	91	41.18%	72,875	1,781
Dorsett	148	99677	28	18.92%	18,909	390
Geraldine	358	140347	78	21.79%	46,292	1,498
Jefferson	103	88033	48	46.60%	41,097	840
Mackenzie	294	192779	39	13.27%	34,577	602
Total	1124	657255	284	25.27%	213750	8618

Exhibit 3-27: December Storm, Outage Summary by District

During this storm, Jefferson experienced the highest percentage of feeders locked out, whereas this district showed the lowest corresponding percentage during the July storm. The different nature of the storm provides the most straightforward explanation for this difference.

District	Poles Down	%	Conductor Down (mi)	%
Berkeley	39	0.07%	59.56	1.70%
Dorsett	27	0.06%	2.89	0.09%
Geraldine	30	0.05%	16.74	0.57%
Jefferson	23	0.03%	1.26	0.02%
Mackenzie	84	0.21%	35.87	0.95%
Total	203	0.07%	116.32	0.59%

Exhibit 3-28: December Storm, Pole and conductor installation from DOJM

With the exception of the pole performance in Mackenzie, this storm could be characterized by the high failure rate of conductors (0.59% as opposed to 0.18% during the July storm). This is typical for snow and ice storms. Whereas Jefferson had the highest feeder lock-out rate, Berkeley in fact experiences the highest conductor failure rate.

The root causes are reported in the same fashion for a snowstorm as they would be for a severe thunderstorm i.e. there is no distinction for ice, snow etc. This obviously limits the forensic analysis with respect to the analysis of root causes.

As displayed in Exhibit 3-29, the dominant root cause for this event, similar to the July storm, was tree related with a substantial 60%. A graphical summary of outage event root causes by district is shown in Exhibit 3-30. Note that the size of each pie chart is relative to the number of outage events.

District	Tree Broke	Tree Contact	Tree Other	Tree (total)	Lightning	Equipment	Others	Unknown
Berkeley	25.66%	33.80%	9.38%	68.84%	0.56%	16.56%	1.24%	12.80%
Dorsett	20.51%	23.33%	6.67%	50.51%	1.79%	16.67%	2.05%	28.97%
Geraldine	29.77%	22.50%	12.15%	64.42%	0.33%	7.74%	1.07%	26.44%
Jefferson	9.17%	20.95%	24.64%	54.76%	2.86%	6.79%	3.93%	31.67%
Mackenzie	20.27%	19.44%	23.59%	63.29%	1.16%	16.61%	1.33%	17.61%
Average	21.08%	24.00%	15.28%	60.36%	1.34%	12.87%	1.92%	23.50%

Exhibit 3-29: December Storm, Root Cause by District

- Note that there is a substantial percentage, approximately 24%, of root causes defined as unknown. If unknowns were removed from the analysis, the average root causes for all districts would be approximately 79% tree, 2% lightning, 17% equipment, 3% others.

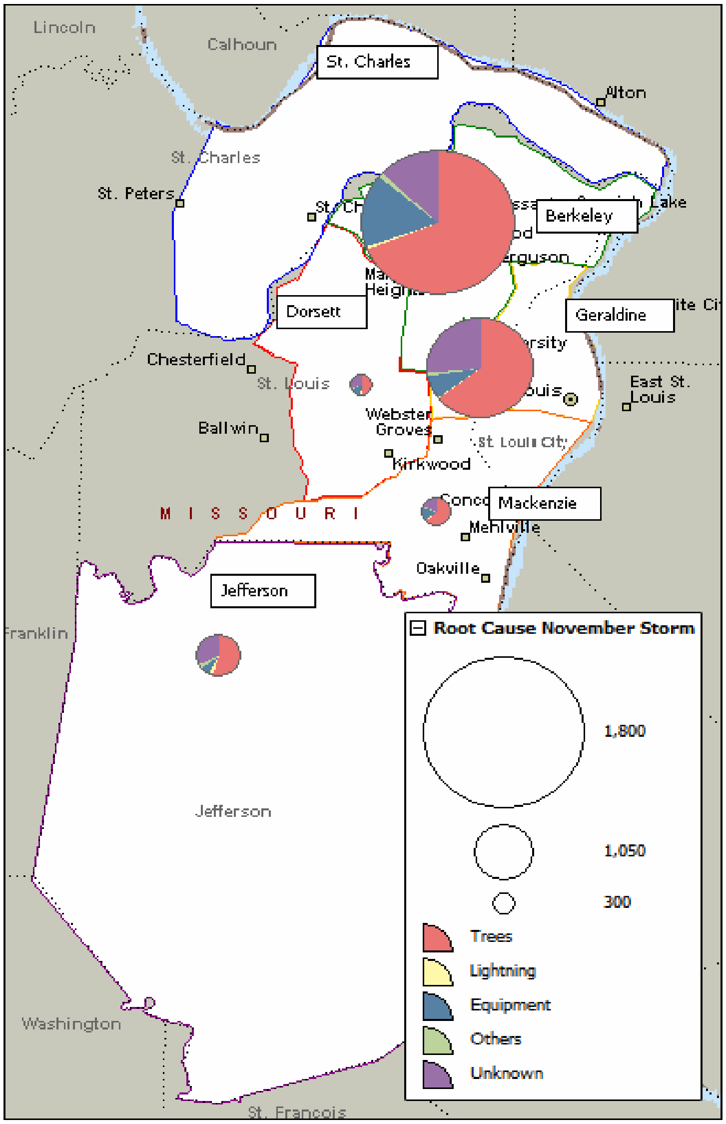


Exhibit 3-30: December Storm, Root Cause by District

(Number of outage events, on a district basis)

A list of general component categories and their associated percentage of outage events has been developed and is provided in Exhibit 3-31. As can be seen, wire and equipment were the dominant components affected by the December storm. Different from the July storm, the trees are not contributing much as root components, which, as discussed, is adequate as trees are not part of the system. Perhaps training of field crews has improved this from the unfavorable data collection situation during the July storms (unfortunately at the expense of increased percentage of unknowns) or it is because there are more outages related to blown fuses (root component) due to tree contact (snow on tree canopy as a root cause). The option tree as root component should be removed as input.

District	Structures	Trees	Wire	Equipment	Unknown
Berkeley	6.06%	1.29%	20.10%	34.48%	38.07%
Dorsett	6.67%	2.82%	27.44%	43.85%	19.23%
Geraldine	4.61%	1.34%	21.09%	39.25%	33.71%
Jefferson	12.38%	1.90%	20.60%	36.43%	28.69%
Mackenzie	7.97%	2.49%	20.93%	33.06%	35.55%
Average	7.54%	1.97%	22.03%	37.41%	31.05%

Exhibit 3-31: December Storm, Root Components

3.3 Conclusions

This section reports the conclusions that can be drawn after reviewing the partial findings as reported in Section 3.2. The conclusions are presented according to how the infrastructure review was organized: the general system reliability and programs leading up to the 2006 storms, the forensic investigation, followed by an integral assessment.

It is important to know that while the OAS captures representative data, it does not provide 100% dependability as input depends on field calls often made under difficult circumstances based on best estimates.

3.3.1 System reliability indicators are trending up as a result of recent storm activity.

AmerenUE’s daily reliability indicators (i.e. the number of sustained customer outages) are trending up. The root cause behind this observation is established as trees during storms; the daily non-storm indicators are essentially flat over the years. The increase of severe storm events over recent years is the primary cause. As contributing factors, it deserves recommendation to investigate the resilience of the system against these storms. This investigation would focus on review of the vegetation management and pole inspection and treatment programs. These programs leading up to the 2006 storms have been evaluated as part of the infrastructure review.

General Programs

3.3.2 Prior to the 2006 storms, AmerenUE's vegetation management program did not achieve all of its stated annual spending targets; however, much of the storm damage would not have been prevented by the vegetation program in place at the time.

A review of AmerenUE's vegetation management budget and spending indicates the absence of a storm reserve. AmerenUE does not maintain reserves for any storm related spending as severe storms rarely occur in the area.

AmerenUE's vegetation management budget has been ramping up since 2004 (after a budget cut in 2003) and has reduced the growth of cycle work backlog since then but has been hampered by increasing storm related efforts and spending. The observed under-spending for cycle T&D work has to do with resource unavailability, storm expenditures (including resources) and providing aid to other storm stricken mutual aid utility partners. That said, since 2004, all storm-normalized SAIFI targets and "Line miles" trim goals have been met.

3.3.3 AmerenUE's pole inspection program missed its annual inspection rate target as a result of budget cuts and changes to the program, however, this did not contribute much to the level of storm damage.

This program saw a change before and after 2003. Before 2003 AmerenUE had applied a targeted (pole, area or circuit selection) approach based on criticality and perceived condition. The inspection rate was approximately 11% yielding an average reject rate of 5.32%. There was a budget cut in 2003, coinciding with budget cut in vegetation management spending. After 2003, AmerenUE applied a cyclical approach to selection. The inspection rate is ramping up to the targeted 10% with an average reject rate of 3.76%. The program has an audit function, staffed by AmerenUE employees, focusing on adequate application of AmerenUE's reject standards. While the number of auditors has increased with the change in program, the auditing does not focus on completion of pole replacement work orders.

General Forensic

The majority (86%) of the total outages in both the July and December storms occurred in six districts with significant overlap from all storms in a small area. The likelihood of this happening is small (it never happened before in documented history) and has resulted in multiple, extended outage events for a high number of customers. The affected areas have a high vegetation density, a high pole density and high customer density.

Forensic

Vegetation related

The number of outages correlate with vegetation density and time since last trimmed. The shorter the period since last trimmed, the smaller the chance of a feeder being locked-out during the storms. This applies to both storms.

Tree related outages were the root cause for approximately 81% of the outages in the July storm. These root causes break down into: 30% tree broke, 29% tree contact and 22% tree other. Reportedly, 85% of the broken trees originated out-of-easement. This emphasizes the importance of addressing this issue going forward (while anticipating more storms). The fact that the number of outages correlated positively with time since last trimmed and that this established 29% of the outages, emphasizes the importance of the ongoing cycle trim work backlog reduction. It must be noted that cycle trim work, even being on schedule, will only have a limited effect reducing this percentage during storms.

Pole related

The pole failure rate during the July storm was established at 0.10%. This rate was consistent with KEMA's model forecast for similar storms. The pole failure rate per district correlates positively with age (with a factor 0.8). As such, the Mackenzie District was vulnerable with the highest average pole age of 39.6 years. It is important to keep in the mind that a significant amount of outages do not involve poles as a root component. Only 290 poles were issued (and thus replaced) in the six affected districts. From the available data it is unknown what type of poles failed. For post-storm infrastructure analysis it is of interest to identify double circuit poles, feeder versus lateral poles (although most of the issued poles were class 4 and thus the non-inspected lateral poles) and, for instance, poles that were evaluated below design loading strength (<0.4% out of 51,000 evaluated poles between 2003 and 2007, refer to Section 4.3.3).

Equipment caused outages were the root cause for approximately 11% of the outages during the July storm. Assuming that 4% of this total of 11% is related to pole breakages (with potential root causes being: wind only, design overloading or pole decay), this assumed 4% is then the maximum potential for improvement of pole loading evaluations and inspection programs. This number reduces to a maximum of 2.4% when considering the root component data.

Conductor related

The December storm yielded root outage causes 79% tree, 2% lightning, 17% equipment, 3% others. Whereas the pole failure rate was relatively low, the conductor failure rate during the December storm was 0.59%, mostly in Berkeley district. This is expected for an ice storm, however, there are no calibrated models for snow and ice storms to verify the conductor failure rate. Tree related outages positively correlated with conductor failure rates during this storm, although weakly. Most of the damage would come from ice depositions directly onto the conductor that subsequently snaps due to excessive wind loading or onto tree branches touching or breaking off into the conductors. Due to the outage reporting nature, not fit for forensic purposes, it is not straightforward to distinguish these two in order to steer improvement toward vegetation management or pole loading analyses.

Integral Assessment

The statistical and forensic analysis based on the available data does not infer any major deficits that contributed negatively to the system performance during the investigated storms.

The July storms can be characterized by relatively low equipment failure rates but a large coverage of area with dense vegetation and customers, resulting in outages of about half of the AmerenUE feeders in the affected area. From a restoration perspective, the extent of the outage can be explained by inaccessible terrain (due to the many broken trees) and the large area.

Potential contributing factors

The first July storm came from an unusual direction (NE-SW as opposed to the usual direction NW-SE) potentially taking out or loosening trees that had been hardened against storms in the usual direction. The second July storm, in the usual direction, then likely has taken out more trees than expected for the same wind speeds.

The first July storm may have taken out primarily feeders tangential to the storm, the second July storm did the same adding up to more feeders than expected based on just wind speeds (as opposed to also including wind direction).

The December storm can be characterized by extensive conductor failure due to a combination of wind and ice loading.

3.3.4 The forensic analysis could have been more informative had AmerenUE had a formal forensic process in place to gather the critical data.

AmerenUE could in general improve on data gathering, analysis and feedback of findings into planning functions related to vegetation management and pole inspection and treatment programs. Both post-storm forensic analyses and analysis of day-to-day operations would potentially improve by increased visibility into the integral state of the system to justify future spending (e.g. spending versus system improvement, where to spend the next dollar?). This would require a consolidation of pole, conductor and (potentially new) vegetation inventory data, inspection and maintenance programs (including the new distribution line equipment), their results and related spending.

For forensic analysis purposes, the OAS data could be more concise and for instance differentiate causes and components in an unambiguous fashion. Still, this would not distinguish specific equipment such as multiple-circuit poles, multiple events (cascading) and evaluation of design overload. There should be a dedicated forensic data collection methodology in place such as now mandatory in Florida. This would prove useful in anticipating actual increase in severe storm events, as the recent trend seems to indicate.

3.4 Recommendations

3.4.1 Continue with AmerenUE's enhanced vegetation management program.

Continue with the ongoing vegetation management to achieve the committed schedule the 4th quarter of 2008 - analysis points out that feeders affected by the storm were on average trimmed longer ago than non-affected feeders. It is important to start with the feeder three-phase backbone circuits.

Continue with the ongoing enhanced programs that, among others, address the issue of out of easement tree removal – analysis points out that 30% of the outages were caused by broken trees from which reportedly 85% were out of easement. Consider creating a tree inventory (e.g. danger tree locations, hazard tree locations, growth rates by species in AmerenUE's GIS).

As the vegetation in the greater St. Louis area is denser than the national average for urban areas and the tree canopy is actually growing, it is recommended to periodically review the vegetation management budget in light of the growing tree canopy.

3.4.2 Continue the revised pole inspection at the targeted inspection rate. The pole inspection planning, record keeping, analysis and auditing functions should be improved.

Continue the revised pole inspection and treatment program at the targeted inspection rate.[8] The pole inspection planning, record keeping and analysis should be improved. The improved planning must be supported by a consolidated pole inventory (with, amongst others, the ability to locate each pole, obtain the corresponding pole attributes, inspection and treatment history and feeder number). Inspection and treatment results should be readily available within AmerenUE. They should be tied to the pole inventory and potentially tied to a (new) pole loading calculation database. Geographic and trend analysis results should feed back into pole maintenance planning and budgeting; potentially, to targeted system hardening measures. Lastly, while the current program does indeed contain an audit function focused on adequate application of AmerenUE's pole reject standards, it should also ensure the completion of pole replacement work orders.

3.4.3 Modify OAS data structure to capture outage root cause and affected components better, supporting post-storm infrastructure analysis.

Introduce modifications to the OAS and train crews correspondingly. Eliminate inconsistencies and improve data entry, separating affected equipment from causes adequately. Introduce 'Wind-only' as a root cause and remove "Trees" as a root component, and make the other necessary modifications to provide for

[8] It must be noted that a recent program change will include the inspection of lateral poles as well. The targeted inspection rate with this inclusion will also change, from 10% to 8.33%, corresponding to a 12-year cycle. The combination of these changes will most likely result in higher pole reject rates and thus increased replace, treat or reinforce spending.

reporting that removal of a tree is necessary for the restoration of an outage. Consider verification of tree related outages (potentially with the tree inventory).

Consider a dedicated post-storm forensic data collection and analysis methodology, including a data template, database and dispatch procedure. During such forensic data collection details like lateral versus feeder, multiple-circuit pole or other important attributes can be captured for analysis. Create and train dedicated 'forensic' teams for post-storm data collection to be performed in parallel with the storm restoration process. Ensure ability to combine the forensic data with materials issued during the storm, pole loading calculation results and the pole inspection database. See recommendation 7.4.3 later in the report.

4. Project Area – Engineering Standards

This project area focused on reviews of engineering practices and standards related to sub-transmission and distribution system integrity and strength. The focus of the investigation was on the impact of the standards and practices on the infrastructure's ability to withstand storms of the type and magnitude experienced in 2006.

4.1 Engineering Data and Analysis

KEMA reviewed AmerenUE's engineering standards to evaluate the standards used by the company in the area of distribution pole loading and strength calculations. The KEMA analysis will provide a general review of the applicable sections of the National Electric Safety Code (NESC) and the requirements on distribution designs.

Two primary documents house AmerenUE's engineering and construction standards:

- Distribution Feeder Design, Article PS-30 Rev. 1 – This is the introductory article of the Electrical Distribution Design Articles and provides the basic concepts, design philosophies, and engineering considerations for distribution line design at AmerenUE.

- Distribution Construction Standards, May 2005 Edition – These standards apply to all AmerenUE operating companies and are the detailed construction standards used in the construction of new facilities as well as the rehabilitation or rebuilding of existing facilities. These standards have been developed in conformance with all applicable national, state and local codes and meet the minimum standards of the NESC.

Together, these documents provide designers, engineers, construction personnel and others with the necessary information to specify and build distribution facilities to meet company, customer and code requirements.

4.1.1 Overview of NESC requirements

The governing safety standard for distribution pole strength is the NESC. This code provides minimum design specifications to ensure public safety. It is not intended to be a design manual, nor is it intended to address issues other than public safety. A pole meeting the NESC requirements can be considered safe, but may or may not be the best solution from the perspective of economics or reliability.

The NESC defines three different grades of safety requirements depending upon the public safety issues related to a particular installation. These are termed Grade B, Grade C, and Grade N, with Grade B being the highest requirement. In general, the NESC requires distribution structures to meet Grade C construction except when crossing railroad tracks or limited-access highways (these require Grade B construction).

According to the NESC, a structure must be able to withstand loading due to combined ice buildup and wind (the ice adds weight and increases surface area exposed to wind). For the purpose of determining the loading calculations for safety when considering wind and ice, the NESC has three primary rules. Rule 250B addresses ice, Rule 250C addresses extreme wind, and Rule 250D addresses combined freezing rain/ice and wind loads.

Rule 250B “Combined ice and wind district loading” divides the United States into three loading districts termed heavy, medium, and light (see Exhibit 4-1). Missouri is completely located within the heavy loading district. These districts determine the loading criteria for overhead line designs with consideration for combined ice and wind loads.

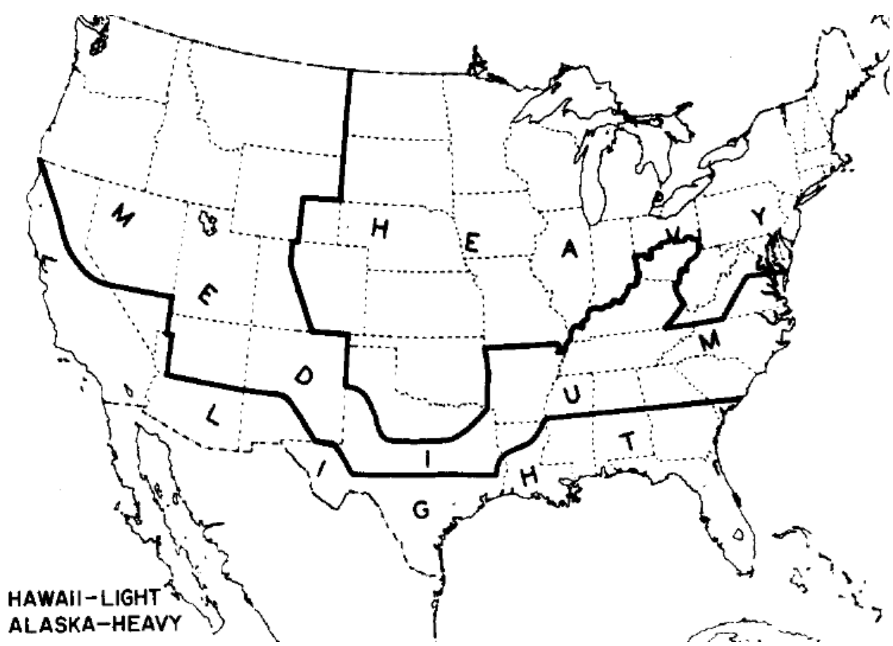
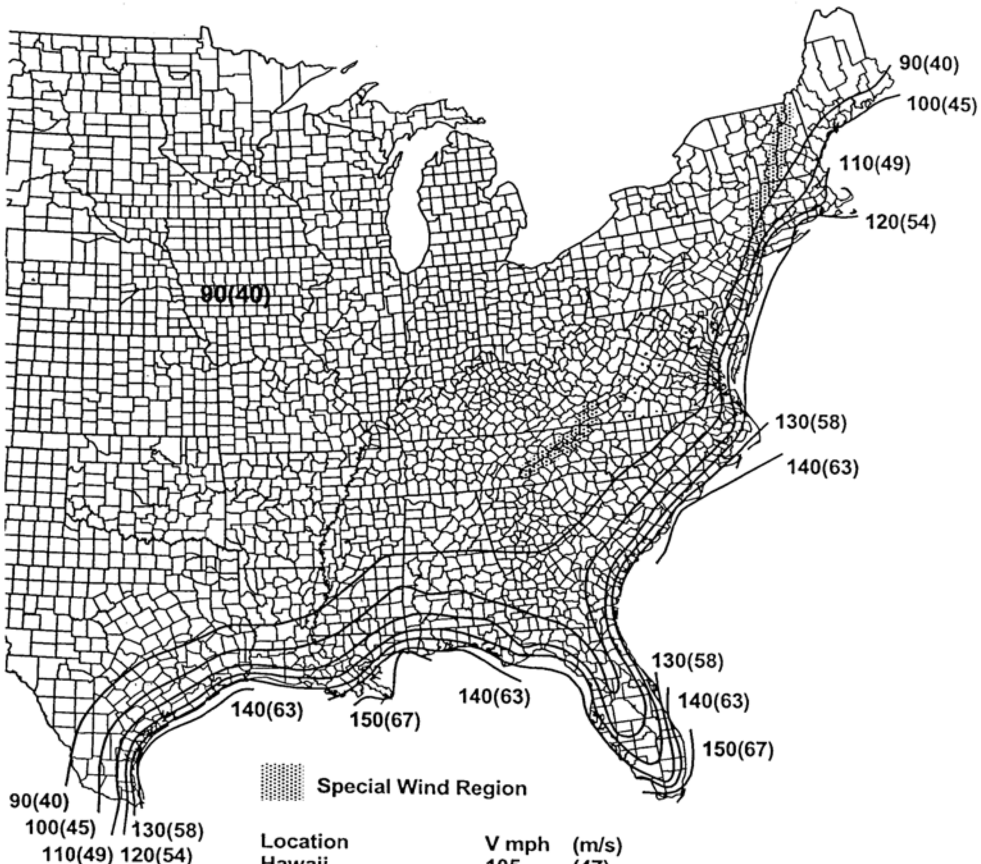


Exhibit 4-1: Overhead Line Loading Districts (NESC Figure 250-1)

Rule 250C "Extreme wind loading" provides extreme wind criteria to be considered in pole loading calculations. The extreme wind speed criteria of the NESC changed in 2002, and are now based on three-second gust speeds (see Exhibit 4-2) as opposed to one minute sustained winds as defined in earlier editions of the Code. It is important to note that only structures taller than 60 feet (18m) must meet these extreme wind criteria. Most distribution structures are not in this category.



Location	V mph	(m/s)
Hawaii	105	(47)
Puerto Rico	145	(65)
Guam	170	(76)
Virgin Islands	145	(65)
American Samoa	125	(56)

Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10 m) above ground for Exposure C category.
2. Linear interpolation between wind contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

Exhibit 4-2: Basic Wind Speed Map (NESC Figure 250-2(B)

Rule 250D "Extreme ice with concurrent wind loading" was added in the 2007 edition of NESC. This rule addresses concurrent ice and wind load due primarily to freezing rain conditions (see Exhibit 4-3). Like Rule 250C, this is an "extreme" condition rule and as such does not apply to structures less than 60 feet above ground or water level. Again, most distribution structures do not come under this rule.

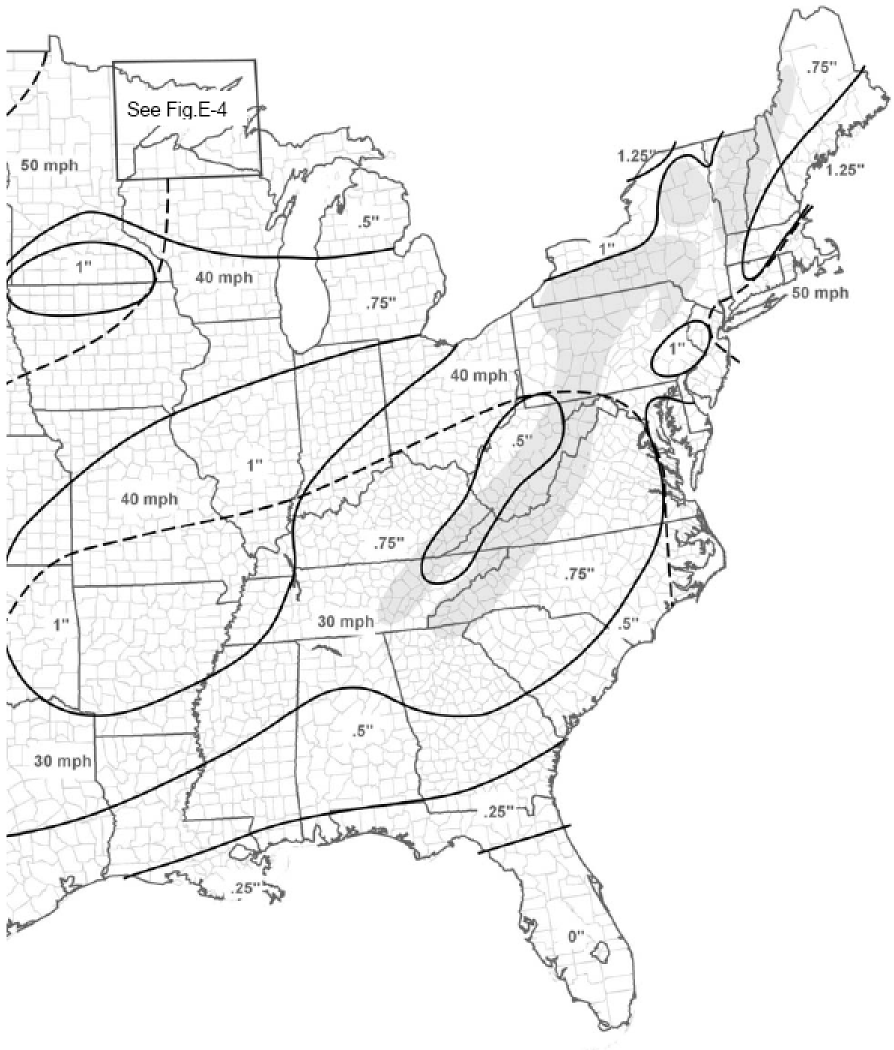


Exhibit 4-3: Combined Freezing Rand and Wind Zones (NESC Figure 250-3)

Summary of NESC Requirements for Distribution Poles in AmerenUE Service Territory

- Grade C construction is required for most distribution structures

- According to the NESC heavy loading district, distribution structures in Missouri must be designed for 0.5 inch radial ice buildup and 40 mph winds.
- Extreme wind loading requirement for Missouri (for structures more than 60 feet high) is 90 miles per hour.
- Extreme concurrent ice and wind for Missouri (for structures more than 60 feet high) is 1.0 inch radial ice and 40 mile per hour wind (Grade B) and 0.8 inch radial ice with 40 mph wind (Grade C).

4.2 Review of Design Standards and Practices

Standard distribution line design and construction at AmerenUE is based on Grade C requirements. Grade B construction is also used, as required by the Code, for specific situations such as railroad crossing and limited access highway crossings.

The Distribution Construction Standards manual defines the pole size to be used in a given construction situation. The manual contains pole sizing charts, as illustrated in Exhibit 4-4 for all three grades of construction (B, C, N) as defined by NESC. The manual also includes a table from the NESC which defines the minimum grade of construction required for specific conductor applications and voltage ratings.

As mentioned earlier, structures of less than 60 feet above ground or water level are not required to meet the extreme wind or ice conditions specified in rules 250-C and 250-D of NESC. In the greater St. Louis area AmerenUE uses multiple circuit construction that carries both sub-transmission (34.5 kV) and distribution (4 and 12 kV) facilities. This configuration often requires poles that exceed 60 feet and thereby requires that the structures be built to extreme wind and ice standards. AmerenUE has recently implemented a standard minimum pole class for all construction of 34.5 and 69 kV facilities. This new standard of using a minimum class 1 pole addresses the requirements of the 2007 NESC.

POLES
Transverse Loading – Pole Class Selection

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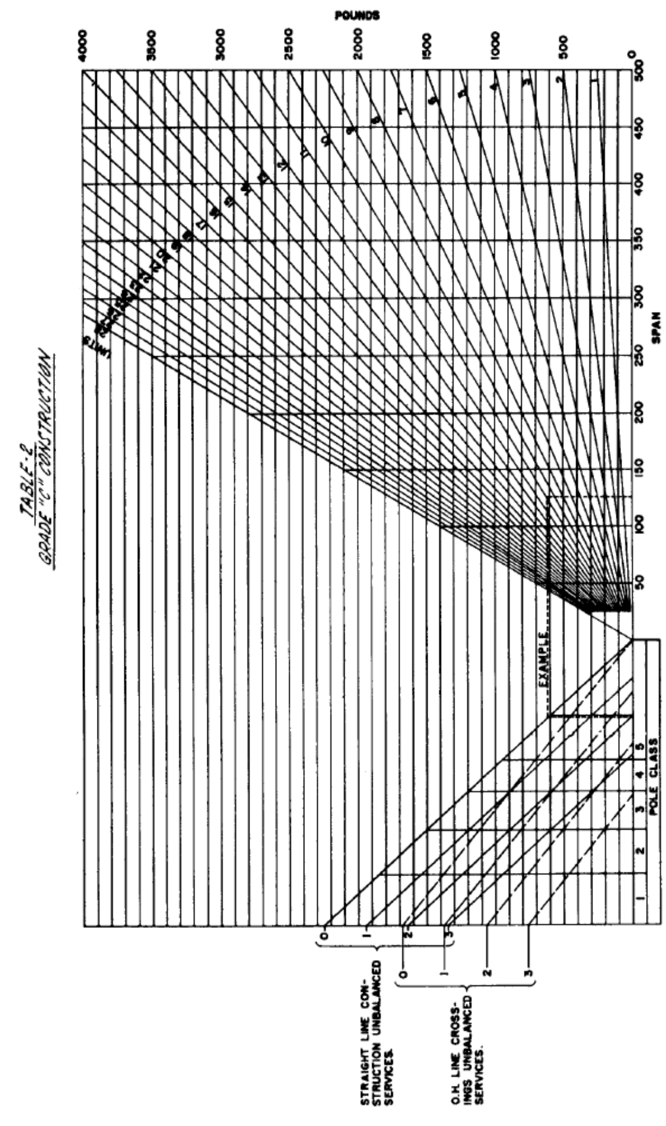

DISTRIBUTION CONSTRUCTION STANDARDS
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ENG: SAL
REV. NO: 0
REV. DATE: 09/20/94
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Exhibit 4-4: Grade C Pole Selection Chart from Distribution Construction Standards

In normal work planning and design, the division engineering personnel are responsible for designing all extensions, upgrades, or replacements of distribution lines. It is the responsibility of those personnel to adhere to company standards in line design and construction. If situations are encountered that have unique or unusual requirements, the field personnel contact the engineering standards department for guidance and assistance in ensuring that appropriate design considerations are met. In order to assist field personnel in calculations for line design the standards department is currently developing a design tool based on company standards and the 2007 edition of NESC. It is anticipated that this tool will be distributed to the field by early 2008 for local use.

In addition to electric facility design, a major consideration in pole loading is the addition of foreign utility attachments to the electric facility structures. The use of power poles by telephone, CATV, broadband and other communications providers is common practice in the industry with those providers being given certain rights of access to electric facilities by the Federal Communications Commission. The addition of communications cables to power poles can have a significant impact on total pole load, to the extent that safety margins are sometimes consumed or exceeded by the additional facilities.

In order to ensure that poles are adequate for the addition of such cables, AmerenUE has in place an application process that communications companies follow to request attachment to poles. This process includes detailed load analysis of the poles in question to ensure appropriate strength capacity is available. If not available, the pole is typically changed to a larger size to accommodate the additional equipment. AmerenUE uses a contract engineering firm to perform the loading analysis.

4.3 Conclusions

4.3.1 KEMA analysis has found that AmerenUE has adequate standards in place to ensure that pole loading and line design meet the appropriate criteria as defined by NESC.

As the primary purpose of this study has been to evaluate AmerenUE’s practices as they relate to severe storms and potential storm damage, our review has not found any indication of design standard or process deficiencies that might have contributed to the extent of damage experienced during severe weather in 2006. KEMA does believe, however, that improvement in the overall consistency of application of design standards can be made. As stated earlier, an automated tool for line design calculations is in development and is anticipated to be available in early 2008. This tool will provide significant capability to improve overall consistency in application of design standards.

4.3.2 Methodology for calculating design loading of poles is not well documented although tables and charts that are based on standard calculations are provided in the Distribution Construction Manual.

The standards organization is working on many fronts to reach a higher level of consistency across operating companies in design practices. There is also an ongoing effort to bring more standardization to sizes of poles and conductors used in line construction as well as to the line configuration. While KEMA does not believe that current levels of standardization or consistency in these areas are an issue for storm resiliency, we fully support the belief that improvement in these areas will ultimately benefit the overall reliability of the system under all conditions.

KEMA has also surveyed a number of other utilities about practices of line design and pole loading. Most notably, KEMA investigated the practices of other companies in grade of construction used, allowance and procedures for foreign attachments, and any specific design considerations made for potential severe weather impacts. The details of this comparative data are provided in Section 16.2 of this document. In summary, KEMA finds that AmerenUE's practices are generally consistent with those of other companies in the industry. It is noted, however, that some companies of comparable size and geographic characteristics of AmerenUE, have adopted Grade B construction as a standard for all distribution facilities. AmerenUE is currently evaluating the application of both Grades B and C construction throughout the system to determine the most beneficial standard for all AmerenUE companies.

4.3.3 An appropriate procedure is in place to evaluate requests by others to attach to AmerenUE poles, including a detailed pole loading calculation.

KEMA has reviewed a sample of the loading calculations performed in response to foreign utility attachment requests. This sample provided an opportunity to review the calculations being performed for consistency with NESC and AmerenUE standards. Additionally, and more importantly, the sample provides a good data set on the current loading condition of AmerenUE facilities. During the period from 2003 to the present, over 51,000 loading calculations were performed to assess the potential addition of communications facilities to existing poles. These calculations showed that approximately 78% of the poles studied were found to be in compliance with company standards and NESC requirements for Grade C construction prior to the additional attachments being installed and capable of handling the additional load. Stated another way, 22% of the poles studied were found in compliance with codes and standards at the time of review but required changes to be sufficient for the additional loading proposed. Less than 0.4% was found to be below code specifications at the time of the loading study. In KEMA's opinion, this is an excellent indicator of AmerenUE's dedication to NESC compliance and quality company standards in pole loading and design on an everyday basis.

4.4 Recommendations

4.4.1 Complete and distribute the automated pole loading calculation tool currently in development in the standards department.

This tool provides field personnel with fast and convenient capability to analyze pole loading for new, replacement and existing structures. Explanation and/or training on the tool, when distributed, should be tailored to cover the primary areas of concern in loading calculations and to develop consistent practices throughout the operating departments. With the delivery of the automated design analysis tool, AmerenUE should also document the procedures to be followed in using the tool and the methods, algorithms and standards that are the basis of the tool.

4.4.2 Develop design standards and guidelines related to NESC construction grades (B or C) and to specific applications in the service territory.

Current guidelines within AmerenUE call for Grade C construction except where Grade B is required by Code. Some discussion is underway regarding consideration for Grade B as the standard. AmerenUE should develop guidelines based on operational metrics that dictate construction grade, storm hardening and other special design considerations. Operational metrics to be considered are such things as critical feeders, areas of historically significant storm damage, or other considerations that would warrant a more stringent design standard that would assist in achieving operational targets for reliability.

4.4.3 Make use of detailed pole loading analyses done for foreign attachment applications by cataloging the loading data by circuit, location or other identifier. The assembled information may then be used as a data sample in future studies of loading, pole condition, forensic analysis, etc.

As earlier noted, over 51,000 detailed engineering studies have been performed in recent years as part of the foreign utility attachment process. The data from these studies, in addition to determining requirements for the requested attachments, can also be used for further analysis of design strength, pole capacity, strength deterioration as function of age, application or location, as well as other considerations.

4.4.4 Develop and maintain current knowledge of technological developments in pole and conductor materials and designs.

As in other fields, new technologies are impacting pole and conductor development and manufacture. Distribution size poles manufactured from composite materials is a rapidly growing market due to the additional size and strength that can be gained without the additional weight of concrete or steel. Similarly, composite conductors are being used widely for reconductoring applications in order to increase circuit capacity without having to upgrade poles or structures due to the weight added by increasing the size of standard conductors. Further, changes and improvements in pole framing or other pole mounted equipment can reduce loading thereby increasing the structures ability to withstand severe weather.

5. Project Area – Maintenance

KEMA has undertaken a review of the maintenance programs and processes in place at AmerenUE as they relate to storm preparedness and the ability of the infrastructure to withstand severe weather. With a focus on the subtransmission and distribution systems, KEMA has reviewed the ongoing maintenance programs that are designed to ensure the reliable operation of that system in both normal and storm conditions. Our analysis has covered three primary maintenance areas:

- Pole inspection and maintenance,
- Vegetation maintenance and management, and
- Distribution line equipment maintenance.

A general discussion of each area follows in this section with later sections addressing findings, conclusions, and recommendations.

5.1 Maintenance Program Overview

5.1.1 Pole inspection and maintenance

AmerenUE has had a wood pole inspection and maintenance program in place for a number of years. This program is consistent with those found throughout the industry and includes a company standard for inspection, treatment, reinforcement, and replacement. AmerenUE's specifications for inspection and treatment of in-service wood poles are well documented and consistent with both NESC and ANSI guidelines which are the governing standards for pole strength and suitability for service.

The AmerenUE program has undergone changes in recent years to expand and improve the program. Prior to 2007 the program was directed toward subtransmission and feeder backbone poles (200,000 units) only, as described in Section 3.2.1. Beginning in 2007 the program was expanded to include all wood poles, regardless of application (adding another 700,000 lateral poles). In the new program all poles will be visually inspected at a minimum of once every four years and subject to a detailed, intrusive inspection once every twelve years. Exhibit 5-1 illustrates the scope of the program and the changes that have occurred over time.

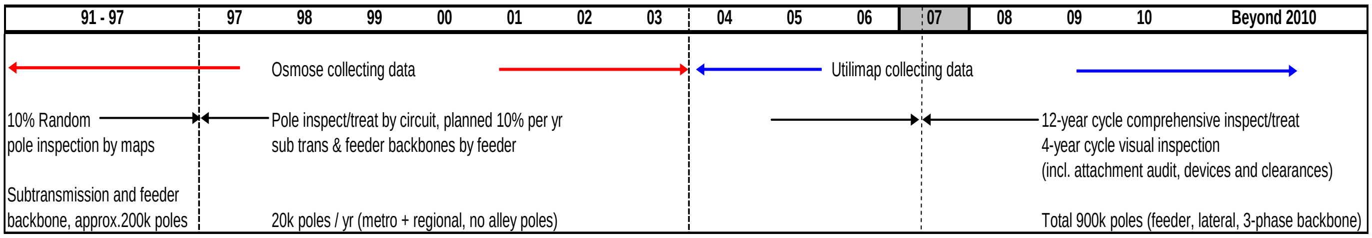

Exhibit 5-1: Pole Inspection Program

5.1.2 Vegetation maintenance and management

The subtransmission and distribution vegetation management program at AmerenUE is typical of programs found in most electric utility companies including the challenges most companies face in program funding, cycle schedules, and resource management. In recent years AmerenUE has made (and continues) a concerted effort to put the vegetation program on a regular cycle trim schedule of four years for urban areas and six years for rural territories. AmerenUE is currently on track to achieve its desired cycle schedules by the 4th quarter of 2008.

The greater St. Louis area is often called an “urban forest” because of the tree density of the region. The high vegetation density as well as the density of electrical hardware in the same areas, as described in Section 3.2.1, creates challenges for the utility in both routine operations and maintenance and particularly in storm conditions. High numbers of tree related outages are often experienced during stormy weather, often caused by trees outside of the utility trim zone and therefore, essentially out of the utility’s area of influence or control. AmerenUE is like other utilities throughout the country that are challenged to balance the need for vegetation maintenance for system reliability with the public desire for large and dense areas of vegetation for aesthetics.

To balance the inherent conflicts between constituencies, AmerenUE has undertaken various programs aimed at finding a middle ground acceptable to most interested parties. These programs include such things as danger tree identification and replacement efforts, conversion of overhead electric facilities to underground and joint efforts with municipalities on development and enforcement of ordinances.

5.1.3 Distribution line equipment maintenance

As part of its efforts to improve system reliability and overall system integrity, AmerenUE has begun a structured distribution circuit inspection program. The company has routinely performed inspections and maintenance on various components of the distribution system. Pole inspections and vegetation maintenance previously discussed are two leading examples. Additionally the company has performed routine maintenance on various other components of the system such as network protectors, switches, and similar equipment. **Error! Reference source not found.** is reproduced from AmerenUE's "Policy for Electric Subtransmission and Distribution Circuit Inspections" and details the type and frequency of inspections in the program as well as the facilities included in the program. The policy document also details the scope of the inspections performed on each type of equipment.

Exhibit 5-2: Electric Circuit Inspection Program

5.2 AmerenUE and Comparative Data

5.2.1 Pole inspection program

Data from pole inspections prior to 2007 was presented and analyzed in Section 3 of this report, Infrastructure Forensic Analysis. Further analysis of pole inspection reject rates, average ages at inspection and similar data is not presented in this section; however, KEMA's analysis of the program, execution and comparison to other programs in the industry is presented.

With the change in the pole inspection program to include the entire pole population, AmerenUE has improved their program to the level of other comprehensive programs in the industry. While detailed forensic data from the 2006 storms was not available, KEMA experience leads us to believe that if the data were available a higher pole failure rate would be found in specific segments of the pole population that have not been part of the pole inspection and treatment program in the past. Specifically this refers to lateral or tap line poles or any other pole not included in the subtransmission and feeder backbone groups. Findings at other companies lead us to this belief and to the expectation that pole reject rates will increase under the new program scope (as mentioned in the footnote 8).

KEMA has found through industry surveys and engagements with other companies that pole inspection programs vary in cycle time but that those companies with active programs, on average, seek to achieve a ten-year inspection cycle. AmerenUE’s target of 12 years for detailed inspection and treatment is consistent with many other companies and when combined with a four-year visual inspection cycle and more frequent walk-by surveys, creates an aggressive inspection program that should be beneficial to reliability improvement and effective in maintaining pole integrity for storm duty as well as normal use. Exhibit 5-3 provides the detail of the interlaced inspection programs that result in frequent opportunities to observe obvious pole defects.

			2007												
Cycle Year	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Tree Trimming, Urban Feeders (inspection results reported in FODR)	X				X				X				X		
Visual Circuit Inspections (results reported in CDIS)			X				X				X				X
Pole and G/L Inspect & treat (results reported in CDIS)			X												X
Subtransmission Walk-by		X		X		X		X		X		X		X	

Exhibit 5-3: AmerenUE's Interlaced Infrastructure Inspections

5.2.2 Vegetation maintenance program

AmerenUE for several years has been working to overcome a vegetation maintenance backlog and to restore the program to on-cycle trimming. This effort has been the subject of discussion with the Missouri PSC and agreement and expectation is in place for vegetation maintenance to be on-cycle by the 4th quarter of 2008. Budget reductions in prior years have now been overcome with increasing funding and expenditure each year as the backlog reduction program progresses as well as enhancements to the basic maintenance program are introduced as pilot projects. Exhibit 5-4 shows the expenditures for the program from 2001 through 2006 with the projection for 2007.

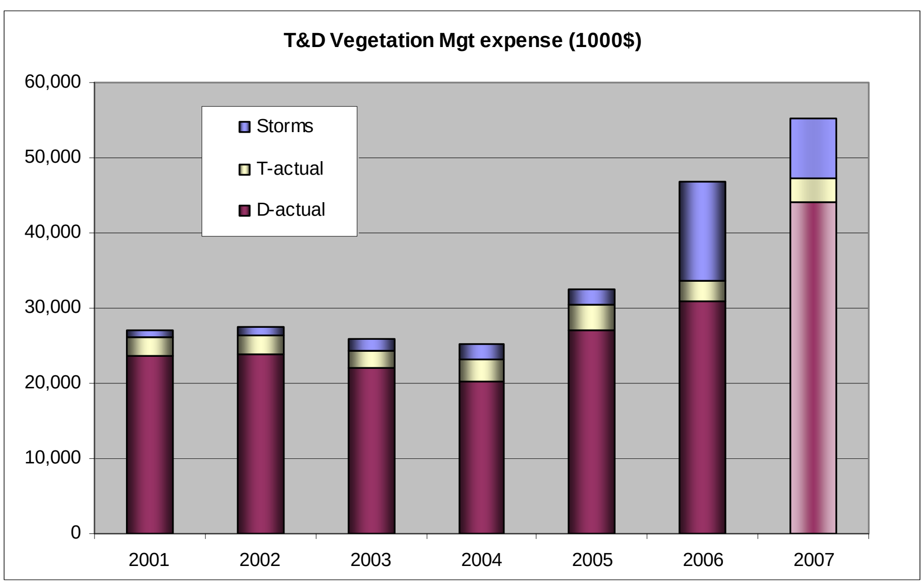

Exhibit 5-4: Vegetation Expenditures 2001 - 2007

5.2.3 Distribution line equipment maintenance program

AmerenUE's Distribution Circuit Inspections program is in its first full year of implementation. The lack of operational history for the program does not allow for analysis; however, KEMA notes that funding for the program elements is projected to be substantial, both for inspections and for anticipated repairs and equipment replacement.

Dedicated inspection forms for transformers, regulators, capacitors, sectionalizers and reclosers have been reviewed by KEMA. The form for Arresters, hard to assess in general, has not been received. The forms are general in nature and have inventory data items such as presence of animal guards (yes/no). This would facilitate an as-found / as–left analysis to generate a work ticket intended to restore the original condition. The forms do not yet have failure data fields such as predetermined failure mode, cause and effect fields to be filled out upon equipment failure. Analysis of such data would identify additional relevant inspection parameters.

The forms go hand-in-hand with an available training guideline document. KEMA found these guidelines useful since they are compiled of many photographs with accompanying text. The received version does not seem formalized in that the document lacks a company number, date, revision number, and approval history.

5.3 Conclusions

5.3.1 Maintenance prior to 2007 has been consistent with industry practices (ramping up from under-funding), new programs going forward are better.

As outlined earlier in this section, the pole inspection, vegetation and distribution circuit inspection programs have all been enhanced, or newly created, in the last two years. This increased emphasis on infrastructure maintenance is designed to improve system performance both in daily operations and in extreme weather or storm conditions. The elements of the maintenance programs are consistent with industry practices and in some cases go well beyond what is typical for the industry.

5.3.2 Vegetation management program is making good progress with increased funding to achieve desired cycles.

Reduction of the vegetation backlog has been a top priority for several years. As shown in Exhibit 5-4, funding for the vegetation program has steadily increased since 2004 with a substantial increase in the 2007 budget. The increased funding is necessary for both backlog reduction and for program enhancements that include more aggressive trim cycles for certain circuits and more aggressive actions to remove problem trees and expand rights-of-way. The ultimate measure of success will be decreasing outages caused by trees in both storm and non-storm conditions. A target for contribution of trees to reliability indices (i.e. tree-related SAIFI) has been established and will provide a quantifiable measure of success of the vegetation maintenance actions.

5.3.3 Distribution line equipment inspection program will provide information to build a library of inspection, failure, and maintenance data.

As shown in Exhibit 5-2, distribution line equipment will be inspected at intervals ranging from one year for overhead and underground operating devices to twelve years for a comprehensive wood pole inspection. The frequency of inspection and the number of devices included in the program will result in a large amount of data on condition and operations of line devices. AmerenUE's current plan is to collect and maintain data on inspections performed, however, data on equipment failures is not currently collected or maintained. KEMA believes that the equipment inspections and equipment failure or replacement information should be maintained as a library in order to analyze failure rates by class of equipment, age profiles, and various other information to be used in maintenance and replacement planning, including the evaluation of certain equipment types, makes and models. The analysis also may identify additional relevant inspection parameters for inclusion into the inspection program.

5.3.4 Programs include solid interlacing of pole, line equipment and vegetation inspection schedules, augmented by sub-transmission walk-bys.

As illustrated in Exhibit 5-3, AmerenUE has made a strong effort to integrate the various maintenance and inspection programs to provide maximum exposure of facilities and equipment to visual or more detailed inspections. By purposefully staggering inspection cycles in each program, the company has created a plan in which circuits and poles are subject to visual inspections more frequently than the specific program for each particular class of equipment requires, while executing it at similar costs.

5.4 Recommendations

5.4.1 Develop a statistical analysis methodology to ensure that equipment maintenance is optimal for different classes of line equipment.

As outlined in Section 5.3.3, the distribution circuit inspection program will produce data that can be used to evaluate equipment condition at various ages, duty cycles, locations (environments), etc. The analysis of this information can provide valuable information on how to optimize the various equipment classes from the standpoint of design (historical performance), inspection, maintenance and replacements. The analysis will also support more accurate budget forecasts for the related spending.

5.4.2 Continue the evaluation of the enhanced vegetation management program and apply the same approach to pole inspection and distribution line equipment programs.

In line with the recommendations for pole and line equipment maintenance programs, KEMA would like to emphasize the importance of program evaluation. In particular, the evaluation of the enhanced programs that are being executed as pilot programs to further determine when, where and to what extent to further implement these. Targets for such evaluation have been established and the approach could be considered for application to the pole and distribution line equipment programs.

6. Project Area – Emergency Restoration Plan

KEMA's focus in this section is to provide an assessment of the parts of the AmerenUE's Electric Emergency Restoration Plan (EERP) that have proven to be effective as currently structured and an assessment of those areas that can be improved to prepare AmerenUE for future events of the magnitude of the July and December Storms as well as for more effective response to storms of lesser consequence.

6.1 Leading Practices in Emergency Restoration

6.1.1 Industry Practices

To provide a baseline for reviewing AmerenUE processes and capabilities, it is necessary to provide a summary level description of typical storm restoration activity. For this purpose, KEMA has prepared a model of a storm restoration process that incorporates leading practices from the utility industry. The model provides the reader with a basic understanding of how storm restoration is typically managed in a leading utility company and highlights the basic flow of information, the sequence of events in the field in assessing damage and the logistics of the restoration process. As one would expect, many support activities facilitate the primary processes of system restoration and repair including management of information for both internal decision-making and public dissemination. Both the primary processes and support activities as they existed in 2006 at AmerenUE are discussed throughout this report to provide an understanding of what works well and what could be improved. Exhibit 6-1 shows our definition of the outage management process and is referenced throughout this report to demonstrate the specific area of the process being reviewed.