

COMMONWEALTH OF KENTUCKY

JUN 29 2007

BEFORE THE PUBLIC SERVICE COMMISSIONUBLIC SERVICE

In the Matter of:

An Investigation of the Reliability)	
Measures of Kentucky's Jurisdictional)	
Electric Distribution Utilities and)	Case No. 2006-00494
Certain Reliability Maintenance)	
Practices)	

Post-Hearing Brief of Kentucky Power Company

For its Post-Hearing Brief Kentucky Power Company states:

Introduction

The Commission established this proceeding on December 12, 2006 upon its own motion.¹ The purpose of the investigation was to "assess the reliability of ... [electric utility] distribution systems ... [and] vegetation management system practices related to the electric distribution system[s]."² Specifically, the Commission indicated it intended to examine "whether there is a need to develop consistent standards for reporting reliability performance," as well as the adequacy of "current maintenance and vegetation management programs ... and, if warranted, determine the need for minimum maintenance standards."³

¹ Order, In the Matter of: An Investigation of the Reliability Measures of Kentucky's Jurisdictional Electric Distribution Utilities and Certain Reliability Maintenance Practices, Administrative Case 2006-0494 (December 12, 2006).

² Id. at 1.

³ Id. at 3.

With respect to the issues presented in this proceeding, the evidence demonstrates that:

- If the Commission elects to impose a uniform measure of reliability for Kentucky's electric distribution utilities, the System Average Interruption Duration Index ("SAIDI") would be an appropriate index.
- Whatever measure of reliability is chosen, the metric should be reported and reviewed by the Commission on a systemwide basis for each utility instead of at a lower (circuit, substation or customer) level.
- System reliability should be evaluated by looking to the trend over a five-year or longer basis.
- It would be inappropriate to establish a Commonwealth-wide reliability standard. If a standard is developed it should be developed on a utility-by-utility basis.
- The Commission should treat vegetation management practices and plans as a means to an end and not a goal unto themselves.
- Deviation from a vegetation management plan should not give rise to an enforcement action.
- The Commission should not adopt minimum right of way clearance standards.
- A. <u>Distribution System Reliability Must Be Calculated on a System-Wide, Utility-Specific Basis And Evaluated To Determine The Reliability Trend Over a Reasonable Period of Time.</u>

The parties agreed, subject to certain concerns regarding the manner in which the measures would be applied, that SAIDI, Customer Average Interruption Duration Index ("CAIDI") and the System Average Interruption Frequency Index ("SAIFI") provided accurate measures of system reliability.⁴ Kentucky Power recommended that

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⁴ Transcript of Hearing, *In the Matter of: An Investigation of the Reliability Measures of Kentucky's Jurisdictional Electric Distribution Utilities and Certain Reliability Maintenance Practices*, Administrative

if the Commission elected to employ a standard measure of reliability SAIDI be used because it was calculated using the other two measures.⁵ In addition, any index used must be adjusted to exclude Major Event Days as determined under IEEE Standard 1366-2003.⁶

Although recognizing that one or more of the three measures could be used to gauge system reliability, the witnesses were emphatic that the measures were useful only if appropriately employed. Specifically, the witnesses explained the indices could serve as appropriate measures of distribution system reliability only upon three conditions.

1. Reliability Should Be Evaluated At the Utility System Level As Opposed To Some Lower Level.

First, representatives of many of the distribution utilities testified that their companies possessed the ability to record and report reliability information at the circuit or lower levels. Nevertheless, the witnesses consistently maintained that system-wide indices were the appropriate level at which to measure a utility's reliability. Attempts to gauge reliability using indices calculated at the circuit or even lower levels will not provide the Commission with an accurate measure of the reliability of a utility's system. Differences in terrain, customer base and urbanization make comparisons between different parts of a utility's system difficult. Moreover, the amount of data that would

Case 2006-0494 (May 23, 2007) at 28. ("TH") See also, TH 31-32, 35, 40, 44, 46, 48-49, 52, 55, 58, 60, 63

⁵ TH at 29.

⁶ Prefiled Testimony of Everett Phillips.

⁷ See, e.g., TH at 30, 32, 35, 42, 45, 49, 51, 56.

⁸ *Id.* at 28-29, 31, 40-41, 44, 48, 51.

⁹ *Id.* at 51-52, 66.

¹⁰ *Id.* at 51-52, 99, 126, 133.

have to be reported and analyzed if indices were provided at the circuit level or below would be an unreasonable burden on the utilities and make its use by the Commission cumbersome at best.¹¹

The exaggerated variability in the reliability indices resulting from measuring reliability at a level below the system as a whole also supports evaluating reliability only at the system level. This problem was underscored by Mr. Phillips in his prefiled testimony:

When reporting at sub-system levels of a small utility, annual fluctuations become magnified because relatively fewer interruptions can force an area to appear poor performing. Those few events could result from facility failures that would not be reasonably expected to recur in the same location such as vehicle accident breaking a pole or a substation transformer failure. Reporting at the system level allows these types of outages not to be considered area specific and they average out across the service territory. ¹²

Stated otherwise, the larger the data population used in calculating the reliability indices the less likely the result is to be skewed by outliers or transient occurrences.

2. Reliability Indices Should Not Be Used To Establish Fixed Benchmarks But Instead Are Most Appropriately Used To Determine Reliability Trends Over A Multi-Year Period.

<u>Second</u>, whatever the reliability measure adopted it should not serve as a fixed and immutable benchmark against which a utility's performance is measured. That is, reliability standards, if adopted, should not be treated like safety requirements. As Mr. Grubbs testified:

In lieu of a [fixed] standard, I would like to recommend possibly a guideline that could be used by inspectors when they come out and do the annual

¹¹ Id. at 41

^{10.} at 4

¹² Prefiled Testimony of Everett Phillips at 10.

inspection. They could look at it on an individual utility basis that way and take into account the factors that each utility has specific to themselves. 13

Other witnesses similarly testified that use of reliability indices as a guideline¹⁴ rather than a fixed standard is appropriate in light of fluctuations in system reliability resulting from weather conditions such as ice storms¹⁵ as well as the year-to-year fluctuations in the indices resulting from other causes.¹⁶

Because of these variations, a single year's indices will not accurately reflect the reliability of the utility's system.¹⁷ In addition, even substantial measures to improve reliability may not be reflected fully in the indices for several years after the work is completed.¹⁸ As a result, flexibility is required¹⁹ and the witnesses recommended that reliability be tracked over a multi-year period so that the multi-year trend in a utility's reliability – as opposed to single year's results – can be used to assess its performance.²⁰ In this regard, representatives of a number of cooperatives explained that the Rural Utility Service assesses reliability by evaluating the trend in each utility's indices over a five-year period.²¹ Even a five-year trend, however, may not be long enough. As described by Mr. Schaefer, use of a trend over a longer period such as ten

¹³ TH at 41.

¹⁴ Id. at 41-42, 44.

¹⁵ Id. at 53.

¹⁶ Id. at 32, 55.

¹⁷ Id.

¹⁸ Prefiled Testimony of Everett Phillips at 7 ("strategy results or improvements may not be apparent in the indices for a year or more.")

¹⁹ TH at 49, 58, 60, 65.

²⁰ *Id.* at 34, 47 ("[a] trend line based on an historical five years..."), 52, 58-59, 60, 65, 68.

²¹ Id. at 47, 54, 55.

years would not only be based upon more information – and presumably result in a more accurate measure – but would be more fair.²²

Most fundamentally, the use of reliability indices as guidelines and not fixed standards means that the failure to obtain a prescribed standard – and Kentucky Power emphatically believes it would be inappropriate to prescribe fixed benchmarks or standards – should not serve as the sole basis for imposition of penalties or fines. As Mr. Phillips explained, "[n]on-attainment [of a standard] may or may not be an indication of a problem ... [and may be] due to unique short term challenges...."²³ Instead, the utility and Commission staff should act collaboratively to address reliability issues in much the same manner the Rural Utility Services works with cooperatives to develop and monitor corrective action plans.²⁴ Indeed, many utilities now use reliability data in an iterative process to adjust their vegetation maintenance and other reliability maintenance measures.²⁵

3. Individual Reliability Standards, If Established At All, Must Be Fixed On A Utility-By-Utility Basis.

Third, an individual utility's reliability should not be measured against a statewide standard. Rather, the standard must be developed on a utility-by-utility basis. As Mr. Phillips testified, there simply are too many differences between the certified territories of the utilities for the Commission to develop a fair or workable statewide

²² Id. at 34, 52-53.

²³ Prefiled Testimony of Everett Phillips at 12.

²⁴ TH at 57; Prefiled Testimony of Everett Phillips at 12-13.

²⁵ Prefiled Testimony of Everett Phillips at 7, 14.

²⁶ Id. at 34.

²⁷ Id. at 30.

standard.²⁸ These differences include the size of the company,²⁹ the terrain within the company's service territory,³⁰ weather,³¹ customer density per line mile,³² the layout of the transportation infrastructure in the service territory,³³ the amount and type of trees and vegetation within the company's service territory,³⁴ the type of outage management system employed by the utility and whether service is provided primarily in urban or rural areas.³⁵

By statute, utilities are required to provide "adequate, efficient and reasonable service." Although the statutory requirement that service be adequate establishes a baseline for service, the General Assembly's inclusion of the term "reasonable" in the statutory command makes clear that in determining what is adequate the Commission must consider all of the conditions under which service is provided. As the questioning at the hearing underscored, reasonably reliable service to a subdivision in Louisville employing underground distribution lines differs markedly from reasonably reliable service provided by an above ground radial distribution line following a road right of way to the end of a hollow in Bell County, Kentucky:

Chairman Goss: Do you see a difference in terms of geography vis-àvis reliability between LG&E and KU? In other words, are there more

²⁸ Id.

²⁹ Id. at 29-30, 44.

³⁰ *Id.* at 32, 38, 46, 51.

³¹ *Id.* at 60.

³² Prefiled Testimony of Everett Phillips at 3.

³³ *Id.* at 3-4.

³⁴ TH at 32, 38, 47.

³⁵ *Id.* at 36-37, 44-45.

³⁶ KRS 278.030(2)

³⁷ See, e.g., Black's Law Dictionary 1272 (7th ed. 1999) (defining reasonable as "fair, proper or moderate *under the circumstances*.") (emphasis supplied.)

problems where KU is in the southeastern part of the state or the eastern part of the state versus LG&E in the urban areas?

A: Yes, I would agree. For instance our Pineville area is an area, heavily treed area, and we have more problems typically, routinely, on those types of circuits.³⁸

In addition to requiring that service be adequate and reasonable, the statute also mandates that service be efficient.³⁹ Even assuming it was physically possible to provide service in the heavily forested, mountainous areas of eastern Kentucky at the same reliability levels as service provided to a subdivision in eastern Jefferson County, the costs of doing so would be so high as to render the service inefficient.⁴⁰

Use of a "one-size-fits-all" standard may also raise significant policy issues for the Commission. Setting standards without regard to the myriad of factors affecting the provision of service and its costs by individual utilities could require the Commission to increase rates for utilities, such as Kentucky Power, that provide service in mountainous, heavily forested or difficult to access areas to levels that would impose a financial burden on ratepayers. Indeed, because "Kentucky Power's service territory has a higher incidence of poverty than the remainder of the Commonwealth, ... [and] the depth and severity of poverty in Kentucky Power's service territory is greater than the remainder of the state" the increased burden would be compounded.

Alternatively, using a statewide standard but adjusting it for the demands of

³⁸ TH at 37.

³⁹ KRS 278.030(2).

⁴⁰ See, e.g., The American Heritage Dictionary of the English Language 416 (New College Edition 1976) (defining efficient as "acting or producing effectively with a minimum of waste, expense or unnecessary effort ... **exhibiting a high ratio of output to input**.") (emphasis supplied).

⁴¹ TH at 37.

⁴² Verified Joint Application of Kentucky Power Company and the Kentucky Association for Community Action, Inc., *In the Matter of: Joint Application of Kentucky Power Company and Kentucky Association for Community Action for the Establishment of a Home Energy Assistance Program*, P.S.C. Case No. 2006-00373 at ¶ 10 (Filed August 3, 2006).

mountainous terrain, thereby resulting in a progression toward the mean of the two areas, could result in a lessening of reliability in urban or more easily served areas. Indeed, a statewide benchmark necessarily would be lower than might otherwise be established for primarily urban service territories if the standard were determined on a system-wide basis.⁴³

Finally, although Mr. Thomas, the witness for Louisville Gas & Electric Company and Kentucky Utilities Company, suggested that any Commission-imposed standard (even those that apply to matters other than reliability) should be uniform across the Commonwealth if one were to be imposed, 44 he continued however, by explaining that the need to account for differences in topography, urbanization, forestation and other factors that differ radically between utilities and within individual utility service territories means the Commission should refrain setting any standards. 45 In this regard, Mr. Thomas' testimony is consistent with that of other witnesses, 46 including Mr. Phillips of Kentucky Power, who testified the Commission should not impose any standard. 47

B. Although Vegetation Management Plans Are A Useful Tool In Maintaining And Improving Reliability, The Commission Should Not Impose Specific Plan Standards Nor Prescribe Fixed Clearance Requirements.

Many of the parties to this proceeding reported that vegetation management plans are an important part of their efforts to maintain and improve the reliability of their

⁴³ This is not to suggest that utilities providing service in urban areas would intentionally reduce the reliability of their service in those areas. But in establishing reliability capital and maintenance budgets that ultimately are scrutinized by the Commission in rate cases, it would not be unreasonable for a utility to consider a Commission-imposed reliability standard.

⁴⁴ Id. at 35.

⁴⁵ *Id.* at 37.

⁴⁶ *Id.* at 41, 44.

⁴⁷ *Id.* at 29.

systems.⁴⁸ Nevertheless, the clear preponderance of the evidence demonstrates it would be inappropriate for the Commission to prescribe standards for vegetation management plans or fixed clearance requirements.

1. The Variability Between Utility Service Territories And Operations Make Any Attempt To Prescribe Standards For Vegetation Management Plans Problematic And Unproductive.

Vegetation management plans are only one of several means employed by utilities to maintain and improve system reliability. For example, in addition to developing and using a detailed vegetation management plan and other measures, Kentucky Power also uses its Transmission and Distribution Asset Management Programs and its Major Transmission and Distribution Reliability Programs to address reliability concerns. Any requirement that Kentucky Power adhere to a specified vegetation management plan may result in Kentucky Power having to shift resources from these other two programs to fund the Commission prescribed vegetation management programs in instances where, because of the unique features of Kentucky Power's system and service territory, the other programs would be a more effective means of addressing reliability.

For example, the mountainous and heavily wooded terrain found in Kentucky Power's service territory means that line outages sometimes are the result of trees falling from outside Kentucky Power's right-of-way onto the lines.⁵⁰ In such cases, it may be more effective for Kentucky Power to acquire additional rights to remove trees from outside its right of way instead of undertaking any particular vegetation

⁴⁸ See, e.g, Prefiled Testimony of Everett Phillips at 13-15. See also, TH at 98.

⁴⁹ Prefiled Testimony of Everett Phillips at 4-5.

⁵⁰ See. TH at 124.

management practice. Thus, the prescription by the Commission of a model plan for all utilities may undermine reliability in those areas where other means of maintaining and improving reliability are more effective. Moreover, in many instances, reliability problems arise from causes other than vegetation so that a vegetation management plan – whether prescribed or not – would have no effect.⁵¹

Although a number of utilities have developed and employ their own vegetation management plans,⁵² the preponderance of evidence suggests there is no recognized model plan.⁵³ Indeed, the utilities testifying at the hearing recommended against the imposition of a standard plan.⁵⁴ In any event, if the Commission elected to prescribe a plan for all utilities it would need to develop its own plan. Yet, the difficulty of doing so was underscored at the hearing by testimony that it would be easier to list what should not be contained in a Commission-prescribed plan than to list the elements of a model plan.⁵⁵

More fundamentally, the record is clear that a vegetation management plan for a specific utility must be based upon the individual characteristics of that utility and its service territory. For example, Mr. Phillips testified:

Differences exist in service territories, terrain, customer population densities, etc. In addition, many existing distribution easements do not specify an easement width and limit our ability to control to that which "endangers the safer operation of the line." ⁵⁶

⁵² TH at 99, 111, 126, 133.

⁵¹ TH at 124, 132.

⁵³ *Id.* at 83, 89, 96, 103, 111, 114, 118, 122, 125, 127 130, 133.

⁵⁴ *Id.* at 107, 109, 116, 120, 123, 126 129.

⁵⁵ *Id.* at 84, 91,

⁵⁶ Prefiled Testimony of Everett Phillips at 15.

Other factors to be considered are the "number of circuits, the length of miles of those circuits ... any specific areas that need specific attention," whether the utility owns the distribution rights of way, ⁵⁸ level of customer complaints and historical reliability. ⁵⁹ The variation in these characteristics across the Commonwealth and between utilities is a further reason the Commission should heed the recommendations of the utilities and refrain from prescribing a standard vegetation management plan.

2. Vegetation Management Plans Are A Tool And Not An End Unto Themselves. As Such, A Deviation By A Utility From Its Plan Should Not Serve As A Basis For Enforcement Action.

Vegetation management plans are a tool for maintaining and improving reliability. Accordingly, the Commission's focus should be, as discussed above, on the multi-year trend of the utility's reliability indices. A vegetation management plan can be scrupulously followed yet fail to maintain or improve the reliability of a utility's system. Conversely, a utility may vary from its plan yet have its reliability improve. In either case, what is important is the trend in the utility's reliability over a reasonable period and not whether it "checked all of the boxes" on its vegetation management plan. Moreover, because vegetation management plans are just that — plans for future action — the utility must have the flexibility to deviate because of changes in circumstances or conditions. For example, a plan may provide for a five to seven year trim cycle. But the prevalence of fast-growing softwoods or slower-growing hardwoods in a section of right of way may make deviation from the plan, by increasing the frequency of trimmings in

⁵⁷ TH at 102.

⁵⁸ *Id.* at 84-85.

⁵⁹ Prefiled Testimony of Everett Phillips at 14.

⁶⁰ TH at 116.

⁶¹ *Id.* at 112, 131,

the case of the fast-growing vegetation and decreasing it with hardwood trees, reasonable. 62

Because a vegetation management plan is a means to maintaining and improving reliability and not an end unto itself, the Commission should refrain from taking "enforcement action" where a utility deviates from an applicable vegetation management plan.⁶³ As Mr. Wilson of Jackson Energy Cooperative testified:

Well, as far as the enforcement issue, that's a very difficult thing to do when you're talking about several thousand miles of line out there. For me to physically look at all of my lines, it's tough enough, let alone for you all to do it statewide.⁶⁴

If the Commission nevertheless concludes that some response is required where a utility materially and repeatedly deviates from its vegetation management plan, the Commission should require the offending utility to develop and adhere to a corrective action plan. Such an approach has the distinct advantage of allowing the utility and the Commission to act collaboratively and avoid the more adversarial approach inherent in a typical enforcement action.

3. The Commission Should Not Adopt A Fixed Right of Way Clearance Standard.

The Commission also inquired whether it should adopt a fixed right of way clearance standard. Although there was some support for such an approach, minimum clearance standards raise the same sort of problems posed by a requirement for uniform vegetation management plans:

⁶² See, e.g., TH at 83, 124, 132.

⁶³ *Id.* at 83, 112, 114-115, 127, 130, 134.

⁶⁴ *Id.* at 112.

⁶⁵ *Id.* at 96, 104, 107, 112, 114-115, 127, 130, 134.

⁶⁶ *Id.* at 82.

⁶⁷ See, e.g., TH at 86.

Due to varying physical conditions in each utility's service territory, varying rights in easements and varying environments KPCo operates in, it may be impossible for each utility to meet a minimum standard in all of their service territory.⁶⁸

Indeed, Mr. Hoyt of Kenergy testified that a minimum clearance standard would impair Kenergy's ability to respond to those "circumstances unique to each co-op that requires us to make management decisions for the proper care of the right-of-way from the vegetation management standpoint...."⁶⁹ This point was made even more emphatically by Mr. Wilson, who testified that although a requirement to clear the right of way for twenty feet on each side of the center line might be acceptable in a rural area, it would raise significant if not insurmountable difficulties in urban and suburban areas.⁷⁰ Likewise, a fixed standard may impede the ability of utilities to obtain new right of ways.⁷¹

Finally, implementation of fixed standards for right of way clearance will require significant resources. Kentucky Power has acquired its rights of way over more than the past 75 years. Merely reviewing the thousands of right of way documents will impose a significant burden. In addition, additional resources will be required to acquire – whether through negotiation or condemnation – additional right of way where required to meet any fixed standards. These costs in turn will need to be recovered through rates.

⁶⁸ Prefiled Testimony of Everett Phillips at 17. See also, TH at 103.

⁶⁹ TH at 103.

⁷⁰ *Id.* at 110.

⁷¹ *Id.* at 105-106.

Utilities require flexibility⁷² in addressing vegetation management problems and the one-size-fits-all standard inherent in fixed clearance standards will impede rather than aid the maintenance and improvement of distribution system reliability.

Conclusion

Reliable electric service is important to Kentucky distribution utility customers. Service reliability can be maintained and improved only by using sustained programs tailored to the challenges presented by each utility's service territory. The record is clear that the best way to ensure such service is for the Commission and distribution utilities to work collaboratively to monitor reliability using a rolling multi-year index that measures reliability on a specific utility system-wide basis.

The evidence of record also militates against establishing a reliability standard or benchmark. If the Commission nevertheless elects to impose such a standard for distribution utilities, the standard should be established on a utility specific basis. The alternative, a state-wide reliability standard, would by definition fail to reflect the unique geographic, demographic and service characteristics of each utility's certified territory.

Finally, vegetation management programs are an important part of efforts to maintain and improve distribution reliability. But the record is clear they are just one of several tools a utility can employ to address reliability issues. There is no one-size fits all program. Utilities need the flexibility to address reliability issues unique to their service territory using the most efficient means, whether that is through vegetation management or otherwise. Accordingly, the Commission should refrain from imposing vegetation standards.

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⁷² *Id.* at 122.

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CERTIFICATE OF SERVICE

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