COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

AN INVESTIGATION OF THE RELIABILITY MEASURES OF KENTUCKY'S JURISDICTIONAL ELECTRIC DISTRIBUTION UTILITIES	))))	ADMINISTRATIVE CASE NO. 2011-00450

ORDER

On January 11, 2012, the Commission issued an Order which initiated an investigation to review the measures used by Kentucky's jurisdictional electric utilities to assess the reliability of their distribution systems and the manner in which those measures are reported to the Commission.

The Order stated that in this administrative case, the Commission would investigate the adequacy of the current reporting requirements, including the ability of the electric distribution utilities to submit on-line or electronic reports. The Commission would also investigate the utilities' corrective-action measures and the timeliness of their completion. The Commission indicated that it would seek suggestions, comments, and best practices on reporting requirements, pertinent provisions of the National Electrical Safety Code ("NESC"), and other matters relating to electric utility distribution reliability.

As the Commission stated in the order initiating this proceeding, in Case No. 2006-00494 ("Admin Case No. 2006-00494"),[1] the Commission found that the outage reporting requirements did not provide sufficient information for the Commission to judge the adequacy of service. In that case, the Commission directed each

[1] Case No. 2006-00494, *An Investigation of the Reliability Measures of Kentucky's Jurisdictional Electric Distribution Utilities and Certain Reliability Maintenance Practices* (Ky. PSC Oct. 26, 2007) at 6.

jurisdictional electric utility to submit annual reports that identify System Average Interruption Duration Index ("SAIDI"), System Average Interruption Frequency Index ("SAIFI"), and the Customer Average Interruption Duration Index ("CAIDI"). The Commission further directed that the reporting be based on the criteria and definitions set forth in the Institute of Electrical and Electronics Engineers ("IEEE") standard number 1366 (latest version) "Guide for Electric Power Distribution Reliability Indices" ("IEEE Standard").[2] The Commission also directed that each annual report include the system-wide SAIDI, SAIFI and CAIDI indices for each of the preceding five 12-month periods. Finally, the Commission directed that each utility provide a list of the ten worst-performing circuits for each index and identify the major outage category that contributed to the performance of those ten circuits.[3]

As the Commission has stated in several orders, Kentucky's jurisdictional utilities are required by statute to furnish adequate, efficient, and reasonable service.[4] Adequate service is generally defined as having sufficient capacity to meet maximum demand "and to assure such customers of reasonable continuity of service."[5] KRS 278.042 addresses service adequacy and safety standards, referring to the NESC as published by the IEEE. Paragraph (2) of the statute says:

> Except as otherwise provided by law, the commission shall, in enforcing service adequacy and safety standards for electric utilities, ensure that each electric utility constructs and maintains its plant and facilities in accordance with

[2] On May 31, 2012, a new edition of this IEEE Standard was issued (1366-2012) and is now the most current edition.

[3] *Id.* at 6-9.

[4] KRS 278.030(2).

[5] Case No. 2006-00494, *An Investigation of the Reliability Measures of Kentucky's Jurisdictional Electric Distribution utilities and Certain Reliability Maintenance Practices* (Ky. PSC Oct. 26, 2007) at 1.

> accepted engineering practices as set forth in the commission's administrative regulations and orders and in the most recent edition of the NESC.

Regulations have been promulgated that further define these requirements for electric utilities. All electric utilities are required to provide adequate service according to their tariffs on file at the Commission.[6] They are required to "make all reasonable efforts to prevent interruptions of service, and when such interruptions occur shall endeavor to reestablish service with the shortest possible delay."[7]

Also, utilities are required by regulation to report to the Commission any loss of service for "four (4) or more hours to ten (10) percent or 500 or more of the utility's customers, whichever is less."[8] While this level of monitoring provides the Commission with information about major outages and is useful in times of emergency operations, it does not provide information regarding the day-to-day reliability experienced by ratepayers.

In this administrative case, the Commission has investigated the adequacy of the current reporting requirements as set forth by regulation and as required by Admin Case No. 2006-00494. In this case, we also made inquiry into the ability of the electric distribution utilities to submit on-line or electronic reports. The Commission has also investigated the utilities' corrective-action measures and the timeliness of their completion. The Commission sought suggestions, comments, and best practices on reporting requirements, pertinent provisions of the NESC, and other matters relating to electric utility distribution reliability.

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[6] 807 KAR 5:041, Section 2.

[7] 807 KAR 5:041, Section 5(1).

[8] 807 KAR 5:006, Section 27(1)(c), excepting a natural gas utility.

Initial data requests were issued as an Appendix to the January 11, 2012 Order, and Staff's Second Request for Information was issued March 15, 2012. A procedural schedule was issued which allowed for the submission of testimony. Only Louisville Gas and Electric Company ("LG&E") and Kentucky Utilities Company ("KU") submitted testimony.

DISCUSSION

The jurisdictional utilities generally believe the current requirement to report their system-average SAIDI, system-average SAIFI, and system-average CAIDI, along with these same indices for the 10 worst-performing circuits, based upon the IEEE Reliability Standard, is adequate to evaluate the reliability of their distribution system. Nolin Rural Electric Cooperative Corporation ("Nolin") believes it is reasonable for each utility to develop and report five-year average SAIDI and SAIFI indices on a circuit-by-circuit basis as a benchmark for comparison purposes. The utility already performs this task. Nolin feels it is reasonable for the Commission to require each utility to explain why a particular circuit has a higher SAIDI than the utility's five-year average SAIDI for that circuit, as it is already completing this task.[9] Another example is LG&E's and KU's response that they believe it is reasonable for the Commission to require each utility to develop and report five-year averages for each of the reliability indices on a circuit-by-circuit basis, but state that use of this data as a benchmark comparison is questionable.[10] The jurisdictional utilities do not see any benefit in expanding the

[9] Nolin Rural Electric Cooperative Corporation Responses to Commission Staff's Second Request for Information, response to Item No. 1, filed March 28, 2012.

[10] Response of Louisville Gas and Electric Company and Kentucky Utilities Company to Staff's Second Request for Information dated March 15, 2012, response to Question No. 1, filed March 30, 2012.

current reporting of the 10 worst-performing circuits to the 15 or 20 worst-performing circuits for each index. The jurisdictional utilities believe it would be unreasonable for the Commission to require each utility to develop and report a rolling five-year average for SAIDI, SAIFI, or CAIDI on a circuit-by-circuit basis as a benchmark to be used for comparisons.

In their testimony, LG&E and KU recommend that the Commission keep the current reporting requirements in place, ease the speed of reporting by implementing an on-line report completion and submission system, and improve the quality and usefulness of the 10-worst-performing-circuits report by excluding uncontrollable events from the calculation of the reliability statistics.[11]

Pursuant to KRS 278.030(2), a utility is required to furnish adequate, efficient, and reasonable service. Additionally, KRS 278.010(14) contains as part of its definition for "adequate service" the capacity "to assure such customers of reasonable continuity of service." In order to better assess each utility's performance in providing adequate service to its customers, the Commission adopted the IEEE Reliability Standard in Admin Case No. 2006-00494 as the guideline for utilities to report the annual performance of their systems.

The IEEE Reliability Standard states that in order to adequately measure performance, the duration and frequency of customer interruptions must be examined at various levels. In Admin Case No. 2006-00494, the Commission selected, at the distribution level, three indices – SAIDI, SAIFI and CAIDI – from the IEEE Reliability

[11] Testimony of Paul Gregory "Greg" Thomas, Vice President, Energy Delivery – Distribution Operations Louisville Gas and Electric Company and Kentucky Utilities Company, filed May 11, 2012, p. 4.

Standard as the means for measuring the performance for utility systems in the Commonwealth.

The Commission believes that the system-wide information filed yearly by each utility regarding SAIDI, SAIFI and CAIDI is not sufficient to render a judgment on a utility's specific reliability performance because the system-wide indices reflect only average performance criteria based on the sum of all of the circuits within its territory. It is possible for system-wide indices of a utility to mask significant and persistent performance issues within the system and to reflect improving annual average system-wide indices, even though reliability is declining for individual circuits. By requiring reporting on a circuit level, the performance of each circuit within the utility's system can be analyzed individually over time to determine its performance trend.[12] With the data provided per circuit, the Commission believes it will have sufficient information to analyze reliability and effectively review the utilities' plans for any corrective actions. The Commission believes that requiring indices to be reported for every circuit whose SAIDI and/or SAIFI exceeds the five-year averages for that same circuit will eliminate the ability to mask poorly performing circuits and will provide a more accurate representation of the utility's overall system reliability.

It is important to note that the Commission does not believe that it is practical to use SAIDI or SAIFI on a system-wide or individual-circuit basis to compare one system to another or one circuit to another. However, the Commission does believe that it is appropriate to use SAIDI and SAIFI as indicators of the historical performance of an individual circuit. The Commission recognizes that while all electric utilities use SAIDI

[12] It is important to note that a circuit's performance will be compared with its previous five-year average, and not with the performance of other circuits or the utility's system-wide average performance.

and SAIFI in some fashion, they do not use these indices as the primary indicator of reliability or as the primary determinant of where to perform additional clearing or to make additional capital investment. Likewise, the Commission considers SAIDI and SAIFI, whether calculated system-wide or on a circuit-by-circuit basis, with or without Major Event Days ("MEDs"), as simply indicators of reliability.

Therefore, based on the evidence of record and being otherwise sufficiently advised, the Commission finds that each jurisdictional electric distribution utility should collect and maintain all records necessary to evaluate its system-reliability performance in accordance with the methodology established by the most recent edition of the ("IEEE") standard number 1366 "Guide for Electric Power Distribution Reliability Indices," which currently is IEEE Standard 1366-2012[13] and, at a minimum should annually:

1. Calculate the SAIDI system-wide indices including MEDs and calculate the SAIDI system-wide indices excluding MEDs;

2. Calculate the SAIFI system-wide indices including MEDs and calculate the SAIFI system-wide indices excluding MEDs;

3. Develop a system-wide rolling five-year average SAIDI excluding MEDs;

4. Develop a system-wide rolling five-year average SAIFI excluding MEDs;

5. Calculate SAIDI excluding MEDs for every circuit within its system;

6. Develop a rolling five-year average SAIDI for each circuit within its system;

7. Compare each circuit to that circuit's rolling five-year average SAIDI;

[13] In subsequent years, should the IEEE standard number 1366 "Guide for Electric Power Distribution Reliability Indices" be updated, each utility should collect and maintain all records in accordance with the most recent version of the 1366 Guide. The IEEE 1366 (latest version) shall be utilized to define SAIDI, SAIFI, and T_{MED}.

8. Calculate SAIFI excluding MEDs for every circuit within its system;

9. Develop a rolling five-year average SAIFI for each circuit within its system;

10. Compare each circuit to that circuit's rolling five-year average SAIFI.

11. File a Reliability Report[14] by April 1 of each year, containing the reliability information as outlined in the attached Appendix for the preceding calendar year from January 1 to December 31 that includes the SAIDI and SAIFI system-wide indices, both including and excluding MEDs.

12. For each circuit with either SAIDI or SAIFI value higher than that circuit's respective SAIDI or SAIFI rolling five-year average, excluding MEDs, include in the annual Reliability Report the following information:

a. The circuit's SAIDI index for the year;

b. The circuit's SAIFI index for the year;

c. The circuit's rolling five-year average SAIDI;

d. The circuit's rolling five-year average SAIFI;

e. The substation name, number and location (i.e., County-Road-Town);

f. The circuit name, number and location (Town-Road-General Area);

g. The circuit's overall length in miles to the nearest tenth of a mile;

h. The number of customers served on the circuit for the year;

i. The date of the last circuit trim performed by the utility as part of its vegetation management plan;

[14] A format different from that outlined in the Appendix is acceptable so long as each jurisdictional electric distribution utility provides the substantive information outlined in Appendix A and the electronic copy is in an electronic format which is compatible with Microsoft Excel.

j. A list of outage causes for the circuit, along with the percentage of total outage numbers represented by each cause;

k. Circuit five-year average SAIDI;

l. Reporting year SAIDI;

m. Circuit five-year average SAIFI;

n. Reporting year SAIFI;

o. A Corrective Action Plan which describes any measures the utility has completed or plans to complete to improve the circuit's performance; and

p. Any other information the utility believes will assist the Commission in understanding the circumstances surrounding the circuit's performance.

The Commission further finds that it is reasonable for Commission Staff to conduct a technical conference to address any questions concerning the requirements set out in this Order.

IT IS THEREFORE ORDERED that:

1. Each jurisdictional electric distribution utility shall collect and maintain all records necessary to evaluate its system reliability performance in accordance with the methodology established by the most recent edition of the ("IEEE") standard number 1366 "Guide for Electric Power Distribution Reliability Indices," which currently is IEEE Standard 1366-2012,[15] and shall report by April 1 of each year for the preceding

[15] In subsequent years, should the IEEE standard number 1366 "Guide for Electric Power Distribution Reliability Indices" be updated, each utility should collect and maintain all records in accordance with the most recent version of the 1366 Guide. The IEEE 1366 (latest version) shall be utilized to define SAIDI, SAIFI, and T_{MED}.

calendar year the reliability information as outlined in the findings paragraphs above and in the attached Appendix. Each jurisdictional electric distribution utility shall file one paper copy in addition to an electronic copy of its report. Those portions of the report that are not narrative shall be in a format which is compatible with Microsoft Excel.

2. Within 60 days of the entry of this Order, Commission Staff shall schedule a technical conference to address any questions concerning the requirements set out in this Order.

By the Commission

ENTERED
MAY 30 2013
KENTUCKY PUBLIC
SERVICE COMMISSION

ATTEST:

Executive Director

APPENDIX

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2011-00450 DATED MAY 30 2013

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME _____
REPORT PREPARED BY _____
E-MAIL ADDRESS OF PREPARER _____
PHONE NUMBER OF PREPARER _____

SECTION 2: REPORTING YEAR

CALENDAR YEAR OF REPORT _____

SECTION 3: MAJOR EVENT DAYS (MED)

T_{MED} _____
FIRST DATE USED TO DETERMINE T_{MED} _____
LAST DATE USED TO DETERMINE T_{MED} _____
NUMBER OF MED IN REPORT YEAR _____

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

SECTION 4: SYSTEM RELIABILITY INFORMATION AND RESULTS

System-wide Information

TOTAL CUSTOMERS _____ TOTAL CIRCUITS _____

Excluding MED

5 YEAR AVERAGE		REPORTING YEAR	
SAIDI	_____	SAIDI	_____
SAIFI	_____	SAIFI	_____

Including MED

5 YEAR AVERAGE		REPORTING YEAR	
SAIDI	_____	SAIDI	_____
SAIFI	_____	SAIFI	_____

Notes:

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

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SECTION 5: CIRCUIT REPORTING

(CIRCUITS WITH SAIDI AND/OR SAIFI EXCEEDING 5 YEAR AVERAGE)

(CIRCUIT NUMBERS SHOULD BE REPORTED EXCLUDING MED)

CIRCUIT #1:

1. SUBSTATION NAME AND NUMBER
2. SUBSTATION LOCATION (COUNTY-ROAD-TOWN)
3. CIRCUIT NAME AND NUMBER
4. CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)
5. TOTAL CIRCUIT LENGTH (MILES)
6. CUSTOMER COUNT FOR THIS CIRCUIT
7. DATE OF LAST CIRCUIT TRIM (VM)
8. LIST OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE N NUMBERS REPRESENTED BY EACH CAUSE
9. CIRCUIT 5 YEAR AVERAGE (SAIDI)
10. REPORTING YEAR (SAIDI)
11. CIRCUIT 5 YEAR AVERAGE (SAIFI)
12. REPORTING YEAR (SAIFI)
13. CORRECTIVE ACTION PLAN

REPEAT INFORMATION FOR EACH CIRCUIT EXCEEDING ITS 5 YEAR AVERAGE FOR SAIDI AND/OR SAIFI

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SECTION 6: VEGETATION MANAGEMENT PLAN REVIEW

INCLUDE CURRENT VEGETATION MANAGEMENT PLAN

Additional page may be attached as needed.

SECTION 7: UTILITY COMMENTS

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