JACKSON ENERGY COOPERATIVE

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McKee, Kentucky 40447
Telephone (606) 364-1000 • Fax (606) 364-1007

March 26, 2008

Director of Engineering
Kentucky Public Service Commission
211 Sower Blvd.
PO Box 615
Frankfort, KY 40602-0615

Re: Jackson Energy Cooperative: 2007 Annual Reliability Report
Administrative Case No. 2006-00494

Jackson Energy Cooperative respectfully submits the 2007 Annual Reliability Report per the order dated October 26, 2007 in Administrative Case No. 2006-00494.

Please inform me if any further information is required.

Sincerely,

Clayton O. Oswald
Attorney for Jackson Energy Cooperative

COO/cr

Jackson Energy Cooperative's 2007 Annual Reliability Report includes the data requested in Administrative Case No. 2006-00494 for 2005, 2006, and 2007. Five years of data was requested but can not be provided as Jackson Energy does not have adequate data for the prior years. With the implementation of the Outage Management System (OMS) in 2005, this data is recorded and can be reported beginning with year 2005.

The following Appendices contain the data requested:

Appendix A:

Annual system wide CAIDI, SAIDI, and SAIFI calculated from year 2005 thru 2007 which does include Major Event Days. Jackson Energy's OMS Vendor will be making programming changes in the software to allow for the Major Event Days to be removed in the future. However, for this report, the indices for years 2005 thru 2007 listed in Appendix A include Major Event Days.

Appendix B:

Annual system wide CAIDI, SAIDI, and SAIFI calculated for year 2007 which does not include Major Event Days. The process to compute CAIDI, SAIDI, and SAIFI excluding the Major Event Days was performed by hand using the calculations as defined by the IEEE Standard 1366. As mentioned previously, the OMS software vendor will be making programming changes to exclude these in the future.

Appendix C:

A copy of the IEEE Standard 1366 guide has been attached for reference.

Appendix D:

The cause of the outages for years 2005, 2006, and 2007 which include the number of members affected and the duration of the outage in hours per cause. This data includes the Major Event Days.

Appendix E:

A list of the ten worst performing circuits for 2007 for each index value: CAIDI, SAIDI, and SAIFI which does not include Major Event Days. The process to compute the data for each index was performed by hand. As mentioned previously, the OMS software vendor will be making programming changes to exclude these in the future.

Each circuit is identified with further detail explaining the cause of the outage. In addition, the first pages of each index listing the 10 circuits indicate the tree clearing schedule and notes where improvements have been implemented.

Appendix A

Monthly Report

Period From 1/1/2005 to 12/31/2005

Substation	Outages	YTD Outages	Customer Hours	Members Affected	CAIFI	CAIDI	SAIDI	SAIFI
Annville	55	55	1,416.0	2137	1.9270	0.6626	0.0383	0.0578
Beattyville	141	141	7,003.9	6822	2.8956	1.0267	0.1893	0.1844
Booneville	74	74	6,039.7	4706	3.8605	1.2834	0.1632	0.1272
Brodhead	72	72	4,618.0	3356	1.7175	1.3760	0.1248	0.0907
Bush	62	62	2,166.6	1536	2.1573	1.4106	0.0586	0.0415
Campground	83	83	2,954.3	2239	1.5947	1.3195	0.0798	0.0605
East Bernstadt	83	83	2,935.9	2543	1.4590	1.1545	0.0793	0.0687
Eberle	68	68	1,870.0	1689	1.8279	1.1072	0.0505	0.0456
Fall Rock	78	78	3,468.2	4643	2.6776	0.7470	0.0937	0.1255
Goose Rock	105	105	21,435.6	9563	3.9862	2.2415	0.5793	0.2585
Greenbriar	21	21	2,641.9	3032	2.9960	0.8713	0.0714	0.0819
Greenhall	41	41	2,408.3	1745	2.3645	1.3801	0.0651	0.0472
Hargett	52	52	1,054.6	541	1.6295	1.9494	0.0285	0.0146
Keavy	83	83	6,374.8	3369	2.8240	1.8922	0.1723	0.0911
Laurel Ind	36	36	775.2	714	1.8030	1.0857	0.0210	0.0193
Maplesville	80	80	3,043.9	2806	2.5579	1.0848	0.0823	0.0758
Maretburg	51	51	2,531.1	2223	2.8391	1.1386	0.0684	0.0601
McKee	56	56	2,537.2	1581	2.0586	1.6048	0.0686	0.0427
Millers Creek	75	75	2,297.3	1734	2.0892	1.3249	0.0621	0.0469
Oneida	73	73	9,263.3	3484	3.8884	2.6588	0.2504	0.0942
Pine Grove	62	62	1,421.5	931	1.4920	1.5269	0.0384	0.0252
Rice Station	85	85	4,888.1	3093	1.6810	1.5804	0.1321	0.0836
Sand Gap	45	45	959.5	542	1.5014	1.7703	0.0259	0.0146
South Fork	44	44	4,977.4	2590	3.4718	1.9218	0.1345	0.0700
Three Links	61	61	6,733.6	3892	2.1877	1.7301	0.1820	0.1052
Tyner	45	45	710.8	709	1.4588	1.0025	0.0192	0.0192
West London 1	25	25	513.4	625	1.5170	0.8215	0.0139	0.0169
West London 2	38	38	701.9	1069	1.3396	0.6566	0.0190	0.0289
YTD Totals	1794	1794	107742	73914	2.4412	1.4577	2.9119	1.9976

Monthly Report

Period From 1/1/2006 to 12/31/2006

Substation	Outages	YTD Outages	Customer Hours	Members Affected	CAIFI	CAIDI	SAIDI	SAIFI
Annville	60	60	1,917.3	1698	1.5693	1.1292	0.0524	0.0464
Beattyville	170	170	12,274.8	4843	2.8190	2.5346	0.3355	0.1324
Booneville	87	87	2,342.5	1145	1.4366	2.0458	0.0640	0.0313
Brodhead	166	166	5,485.4	2626	1.9744	2.0889	0.1499	0.0718
Bush	46	46	894.3	485	1.3398	1.8439	0.0244	0.0133
Campground	96	96	4,553.4	5271	2.3905	0.8639	0.1245	0.1441
Conway	0	0	0.0	0	0	0.0000	0.0000	0.0000
East Bernstadt	87	87	2,817.7	1479	2.0068	1.9052	0.0770	0.0404
Eberle	68	68	4,043.1	1737	1.9088	2.3277	0.1105	0.0475
Fall Rock	80	80	3,652.3	1900	2.0213	1.9223	0.0998	0.0519
Goose Rock	112	112	30,512.8	6775	2.8371	4.5037	0.8341	0.1852
Greenbriar	66	66	12,363.7	3865	4.2194	3.1989	0.3380	0.1057
Greenhall	61	61	2,236.2	1270	2.1821	1.7608	0.0611	0.0347
Hargett	63	63	2,416.3	1262	2.0791	1.9147	0.0661	0.0345
Keavy 1	19	19	198.5	169	1.1901	1.1747	0.0054	0.0046
Keavy 2	78	78	3,917.0	1966	2.2469	1.9923	0.1071	0.0537
Laurel Ind 1	38	38	733.2	516	2.0235	1.4210	0.0200	0.0141
Laurel Ind 2	17	17	194.8	186	1.5763	1.0472	0.0053	0.0051
Maplesville	88	88	5,530.1	4495	4.0679	1.2303	0.1512	0.1229
Maretburg	54	54	2,007.2	1336	2.0875	1.5024	0.0549	0.0365
McKee	72	72	4,519.3	4407	3.6756	1.0255	0.1235	0.1205
Millers Creek	112	112	7,125.1	2858	3.8990	2.4930	0.1948	0.0781
Oneida	72	72	6,322.2	3066	3.4334	2.0620	0.1728	0.0838
Pine Grove	55	55	1,719.7	1524	1.5044	1.1284	0.0470	0.0417
Rice Station	128	128	11,534.9	7269	3.9830	1.5869	0.3153	0.1987
Sand Gap	58	58	1,664.8	934	2.5040	1.7825	0.0455	0.0255
South Fork	67	67	2,387.2	1089	1.8000	2.1921	0.0653	0.0298
Three Links	103	103	8,594.4	7284	4.7701	1.1799	0.2349	0.1991
Tyner	76	76	2,756.0	1806	2.3826	1.5260	0.0753	0.0494
West London 1	42	42	547.1	431	1.7309	1.2693	0.0150	0.0118
West London 2	55	55	3,305.3	2264	3.1532	1.4599	0.0904	0.0619
YTD Totals	2296	2296	148566	75956	2.7610	1.9560	4.0612	2.0763

Monthly Report

Period From 1/1/2007 to 12/31/2007

Substation	Outages	YTD Outages	Customer Hours	Members Affected	CAIFI	CAIDI	SAIDI	SAIFI
Annville	47	47	2,606.6	2478	2.1642	1.0519	0.0713	0.0677
Beattyville	144	144	10,732.5	5750	3.3353	1.8665	0.2934	0.1572
Booneville	61	61	1,680.4	1047	2.0370	1.6049	0.0459	0.0286
Brodhead	128	128	4,161.0	1998	1.7526	2.0826	0.1137	0.0546
Bush	52	52	4,534.7	2541	2.0247	1.7846	0.1240	0.0695
Campground	71	71	3,846.1	1034	1.3172	3.7196	0.1051	0.0283
Conway	7	7	1,246.5	869	1.1743	1.4344	0.0341	0.0238
East Bernstadt	99	99	8,370.1	5054	2.7157	1.6561	0.2288	0.1382
Eberle	72	72	4,774.4	2863	2.4263	1.6676	0.1305	0.0783
Fall Rock	71	71	9,346.1	4422	2.5111	2.1135	0.2555	0.1209
Goose Rock	128	128	17,401.8	8014	2.9881	2.1714	0.4757	0.2191
Greenbriar	35	35	4,065.3	2321	2.5338	1.7515	0.1111	0.0634
Greenhall	60	60	4,261.6	2114	2.7383	2.0159	0.1165	0.0578
Hargett	63	63	1,086.1	732	1.4699	1.4837	0.0297	0.0200
Keavy 1	29	29	2,130.2	1625	2.9332	1.3109	0.0582	0.0444
Keavy 2	48	48	3,204.2	894	1.5521	3.5841	0.0876	0.0244
Laurel Ind 1	31	31	3,675.2	1095	2.0699	3.3563	0.1005	0.0299
Laurel Ind 2	26	26	1,795.6	365	1.9415	4.9193	0.0491	0.0100
Maplesville	50	50	2,371.5	1201	1.6657	1.9746	0.0648	0.0328
Maretburg	35	35	925.5	514	1.6113	1.8006	0.0253	0.0141
McKee	48	48	7,211.9	6418	4.6541	1.1237	0.1971	0.1754
Millers Creek	83	83	7,337.6	2225	2.1010	3.2978	0.2006	0.0608
Oneida	75	75	6,929.0	3742	4.1624	1.8517	0.1894	0.1023
Pine Grove	81	81	5,520.3	2416	1.7147	2.2849	0.1509	0.0660
Rice Station	111	111	7,014.7	5578	2.9877	1.2576	0.1918	0.1525
Sand Gap	52	52	6,765.8	4028	3.7964	1.6797	0.1849	0.1101
South Fork	49	49	3,990.2	2127	2.8978	1.8760	0.1091	0.0581
Three Links	72	72	13,485.8	8335	4.5472	1.6180	0.3686	0.2278
Tyner	49	49	2,312.0	1827	1.6870	1.2654	0.0632	0.0499
West London 1	25	25	1,682.8	1754	2.0491	0.9594	0.0460	0.0479
West London 2	34	34	3,418.9	1501	1.4803	2.2778	0.0935	0.0410
YTD Totals	1936	1936	157884	86882	2.7547	1.8172	4.3159	2.3750

Appendix B

2007 System Wide Indices*

CAIDI	SAIDI	SAIFI
1.6424	2.5648	1.5616

*Does not include Major Event Days

Appendix C

IEEE Standards

IEEE Std 1366™-2003
(Revision of IEEE Std 1366-1998)

1366™

IEEE Guide for Electric Power Distribution Reliability Indices

IEEE Power Engineering Society

Sponsored by the
Transmission and Distribution Committee

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IEEE Guide for Electric Power Distribution Reliability Indices

Sponsor

Transmission and Distribution Committee
of the
IEEE Power Engineering Society

Approved 26 April 2004

American National Standards Institute

Approved 10 December 2003

IEEE-SA Standards Board

Grateful acknowledgment is made to the Edison Electric Institute for the permission to use the following source material:

Pages 28–30 of the June 2001, Edison Electric Institute 2000 Reliability Report.

Abstract: Distribution reliability indices and factors that affect their calculations are defined in this guide. The indices are intended to apply to distribution systems, substations, circuits, and defined regions.
Keywords: circuits, distribution reliability indices, distribution systems, electric power, reliability indices

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Introduction

(This introduction is not part of IEEE Std 1366-2003, IEEE Guide for Electric Power Distribution Reliability Indices.)

This Guide has been updated to clarify existing definitions and to introduce a statistically based definition for classification of major event days. The working group created a methodology, 2.5 Beta Method, for determination of major event days. Once days are classified as normal or major event days, appropriate analysis and reporting can be conducted. After this document is balloted, the working group will continue to investigate the major event definition by reviewing catastrophic events and days with zero events to determine if enhancements are warranted.

Patents

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Errata, if any, for this and all other standards can be accessed at the following URL: http://standards.ieee.org/reading/ieee/updates/errata/index.html. Users are encouraged to check this URL for errata periodically.

Interpretations

Current interpretations can be accessed at the following URL: http://standards.ieee.org/reading/ieee/interp/index.html.

Participants

At the time this standard was completed, the Working Group on System Design had the following membership:

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James D. Bouford, Richard D. Christie, Dan Kowalewski, John McDaniel, David J. Schepers, Joseph Viglietta, Cheryl A. Warren, Charles Williams.

The following members of the balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

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Satish K. Aggarwal, *NRC Representative*

Michelle Turner
IEEE Standards Project Editor

CONTENTS

IEEE Guide for Electric Power Distribution Reliability Indices

1. Overview

1.1 Scope

This guide identifies distribution reliability indices and factors that affect their calculation. It includes indices, which are useful today, as well as ones that may be useful in the future. The indices are intended to apply to distribution systems, substations, circuits, and defined regions.

1.2 Purpose

The purpose of this guide is twofold. First, it is to present a set of terms and definitions which can be used to foster uniformity in the development of distribution service reliability indices, to identify factors which affect the indices, and to aid in consistent reporting practices among utilities. Secondly, it is to provide guidance for new personnel in the reliability area and to provide tools for internal as well as external comparisons. In the past, other groups have defined reliability indices for transmission, generation, and distribution but some of the definitions already in use are not specific enough to be wholly adopted for distribution. Users of this guide should recognize that not all utilities would have the data available to calculate all the indices.

2. References

The following standards shall be used, when applicable, in preparing manuscripts. When the following standard is superseded by an approved revision, the revision shall apply.

IEEE Std. 859™-1987(R2002), IEEE Standard Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities.[1, 2]

IEEE Std 493™-1997(R2002), Recommended Practice for Design of Reliable Industrial and Commercial Power Systems.

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[1]IEEE Publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (http://standards.ieee.org/).

[2]The IEEE standards or products referred to in this clause are trademarks of the Institute of Electrical and Electronics Engineers, Inc.

3. Definitions

Definitions are given here to aid the user in understanding the factors that affect index calculation. Many of these definitions were taken directly from *The Authoritative Dictionary of IEEE Standards Terms,* 7th Edition [B9][3]. If there is a conflict between the definitions in this document and the dictionary, the definitions in this document take precedence. Others are given because they have a new interpretation within this document or have not been previously defined.

3.1 connected load: Connected transformer kVA, peak load, or metered demand (to be clearly specified when reporting) on the circuit or portion of circuit that is interrupted. When reporting, the report should state whether it is based on an annual peak or on a reporting period peak.

3.2 customer: A metered electrical service point for which an active bill account is established at a specific location (e.g., premise).

3.3 customer count: The number of customers either served or interrupted depending on usage.

3.4 distribution system: That portion of an electric system that delivers electric energy from transformation points on the transmission system to the customer.

NOTE—The distribution system is generally considered to be anything from the distribution substation fence to the customer meter. Often the initial overcurrent protection and voltage regulators are within the substation fence and are considered to be part of the distribution system.

3.5 forced outage: The state of a component when it is not available to perform its intended function due to an unplanned event directly associated with that component.

3.6 interrupting device: An interrupting device is a device whose purpose is to interrupt the flow of power, usually in response to a fault. Restoration of service or disconnection of loads can be accomplished by manual, automatic, or motor-operated methods. Examples include transmission circuit breakers, feeder circuit breakers, line reclosers, line fuses, sectionalizers, motor-operated switches or others.

3.7 interruption: The loss of service to one or more customers connected to the distribution portion of the system. It is the result of one or more component outages, depending on system configuration. *See also:* outage.

3.8 interruption duration: The time period from the initiation of an interruption to a customer until service has been restored to that customer. The process of restoration may require restoring service to small sections of the system (see 5.3.2) until service has been restored to all customers. Each of these individual steps should be tracked collecting the start time, end time and number of customers interrupted for each step.

3.9 interruptions caused by events outside of the distribution system: Outages that occur on generation, transmission, substations, or customer facilities that result in the interruption of service to one or more customers. While generally a small portion of the number of interruption events, these interruptions can affect a large number of customers and last for an exceedingly long duration.

3.10 lockout: Refers to the final operation of a recloser or circuit breaker in an attempt to isolate a persistent fault, or to the state where all automatic reclosing has stopped. The current-carrying contacts of the overcurrent protecting device are locked open under these conditions.

3.11 loss of service: A complete loss of voltage on at least one normally energized conductor to one or more customers. This does not include any of the power quality issues such as: sags, swells, impulses, or harmonics.

[3]The numbers in brackets correspond to those of the bibliography in Annex D.

3.12 major event: Designates an event that exceeds reasonable design and or operational limits of the electric power system. A Major Event includes at least one Major Event Day (MED).

3.13 major event day: A day in which the daily system SAIDI exceeds a threshold value, T_{MED}. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began. Statistically, days having a daily system SAIDI greater than T_{MED} are days on which the energy delivery system experienced stresses beyond that normally expected (such as severe weather). Activities that occur on major event days should be separately analyzed and reported. (See 4.5.)

3.14 momentary interruption: A single operation of an interrupting device that results in a voltage zero. For example, two circuit breaker or recloser operations (each operation being an open followed by a close) that momentarily interrupts service to one or more customers is defined as two momentary interruptions.

3.15 momentary interruption event: An interruption of duration limited to the period required to restore service by an interrupting device.

NOTE—Such switching operations must be completed within a specified time of 5 min or less. This definition includes all reclosing operations that occur within five minutes of the first interruption. For example, if a recloser or circuit breaker operates two, three, or four times and then holds (within 5 min of the first operation), those momentary interruptions shall be considered one momentary interruption event.

3.16 outage (electric power systems): The state of a component when it is not available to perform its intended function due to some event directly associated with that component.

NOTE—

(1) An outage may or may not cause an interruption of service to customers, depending on system configuration.

(2) This definition derives from transmission and distribution applications and does not apply to generation outages.

3.17 planned interruption: A loss of electric power that results when a component is deliberately taken out of service at a selected time, usually for the purposes of construction, preventative maintenance, or repair.

NOTE—

(1) This derives from transmission and distribution applications and does not apply to generation interruptions.

(2) The key test to determine if an interruption should be classified as a planned or unplanned interruption is as follows: if it is possible to defer the interruption, the interruption is a planned interruption; otherwise, the interruption is an unplanned interruption.

3.18 planned outage: The state of a component when it is not available to perform its intended function due to a planned event directly associated with that component.

3.19 reporting period: The time period from which interruption data is to be included in reliability index calculations. The beginning and end dates and times should be clearly indicated. All events that begin within the indicated time period should be included. A consistent reporting period should be used when comparing the performance of different distribution systems (typically one calendar year) or when comparing the performance of a single distribution system over an extended period of time. The reporting period is assumed to be one year unless otherwise stated.

3.20 step restoration: A process of restoring interrupted customers downstream from the interrupting device/component in stages over time.

3.21 sustained interruption: Any interruption not classified as a part of a momentary event. That is, any interruption that lasts more than 5 minutes.

3.22 total number of customers served: The average number of customers served during the reporting period. If a different customer total is used, it must be clearly defined within the report.

3.23 unplanned interruption: An interruption caused by an unplanned outage.

4. Reliability indices

4.1 Basic factors

These basic factors specify the data needed to calculate the indices.

i denotes an interruption event

r_i = Restoration Time for each Interruption Event

CI = Customers Interrupted

CMI = Customer Minutes Interrupted

E = Events

T = Total

IM_i = Number of Momentary Interruptions

IM_E = Number of Momentary Interruption Events

N_i = Number of Interrupted Customers for each Sustained Interruption event during the Reporting Period

N_{mi} = Number of Interrupted Customers for each Momentary Interruption event during the Reporting Period

N_T = Total Number of Customers Served for the Areas

L_i = Connected kVA Load Interrupted for each Interruption Event

L_T = Total connected kVA Load Served

CN = Total Number of Customers who have Experienced a Sustained Interruption during the Reporting Period

$CNT_{(k>n)}$ = Total Number of Customers who have Experienced more than *n* Sustained Interruptions and Momentary Interruption Events during the Reporting Period.

k = Number of Interruptions Experienced by an Individual Customer in the Reporting Period

T_{MED} = Major event day identification threshold value.

4.2 Sustained interruption indices

4.2.1 System average interruption frequency index (SAIFI)

The system average interruption frequency index indicates how often the average customer experiences a sustained interruption over a predefined period of time. Mathematically, this is given in Equation (1).

$$\text{SAIFI} = \frac{\sum \text{Total Number of Customers Interrupted}}{\text{Total Number of Customers Served}} \quad (1)$$

To calculate the index, use Equation (2) below.

$$\text{SAIFI} = \frac{\sum N_i}{N_T} = \frac{\text{CI}}{N_T} \quad (2)$$

4.2.2 System average interruption duration index (SAIDI)

This index indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in customer minutes or customer hours of interruption. Mathematically, this is given in Equation (3).

$$\text{SAIDI} = \frac{\sum \text{Customer Interruption Durations}}{\text{Total Number of Customers Served}} \quad (3)$$

To calculate the index, use Equation (4).

$$\text{SAIDI} = \frac{\sum r_i N_i}{N_T} = \frac{\text{CMI}}{N_T} \quad (4)$$

4.2.3 Customer average interruption duration index (CAIDI)

CAIDI represents the average time required to restore service. Mathematically, this is given in Equation (5).

$$\text{CAIDI} = \frac{\sum \text{Customer Interruption Duration}}{\text{Total Number of Customers Interrupted}} \quad (5)$$

To calculate the index, use Equation 6.

$$\text{CAIDI} = \frac{\sum r_i N_i}{\sum N_i} = \frac{\text{SAIDI}}{\text{SAIFI}} \quad (6)$$

4.2.4 Customer total average interruption duration index (CTAIDI)

This index represents the total average time in the reporting period that customers who actually experienced an interruption were without power. This index is a hybrid of CAIDI and is similarly calculated except that those customers with multiple interruptions are counted only once. Mathematically, this is given in Equation (7).

$$\text{CTAIDI} = \frac{\sum \text{Customer Interruption Duration}}{\text{Total Number of Customers Interrupted}} \quad (7)$$

To calculate the index, use Equation (8).

$$\text{CTAIDI} = \frac{\sum r_i N_i}{\text{CN}} \tag{8}$$

NOTE— In tallying Total Number of Customers Interrupted, each individual customer should only be counted once regardless of number of times interrupted during the reporting period. This applies to 4.2.4 and 4.2.5.

4.2.5 Customer average interruption frequency index (CAIFI)

This index gives the average frequency of sustained interruptions for those customers experiencing sustained interruptions. The customer is counted once regardless of the number of times interrupted for this calculation. Mathematically, this is given in Equation (9).

$$\text{CAIFI} = \frac{\sum \text{ Total Number of Customers Interrupted}}{\text{Total Number of Custers Interrupted}} \tag{9}$$

To calculate the index, use Equation (10)

$$\text{CAIFI} = \frac{\sum N_i}{\text{CN}} \tag{10}$$

4.2.6 Average service availability index (ASAI)

The average service availability index represents the fraction of time (often in percentage) that a customer has received power during the defined reporting period. Mathematically, this is given in Equation (11).

$$\text{ASAI} = \frac{\text{Customer Hours Service Availability}}{\text{Customer Hours Service Demands}} \tag{11}$$

To calculate the index, use Equation (12).

$$\text{ASAI} = \frac{N_T \times (\text{ Number of hours/yr}) - \sum r_i N_i}{N_T \times (\text{ Number of hours/yr})} \tag{12}$$

NOTE—There are 8760 hours in a non-leap year, 8784 hours in a leap year.

4.2.7 Customers experiencing multiple interruptions (CEMI_n)

This index indicates the ratio of individual customers experiencing more than n sustained interruptions to the total number of customers served. Mathematically, this is given in Equation (13).

$$\text{CEMI}_n = \frac{\text{Total Number of Customers that experience more than } n \text{ sustained interruptions}}{\text{Total Number of Customers Served}} \tag{13}$$

To calculate the index, use Equation (14).

$$\text{CEMI}_n = \frac{\text{CN}_{(k > n)}}{N_T} \tag{14}$$

NOTE—This index is often used in a series of calculations with n incremented from a value of one to the highest value of interest.

4.3 Load based indices

4.3.1 Average system interruption frequency index (ASIFI)

The calculation of this index is based on load rather than customers affected. ASIFI is sometimes used to measure distribution performance in areas that serve relatively few customers having relatively large concentrations of load, predominantly industrial/commercial customers. Theoretically, in a system with homogeneous load distribution, ASIFI would be the same as SAIFI. Mathematically, this is given in Equation (15).

$$\text{ASIFI} = \frac{\sum \text{Total Connected kVA of Load Interrupted}}{\text{Total Connected kVA Served}} \tag{15}$$

To calculate the index, use Equation (16).

$$\text{ASIFI} = \frac{\sum L_i}{L_T} \tag{16}$$

4.3.2 Average system interruption duration index (ASIDI)

The calculation of this index is based on load rather than customers affected. Its use, limitations, and philosophy are stated in the ASIFI definition in 4.3.1. Mathematically, this is given in Equation (17).

$$\text{ASIDI} = \frac{\sum \text{Connected kVA Duration of Load Interrupted}}{\text{Total Connected kVA Served}} \tag{17}$$

To calculate the index, use Equation (18).

$$\text{ASIDI} = \frac{\sum r_i L_i}{L_T} \tag{18}$$

4.4 Other indices (momentary)

4.4.1 Momentary average interruption frequency index (MAIFI)

This index indicates the average frequency of momentary interruptions. Mathematically, this is given in Equation (19).

$$\text{MAIFI} = \frac{\sum \text{Total Number of Customer Momentary Interruptions}}{\text{Total Number of Customers Served}} \tag{19}$$

To calculate the index, use Equation (20).

$$\text{MAIFI} = \frac{\sum \text{IM}_i \, \text{N}_{mi}}{N_T} \tag{20}$$

4.4.2 Momentary average interruption event frequency index ($MAIFI_E$)

This index indicates the average frequency of momentary interruption events. This index does not include the events immediately preceding a lockout. Mathematically, this is given in Equation (21).

$$\text{MAIFI}_E = \frac{\sum \text{Total Number of Customer Momentary Interruption Events}}{\text{Total Number of Customers Served}} \tag{21}$$

To calculate the index, use Equation (22).

$$\text{MAIFI}_E = \frac{\sum \text{IM}_E N_{mi}}{N_T} \tag{22}$$

4.4.3 Customers experiencing multiple sustained interruption and momentary interruption events ($CEMSMI_n$)

This index is the ratio of individual customers experiencing more than n of both sustained interruptions and momentary interruption events to the total customers served. Its purpose is to help identify customer issues that cannot be observed by using averages. Mathematically, this is given in Equation (23).

$$\text{CEMSMI}_n = \frac{\text{Total Number of Customers Experiencing More Than } n \text{ Interruptions}}{\text{Total Number of Customers Served}} \tag{23}$$

To calculate the index, use Equation (24).

$$\text{CEMSMI}_n = \frac{\text{CNT}_{(k>n)}}{N_T} \tag{24}$$

4.5 Major event day classification

The following process ("Beta Method") is used to identify MEDs. Its purpose is to allow major events to be studied separately from daily operation, and in the process, to better reveal trends in daily operation that would be hidden by the large statistical effect of major events. This approach supersedes previous major event definitions (see Annex A for sample definitions). For more technical detail on derivation of the methodology refer to Annex B.

A major event day is a day in which the daily system SAIDI exceeds a threshold value, T_{MED}. The SAIDI index is used as the basis of this definition since it leads to consistent results regardless of utility size and because SAIDI is a good indicator of operational and design stress. Even though SAIDI is used to determine the major event days, all indices should be calculated based on removal of the identified days.

In calculating daily system SAIDI, any interruption that spans multiple days is accrued to the day on which the interruption begins.

The major event day identification threshold value, T_{MED}, is calculated at the end of each reporting period (typically one year) for use during the next reporting period as follows:

a) Collect values of daily SAIDI for five sequential years ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all available historical data until five years of historical data are available.

b) Only those days that have a SAIDI/Day value will be used to calculate the T_{MED} (do not include days that did not have any interruptions).

c) Take the natural logarithm (ln) of each daily SAIDI value in the data set.

d) Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.

e) Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.

f) Compute the major event day threshold, T_{MED}, using equation (25).

$$T_{MED} = e^{(\alpha + 2.5\ \beta)} \tag{25}$$

g) Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is classified as a major event day.

Activities that occur on days classified as major event days should be separately analyzed and reported.

4.5.1 An example of using the major event day definition

An example of using the major event day definition to identify major events and subsequently calculate adjusted indices that reflect normal operating performance is shown in this subclause.

This subclause illustrates the calculation of the daily SAIDI, calculation of the major event day threshold T_{MED}, identification of major event days, and calculation of adjusted indices.

Table 1 gives selected data for all outages occurring on a certain day for a utility that serves 2,000 customers.

Table 1—Outage data for 1994

Date	Time	Duration (min)	Number of Customers	Interruption Type
3/18	18:34:30	20.0	200	Sustained
3/18	18:38:30	1.0	400	Momentary
3/18	18:42:00	513.5	700	Sustained
NOTE— Although the third interruption was not restored until the following day, its total duration counts in the day that the interruption began. Note also that SAIDI considers only sustained interruptions. Then for 3/18/1994, daily SAIDI (assuming a 2000 customer utility) is given in Equation (26).				

$$\text{SAIDI} = \frac{(20 \times 200) + (513 \times 700)}{2000} = 181.73 \text{ min} \tag{26}$$

One month of historical daily SAIDI data is used in the following example to calculate the Major Event Day threshold T_{MED}. Five years of historical data is preferable for this method, but printing that many values in this standard is impractical, so only one month is used to illustrate the concept. The example data is shown in Table 2.

Table 2—One month of daily SAIDI and ln (SAIDI/day) data

Date	SAIDI/day (min)	ln (SAIDI/day)	Date	SAIDI/day (min)	ln (SAIDI/day)
12/1/93	26.974	3.295	12/17/93	0.329	−1.112
12/2/93	0.956	−0.046	12/18/93	0	this day is not included in the calculations since no customers were interrupted.
12/3/93	0.131	−2.033	12/19/93	0.281	−1.268
12/4/93	1.292	0.256	12/20/93	1.810	0.593
12/5/93	4.250	1.447	12/21/93	0.250	−1.388
12/6/93	0.119	−2.127	12/22/93	0.021	−3.876
12/7/93	0.130	−2.042	12/23/93	1.233	0.209
12/8/93	12.883	2.556	12/24/93	0.996	−0.004
12/9/93	0.226	−1.487	12/25/93	0.162	−1.818
12/10/93	13.864	2.629	12/26/93	0.288	−1.244
12/11/93	0.015	−4.232	12/27/93	0.535	−0.626
12/12/93	1.788	0.581	12/28/93	0.291	−1.234
12/13/93	0.410	−0.891	12/29/93	0.600	−0.511
12/14/93	0.007	−4.967	12/30/93	1.750	0.560
12/15/93	1.124	0.117	12/31/93	3.622	1.287
12/16/93	1.951	0.668			
NOTE—The SAIDI/day for 12/18 is zero. The natural logarithm of zero is undefined. Therefore, 12/18/93 is note considered during the analysis					

The value of α, the log-average, is the average of the natural logs, and equals −0.555 in this case.

The value of β, the log-standard deviation, is the standard deviation of the natural logs, and equals 1.90 in this example.

The value of $\alpha + 2.5\beta$ is 4.20.

The threshold value T_{MED} is calculated by $e^{(4.20)}$ and equals 66.69 SAIDI per day. This value is used to evaluate the future time period (e.g., the next year).

Table 3 shows example SAIDI/day values for the first month of 1994.

Table 3—Daily SAIDI data, January 1994

Date	SAIDI/Day	Date	SAIDI/Day
1/1/94	0.240	1/17/94	5.700
1/2/94	0.014	1/18/94	0.109
1/3/94	0.075	1/19/94	0.259
1/4/94	2.649	1/20/94	1.142
1/5/94	0.666	1/21/94	0.262
1/6/94	0.189	1/22/94	0.044
1/7/94	0.009	1/23/94	0.243
1/8/94	1.117	1/24/94	5.932
1/9/94	0.111	1/25/94	2.698
1/10/94	8.683	1/26/94	5.894
1/11/94	0.277	1/27/94	0.408
1/12/94	0.057	1/28/94	237.493
1/13/94	0.974	1/29/94	2.730
1/14/94	0.150	1/30/94	8.110
1/15/94	0.633	1/31/94	0.046
1/16/94	0.434		

The SAIDI/day on 1/28/94 (237.49) exceeds the example threshold value (T_{MED} = 66.69), indicating that the distribution system experienced stresses beyond that normally expected on that day. Therefore, 1/28/94 is classified as a major event day. The SAIDI/day for all other days was less than T_{MED}, indicating that normal stresses were experienced on those days.

To complete the example, indices should be calculated for the following two conditions:

a) all events included

b) major event days removed. In most cases, utilities will calculate all of the indices they normally use (e.g., SAIFI, SAIDI and/or CAIDI). For this example, only SAIDI will be shown. 1994 SAIDI for condition one, all events included, is given in Equation (27) below.

$$\text{SAIDI} = \sum \text{Daily SAIDI} = 287.35 \tag{27}$$

1994 SAIDI for condition two, major event days removed for separate reporting and analysis, is given in equation 28 below.

$$\text{SAIDI} = \sum \text{Daily SAIDI with the MEDS removed} = 49.86 \tag{28}$$

5. Application of the indices

Most utilities store interruption data in large computer databases. Some databases are better organized than others for querying and analyzing reliability data. The following section will show one sample partial database and the methodology for calculating indices based on the information provided.

5.1 Sample system

Table 4 shows an excerpt from one utility's customer information system (CIS) database for feeder 7075, which serves 2,000 customers with a total load of 4 MW. In this example, Circuit 7075 constitutes the "system" for which the indices are calculated. More typically the "system" combines all circuits together in a region or for a whole company.

Table 4—Outage data for 1994

Date	Time	Time on	Circuit	Event code	Number of customers	Load kVA	Interruption type
3/17	12:12:20	12:20:30	7075	107	200	800	S
4/15	18:23:56	18:24:26	7075	256	400	1600	M
5/5	00:23:10	01:34:29	7075	435	600	1800	S
6/12	23:17:00	23:47:14	7075	567	25	75	S
7/6	09:30:10	09:31:10	7075	678	2000	4000	M
8/20	15:45:39	20:12:50	7075	832	90	500	S
8/31	08:20:00	10:20:00	7075	1003	700	2100	S
9/3	17:10:00	17:20:00	7075	1100	1500	3000	S
10/7	10:15:00	10:55:00	7075	1356	100	200	S
Interruption type: S– Sustained M– Momementary					Total Customers Served = 2,000		

The total number of customers who have experienced a sustained interruption is 3,215. The total number of customers experiencing a momentary interruption is 2, 400.

Table 5—Extracted customers who were interrupted

Name	Circuit Number	Date	Event code	Duration min
Willis, J	7075	3/17/94	107	8.17
Williams, J	7075	4/15/94	256	0.5
Willis, J	7075	4/15/94	256	0.5
Wilson, D	7075	5/5/94	435	71.3
Willis, J	7075	6/12/94	567	30.3
Willis, J	7075	8/20/94	832	267.2
Wilson, D	7075	8/20/94	832	267.2
Yattaw, S	7075	8/20/94	832	267.2
Willis, J	7075	8/31/94	1003	120
Willis, J	7075	9/3/94	1100	10
Willis, J	7075	10/27/94	1356	40

Table 6—Interrupted device operations

Record Number	Device	Date	Time	Number of Operations	Number of Operations to lockout
1	Brk 7075	4/15	18:23:56	2	3
2	Recl 7075	7/6	09:30:10	3	4
3	Brk 7075	8/2	12:29:02	1	3
4	Brk 7075	8/2	12:30:50	2	3
5	Recl 7075	8/2	13:25:40	2	4
6	Recl 7075	8/25	08:00:00	2	4
7	Brk 7075	9/2	04:06:53	2	3
8	Recl 7075	9/5	11:53:22	3	4
9	Brk 7075	9/8	15:25:10	1	3
10	Recl 7075	10/2	17:15:19	1	4
11	Recl 7075	11/12	00:00:05	1	4

From Table 6, it can be seen that there were eight circuit breaker operations that affected 2000 customers. Each of them experienced 8 momentary interruptions. There were twelve recloser operations that caused 750 customers to experience 12 momentary interruptions. Some of the operations occurred during one reclosing sequence. To calculate the number of momentary interruption events, only count the total number of reclosing sequences. In this case there were five circuit breaker events (records 1, 3, 4, 7, and 9) that affected 2000 customers. Each of them experienced 5 momentary interruption events. There were six recloser events (records 2, 5, 6, 8, 10 and 11) that affected 750 customers each of them experienced 6 momentary interruption events.

5.2 Calculation of indices for a system with no major event days

The equations in Clause 4.5 and definitions in Clause 3 should be used to calculate the annual indices (see Equations (29) – (40)). In the example below, the indices are calculated by using the equations in 4.2 and 4.4 using the data in Table 4 and Table 5, assuming there were no major event days in this data set.

$$\text{SAIFI} = \frac{200 + 600 + 25 + 90 + 700 + 1500 + 100}{2000} = 1.61 \tag{29}$$

$$\text{SAIDI} = \frac{(8.17 \times 200) + (71.3 \times 600) + (30.3 \times 25) + (267.2 \times 90) + (120 \times 700) + (10 \times 1500) + (40 \times 100)}{2000} = 86.11 \text{ min} \tag{30}$$

$$\text{CAIDI} = \frac{\text{SAIDI}}{\text{SAIFI}} = \frac{86.110}{1.6075} = 53.57 \text{ min} \tag{31}$$

To calculate CTAIDI and CAIFI, the number of customers experiencing a sustained interruption is required. The total number of customers affected (CN) for this example can be no more than 2000. Since only a small portion of the customer information table is shown it is impossible to know CN; however, it is likely that not all of the 2000 customers on this feeder experienced an interruption during the year. 1800 will be arbitrarily assumed for CN (for your calculations actual information should be used) since the interruption on 9/3 shows that at least 1500 customers have been interrupted during the year.

$$\text{CTAIDI} = \frac{(8.17 \times 200) + (71.3 \times 600) + (30.3 \times 25) + (267.2 \times 90) + (120 \times 700) + (10 \times 1500) + (40 \times 100)}{1800} = 95.68 \text{ min} \quad (32)$$

$$\text{CAIFI} = \frac{200 + 600 + 25 + 90 + 700 + 1500 + 100}{1800} = 1.79 \quad (33)$$

$$\text{ASAI} = \frac{8760 \times 2000 - (8.17 \times 200 + 600 \times 71.3 + 30.3 \times 25 + 267.2 \times 90 + 120 \times 700 + 10 \times 700 + 10 \times 1500 + 40 \times 100)/60}{8760 \times 2000} = 0.999836 \quad (34)$$

$$\text{ASIFI} = \frac{800 + 1800 + 75 + 500 + 2100 + 3000 + 200}{4000} = 2.12 \quad (35)$$

$$\text{ASIDI} = \frac{(800 \times 8.17) + (1800 \times 71.3) + (75 \times 30.3) + (500 \times 267.2) + (2100 \times 700) + 3000(6) + 200 \times 40}{4000} = 444.69 \quad (36)$$

CTAIDI, CAIFI, CEMI_n, and CEMSMI_n require detailed interruption information for each customer. The database should be searched for all customers who have experienced more than n interruptions that last longer than five minutes. Assume n is chosen to be 5. In Table 5, customer Willis, J. experienced seven interruptions in one year and it is plausible that other customers also experienced more than five interruptions, both momentary and sustained.

For this example, assume arbitrary values of 350 for $\text{CN}(k > n)$, and 750 for $\text{CNT}(k > n)$. The number of interrupting device operations is given in Table 6 and is used to calculate MAIFI and MAIFI_E. Assume the number of customers downstream of the recloser equals 750. These numbers would be known in a real system.

$$\text{CEMI}_5 = \frac{350}{2000} = 0.175 \quad (37)$$

$$\text{MAIFI} = \frac{8 \times 2000 + 12 \times 750}{2000} = 12.5 \quad (38)$$

$$\text{MAIFE}_E = \frac{5 \times 2000 + 6 \times 750}{2000} = 7.25 \quad (39)$$

$$\text{CEMSMI}_5 = \frac{750}{2000} = 0.375 \quad (40)$$

Using the above sample system should help define the methodology and approach to obtaining data from the information systems and using it to calculate the indices.

5.3 Examples

The following subclause illustrates two concepts: momentary interruptions and step restoration through the use of examples.

5.3.1 Momentary interruption example

To better illustrate the concepts of momentary interruptions and sustained interruptions and the associated indices, consider Figure 1 and Equation 41, Equation 42, and Equation 43. Figure 1 illustrates a circuit composed of a circuit breaker (B), a recloser (R), and a sectionalizer (S).

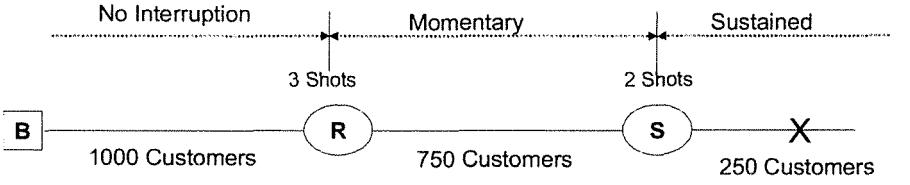


Figure 1—Sample system 2

For this scenario, 750 customers would experience a momentary interruption and 250 customers would experience a sustained interruption. Calculations for SAIFI, MAIFI, and MAIFIE on a feeder basis are shown in Equations 41–43 below. Notice that the numerator of MAIFI is multiplied by 2 because the recloser took two shots, however, MAIFIE is multiplied by 1 because it only counts the fact that a series of momentary events occurred.

$$\text{SAIFI} = \frac{250}{2000} = 0.125 \tag{41}$$

$$\text{MAIFI} = \frac{2 \times 750}{2000} = 0.75 \tag{42}$$

$$\text{MAIFI}_E = \frac{1 \times 750}{2000} = 0.375 \tag{43}$$

5.3.2 Step restoration examples

The following case illustrates the step restoration process. A feeder serving 1000 customers experiences a sustained interruption. Multiple restoration steps are required to restore service to all customers. Table 7 shows the times of each step, a description and associated customers interruptions and minutes they were affected in a time line format.

Table 7—Example 1 for a feeder serving 1000 customers with sustained interruption

Relative Time	Description	Customer Interruptions	Duration (min)	CMI
00:00	1000 customers interrupted.			
00:45	500 customers restored, 500 still out of service.	500	45	22 500
01:00	Additional 300 customers restored, 200 still out of service.	300	60	18 000
01:10	Feeder trips again, 800 previously restored customers are interrupted again. (200 remained out and were not restored at this time.)			
01:30	800 customers restored again.	800	20	16 000
02:00	Final 200 customers restored. Event ends.	200	120	24 000
Totals		1800	N/A	80 500
Example SAIFI = 1800/1000 = 1.8 interruptions Example CAIDI = 80 500/1800 = 44.7 min Example SAIDI = 80 500/1000 = 80.5 min				

Figure 2 illustrates the example described in Table 7. In this example, all of the customers supplied by the circuit were interrupted at the beginning of step 1. Service was restored to a portion of those customers at the end of step 1. Service was restored to another portion of those customers at the end of step 2. Additional customers were interrupted during step 3 (new step 1). Service was restored to additional customers at the end of step 3.

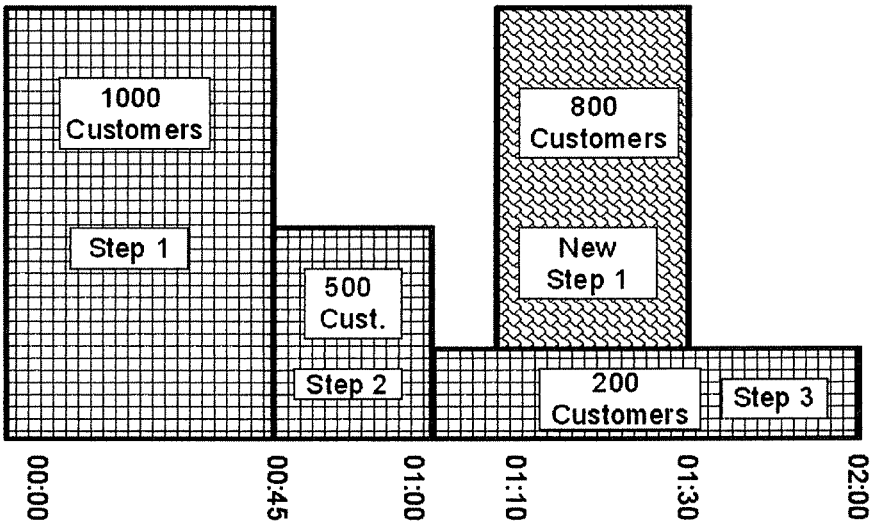


Figure 2—Step restoration time chart

Table 8 shows the information in a format that explains each step and allows the reader to see the calculation steps.

Table 8—Restoration steps for example 1

Steps	Time	Customers Interrupted	CMI
1	00:00–00:45	1000	45 000
2	00:45–01:00	500	7500
3	01:00–02:00	200	12 000
			1
1	01:10–01:30	800	16 000

Total customer for SAIFI count (Only step 1's)		1800	
Total CMI			80 500

6. Information about the factors which affect the calculation of reliability indices

6.1 Rationale behind selecting the indices provided in this guide

One view of distribution system performance can be garnered through the use of reliability indices. To adequately measure performance, both duration and frequency of customer interruptions must be examined at various system levels. The most commonly used indices are SAIFI, SAIDI, CAIDI and ASAI. All of these indices provide information about average system performance. Many utilities also calculate indices on a feeder basis to provide more detailed information for decision making. Averages give general performance trends for the utility; however, using averages will lead to loss of detail that could be critical to decision making. For example, using system averages alone will not provide information about the interruption duration experienced by any specific customer. At the time of this writing, it is difficult for most utilities to provide information on a customer basis. This group envisions that the tracking of specific details surrounding specific interruptions rather than averages will, in the future, be accomplished by improving tracking capabilities. To this end, the working group has included not only the most commonly used indices, but also indices that examine performance at the customer level (e.g., $CEMI_n$).

6.2 Factors that cause variation in reported indices

Many factors can cause variation in the indices reported by different utilities. Some examples of differences in the following:

- level of automated data collection
- geography
- system design
- data classification (e.g., are major events in the data set?, planned interruptions?)

To ensure accurate and equitable assessment and comparison of absolute performance and performance trends over time, it is important to classify performance for each day in the data set to be analyzed as either day-to-day or major event day. Not performing this critical step can lead to false decision making because major event day performance often overshadows and disguises daily performance. Interruptions that occur as a result of outages on customer owned facilities or loss of supply from another utility should not be included in the index calculation.

Annex A

(informative)

Survey of reliability index usage

The Working Group on System Design conducted three surveys on distribution reliability index usage. The first one was completed in 1990 and the second was completed in 1995 and the third one was completed in 1997. The purpose of the surveys was to determine index usage and relative index values. In 1990, 100 United States utilities were surveyed, 49 of which responded. In 1995, 209 utilities were surveyed, 64 of which responded. In 1997, 159 utilities were surveyed and 61 responded. Responding utility locations are shown by state in Figure A.1. Newer surveys are being performed by Edison Electric Institute (EEI). The data provided is not comparable because utilities provided whatever information was easily obtainable.

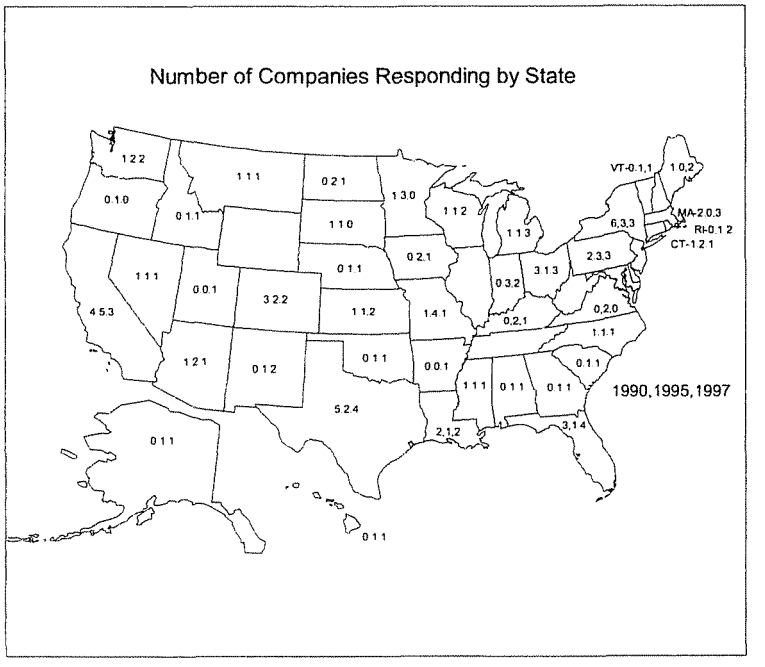


Figure A.1—Location of companies that respond to surveys

All surveys showed that the most commonly used indices are SAIFI, SAIDI, CAIDI, and ASAI. Figure A.2 shows the percentage of companies using specific indices in 1990. Figure A.3 shows the same information for 1995 and 1997. Figures A.4–A.8 show data on the most commonly used indices given by quartiles where Q1 is the top quartile. The data shown in the Q1 column means that 25% of utilities have an index less than the value shown. For further clarification:

Q1: 25% of utilities have an index less than the value shown

Q2: 50% of utilities have an index less than the value shown (the median value)

Q3: 75% of utilities have an index less the value shown

Q4:100% of utilities have an index less the value shown

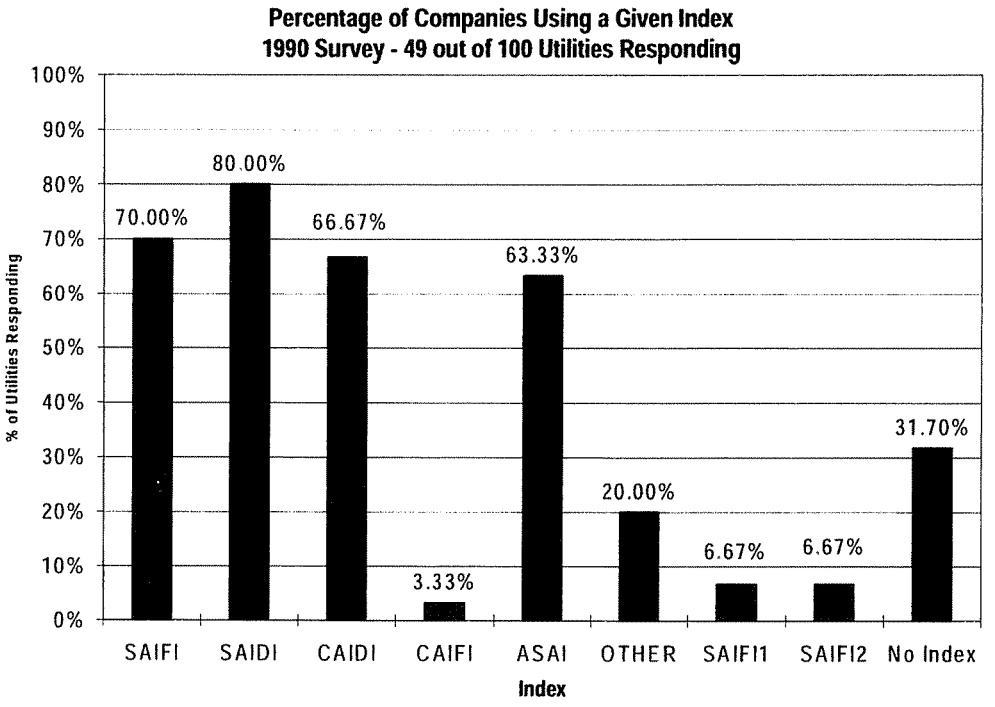


Figure A.2—Percentage of companies using a given index reporting in 1990 (49 out of 100 utilities responding) [B11]

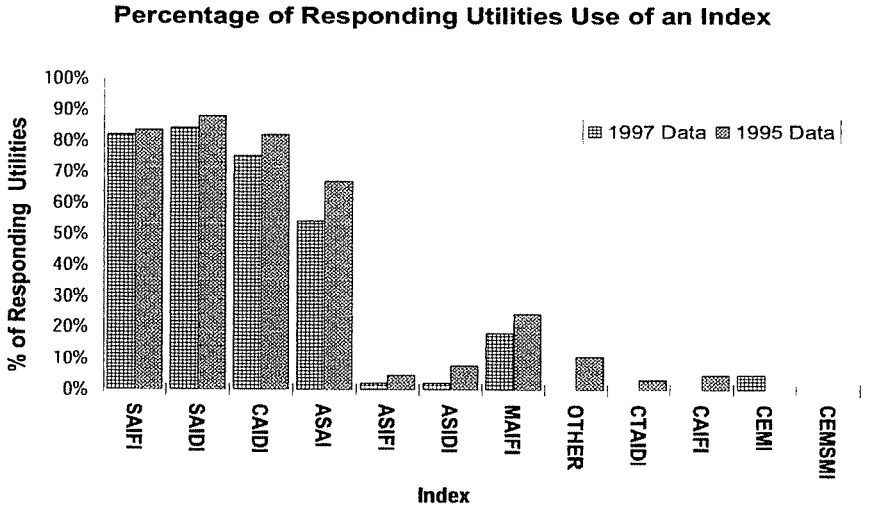


Figure A.3—Percentage of companies using indices reporting in 1995 and 1997 [B1]

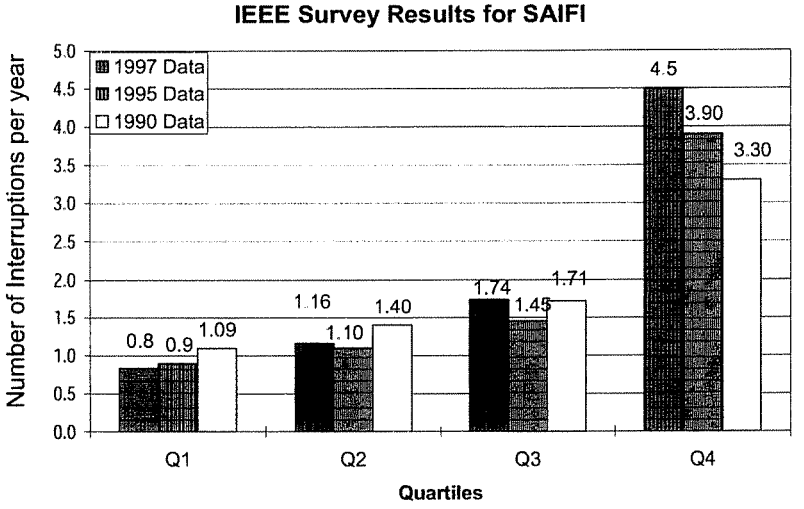


Figure A.4—SAIFI– 1990, 1995 and 1997 survey results [B1] and [B11]

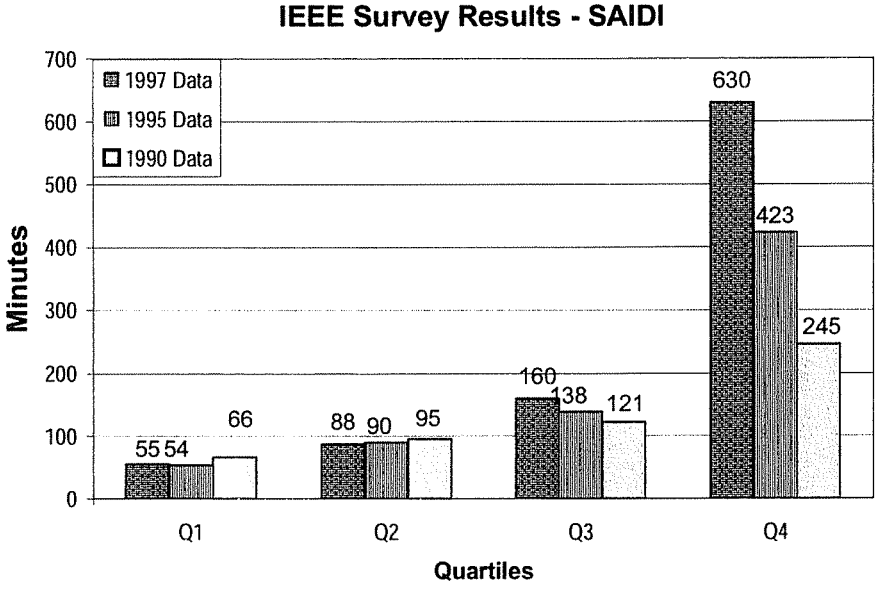


Figure A.5—SAIDI– 1990, 1995, and 1997 survey results [B1] and [B11]

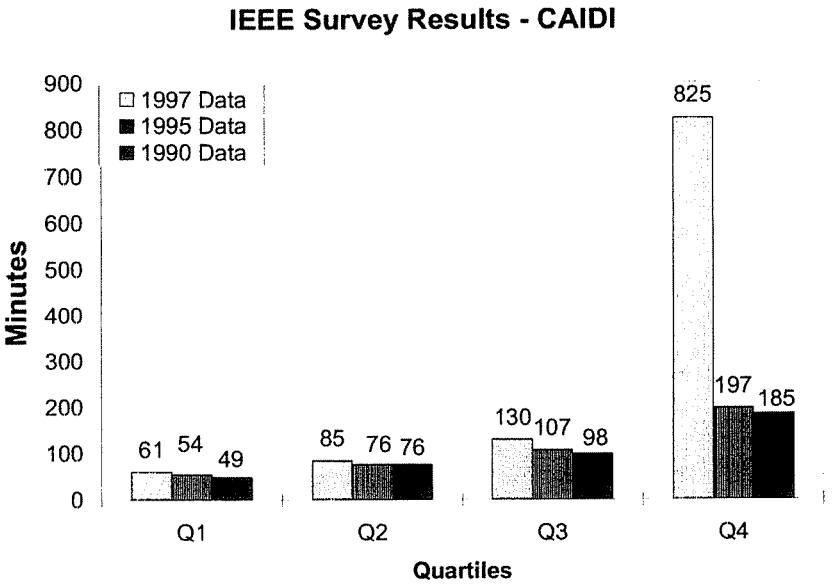


Figure A.6—CAIDI– 1990, 1995, and 1997 survey results

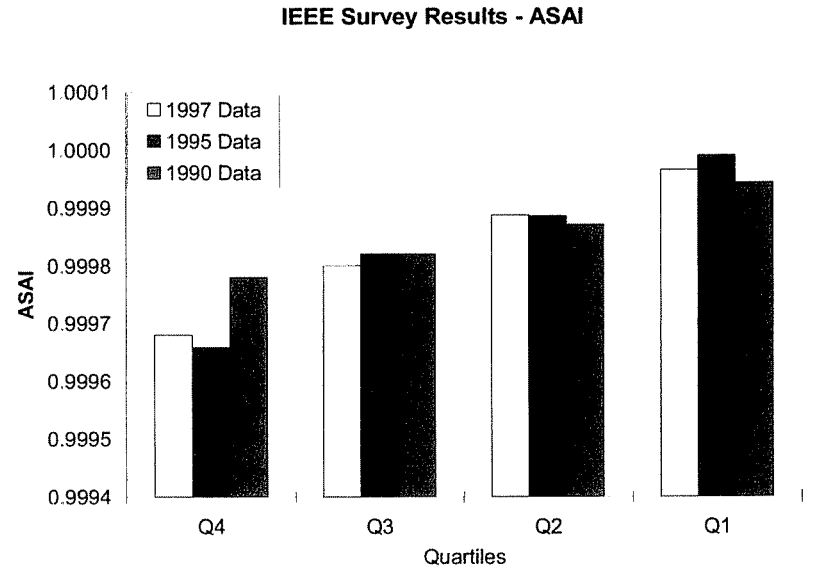


Figure A.7—ASAI– 1990, 1995, and 1997 survey results [B1] and [B11]

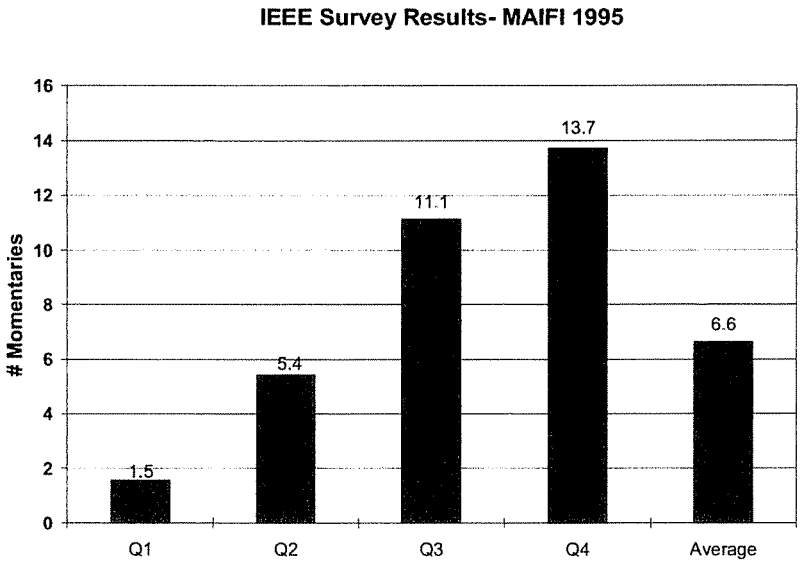


Figure A.8—MAIFIQ– 1995 survey results (1990/7 data not available) [B1]

A.1 Cause codes

In the 1997 survey, cause codes were surveyed. The results are shown below in Figure A.9.

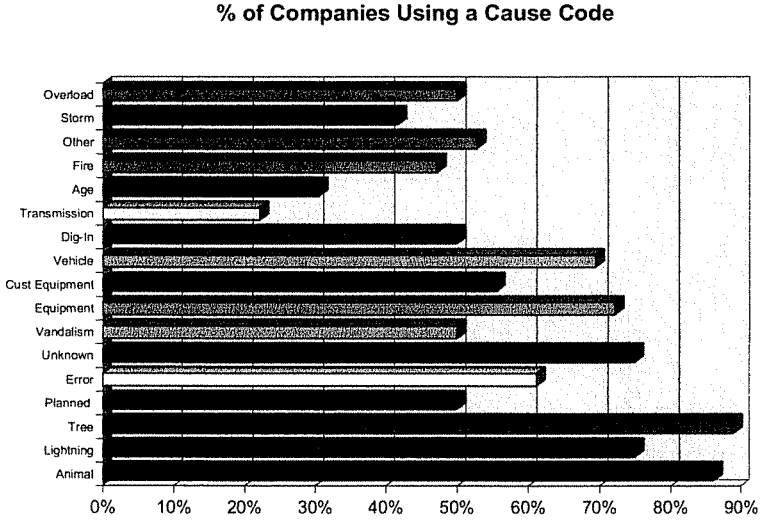


Figure A.9—1997 Cause code usage 1

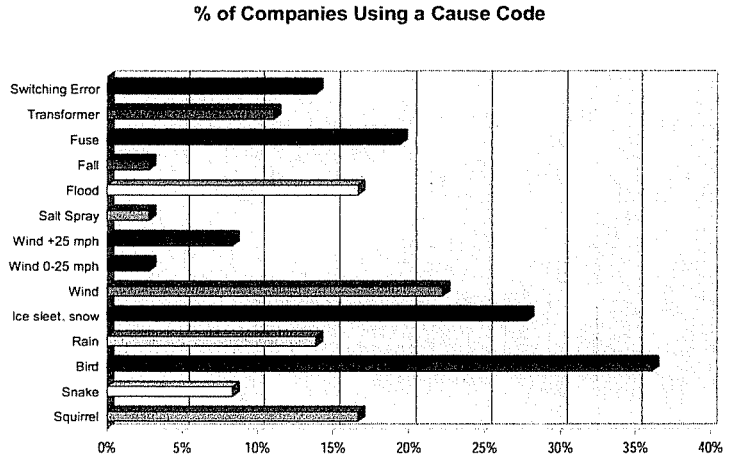


Figure A.10—1997 Cause code usage 2

A.2 Results of question # 7 of the 1999 EEI reliability survey

The following information was provided by the Edison Electric Institute (EEI) based on a survey they performed in 1999. The text is shown exactly as the survey respondents provided the information to EEI.

What definition do you use for major events?

1) Major storm defined as 10% or more of the customer base interrupted in an operating region (based on 8 operating regions) or customers interrupted for 24 hours.
2) Interruptions that result from a catastrophic event that exceeds the design limits of the electric power system, such as an earthquake, tornado, or an extreme storm.
3) A major storm is an event that affects 10% or more of the connected customers with 1% not restored within 24 hours.
4) Ten percent or more of our customers are without power and have been without power for more than 24 hours.
5) The major storm exclusion a criterion is based on a statistical analysis of the last four-year history of reliability data. A cumulative frequency distribution of the number of locations requiring service restoration work per day is calculated for the four-year period. When the frequency of the restoration work exceeds the 98.5 percentile, by company or region the major storm criterion work be met for the all interruptions for that day.
6) Ten percent of customers in a given region affected by an event plus the last customer out greater than 24 hours.

   All three of the following must be true:

   —widespread damage

   —10 000 or 10% of customers served in area affected

   —National Weather Service declares severe weather watch or warning for the area
7) Ten percent customer base and 1 customer for 24 hours.

8) More than 15 000 customers out (out of a total customer base of 450 000).

9) As defined by our PUC as named storms, tornados, ice storms, etc.

10) Events where 10% of your customers (meters) have experienced an interruption due to the event.

11) IEEE Std 1366™-1998; Definition 3.12 major event. Company 1 defined as, 10% of the customers within a region without electricity and not restored within a 24 hour period.

12) Ten percent of the entire electric system's customers must experience an interruption in service and one percent of the entire electric system's customers must experience an interruption in service for more than 24 hours.

13) Ten percent of customers out of service and restoration time exceeding 24 hours.

14) Named storms, i.e. hurricane, tropical storms, or tornadoes verified by the National Weather Service. Major forest fires are also included. In addition, Company 2 reporting definition does not include planned interruptions. MAIFI is reported as momentary events.

15) (1) Winds in excess of 90 mph OR (2) 1/2 inch of ice and winds in excess of 40 mph.

NOTE— The major storm outage minutes in 1999 were minimal for Company 3 and did not impact the reliability measures.

16) 0.8 hours x customers served for a month, if the customer hours lost for any one day in that month exceed this value it can be removed from our year-end calculations. Interruptions that result from a catastrophic event that exceeds the design limits of the electric power system, such as an earthquake or an extreme storm. These events shall include situations where there is a loss of power to 10% or more of the customers over a 24-hour period and with all customers not restored within 24 hours.

17) State of Connecticut Department of Public Utility Control – Major Storm Exclusion Definition for 1999 – Any day or 24-hour period, where 31 restoration steps or greater were experienced. For 2000, the UI storm exclusion is based on 35 restoration steps or greater. The change in storm exclusion restoration step threshold, is based on the previous four-year outage history.

18) A period of adverse weather which interrupts 10% or more of the customers served in an operating area, or results in customers being without power for 24 hours or longer.

19) Weather events that cause more than 100 000 customers to be interrupted, with restoration taking at least 24 hours.

20) (1) A Watch or Warning has been issued by the National Weather Service, (2) Extensive mechanical damage has been experienced and (3) More than 6% of the customers served in a region have been affected by outages during a 12-hour period.

21) A major storm is defined as the interruption to 110 000 customers or more which is about 5 percent of our total customers. The 110 000 was arrived at by going out six standard deviations from the mean of all daily cases of trouble.

22) Any outage lasting longer than 48 hours is capped at 48 hours.

23) Any event outage over 10% of the customers in a region AND requiring over 24 hours to restore service to all customers. (PUC definition) Outages occurring during qualifying major storms are not entered into our system, therefore we can only report on 8B, 11B, and 13B below.

24) Determination is subjective, not strictly defined at this time.

25) Tropical storms, hurricanes, tornados, and ice storms.

26) Interruptions that result from a catastrophic event that exceeds the design limits of the electric power system, such as an earthquake or an extreme storm. These events shall include situations where there is a loss of power to 10% or more customers in a region over a 24-hour period and with all customers not restored within 24 hours.

27) >10% of customers out of service for >24 hours.

28) 15 000 or more customers out of service.

29) Ten percent of customers in an area (region) interrupted.

30) (1) 10% or more of customers interrupted in a operating area. And (2) A storm or other large occurrence where customers experience an interruption for 24 or more hours in an operating area.

31) A storm is determined at regional level when in any consecutive 24 hours the cumulative outages reach 15 AND cumulative customer interruption minutes reach 200 000

32) A major storm is defined as an interruption of electric service resulting from conditions beyond the company's control, which affects at least 10% of the customers in an operating area during the course of an event.

33) Level 3 or above out of 5 according to our emergency plan. About 5 storms per year excluded.

34) Any day during which the number of interruptions are greater than 3 standard deviations above average.

35) CAIDI for the storm period must be 2.5 times normal. Outside crews required to restore damage. Restoration of damage must require 24 hours or more.

36) Named Storms (i.e. hurricane).

37) Extension mechanical damage to the electric system. Outages involving more than 10% of the customers served by district. More than 1% of the customers serviced have not been restored within 24 hours.

38) 15 000 or more customers outages.

39) (1) > 10% of the customers out of service at any one time, reported on a district basis. and (2) Extraordinary storm event such as a tornado, severe winds, etc.

40) A major storm is one which affects 15 000 of our approximately 120 000 customers AND makes an incremental addition of 10 min to company SAIDI.

41) A storm or equipment failure that would cause widespread serious damage throughout the service area in such proportion that available Company 4 forces would be unable to restore service within 48 hours. We designate this as a Level III event – Company 4 has 3 levels of event classifications There were no Level III events in 1999.

42) The major storm exclusion criterion is based on a statistical analysis of the last four-year history of reliability data. A cumulative frequency distribution of the number of locations requiring service restoration work per day is calculated for the four-year period. When the frequency of the restoration work exceeds the 98.5 percentile, by company or region the major storm criterion work be met for the all interruptions for that day.

43) Named storms, tornadoes, ice, events with >10% of customers out.

44) An interruption of electric service resulting from conditions beyond the control of the electric distribution company which affects at least 10% of the customers in an operating area during the course of event for a duration of 5 min each or greater.

45) An interruption of electric service resulting from conditions beyond the control of the electric distribution company which affects at least 10% of the customers in an operating area.

Annex B

(informative)

Major events definition development

B.1 Justification and process for development of the 2.5 beta methodology

The statistical approach to identifying major event days was chosen over the previous definitions (as shown in A.2) because of the difficulties experienced in creating a uniform list of types of major events, and because the measure of impact criterion (i.e., percent of customers affected) required when using event types resulted in non-uniform identification. The new methodology should fairly identify major events for all utilities. Some key issues had to be addressed in order to consider this work successful. They were as follows:

— Definition must be understandable and easy to apply.

— Definition must be specific and calculated using the same process for all utilities.

— Must be fair to all utilities regardless of size, geography, or design.

— Entities that adopt the methodology will calculate indices on a normalized basis for trending and reporting. They will further classify the major event days separately and report on those days through a separate process.

Daily SAIDI values are preferred to daily customer minutes interrupted (CMI) values for major event day identification because the former permits comparison and computation among years with different numbers of customers served. Consider the merger of two utilities with the same reliability and the same number of customers. CMI after the merger would double, with no change in reliability, while SAIDI would stay constant.

Daily SAIDI values are preferred to daily SAIFI values because the former are a better measure of the total cost of reliability events, including utility repair costs and customer losses, than the latter. The total cost of unreliability would be a better measure of the size of a major event, but collection of this data is not practical.

The selected approach for setting the major event day identification threshold, known as the "Two Point Five Beta" method (since it is using the log-normal SAIDI values rather than the raw SAIDI values), is preferred to using fixed multiples of standard deviation (e.g. "Three Sigma") to set the identification threshold because the latter results in non-uniform MED identification among utilities with different sizes and average reliabilities. The b multiplier of 2.5 was chosen because, in theory, it would classify 2.3 days per year as major events. If significantly more days than this are identified, they represent events that have occurred outside the random process that is assumed to control distribution system reliability. The process and the multiplier value were evaluated by a number of utilities with different sized systems from different parts of the United States and found to correlate reasonably well to current major event identification results for those utilities. A number of alternative approaches were considered. None was found to be clearly superior to Two Point Five Beta.

When a major event occurs which lasts through midnight (for example, a six hour hurricane which starts at 9:00 PM), the reliability impact of the event may be split between two days, neither of which would exceed the T_{MED} and therefore be classified as a major event day. This is a known inaccuracy in the method that is accepted in exchange for the simplicity and ease of calculation of the method. The preferred number of years of data (five) used to calculate the major event day identification threshold was set by trading off between the desire to reduce statistical variation in the threshold (for which more data is better) and the desire to see

the effects of changes in reliability practices in the reported results, and also to limit the amount of data which must be archived.

B.1.1 Remarks

To generate the example data, values of a and b were taken from an actual utility data set, and then daily SAIDI/day values were artificially generated using a log normal distribution with these values of α and β. The daily SAIDI values were then adjusted to illustrate all aspects of the calculation, e.g. a day in Table 2 was assigned a SAIDI value of zero, and a day in Table 3 was assigned a SAIDI value higher than the computed threshold.

This annex provides a technical description and analysis of the 2.5β method of identifying MEDs in distribution reliability data. The 2.5β method is a statistical method based on the theory of probability and statistics. Fundamental concepts such as probability distribution and expected value are highlighted in italics when they are first used, and provided with a short definition. An undergraduate probability and statistics textbook can be consulted for more complete definitions.

B.1.2 Beta (β) method description

A threshold on daily SAIDI is computed once a year (see 4.5). The short version is as follows:

a) Assemble the five most recent years of historical values of SAIDI/day. If less than five years of data is available, use as much as is available.
b) Discard any day in the data set that has a SAIDI/Day of zero.
c) Find the natural logarithm of each value in the data set.
d) Compute the average (α, or Alpha) and standard deviation (β or Beta) of the natural logarithms computed in step 3.
e) Compute the threshold T_{MED} = exp (Alpha + 2.5 * Beta).
f) Any day in the next year with SAIDI > T_{MED} is a major event day.

B.2 Random nature of distribution reliability

The reliability of electric power distribution systems is a random process, that is, a process that produces random values of a specific random variable. A simple example of a random process is rolling a die. The random variable is the value on the top face of the die after a roll, which can have integer values between 1 and 6.

In electric power distribution system reliability, the random variables are the reliability indices defined in the guide. These are evaluated on a daily or yearly basis, and take on values from zero to infinity.

B.3 Choice of SAIDI to identify major event days

Four commonly used reliability indices are:

— System Average Interruption Duration Index (SAIDI)
— System Average Interruption Frequency Index (SAIFI)
— Customer Average Interruption Duration Index (CAIDI)
— Average Service Availability Index (ASAI)

These indices are actually measures of unreliability, as they increase when reliability becomes worse.

An ideal measure of unreliability would be customer cost of unreliability, the dollar cost of power outages to a utility's customers. This cost is a combination of the initial cost of an outage and accumulated costs during the outage. Unfortunately, the customer cost of unreliability has so far proven impossible to estimate accurately. In contrast, the reliability indices above are routinely and accurately computed from historical reliability data. However, the ability of an index to reflect customer cost of unreliability indicates the best one to use for major event day identification.

Duration-related costs of outages are higher than initial costs, especially for major events, which typically have long duration outages. Thus a duration-related index will be a better indicator of total costs than a frequency-related index like SAIFI or MAIFI. Because CAIDI is a value per customer, it does not reflect the size of outage events. Therefore SAIDI best reflects the customer cost of unreliability, and is the index used to identify major event days. SAIDI in minutes/day is the random variable used for major event day identification.

The use of Customer Minutes Interrupted per day was also considered. Like SAIDI, CMI is a good representation of customer cost of unreliability. In fact, SAIDI is just CMI divided by the number of customers in the utility. The number of customers can vary from year to year, especially in the case of mergers, and multiple years of data are used to find major event days. Use of SAIDI accounts for the variation in customer count, while use of CMI does not. Therefore SAIDI is preferred.

B.4 Probability distribution of distribution system reliability

B.4.1 Probability density functions and probability of exceeding a threshold value

MEDs will be days with larger SAIDI values. This suggests the use of a threshold value for daily SAIDI. The threshold value is called T_{MED}. Days with SAIDI greater than T_{MED} are major event days. As the threshold increases, there will be fewer days with SAIDI values above the threshold. The relationship between the threshold and the number of days with SAIDI above the threshold is given by the probability density function of SAIDI/day.

The probability density function gives the probability that a specific value of a random variable will appear. For example, for a six sided die, the probability that a one will appear in a given roll is 1/6th, and the value of the probability density function of one is 1/6th for this random process.

The probability that a value greater than one will occur is just the sum of the probability densities for all values greater than one. Since each value has a probability density of 1/6th for the example, this sum is just 5/6ths. As the threshold increases, the probability decreases. For example, for a threshold of 4, there are only two values greater than 4, and the probability of rolling one of them is 2/6ths or 1/3rd.

In the die rolling example, the random variable can only have discrete integer values. SAIDI/day is a continuous variable. In this case, the sum is replaced by an integral. The probability p that any given day will have a SAIDI/day value greater than a threshold value T is the integral of the probability density function from the threshold to infinity as shown below in Equation (B.1).

$$p(\text{SAIDI} > T) = \int_{T}^{\infty} pdf(\text{SAIDI}) d\text{SAIDI} \qquad \text{(B.1)}$$

Graphically, the probability is the area under the probability density function above the threshold, as shown in Figure B.1.

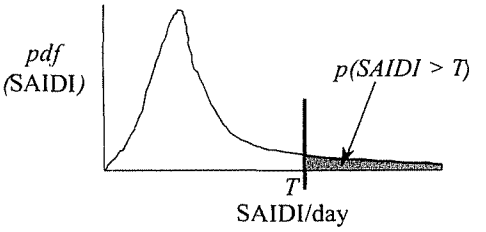


Figure B.1—The area under the probability density function *pdf* (SAIDI) above threshold (T) is the probability *p* that a given day will have a SAIDI value greater than (T)

If any given day has a probability p of being a major event day, then the expected value [see Equation (B.2)] of the number of major event days in a year is the probability times the number of days in a year.

$$E(MED/year) = 365 \cdot p(\text{SAIDI} > T_{MED}) \quad \text{(B.2)}$$

For example, if $p = 0.1$, then the expected number of major event days in a year is 36.5. This does not mean that exactly 36.5 MEDs will occur. The actual number will vary due to the randomness of the process.

Using the die rolling example, the probability of getting a six in any roll is 1/6th. Therefore the expected number of sixes in six rolls is 1. However, if the die is rolled six times, there could be six sixes, or zero sixes, or any number in between. As the number of trials goes up, the number of sixes will approach 1/6th of the number of rolls, but for small numbers of rolls there will be some variation from the expected value.

B.4.2 Gaussian, or normal distribution

The expected number of MEDs per year can be computed for any given threshold if the shape of the probability density function is known. The shape of the probability density function is called the probability distribution. Specific types of shapes have specific names. The most well known is the Gaussian distribution, also called the normal distribution or bell curve, shown in Figure B.2.

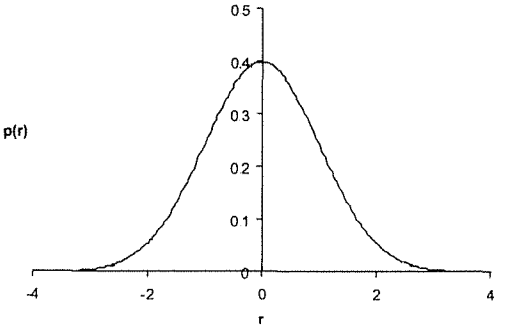


Figure B.2—Gaussian or normal probability distribution

The Gaussian distribution is completely described by its mean, or average value, (μ or Mu) and its standard deviation (σ or Sigma). The average value is at the center of the distribution (at 0 on the x axis in Figure B.2) and the standard deviation is a measure of the spread of the distribution.

An important property of the Gaussian distribution is that the probability of exceeding a given threshold is a function of the number of standard deviations the threshold is from the mean. Equation (B.3) provides mathematical terms.

$$T_{MED} = \mu + n\sigma \tag{B.3}$$

If the threshold is n standard deviations greater than the mean, and the probability of exceeding the threshold, $p(\text{SAIDI} > T_{MED})$, is a function only of n, and not of the mean and standard deviation. Values for this function are found in tables in the backs of probability textbooks and in, for example, standard spreadsheet functions. Table B.1 gives the probability of exceeding the threshold for different number of standard deviations k.

Table B.1—Probability of exceeding a threshold for the Gaussian distribution

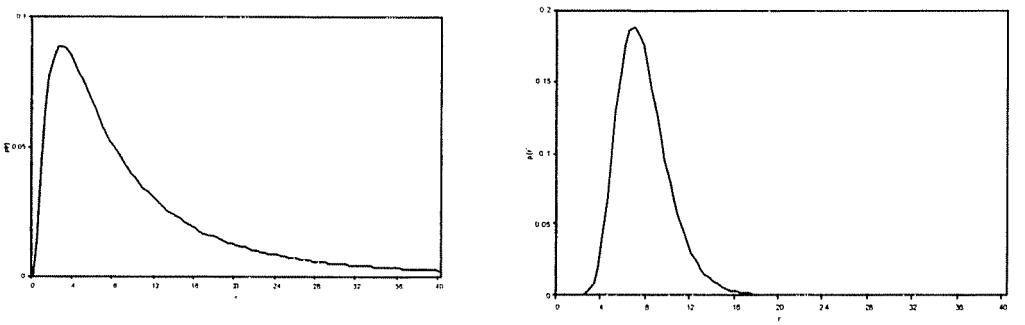
k	p
1	0.15866
2	0.02275
3	0.00135
6	9.9×10^{-10}

B.4.3 Three sigma

The term "Three Sigma" is often used loosely to designate a rare event. It comes from the Gaussian probability distribution. As Table B.1 shows, the probability of exceeding a threshold that is three standard deviations more than the mean is 0.00135, or one and a half tenths of a percent. If daily SAIDI had a Gaussian probability distribution, it would be relatively easy to agree on a Three Sigma definition for the major event day threshold, T_{MED}. Unfortunately, SAIDI does NOT have a Gaussian distribution. It has a log-normal distribution.

B.5 Log-normal distribution

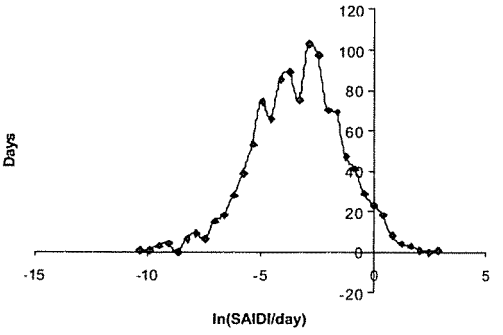
The random variable in the Gaussian distribution has a range from $-\infty$ to ∞. In real life, many quantities, including distribution reliability, can only be zero or positive. This causes the probability distribution to skew, bunching up near the zero axis and having a long tail to the right. The degree of skewness depends on the ratio of mean to standard deviation. When the standard deviation is small compared to the mean, the log normal distribution looks like the Gaussian distribution, as shown in Figure B.3(b). When it is large compared to the mean, it does not, as shown in Figure B.3(a). Daily reliability data usually has standard deviation values far larger than the mean.



(a) (b)

(a) Less than standard deviation.
(b) Greater than standard deviation.

Figure B.3—Log-normal distributions



This indicates three years of daily SAIDI data from anonymous Utility 2 supplied by the Distribution System Design Working Group. The logs of the data are normally distributed, so the daily data is log-normally distributed.

Figure B.4—Histogram of the natural logs

A consequence of the log-normality of daily reliability data is that the three sigma conditions no longer hold. In particular, the probability of exceeding a given threshold is no longer independent of the values of the average and standard deviation of the distribution. This means that using a method such as Three Sigma would result in different numbers of MEDs for utilities with different average values of reliability, or with different standard deviation values. This seems inequitable.

Fortunately, the logarithms of log-normal data have a Gaussian distribution. If the average of the logarithms of the data is called α, or Alpha, and the standard deviation of the logarithms of the data is called ß, or Beta, then α and ß are the mean and standard deviation of a Gaussian distribution and a threshold on the log of the data can be set which is independent of the values of α and ß. Equations (B.4) and (B.5) show these concepts mathematically.

$$\ln(T_{MED}) = \alpha + k\beta \quad \text{(B.4)}$$

and

$$T_{MED} = \exp(\alpha + k\beta) \quad \text{(B.5)}$$

The probability of exceeding T_{MED} is a function of k, just as in the Gaussian example. Table B.2 gives these probabilities as well as the expected number of Major Event Days (MEDs) for various values of k.

Table B.2—Probability of exceeding T_{MED} as a function of multiples of BETA

k	p	MEDs/yr
1	0.15866	57.9
2	0.02275	8.3
2.4	0.00822	3.0
2.5	0.00621	2.3
3	0.00135	0.5
6	9.9×10^{-10}	3.6E–07

B.5.1 Why 2.5?

Given an allowed number of MEDs per year, a value for k is easily computed. However, there is no analytical method of choosing an allowed number of MEDs/year. The chosen value of $k = 2.5$ is based on consensus reached among Distribution Design Working Group members on the appropriate number of days that should be classified as Major Event Days. As Table B.2 shows, the expected number of days for $k = 2.5$ is 2.3 MEDs/year. In practice, the experience of the committee members, representing a wide range of distribution utilities, was that more than 2.3 days were usually classified as MEDs, but that the days that were classified as MEDS were generally those that would have been chosen on qualitative grounds. The performance of different values of k were examined, and consensus was reached on $k = 2.5$.

B.6 Fairness of the 2.5ß method

It is likely that reliability data from different utilities will be compared by utility management, public utilities commissions and other interested parties. A fair MED classification method would classify, on average, the same number of MEDs per year for different utilities.

The two basic ways that utilities can differ in reliability terms are in the mean and standard deviation of their reliability data. Differences in means are attributable to differences in the environment between utilities, and to differences in operating and maintenance practices. Differences in standard deviation are mostly attributable to size. Larger utilities have inherently smaller standard deviations.

As discussed above, using the mean and standard deviation of the logs of the data (α and β) to set the threshold makes the expected number of MEDs depend only on the multiplier, and thus should classify the same number of MEDs for large and small utilities, and for utilities with low and high average reliability.

This is not the case for using the mean and standard deviation of the data without taking logarithms first. The expected number of MEDs varies the average and standard deviation. This variation occurs because of the log-normal nature of the reliability probability distribution.

B.7 Five years of data

From a statistical point of view, the more data used to calculate a threshold, the better. However, the random process producing the data changes over time as the distribution system is expanded and operating procedures are varied. Using too much historical data would suppress the effects of these changes.

The addition of another year of data should have a low probability of changing the MED classification of previous years. A result from order statistics gives the probability that the *k*th largest value in m samples will be exceeded f times in n future samples [B10]. It is given in Equation (B.5).

$$p_{f\backslash m,k,n} = \frac{k}{n+k-f}\frac{\binom{m}{k}\binom{n}{f}}{\binom{n+m}{n+k-f}} \tag{B.5}$$

For example, if $M = 3$ years of data then $m = 1095$ samples. If $f = 3$ MEDs/year then the largest non-MED is the k = 1095 –9 = 1086th ordered sample. The probability of $f = 3$ days in the next year of $n = 365$ samples exceeding the size of the largest non-MED is found from the equation to be 0.194 (19.4%). In Figure B.5 p is plotted against M for several values of f.

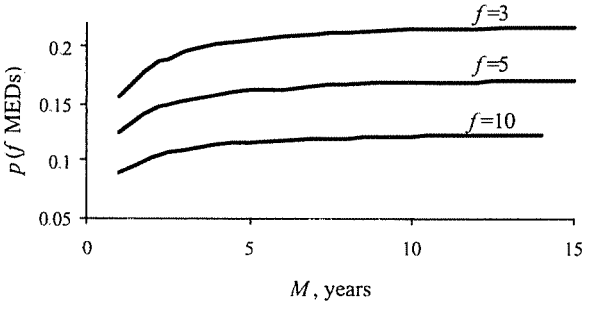


Figure B.5—Probability of exactly new MEDs in the next year of data, using *M* years of historical data

The consensus of the Design Working Group members was that 5 years was the appropriate amount of data to collect. They felt that the distribution system would change enough to invalidate any extra accuracy from more than 5 years of data.

Annex C

(informative)

Internal data subset

C.1 Calculation of reliability indices for subsets of data for internal company use

Reliability performance can be assessed for different purposes. It may be advantageous to calculate reliability indices without planned interruptions in order to review performance during unplanned events. In another case, it may be advantageous to review only sustained interruptions. Assessment of performance trends and goal setting should be based on normal event days (neglecting the impact of MEDs). Utilities and regulators determine the most appropriate data to use for reliability performance monitoring. When indices are calculated using partial data sets, the basis should be clearly defined for the users of the indices. At a minimum, reliability indices based on all collected data for a reporting period and analyzed as to normal versus major event day classifications should be provided. Indices based on subsets of collected data may be provided as specific needs dictate.

Annex D

(informative)

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[4]Available on request from christie@ee.washington.edu.
[5]IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (http://standards.ieee.org/)

Appendix D

Outage Category Report

Jackson Energy Cooperative

Period From 12/1/2005 to 12/31/2005

Cause

Cause Description	Outs	Members	Hours	YTD Outs	YTD Members	YTD Hours
Aircraft	0	0	0.00	0	0	
Animal / Bird	5	63	61.13	139	2063	2,276.13
Bad Connection	1	35	96.25	22	184	293.52
Customer Responsible	1	1	0.53	1	1	0.53
Deterioration	8	128	291.82	40	794	1,727.72
Equipment	14	995	1,502.35	156	6684	11,525.95
Fire	0	0	0.00	15	176	206.92
Ice	0	0	0.00	0	0	
Large Animal	0	0	0.00	7	105	155.55
Lightning	21	342	305.25	260	3886	6,385.75
Maintenance	1	1	1.30	17	306	306.83
Major Storm	0	0	0.00	4	99	528.05
Other Utilities	0	0	0.00	36	2010	842.18
Overload	9	109	94.72	42	1017	3,169.13
Power Supplier	0	0	0.00	20	23445	30,860.70
ROW Crew	2	35	66.10	9	102	109.92
Scheduled	12	246	196.32	179	4664	3,670.48
Squirrel	5	30	31.72	48	1204	991.37
Tree/Limb in ROW	4	12	20.52	211	6367	11,484.82
Tree/Limb out of ROW	4	93	250.13	220	9203	17,719.20
Unknown Cause	18	195	245.90	221	4744	6,448.48
Vandals	0	0	0.00	2	96	325.47
Vehicles	3	7	20.55	50	2115	4,321.70
Wind	0	0	0.00	40	1798	2,455.48
Woodcutter	4	53	150.90	48	1432	1,866.70
Totals	112	2345	3,335.48	1787	72495	107,672.58
Average Outage Time per Customer Affected			1.42			1.49

Outage Category Report

Jackson Energy

Period From 12/1/2006 to 12/31/2006

Cause

Cause Description	Outs	Members	Hours	YTD Outs	YTD Members	YTD Hours
Aircraft	0	0	0.00	1	7	5.13
Animal / Bird	1	14	13.07	129	1265	1,611.12
Bad Connection	1	5	27.75	18	512	859.43
Customer Responsible	0	0	0.00	14	48	75.03
Deterioration	8	94	366.92	46	538	1,513.53
Equipment	20	1037	2,081.78	190	6807	11,154.22
Fire	0	0	0.00	8	225	248.15
Ice	0	0	0.00	10	180	474.77
Large Animal	0	0	0.00	1	6	2.90
Lightning	0	0	0.00	403	7316	11,228.95
Maintenance	8	240	127.07	28	664	356.38
Major Storm	0	0	0.00	3	505	444.20
Other Utilities	0	0	0.00	19	1830	3,832.03
Overload	6	720	1,149.32	35	1450	1,770.38
Power Supplier	1	1081	108.10	8	10131	17,363.43
ROW Crew	0	0	0.00	28	1028	1,307.53
Scheduled	20	404	594.87	166	3193	4,453.38
Squirrel	5	45	42.33	95	953	1,132.15
Tree/Limb in ROW	21	265	1,175.55	289	9663	30,781.60
Tree/Limb out of ROW	52	1254	3,537.82	367	12496	34,766.43
Unknown Cause	25	416	534.43	312	8416	8,653.92
Vandals	1	41	61.00	7	589	2,172.48
Vehicles	2	100	559.38	54	3790	8,799.40
Wind	11	2355	2,707.30	28	3662	4,435.18
Woodcutter	2	21	58.07	40	687	1,129.80
Totals	184	8092	13,144.75	2299	75961	148,571.55
Average Outage Time per Customer Affected			1.62			1.96

Outage Category Report

JEC

Period From 12/1/2007 to 12/31/2007

Cause

Cause Description	Outs	Members	Hours	YTD Outs	YTD Members	YTD Hours
Aircraft	0	0	0.00	0	0	
Animal / Bird	2	32	79.27	152	1259	1,355.47
Bad Connection	1	1	1.40	14	42	77.62
Customer Responsible	2	4	3.93	17	34	56.78
Deterioration	5	111	281.60	41	615	1,184.28
Equipment	21	3273	6,185.72	174	14117	18,751.18
Fire	1	1	1.60	7	694	199.18
Ice	0	0	0.00	5	77	202.90
Large Animal	0	0	0.00	4	7	8.98
Lightning	0	0	0.00	165	2626	4,422.22
Maintenance	3	79	30.12	17	415	309.38
Major Storm	0	0	0.00	2	513	1,606.77
Other Utilities	0	0	0.00	14	1791	2,816.67
Overload	14	496	833.97	34	851	1,129.17
Power Supplier	13	13668	26,413.53	27	24019	43,104.22
ROW Crew	2	15	18.35	25	483	651.40
Scheduled	10	173	142.50	206	5076	6,316.00
Squirrel	3	16	12.53	72	741	1,104.60
Tree/Limb in ROW	14	188	576.57	180	4823	10,423.47
Tree/Limb out of ROW	87	2797	7,748.13	373	15257	43,475.90
Unknown Cause	34	1731	2,566.38	312	7963	12,197.97
Vandals	0	0	0.00	7	101	204.75
Vehicles	4	934	1,686.10	46	4436	6,506.48
Wind	9	245	487.83	15	544	944.72
Woodcutter	2	13	10.48	31	402	840.13
Totals	227	23777	47,080.02	1940	86886	157,890.23
Average Outage Time per Customer Affected			1.98			1.82

Appendix E

CAIDI

2007 Outages

Substation	Feeder	Description	CAIDI	SAIDI	SAIFI	Plan of Action
Oneida	2	Lit Bullskin F2	3.52	3.24	0.92	Scheduled 2009
Greenhall	5	Trav Rest F5	3.45	2.23	0.65	Scheduled 2009
Greenbriar	4	Fox Hollow F4	3.18	0.13	0.04	Scheduled 2009
Goose Rock	2	Big Creek F2	2.93	8.09	2.76	Scheduled 2008
Laurel Industrial #1	3	SinkingCreek F3	2.83	3.23	1.14	Scheduled 2009
Keavy #2	3	Level Green F3	2.78	0.72	0.26	Cleared 2006
South Fork	3	Walnut Grove F3	2.71	6.96	2.57	Scheduled 2009
Beattyville	3	Heidelberg F3	2.57	3.66	1.43	Cleared 2005
Millers Creek	1	Cobb Hill F1	2.41	2.50	1.04	Cleared 2007
Annville	1	Tyner F1	2.40	0.30	0.13	Scheduled 2010

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Oneida	Lit Bullskin F2	6	95	876	Woodcutter	None	Recloser Device	9.6	2/20/2007 4:17 PM		
Oneida	Lit Bullskin F2	7	85	885	Tree/Limb in ROW	None	Fuse, Line	9.9167	7/13/2007 11:56 AM		
Oneida	Lit Bullskin F2	1	204	883	Tree/Limb out of ROW	None	Fuse, Line	3.4167	7/26/2007 10:19 AM		
Oneida	Lit Bullskin F2	7	99	883	Tree/Limb out of ROW	None	Fuse, Line	11.55	7/28/2007 4:14 AM		
Oneida	Lit Bullskin F2	17	407	879	Tree/Limb in ROW	None	Recloser Device	115.3167	11/4/2007 3:29 PM		
Oneida	Lit Bullskin F2	7	75	883	Scheduled	None	Fuse, Line	8.75	7/25/2007 9:30 AM		
									Total	140.20	158.55
Greenhall	Trav Rest F5	85	145	755	Deterioration	Jumper	Jumper	205.4167	12/3/2007 12:38 AM		
Greenhall	Trav Rest F5	47	452	729	Tree/Limb out of ROW	None	Recloser Device	354.85	8/16/2007 8:20 PM		
Greenhall	Trav Rest F5	6	98	754	Tree/Limb out of ROW	None	Fuse, Line	9.8	12/16/2007 8:33 AM		
Greenhall	Trav Rest F5	30	26	746	Scheduled	None	Fuse, Line	13	9/12/2007 9:10 AM		
Greenhall	Trav Rest F5	1	62	733	Unknown Cause	None	Transformer De	1.0333	1/21/2007 8:45 PM		
Greenhall	Trav Rest F5	1	299	733	Tree/Limb out of ROW	None	Fuse, Line	4.9833	1/21/2007 10:11 AM		
Greenhall	Trav Rest F5	1	32	733	Unknown Cause	None	Fuse, Transform	0.55	4/24/2007 8:57 AM		
									Total	369.63	589.63
Greenbriar	Fox Hollow F4	1	191	901	Equipment	Lightning Arrestor	Fuse, Transform	3.1833	9/13/2007 3:30 AM		
									Total	0.00	3.18
Goose Rock	Big Creek F2	133	140	2458	Overload	None	Recloser Device	310.3333	12/21/2007 9:49 AM		
Goose Rock	Big Creek F2	1	62	2342	Unknown Cause	None	Fuse, Line	1.0167	10/23/2007 6:05 PM		
Goose Rock	Big Creek F2	444	347	2342	Unknown Cause	None	Recloser Device	2567.8	11/5/2007 7:46 PM		
Goose Rock	Big Creek F2	1	273	2342	Equipment	Transformer	Service	4.55	11/7/2007 8:35 AM		
Goose Rock	Big Creek F2	26	120	2337	Scheduled	None	Recloser Device	52	8/1/2007 10:09 AM		
Goose Rock	Big Creek F2	1	134	2337	Tree/Limb in ROW	None	Service	2.2333	8/8/2007 8:39 PM		
Goose Rock	Big Creek F2	26	130	2337	Tree/Limb in ROW	None	Recloser Device	55.9	7/19/2007 9:56 PM		
Goose Rock	Big Creek F2	13	121	2348	Unknown Cause	None	Fuse, Line	26.2167	9/20/2007 11:33 AM		
Goose Rock	Big Creek F2	59	107	2365	Tree/Limb in ROW	None	Recloser Device	106.2	6/5/2007 3:10 AM		
Goose Rock	Big Creek F2	1	88	2365	Lightning	None	Fuse, Line	1.4667	6/8/2007 6:06 PM		
Goose Rock	Big Creek F2	11	487	2362	Tree/Limb out of ROW	None	Fuse, Line	89.2833	6/24/2007 8:05 PM		
Goose Rock	Big Creek F2	14	111	2479	Scheduled	None	Fuse, Line	25.6667	3/6/2007 10:22 AM		
Goose Rock	Big Creek F2	3	472	2362	Tree/Limb in ROW	None	Fuse, Line	23.6	6/24/2007 5:44 PM		
Goose Rock	Big Creek F2	6	80	2340	Tree/Limb in ROW	None	Fuse, Line	8	7/17/2007 4:38 PM		
Goose Rock	Big Creek F2	21	131	2484	Scheduled	None	Recloser Device	45.85	2/27/2007 1:35 PM		
Goose Rock	Big Creek F2	1	111	2488	ROW Crew	None	Fuse, Line	1.85	1/22/2007 12:18 PM		
Goose Rock	Big Creek F2	12	55	2367	Tree/Limb in ROW	None	Fuse, Line	11.2	5/4/2007 7:17 PM		
Goose Rock	Big Creek F2	21	66	2337	Scheduled	None	Recloser Device	23.1	7/30/2007 9:36 AM		
Goose Rock	Big Creek F2	3	59	2339	Tree/Limb in ROW	None	Fuse, Line	3	9/14/2007 6:17 AM		
Goose Rock	Big Creek F2	19	477	2365	Tree/Limb out of ROW	None	Recloser Device	149.4667	6/24/2007 5:14 PM		
Goose Rock	Big Creek F2	10	99	2365	Tree/Limb in ROW	None	Fuse, Line	16.5	5/22/2007 3:17 PM		
Goose Rock	Big Creek F2	20	107	2365	Unknown Cause	None	Recloser Device	35.6667	6/4/2007 11:48 PM		
Goose Rock	Big Creek F2	1	83	2488	Tree/Limb out of ROW	None	Fuse, Line	1.3833	1/6/2007 11:13 AM		
Goose Rock	Big Creek F2	704	82	2479	Equipment	Pole	Feeder	962.1333	3/4/2007 12:02 AM		
Goose Rock	Big Creek F2	21	142	2337	Scheduled	None	Recloser Device	50.05	8/16/2007 9:23 AM		
Goose Rock	Big Creek F2	3	43	2337	Tree/Limb in ROW	None	Fuse, Line	2.15	8/21/2007 9:25 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Goose Rock	Big Creek F2	8	109	2365	Tree/Limb out of ROW	None	Fuse, Line	14.5333	6/5/2007 8:32 PM		
Goose Rock	Big Creek F2	8	49	2340	Equipment	Insulator	Fuse, Line	6.5333	7/5/2007 4:23 PM		
Goose Rock	Big Creek F2	32	176	2340	Scheduled	None	Recloser Device	94.4	7/17/2007 12:44 PM		
Goose Rock	Big Creek F2	12	87	2353	Tree/Limb in ROW	None	Fuse, Line	17.2	6/24/2007 8:59 PM		
									Total	500.65	4,709.28
Laurel Ind 1	SinkingCreek F3	4	123	518	Deterioration	Connector	Fuse, Line	8.2	1/11/2007 12:04 PM		
Laurel Ind 1	SinkingCreek F3	21	779	522	Tree/Limb out of ROW	None	Fuse, Line	92.8333	4/4/2007 1:41 AM		
Laurel Ind 1	SinkingCreek F3	34	111	522	Tree/Limb out of ROW	None	Fuse, Line	62.9	4/4/2007 1:42 AM		
Laurel Ind 1	SinkingCreek F3	20	89	549	Scheduled	None	Fuse, Line	29.6667	11/29/2007 12:59 PM		
Laurel Ind 1	SinkingCreek F3	12	32	532	Tree/Limb in ROW	None	Fuse, Line	6.4	10/4/2007 11:48 PM		
Laurel Ind 1	SinkingCreek F3	34	69	534	Animal / Bird	None	Fuse, Line	39.1	8/21/2007 5:43 PM		
Laurel Ind 1	SinkingCreek F3	31	861	522	Tree/Limb out of ROW	None	Fuse, Line	82.2	4/4/2007 1:43 AM		
Laurel Ind 1	SinkingCreek F3	3	339	514	Tree/Limb out of ROW	None	Service	16.9	4/4/2007 6:28 AM		
Laurel Ind 1	SinkingCreek F3	31	136	519	Equipment	Sleeve	Fuse, Line	69.75	1/31/2007 6:09 AM		
Laurel Ind 1	SinkingCreek F3	2	66	522	Unknown Cause	None	Fuse, Line	2.2	6/7/2007 10:42 AM		
Laurel Ind 1	SinkingCreek F3	3	45	537	Animal / Bird	None	Fuse, Line	2.2	7/13/2007 8:17 AM		
Laurel Ind 1	SinkingCreek F3	31	71	522	Animal / Bird	None	Fuse, Transform	37.2	6/20/2007 8:39 AM		
Laurel Ind 1	SinkingCreek F3	34	114	532	Animal / Bird	None	Fuse, Line	64.6	9/27/2007 9:31 AM		
Laurel Ind 1	SinkingCreek F3	12	68	532	Tree/Limb out of ROW	None	Fuse, Line	13.4	10/4/2007 10:40 PM		
Laurel Ind 1	SinkingCreek F3	1	42	534	Equipment	Cutout	Fuse, Line	0.7	7/28/2007 10:30 AM		
Laurel Ind 1	SinkingCreek F3	3	92	536	Lightning	None	Fuse, Line	4.55	8/25/2007 11:28 AM		
Laurel Ind 1	SinkingCreek F3	2	191	533	Lightning	None	Fuse, Line	6.4	11/14/2007 5:17 PM		
Laurel Ind 1	SinkingCreek F3	2	50	546	Vehicles	None	Fuse, Line	1.6333	12/11/2007 9:13 AM		
Laurel Ind 1	SinkingCreek F3	32	60	546	Unknown Cause	None	Fuse, Line	31.7333	12/14/2007 2:08 PM		
Laurel Ind 1	SinkingCreek F3	11	75	506	Scheduled	None	Fuse, Line	13.75	3/20/2007 10:37 AM		
Laurel Ind 1	SinkingCreek F3	10	245	504	Tree/Limb out of ROW	None	Fuse, Line	40.8333	4/4/2007 6:28 AM		
Laurel Ind 1	SinkingCreek F3	104	474	514	Tree/Limb out of ROW	None	Recloser Device	821.6	4/4/2007 6:38 AM		
Laurel Ind 1	SinkingCreek F3	6	37	522	Unknown Cause	None	Fuse, Line	3.7	6/25/2007 1:32 PM		
Laurel Ind 1	SinkingCreek F3	96	74	534	Unknown Cause	None	Fuse, Line	118.4	8/20/2007 4:50 PM		
Laurel Ind 1	SinkingCreek F3	1	143	532	Scheduled	None	Fuse, Line	2.3833	11/20/2007 10:46 AM		
Laurel Ind 1	SinkingCreek F3	21	49	546	Tree/Limb out of ROW	None	Fuse, Line	17.15	12/23/2007 6:22 AM		
									Total	1,154.22	1,590.38
Keavy 2	Level Green F3	2	272	1293	Vehicles	None	Transformer De	9.0667	7/31/2007 11:40 AM		
Keavy 2	Level Green F3	41	292	1298	Vehicles	None	Recloser Device	199.5333	5/19/2007 4:51 PM		
Keavy 2	Level Green F3	3	34	1302	Animal / Bird	None	Fuse, Line	1.7	9/22/2007 8:22 AM		
Keavy 2	Level Green F3	2	152	1294	Tree/Limb out of ROW	None	Fuse, Line	5.0667	1/15/2007 7:08 AM		
Keavy 2	Level Green F3	1	37	1298	Lightning	None	Fuse, Line	0.6167	6/15/2007 2:41 PM		
Keavy 2	Level Green F3	24	55	1294	Animal / Bird	None	Fuse, Line	22	5/6/2007 10:28 AM		
Keavy 2	Level Green F3	17	135	1298	Equipment	Hot Line Clamp	Fuse, Line	38.25	6/25/2007 8:32 PM		
Keavy 2	Level Green F3	1	47	1294	Squirrel	None	Fuse, Line	0.7833	8/26/2007 9:36 AM		
Keavy 2	Level Green F3	11	96	1289	Unknown Cause	None	Fuse, Line	17.6	4/13/2007 8:54 AM		
Keavy 2	Level Green F3	1	43	1727	Squirrel	None	Fuse, Line	0.7167	3/24/2007 10:32 AM		
Keavy 2	Level Green F3	4	55	1298	Tree/Limb out of ROW	None	Fuse, Line	3.6667	7/4/2007 4:24 PM		
Keavy 2	Level Green F3	1	72	1293	Animal / Bird	None	Fuse, Line	1.2	8/12/2007 10:11 AM		

CAIDI

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
									Total	8.73	300.20
South Fork	Walnut Grove F3	31	270	718	Tree/Limb out of ROW	None	Recloser Device	53.55	8/10/2007 4:00 PM		
South Fork	Walnut Grove F3	2	76	712	Tree/Limb in ROW	None	Wire Break	2.5333	11/4/2007 4:30 PM		
South Fork	Walnut Grove F3	31	116	714	Tree/Limb in ROW	None	Recloser Device	56.0667	11/4/2007 2:37 PM		
South Fork	Walnut Grove F3	164	290	726	Tree/Limb out of ROW	None	Recloser Device	792.6667	6/19/2007 3:50 AM		
South Fork	Walnut Grove F3	8	94	1001	Tree/Limb out of ROW	None	Fuse, Line	12.6667	6/29/2007 11:33 PM		
South Fork	Walnut Grove F3	31	111	1001	Tree/Limb out of ROW	None	Recloser Device	57.35	6/29/2007 3:59 PM		
South Fork	Walnut Grove F3	34	315	730	Tree/Limb out of ROW	None	Recloser Device	178.5	3/3/2007 3:26 PM		
South Fork	Walnut Grove F3	7	59	726	Unknown Cause	None	Fuse, Line	6.8833	5/31/2007 9:29 PM		
South Fork	Walnut Grove F3	1	61	718	Overload	None	Transformer De	1.0333	8/9/2007 6:59 PM		
South Fork	Walnut Grove F3	233	52	718	Power Supplier	None	Power Supplier	201.9333	11/28/2007 3:04 PM		
South Fork	Walnut Grove F3	3	295	716	Tree/Limb out of ROW	None	Fuse, Line	14.75	12/16/2007 5:11 AM		
South Fork	Walnut Grove F3	37	263	718	Tree/Limb out of ROW	None	Recloser Device	161.5667	8/17/2007 12:59 AM		
South Fork	Walnut Grove F3	8	407	718	Tree/Limb in ROW	None	Fuse, Line	54.2667	8/16/2007 8:13 PM		
									Total	1,383.92	1,593.77
Beattyville	Heidelberg F3	10	343	2060	Tree/Limb out of ROW	None	Fuse, Line	57.1667	8/16/2007 8:50 PM		
Beattyville	Heidelberg F3	59	161	2060	Tree/Limb out of ROW	None	Recloser Device	159.3	8/6/2007 1:31 AM		
Beattyville	Heidelberg F3	2	66	2056	Animal / Bird	None	Fuse, Line	2.2	9/9/2007 7:43 AM		
Beattyville	Heidelberg F3	12	26	2051	Squirrel	None	Fuse, Line	5.2	10/1/2007 9:56 AM		
Beattyville	Heidelberg F3	46	176	2065	Unknown Cause	None	Recloser Device	134.1667	12/23/2007 12:43 PM		
Beattyville	Heidelberg F3	46	239	2045	Tree/Limb out of ROW	None	Recloser Device	183.2333	4/14/2007 2:17 PM		
Beattyville	Heidelberg F3	10	278	2038	Lightning	None	Fuse, Line	46.1667	6/5/2007 7:02 PM		
Beattyville	Heidelberg F3	10	42	2061	Animal / Bird	None	Fuse, Line	7	7/10/2007 3:38 PM		
Beattyville	Heidelberg F3	1	67	2060	Lightning	None	Fuse, Line	1.1167	8/19/2007 10:48 PM		
Beattyville	Heidelberg F3	45	51	2056	Tree/Limb out of ROW	None	Recloser Device	38.25	9/11/2007 6:46 AM		
Beattyville	Heidelberg F3	46	306	2065	Tree/Limb out of ROW	None	Recloser Device	234.6	12/16/2007 3:32 AM		
Beattyville	Heidelberg F3	59	345	2035	Tree/Limb out of ROW	None	Recloser Device	339.25	12/29/2007 1:06 AM		
Beattyville	Heidelberg F3	1	132	2060	Woodcutter	None	Service	2.2	7/22/2007 12:59 PM		
Beattyville	Heidelberg F3	3	101	2060	Equipment	Cutout	Fuse, Line	5.05	7/20/2007 11:24 AM		
Beattyville	Heidelberg F3	3	37	2061	Tree/Limb out of ROW	None	Fuse, Line	1.85	7/5/2007 5:48 AM		
Beattyville	Heidelberg F3	8	97	2049	Ice	None	Fuse, Line	12.8	1/21/2007 9:40 AM		
Beattyville	Heidelberg F3	1	35	2035	Animal / Bird	None	Fuse, Transform	0.6	5/8/2007 5:37 PM		
Beattyville	Heidelberg F3	30	58	2049	Tree/Limb out of ROW	None	Fuse, Line	29	1/26/2007 2:22 PM		
Beattyville	Heidelberg F3	1	63	2048	Ice	None	Wire Break	1.0333	1/21/2007 11:07 AM		
Beattyville	Heidelberg F3	179	56	2061	Tree/Limb out of ROW	None	Recloser Device	164.0833	7/5/2007 4:13 AM		
Beattyville	Heidelberg F3	1	38	2038	Unknown Cause	None	Fuse, Line	0.6333	5/22/2007 11:58 AM		
Beattyville	Heidelberg F3	1	60	2038	Squirrel	None	Fuse, Line	1	5/27/2007 8:32 PM		
Beattyville	Heidelberg F3	2	49	2038	Animal / Bird	None	Fuse, Line	1.6667	6/2/2007 9:45 AM		
Beattyville	Heidelberg F3	12	30	2051	Unknown Cause	None	Fuse, Line	6	9/26/2007 10:00 AM		
Beattyville	Heidelberg F3	23	207	2060	Equipment	Hot Line Clamp	Fuse, Line	79.7333	8/5/2007 9:28 PM		
Beattyville	Heidelberg F3	1	35	2051	Animal / Bird	None	Fuse, Transform	0.5833	10/11/2007 8:33 PM		
Beattyville	Heidelberg F3	46	305	2060	Equipment	Wire	Recloser Device	233.8333	10/27/2007 10:51 PM		
Beattyville	Heidelberg F3	23	309	2065	Tree/Limb out of ROW	None	Fuse, Line	118.45	12/16/2007 6:48 AM		
Beattyville	Heidelberg F3	4	44	2060	Unknown Cause	None	Fuse, Line	2.9333	7/24/2007 11:03 AM		

CAIDI

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
	Heidelberg F3	4	45	2061	Unknown Cause	None	Fuse, Line	3	7/16/2007 8:44		
Beattyville	Heidelberg F3	59	240	2038	Tree/Limb in ROW	None	Recloser Device	236	6/5/2007 6:38 PM		
Beattyville	Heidelberg F3	2	175	2038	Tree/Limb in ROW	None	Fuse, Line	5.8	6/5/2007 9:53 PM		
Beattyville	Heidelberg F3	19	83	2045	Unknown Cause	None	Fuse, Line	26.2833	4/2/2007 3:05 PM		
Beattyville	Heidelberg F3	1	82	2053	Scheduled	None	Jumper	1.3667	2/16/2007 10:55 AM		
Beattyville	Heidelberg F3	15	70	2053	Unknown Cause	None	Fuse, Line	17.25	3/11/2007 7:34 AM		
Beattyville	Heidelberg F3	60	9	2049	Scheduled	None	Recloser Device	10	1/4/2007 11:38 AM		
									Total	1,566.98	2,168.80
Millers Creek	Cobb Hill F1	47	66	1037	Tree/Limb in ROW	None	Recloser Device	12.1	11/4/2007 2:28 PM		
Millers Creek	Cobb Hill F1	6	143	1045	Tree/Limb out of ROW	None	Wire Break	14.3	12/5/2007 7:23 PM		
Millers Creek	Cobb Hill F1	6	382	1056	Tree/Limb out of ROW	None	Fuse, Line	38.2	12/13/2007 5:34 AM		
Millers Creek	Cobb Hill F1	1	768	1056	Tree/Limb out of ROW	None	Service	12.8167	12/16/2007 7:38 AM		
Millers Creek	Cobb Hill F1	1	44	1041	Unknown Cause	None	Fuse, Line	0.7333	10/9/2007 1:53 PM		
Millers Creek	Cobb Hill F1	1	65	1044	Squirrel	None	Fuse, Line	1.0833	9/4/2007 4:31 PM		
Millers Creek	Cobb Hill F1	51	98	1052	Unknown Cause	None	Fuse, Line	83.3	6/7/2007 4:10 PM		
Millers Creek	Cobb Hill F1	2	97	1054	Unknown Cause	None	Fuse, Line	3.2333	7/2/2007 1:39 PM		
Millers Creek	Cobb Hill F1	1	37	1054	Large Animal	None	Fuse, Line	0.6167	7/11/2007 1:37 PM		
Millers Creek	Cobb Hill F1	2	143	1050	Unknown Cause	None	Fuse, Line	4.7667	4/26/2007 11:05 AM		
Millers Creek	Cobb Hill F1	1	48	1049	Unknown Cause	None	Fuse, Line	0.8167	4/13/2007 2:15 PM		
Millers Creek	Cobb Hill F1	5	55	1050	ROW Crew	None	Fuse, Line	4.5833	5/15/2007 9:42 AM		
Millers Creek	Cobb Hill F1	4	51	1052	Wind	None	Fuse, Line	3.4	6/6/2007 10:10 AM		
Millers Creek	Cobb Hill F1	7	193	1052	Scheduled	None	Fuse, Line	22.5167	6/13/2007 8:54 AM		
Millers Creek	Cobb Hill F1	1	109	1038	Tree/Limb out of ROW	None	Fuse, Line	1.8167	8/12/2007 4:04 PM		
Millers Creek	Cobb Hill F1	13	150	1038	ROW Crew	None	Recloser Device	17.3	8/9/2007 2:12 PM		
Millers Creek	Cobb Hill F1	51	70	1041	Scheduled	None	Recloser Device	59.5	10/15/2007 9:50 AM		
Millers Creek	Cobb Hill F1	1	84	1042	Scheduled	None	Fuse, Line	1.3833	9/24/2007 8:37 AM		
Millers Creek	Cobb Hill F1	36	193	1037	Tree/Limb in ROW	None	Recloser Device	115.8	11/4/2007 2:30 PM		
Millers Creek	Cobb Hill F1	4	388	1056	Tree/Limb out of ROW	None	Wire Break	25.8667	12/14/2007 2:15 PM		
Millers Creek	Cobb Hill F1	1	75	1056	Unknown Cause	None	Fuse, Line	1.25	12/15/2007 1:47 PM		
Millers Creek	Cobb Hill F1	1	320	1047	Tree/Limb out of ROW	None	Fuse, Line	5.3333	8/22/2007 4:48 AM		
Millers Creek	Cobb Hill F1	109	249	1052	Tree/Limb out of ROW	None	Recloser Device	452.35	6/5/2007 6:21 PM		
Millers Creek	Cobb Hill F1	2	157	1044	Scheduled	None	Recloser Device	5.2333	3/19/2007 10:25 AM		
Millers Creek	Cobb Hill F1	1	42	1037	Woodcutter	None	Fuse, Line	0.7	11/19/2007 1:03 PM		
Millers Creek	Cobb Hill F1	31	182	1056	Tree/Limb out of ROW	None	Recloser Device	73.5	12/21/2007 9:41 AM		
Millers Creek	Cobb Hill F1	1	135	1053	Tree/Limb out of ROW	None	Service	2.25	1/13/2007 7:44 AM		
Millers Creek	Cobb Hill F1	2	227	1498	Scheduled	None	Recloser Device	7.5667	6/26/2007 11:01 AM		
Millers Creek	Cobb Hill F1	51	56	1052	Unknown Cause	None	Recloser Device	47.6	6/7/2007 2:50 PM		
Millers Creek	Cobb Hill F1	4	208	1052	Tree/Limb out of ROW	None	Fuse, Line	13.9333	6/5/2007 6:30 PM		
Millers Creek	Cobb Hill F1	32	47	1052	Tree/Limb in ROW	None	Fuse, Line	25.6	6/13/2007 2:08 PM		
									Total	793.87	1,059.45
Annville	Tyner F1	887	60	887	Power Supplier	None	Power Supplier	887	3/4/2007 2:30 AM		
Annville	Tyner F1	3	143	887	Lightning	None	Fuse, Transform	7.2	7/18/2007 6:38 PM		
									Total	0.00	894.20

SAIDI

2007 Outages

Substation	Feeder	Description	CAIDI	SAIDI	SAIFI	Plan of Action
Three Links*	3	Disputanta F3	1.61	25.17	15.59	Cleared 2007
Goose Rock	2	Big Creek F2	2.93	8.09	2.76	Scheduled 2008
Beattyville	2	St. Helens F2	1.60	7.73	4.85	Scheduled 2008
Oneida	4	Spurlock F4	2.05	7.13	3.48	Cleared 2006
South Fork	3	Walnut Grove F3	2.71	6.96	2.57	Scheduled 2009
Oneida	3	Big Bullskin F3	1.35	6.46	4.77	Scheduled 2008
East Bernstadt	4	Frt Sequayah F4	1.69	6.29	3.73	Scheduled 2008
Goose Rock	1	Garrad F1	1.52	6.09	4.00	Cleared 2005
Goose Rock	4	Schoolhouse F4	2.14	6.01	2.81	Scheduled 2008
Greenhall	3	New Zion F3	1.81	5.57	3.08	Scheduled 2010

*Three Links Feeder #3 has been sectionalized into two different circuits with the addition of a new substation. The addition of the substation allowed for more protection zones. In addition, the tree clearing was completed in late 2007. Both of these actions should improve the reliablity of this feeder in the future.

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Three Links	Disputanta F3	1	352	1470	Lightning	Transformer	Transformer Device	5.8833	8/30/2007 2:55 AM		
Three Links	Disputanta F3	3	107	1479	Scheduled	None	Jumper	5.35	9/26/2007 10:36 AM		
Three Links	Disputanta F3	59	198	1482	Woodcutter	None	Recloser Device	194.7	9/27/2007 11:41 AM		
Three Links	Disputanta F3	5	173	1373	Bad Connection	Hot Line Clamp	Fuse, Line	14.4167	10/12/2007 5:07 PM		
Three Links	Disputanta F3	1	140	1487	Squirrel	None	Fuse, Line	2.3333	6/10/2007 10:15 AM		
Three Links	Disputanta F3	1	205	1487	Tree/Limb out of ROW	None	Fuse, Line	3.4167	6/4/2007 9:10 AM		
Three Links	Disputanta F3	18	149	1487	Tree/Limb out of ROW	None	Recloser Device	33.35	6/25/2007 5:34 PM		
Three Links	Disputanta F3	2	95	1471	Large Animal	None	Fuse, Line	3.1	7/7/2007 9:24 AM		
Three Links	Disputanta F3	630	94	1471	Unknown Cause	None	Recloser Device	997.5	7/9/2007 4:29 PM		
Three Links	Disputanta F3	624	34	1471	Unknown Cause	None	Recloser Device	364	7/16/2007 7:22 AM		
Three Links	Disputanta F3	12	38	1471	Unknown Cause	None	Fuse, Line	7.6	7/16/2007 8:27 AM		
Three Links	Disputanta F3	55	134	1488	Unknown Cause	None	Recloser Device	110.2	3/28/2007 4:21 PM		
Three Links	Disputanta F3	883	82	1488	Tree/Limb out of ROW	None	Feeder	1221.483	5/5/2007 10:03 AM		
Three Links	Disputanta F3	1	216	957	Equipment	Transformer	Fuse, Line	3.6	11/30/2007 8:39 AM		
Three Links	Disputanta F3	338	195	955	Tree/Limb out of ROW	None	Feeder	1098.5	11/27/2007 2:00 AM		
Three Links	Disputanta F3	5	74	1470	Unknown Cause	None	Fuse, Line	6.1667	8/28/2007 1:29 PM		
Three Links	Disputanta F3	2	166	1487	Unknown Cause	None	Fuse, Line	5.5333	6/5/2007 8:43 AM		
Three Links	Disputanta F3	40	243	1487	Tree/Limb in ROW	None	Fuse, Line	162	6/6/2007 7:13 AM		
Three Links	Disputanta F3	13	39	1491	Maintenance	None	Fuse, Line	8.6667	1/26/2007 2:05 PM		
Three Links	Disputanta F3	13	257	1490	Scheduled	None	Fuse, Line	55.6833	9/19/2007 8:17 AM		
Three Links	Disputanta F3	23	110	1373	Equipment	Lightning Arrestor	Fuse, Line	42.1667	10/23/2007 12:03 PM		
Three Links	Disputanta F3	4	154	1482	Lightning	None	Fuse, Line	10.3333	11/14/2007 5:09 PM		
Three Links	Disputanta F3	14	15	955	Overload	None	Fuse, Line	3.5	11/27/2007 5:35 AM		
Three Links	Disputanta F3	335	86	957	Unknown Cause	None	Feeder	480.1667	12/8/2007 7:43 PM		
Three Links	Disputanta F3	1	84	1047	Bad Connection	None	Service	1.4	12/24/2007 11:07 AM		
Three Links	Disputanta F3	1	140	1487	Vehicles	None	Jumper	2.3333	5/30/2007 4:20 PM		
Three Links	Disputanta F3	25	186	1487	Woodcutter	None	Fuse, Line	77.5	6/15/2007 9:46 AM		
Three Links	Disputanta F3	2	115	1487	Animal / Bird	None	Fuse, Line	3.8	6/16/2007 5:34 PM		
Three Links	Disputanta F3	631	20	1470	Equipment	Recloser	Recloser Device	210.3333	7/23/2007 7:54 AM		
Three Links	Disputanta F3	13	90	1471	ROW Crew	None	Fuse, Line	19.7167	7/16/2007 10:53 AM		
Three Links	Disputanta F3	18	11	1491	Scheduled	None	Fuse, Line	3.3	1/22/2007 1:50 PM		
Three Links	Disputanta F3	732	68	750	Scheduled	None	Power Supplier	829.6	11/5/2007 2:21 PM		
Three Links	Disputanta F3	23	90	1373	Tree/Limb in ROW	None	Fuse, Line	34.1167	10/23/2007 9:31 AM		
Three Links	Disputanta F3	1	115	1372	Scheduled	None	Fuse, Line	1.9167	10/9/2007 9:29 AM		
Three Links	Disputanta F3	5	23	1381	Tree/Limb out of ROW	None	Fuse, Line	1.9167	10/17/2007 6:28 PM		
Three Links	Disputanta F3	6	147	1471	Tree/Limb out of ROW	None	Wire Break	14.7	7/17/2007 6:32 PM		
Three Links	Disputanta F3	631	217	1470	Other Utilities	None	Recloser Device	2282.117	7/19/2007 7:48 PM		
Three Links	Disputanta F3	25	157	1487	Unknown Cause	None	Fuse, Line	65	3/17/2007 9:20 AM		
Three Links	Disputanta F3	5	116	1491	Lightning	None	Fuse, Line	9.6667	2/21/2007 7:56 AM		
Three Links	Disputanta F3	23	88	1970	Lightning	None	Fuse, Line	33.35	6/30/2007 1:03 PM		
									Total	2,569.48	8,430.42
Goose Rock	Big Creek F2	1	62	2342	Unknown Cause	None	Fuse, Line	1.0167	10/23/2007 6:05 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Goose Rock	Big Creek F2	444	347	2342	Unknown Cause	None	Recloser Device	2567.8	11/5/2007 7:46 PM		
Goose Rock	Big Creek F2	1	273	2342	Equipment	Transformer	Service	4.55	11/7/2007 8:35 AM		
Goose Rock	Big Creek F2	26	120	2337	Scheduled	None	Recloser Device	52	8/1/2007 10:09 AM		
Goose Rock	Big Creek F2	1	134	2337	Tree/Limb in ROW	None	Service	2.2333	8/8/2007 8:39 PM		
Goose Rock	Big Creek F2	26	130	2337	Tree/Limb in ROW	None	Recloser Device	55.9	7/19/2007 9:56 PM		
Goose Rock	Big Creek F2	13	121	2348	Unknown Cause	None	Fuse, Line	26.2167	9/20/2007 11:33 AM		
Goose Rock	Big Creek F2	59	107	2365	Tree/Limb in ROW	None	Recloser Device	106.2	6/5/2007 3:10 AM		
Goose Rock	Big Creek F2	1	88	2365	Lightning	None	Fuse, Line	1.4667	6/8/2007 6:06 PM		
Goose Rock	Big Creek F2	11	487	2362	Tree/Limb out of ROW	None	Fuse, Line	89.2833	6/24/2007 8:05 PM		
Goose Rock	Big Creek F2	14	111	2479	Scheduled	None	Fuse, Line	25.6667	3/6/2007 10:22 AM		
Goose Rock	Big Creek F2	3	472	2362	Tree/Limb in ROW	None	Fuse, Line	23.6	6/24/2007 5:44 PM		
Goose Rock	Big Creek F2	6	80	2340	Tree/Limb in ROW	None	Fuse, Line	8	7/17/2007 4:38 PM		
Goose Rock	Big Creek F2	21	131	2484	Scheduled	None	Recloser Device	45.85	2/27/2007 1:35 PM		
Goose Rock	Big Creek F2	1	111	2488	ROW Crew	None	Fuse, Line	1.85	1/22/2007 12:18 PM		
Goose Rock	Big Creek F2	12	55	2367	Tree/Limb in ROW	None	Fuse, Line	11.2	5/4/2007 7:17 PM		
Goose Rock	Big Creek F2	21	66	2337	Scheduled	None	Recloser Device	23.1	7/30/2007 9:36 AM		
Goose Rock	Big Creek F2	3	59	2339	Tree/Limb in ROW	None	Fuse, Line	3	9/14/2007 6:17 AM		
Goose Rock	Big Creek F2	19	477	2365	Tree/Limb out of ROW	None	Recloser Device	149.4667	6/24/2007 5:14 PM		
Goose Rock	Big Creek F2	10	99	2365	Tree/Limb in ROW	None	Fuse, Line	16.5	5/22/2007 3:17 PM		
Goose Rock	Big Creek F2	20	107	2365	Unknown Cause	None	Recloser Device	35.6667	6/4/2007 11:48 PM		
Goose Rock	Big Creek F2	1	83	2488	Tree/Limb out of ROW	None	Fuse, Line	1.3833	1/6/2007 11:13 AM		
Goose Rock	Big Creek F2	704	82	2479	Equipment	Pole	Feeder	962.1333	3/4/2007 12:02 AM		
Goose Rock	Big Creek F2	21	142	2337	Scheduled	None	Recloser Device	50.05	8/16/2007 9:23 AM		
Goose Rock	Big Creek F2	3	43	2337	Tree/Limb in ROW	None	Fuse, Line	2.15	8/21/2007 9:25 AM		
Goose Rock	Big Creek F2	8	109	2365	Tree/Limb out of ROW	None	Fuse, Line	14.5333	6/5/2007 8:32 PM		
Goose Rock	Big Creek F2	8	49	2340	Equipment	Insulator	Fuse, Line	6.5333	7/5/2007 4:23 PM		
Goose Rock	Big Creek F2	32	176	2340	Scheduled	None	Recloser Device	94.4	7/17/2007 12:44 PM		
Goose Rock	Big Creek F2	12	87	2353	Tree/Limb in ROW	None	Fuse, Line	17.2	6/24/2007 8:59 PM		
									Total	500.65	4,398.95
Beattyville	St. Helens F2	3	52	2053	Scheduled	None	Fuse, Line	2.55	3/13/2007 10:55 AM		
Beattyville	St. Helens F2	24	274	2053	Tree/Limb in ROW	None	Recloser Device	109.6	3/2/2007 3:06 AM		
Beattyville	St. Helens F2	12	92	2054	Scheduled	None	Fuse, Line	18.4	2/8/2007 9:35 AM		
Beattyville	St. Helens F2	9	118	2038	Unknown Cause	None	Fuse, Line	17.85	5/21/2007 9:45 AM		
Beattyville	St. Helens F2	61	406	2061	Lightning	None	Recloser Device	388.35	7/17/2007 5:04 PM		
Beattyville	St. Helens F2	3	223	2061	Lightning	None	Fuse, Line	11.2	7/17/2007 8:32 PM		
Beattyville	St. Helens F2	9	104	2061	Unknown Cause	None	Fuse, Line	15.6	7/5/2007 2:29 PM		
Beattyville	St. Helens F2	31	63	2816	Tree/Limb in ROW	None	Fuse, Line	33.0667	6/28/2007 1:33 PM		
Beattyville	St. Helens F2	31	147	2060	Tree/Limb out of ROW	None	Fuse, Line	75.95	8/20/2007 2:10 PM		
Beattyville	St. Helens F2	710	55	2057	Tree/Limb in ROW	None	Feeder	650.8333	9/2/2007 1:40 PM		
Beattyville	St. Helens F2	1	936	2057	Tree/Limb in ROW	None	Fuse, Line	15.6	9/4/2007 7:54 AM		
Beattyville	St. Helens F2	3	144	2048	Scheduled	None	Jumper	7.2	10/2/2007 9:44 AM		
Beattyville	St. Helens F2	9	455	2065	Wind	None	Fuse, Line	68.25	12/16/2007 7:15 AM		
Beattyville	St. Helens F2	2	121	2068	Wind	None	Fuse, Line	4.0333	12/3/2007 1:10 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Beattyville	St. Helens F2	24	276	2065	Wind	None	Fuse, Line	110.4	12/16/2007 8:54 AM		
Beattyville	St. Helens F2	61	92	2068	Unknown Cause	None	Recloser Device	93.5333	12/7/2007 8:20 PM		
Beattyville	St. Helens F2	43	61	2068	Unknown Cause	None	Recloser Device	43	12/10/2007 10:02 AM		
Beattyville	St. Helens F2	3	243	2065	Tree/Limb out of ROW	None	Fuse, Line	12.2	12/16/2007 9:49 AM		
Beattyville	St. Helens F2	24	221	2065	Unknown Cause	None	Fuse, Line	88	12/18/2007 11:50 PM		
Beattyville	St. Helens F2	24	177	2060	Scheduled	None	Fuse, Line	70.8	8/1/2007 10:02 AM		
Beattyville	St. Helens F2	6	33	2060	Unknown Cause	None	Fuse, Line	3.2	8/2/2007 8:13 AM		
Beattyville	St. Helens F2	45	387	2060	Tree/Limb in ROW	None	Recloser Device	290.25	8/16/2007 7:48 PM		
Beattyville	St. Helens F2	60	321	2060	Tree/Limb out of ROW	None	Recloser Device	321	7/28/2007 1:52 AM		
Beattyville	St. Helens F2	2	35	2057	Animal / Bird	None	Fuse, Line	1.1667	9/5/2007 12:14 PM		
Beattyville	St. Helens F2	3	84	2038	Tree/Limb out of ROW	None	Fuse, Line	4.2	6/7/2007 2:24 PM		
Beattyville	St. Helens F2	9	193	2038	Tree/Limb out of ROW	None	Fuse, Line	28.95	6/8/2007 7:12 PM		
Beattyville	St. Helens F2	2	50	2061	Tree/Limb in ROW	None	Fuse, Transformer	1.6667	7/8/2007 10:45 AM		
Beattyville	St. Helens F2	1	239	2038	Equipment	Transformer	Transformer Device	3.9833	6/23/2007 7:58 PM		
Beattyville	St. Helens F2	24	165	2049	Vehicles	None	Fuse, Line	66	1/2/2007 11:34 AM		
Beattyville	St. Helens F2	31	40	2049	Scheduled	None	Fuse, Line	20.6667	1/2/2007 12:39 PM		
Beattyville	St. Helens F2	706	23	2045	Vehicles	None	Feeder	258.8667	4/11/2007 8:37 AM		
Beattyville	St. Helens F2	709	39	2053	Equipment	Sleeve	Recloser Device	460.85	3/21/2007 3:41 PM		
Beattyville	St. Helens F2	23	98	2036	Scheduled	None	Fuse, Line	37.5667	5/1/2007 12:39 PM		
Beattyville	St. Helens F2	1	38	2045	Vehicles	None	Fuse, Line	0.6333	4/11/2007 9:18 AM		
Beattyville	St. Helens F2	38	248	2053	Tree/Limb out of ROW	None	Jumper	88.6667	3/3/2007 1:29 PM		
Beattyville	St. Helens F2	146	136	2038	Lightning	None	Recloser Device	261.8	6/24/2007 5:41 PM		
Beattyville	St. Helens F2	13	50	2038	Tree/Limb in ROW	None	Fuse, Line	10.6167	6/8/2007 4:11 PM		
Beattyville	St. Helens F2	7	113	2038	Scheduled	None	Fuse, Line	13.1833	6/13/2007 9:18 AM		
Beattyville	St. Helens F2	12	102	2038	Tree/Limb in ROW	None	Fuse, Line	20.6	6/6/2007 9:21 AM		
Beattyville	St. Helens F2	1	196	2065	Tree/Limb out of ROW	None	Fuse, Line	3.2667	12/24/2007 4:58 PM		
Beattyville	St. Helens F2	9	259	2065	Tree/Limb out of ROW	None	Fuse, Line	38.85	12/23/2007 11:33 AM		
Beattyville	St. Helens F2	62	820	2065	Tree/Limb out of ROW	None	Recloser Device	733.4333	12/16/2007 4:46 AM		
Beattyville	St. Helens F2	62	35	2064	Overload	None	Recloser Device	25.4333	12/16/2007 6:34 PM		
Beattyville	St. Helens F2	1	66	2064	Wind	None	Fuse, Line	1.1	12/17/2007 3:19 PM		
Beattyville	St. Helens F2	2	58	2066	Scheduled	None	Fuse, Line	1.9667	12/4/2007 10:26 AM		
Beattyville	St. Helens F2	7	60	2060	Squirrel	None	Fuse, Line	7	11/17/2007 9:42 AM		
Beattyville	St. Helens F2	6	90	2813	Squirrel	None	Fuse, Line	9	11/22/2007 7:44 AM		
Beattyville	St. Helens F2	3	59	2051	Unknown Cause	None	Fuse, Line	2.95	9/28/2007 8:01 AM		
Beattyville	St. Helens F2	2	148	2065	Scheduled	None	Wire Break	4.9333	8/22/2007 10:21 AM		
Beattyville	St. Helens F2	15	30	2067	Scheduled	None	Recloser Device	7.5	8/22/2007 4:41 PM		
Beattyville	St. Helens F2	39	56	2055	Scheduled	None	Recloser Device	36.4	8/30/2007 10:32 AM		
Beattyville	St. Helens F2	25	128	2060	Vehicles	None	Fuse, Line	53.3333	8/7/2007 7:27 PM		
Beattyville	St. Helens F2	2	444	2060	Equipment	Cutout	Fuse, Line	14.8	8/16/2007 9:04 PM		
Beattyville	St. Helens F2	25	43	2061	Tree/Limb in ROW	None	Fuse, Line	17.9167	7/5/2007 11:40 AM		
Beattyville	St. Helens F2	9	43	2061	Scheduled	None	Fuse, Line	6.45	7/3/2007 1:02 PM		
Beattyville	St. Helens F2	9	86	2816	Unknown Cause	None	Fuse, Line	13.05	6/30/2007 12:29 PM		
Beattyville	St. Helens F2	1	303	2038	Equipment	Transformer	Transformer Device	5.0333	6/9/2007 11:33 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Beattyville	St. Helens F2	33	241	2038	Unknown Cause	None	Fuse, Line	132	6/5/2007 8:35 AM		
Beattyville	St. Helens F2	3	82	2051	Scheduled	None	Jumper	4.05	2/1/2007 9:46 AM		
Beattyville	St. Helens F2	9	139	2035	Wind	None	Fuse, Line	21	12/31/2007 11:40 PM		
Beattyville	St. Helens F2	24	34	2065	Maintenance	None	Fuse, Line	13.6	12/19/2007 2:22 PM		
Beattyville	St. Helens F2	31	136	2060	Tree/Limb in ROW	None	Fuse, Line	70.2667	11/15/2007 9:39 AM		
Beattyville	St. Helens F2	6	155	2060	Equipment	Transformer	Fuse, Line	9.3333	11/16/2007 5:00 PM		
Beattyville	St. Helens F2	28	429	2065	Tree/Limb out of ROW	None	Recloser Device	200.2	12/16/2007 5:31 AM		
Beattyville	St. Helens F2	43	293	2056	Tree/Limb out of ROW	None	Wire Break	73.8167	9/11/2007 8:11 AM		
Beattyville	St. Helens F2	31	380	2060	Tree/Limb out of ROW	None	Fuse, Line	196.3333	8/19/2007 7:55 PM		
Beattyville	St. Helens F2	9	179	2060	Lightning	None	Fuse, Line	26.7	8/19/2007 8:10 PM		
									Total	2,997.28	5,460.00
Oneida	Spurlock F4	130	109	877	Wind	None	Recloser Device	236.1667	3/2/2007 2:40 PM		
Oneida	Spurlock F4	69	150	792	Scheduled	None	Jumper	140.7	6/14/2007 9:02 AM		
Oneida	Spurlock F4	13	96	861	Lightning	None	Fuse, Line	20.8	6/19/2007 3:30 PM		
Oneida	Spurlock F4	9	82	882	Unknown Cause	None	Fuse, Line	12.15	10/2/2007 8:27 AM		
Oneida	Spurlock F4	3	142	878	Equipment	Cutout	Fuse, Line	7.1	12/23/2007 9:04 AM		
Oneida	Spurlock F4	8	79	878	Unknown Cause	None	Recloser Device	10.5333	11/24/2007 3:50 AM		
Oneida	Spurlock F4	40	69	878	Unknown Cause	None	Recloser Device	46	11/24/2007 3:58 AM		
Oneida	Spurlock F4	6	72	885	Unknown Cause	None	Fuse, Line	7.2	7/13/2007 1:21 AM		
Oneida	Spurlock F4	30	41	885	Scheduled	None	Recloser Device	20.5	7/16/2007 9:08 AM		
Oneida	Spurlock F4	14	71	885	Scheduled	None	Recloser Device	16.5667	7/9/2007 8:57 AM		
Oneida	Spurlock F4	1	71	1275	Equipment	Lightning Arrestor	Fuse, Line	1.1833	6/27/2007 2:44 PM		
Oneida	Spurlock F4	1	163	861	Tree/Limb in ROW	None	Fuse, Line	2.7167	6/6/2007 8:23 AM		
Oneida	Spurlock F4	14	88	882	Vehicles	None	Recloser Device	20.5333	10/14/2007 12:44 PM		
Oneida	Spurlock F4	4	137	883	Tree/Limb in ROW	None	Fuse, Line	9.1333	8/16/2007 9:48 PM		
Oneida	Spurlock F4	39	122	883	Tree/Limb out of ROW	None	Recloser Device	78.65	8/16/2007 9:54 PM		
Oneida	Spurlock F4	1	74	861	Equipment	Lightning Arrestor	Fuse, Line	1.25	6/12/2007 5:04 PM		
Oneida	Spurlock F4	36	55	885	Unknown Cause	None	Recloser Device	33.6	7/11/2007 7:36 AM		
Oneida	Spurlock F4	14	97	882	Unknown Cause	None	Fuse, Line	22.6333	1/5/2007 7:06 AM		
Oneida	Spurlock F4	181	144	877	Equipment	Wire	Recloser Device	434.4	3/3/2007 12:26 PM		
Oneida	Spurlock F4	181	187	876	Tree/Limb in ROW	None	Recloser Device	533.6167	4/15/2007 5:54 AM		
Oneida	Spurlock F4	1	71	883	Animal / Bird	None	Fuse, Transformer	1.2	8/20/2007 8:46 AM		
Oneida	Spurlock F4	5	67	880	ROW Crew	None	Fuse, Line	5.5833	9/5/2007 12:37 PM		
Oneida	Spurlock F4	38	211	880	Tree/Limb out of ROW	None	Recloser Device	134.2667	9/22/2007 8:16 AM		
Oneida	Spurlock F4	1	146	882	Unknown Cause	None	Fuse, Line	2.4333	10/9/2007 1:07 PM		
Oneida	Spurlock F4	13	75	879	Tree/Limb in ROW	None	Fuse, Line	16.25	10/23/2007 10:06 AM		
Oneida	Spurlock F4	1	149	879	Equipment	Transformer	Transformer Device	2.4833	12/2/2007 9:56 AM		
Oneida	Spurlock F4	180	100	879	Equipment	Anchor	Recloser Device	300	11/16/2007 7:16 AM		
									Total	774.63	2,117.65
South Fork	Walnut Grove F3	31	270	718	Tree/Limb out of ROW	None	Recloser Device	53.55	8/10/2007 4:00 PM		
South Fork	Walnut Grove F3	2	76	712	Tree/Limb in ROW	None	Wire Break	2.5333	11/4/2007 4:30 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
South Fork	Walnut Grove F3	31	116	714	Tree/Limb in ROW	None	Recloser Device	56.0667	11/4/2007 2:37 PM		
South Fork	Walnut Grove F3	164	290	726	Tree/Limb out of ROW	None	Recloser Device	792.6667	6/19/2007 3:50 AM		
South Fork	Walnut Grove F3	8	94	1001	Tree/Limb out of ROW	None	Fuse, Line	12.6667	6/29/2007 11:33 PM		
South Fork	Walnut Grove F3	31	111	1001	Tree/Limb out of ROW	None	Recloser Device	57.35	6/29/2007 3:59 PM		
South Fork	Walnut Grove F3	34	315	730	Tree/Limb out of ROW	None	Recloser Device	178.5	3/3/2007 3:26 PM		
South Fork	Walnut Grove F3	7	59	726	Unknown Cause	None	Fuse, Line	6.8833	5/31/2007 9:29 PM		
South Fork	Walnut Grove F3	1	61	718	Overload	None	Transformer Device	1.0333	8/9/2007 6:59 PM		
South Fork	Walnut Grove F3	233	52	718	Power Supplier	None	Power Supplier	201.9333	11/28/2007 3:04 PM		
South Fork	Walnut Grove F3	3	295	716	Tree/Limb out of ROW	None	Fuse, Line	14.75	12/16/2007 5:11 AM		
South Fork	Walnut Grove F3	37	263	718	Tree/Limb out of ROW	None	Recloser Device	161.5667	8/17/2007 12:59 AM		
South Fork	Walnut Grove F3	8	407	718	Tree/Limb in ROW	None	Fuse, Line	54.2667	8/16/2007 8:13 PM		
									Total	1,383.92	1,593.77
Oneida	Big Bullskin F3	184	149	879	Tree/Limb in ROW	None	Recloser Device	453.8667	11/14/2007 5:44 PM		
Oneida	Big Bullskin F3	30	177	885	Equipment	Cutout	Recloser Device	89	7/11/2007 4:43 AM		
Oneida	Big Bullskin F3	20	121	861	Lightning	None	Fuse, Line	40.3333	6/3/2007 5:21 PM		
Oneida	Big Bullskin F3	192	37	1280	Other Utilities	None	Feeder	118.4	3/23/2007 12:57 PM		
Oneida	Big Bullskin F3	52	128	783	Lightning	None	Recloser Device	110.9333	5/12/2007 5:03 PM		
Oneida	Big Bullskin F3	22	20	877	Maintenance	None	Fuse, Line	7.3333	3/16/2007 9:35 AM		
Oneida	Big Bullskin F3	82	23	861	Equipment	None	Recloser Device	31.4333	5/17/2007 10:40 AM		
Oneida	Big Bullskin F3	4	142	879	Equipment	Cutout	Fuse, Line	9.5333	10/29/2007 3:13 PM		
Oneida	Big Bullskin F3	4	89	879	Unknown Cause	None	Fuse, Line	5.9333	11/2/2007 6:22 AM		
Oneida	Big Bullskin F3	20	223	882	Tree/Limb in ROW	None	Fuse, Line	74.3333	10/10/2007 1:41 PM		
Oneida	Big Bullskin F3	20	89	883	Lightning	None	Fuse, Line	29.6667	8/16/2007 8:26 PM		
Oneida	Big Bullskin F3	4	104	885	Tree/Limb in ROW	None	Fuse, Line	6.9333	7/7/2007 10:41 PM		
Oneida	Big Bullskin F3	82	80	856	Unknown Cause	None	Recloser Device	107.9667	5/14/2007 1:33 PM		
Oneida	Big Bullskin F3	82	3	861	Other Utilities	None	Recloser Device	4.1	5/18/2007 12:47 PM		
Oneida	Big Bullskin F3	5	141	757	Equipment	Cutout	Fuse, Line	11.75	4/15/2007 2:41 PM		
Oneida	Big Bullskin F3	104	90	1275	Tree/Limb out of ROW	None	Recloser Device	124.8	6/30/2007 1:30 PM		
Oneida	Big Bullskin F3	4	116	883	Tree/Limb out of ROW	None	Fuse, Line	7.7333	8/16/2007 8:53 PM		
									Total	667.67	1,234.05
East Bernstadt	Ft. Sequayah F4	28	198	1870	Tree/Limb out of ROW	None	Fuse, Line	91.9333	12/16/2007 2:47 AM		
East Bernstadt	Ft. Sequayah F4	1	78	1838	Unknown Cause	None	Transformer Device	1.3	11/7/2007 7:18 AM		
East Bernstadt	Ft. Sequayah F4	32	104	1842	Tree/Limb in ROW	None	Fuse, Line	55.4667	9/7/2007 7:50 AM		
East Bernstadt	Ft. Sequayah F4	42	133	1842	Equipment	Transformer	Fuse, Line	45.9333	9/6/2007 6:43 PM		
East Bernstadt	Ft. Sequayah F4	18	56	1843	Tree/Limb out of ROW	None	Fuse, Line	16.5	8/21/2007 4:07 AM		
East Bernstadt	Ft. Sequayah F4	14	67	1822	Woodcutter	None	Fuse, Line	15.6333	5/3/2007 4:56 PM		
East Bernstadt	Ft. Sequayah F4	42	103	1835	Maintenance	None	Jumper	72.1	2/26/2007 9:08 AM		
East Bernstadt	Ft. Sequayah F4	3	47	1849	Unknown Cause	None	Fuse, Line	2.3	1/6/2007 8:46 AM		
East Bernstadt	Ft. Sequayah F4	8	136	1870	Tree/Limb out of ROW	None	Fuse, Line	18.1333	12/16/2007 8:21 AM		
East Bernstadt	Ft. Sequayah F4	28	155	1871	Animal / Bird	None	Fuse, Line	72.3333	12/7/2007 11:13 AM		
East Bernstadt	Ft. Sequayah F4	28	229	1871	Tree/Limb out of ROW	None	Fuse, Line	106.8667	12/10/2007 3:03 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
East Bernstadt	Ft. Sequayah F4	5	24	1839	Unknown Cause	None	Transformer Device	2	11/14/2007 7:45 PM		
East Bernstadt	Ft. Sequayah F4	3	23	1843	Animal / Bird	None	Fuse, Line	1.15	7/22/2007 8:47 AM		
East Bernstadt	Ft. Sequayah F4	6	150	1838	Tree/Limb out of ROW	None	Fuse, Line	15	10/24/2007 12:43 PM		
East Bernstadt	Ft. Sequayah F4	3	390	1835	Tree/Limb in ROW	None	Fuse, Line	19.5	2/22/2007 4:23 PM		
East Bernstadt	Ft. Sequayah F4	680	17	1822	Fire	Pole	Feeder	181.3333	5/9/2007 3:00 PM		
East Bernstadt	Ft. Sequayah F4	3	90	1843	Tree/Limb in ROW	None	Fuse, Line	4.5	7/20/2007 3:58 AM		
East Bernstadt	Ft. Sequayah F4	681	89	1820	Equipment	Insulator	Feeder	1010.15	6/4/2007 4:31 PM		
East Bernstadt	Ft. Sequayah F4	31	59	1820	Tree/Limb out of ROW	None	Fuse, Line	30.4833	5/16/2007 5:39 PM		
East Bernstadt	Ft. Sequayah F4	28	211	1839	Tree/Limb out of ROW	None	Fuse, Line	98.4667	11/19/2007 3:29 AM		
East Bernstadt	Ft. Sequayah F4	9	55	1839	Tree/Limb out of ROW	None	Fuse, Line	8.25	11/14/2007 8:04 PM		
East Bernstadt	Ft. Sequayah F4	1	152	1837	Deterioration	Wire	Transformer Device	2.5333	9/2/2007 6:36 AM		
East Bernstadt	Ft. Sequayah F4	23	250	1839	Woodcutter	None	Fuse, Line	44.2167	8/19/2007 12:57 PM		
East Bernstadt	Ft. Sequayah F4	6	0	1852	Tree/Limb in ROW	Pole	Wire Break	500.7667	10/19/2007 3:25 AM		
East Bernstadt	Ft. Sequayah F4	26	28	1822	Tree/Limb in ROW	None	Fuse, Line	12.5667	5/16/2007 3:57 PM		
East Bernstadt	Ft. Sequayah F4	680	156	1822	Equipment	Insulator	Recloser Device	1768	5/16/2007 6:06 AM		
East Bernstadt	Ft. Sequayah F4	14	115	1843	Tree/Limb in ROW	None	Fuse, Line	26.8333	7/20/2007 4:58 AM		
East Bernstadt	Ft. Sequayah F4	8	50	1820	Animal / Bird	None	Fuse, Line	6.6667	6/7/2007 2:42 PM		
East Bernstadt	Ft. Sequayah F4	1	81	1820	Unknown Cause	None	Fuse, Line	1.35	6/10/2007 10:07 AM		
East Bernstadt	Ft. Sequayah F4	4	47	1839	Tree/Limb out of ROW	None	Fuse, Line	3.1333	11/16/2007 12:32 PM		
East Bernstadt	Ft. Sequayah F4	28	101	1838	Tree/Limb out of ROW	None	Fuse, Line	47.1333	11/8/2007 1:38 AM		
East Bernstadt	Ft. Sequayah F4	1	28	1837	Squirrel	None	Fuse, Line	0.4667	9/4/2007 4:36 PM		
East Bernstadt	Ft. Sequayah F4	31	76	1822	Tree/Limb out of ROW	None	Fuse, Line	39.2667	4/25/2007 4:54 PM		
East Bernstadt	Ft. Sequayah F4	31	66	1835	Squirrel	None	Fuse, Line	34.1	3/20/2007 7:14 PM		
East Bernstadt	Ft. Sequayah F4	1	94	1835	Maintenance	None	Jumper	1.5667	2/12/2007 2:59 PM		
East Bernstadt	Ft. Sequayah F4	6	56	1835	Squirrel	None	Fuse, Line	5.6	3/9/2007 8:09 AM		
East Bernstadt	Ft. Sequayah F4	1	87	1820	Unknown Cause	None	Fuse, Line	1.4333	5/25/2007 1:33 PM		
East Bernstadt	Ft. Sequayah F4	14	57	1820	Unknown Cause	None	Fuse, Line	13.3	6/15/2007 4:54 PM		
East Bernstadt	Ft. Sequayah F4	8	236	2463	Tree/Limb out of ROW	None	Recloser Device	31.4667	6/27/2007 4:40 PM		
									Total	1,126.27	4,409.73
Goose Rock	Garrad F1	3	125	2340	Unknown Cause	None	Fuse, Line	6.25	7/8/2007 12:47 PM		
Goose Rock	Garrad F1	3	181	2365	Tree/Limb out of ROW	None	Fuse, Line	9.05	6/5/2007 6:10 PM		
Goose Rock	Garrad F1	576	304	2412	Vehicles	None	Recloser Device	1624.9	3/27/2007 3:34 PM		
Goose Rock	Garrad F1	1	38	2478	Unknown Cause	None	Service	0.6333	3/14/2007 8:48 PM		
Goose Rock	Garrad F1	1	63	2483	Overload	None	Transformer Device	1.0333	2/11/2007 11:07 AM		
Goose Rock	Garrad F1	9	39	2488	Squirrel	None	Fuse, Line	5.85	1/24/2007 8:03 AM		
Goose Rock	Garrad F1	8	53	2337	Tree/Limb in ROW	None	Fuse, Line	7.0667	7/24/2007 10:26 AM		
Goose Rock	Garrad F1	3	116	2337	Tree/Limb out of ROW	None	Service	5.8	7/24/2007 8:34 PM		
Goose Rock	Garrad F1	16	124	2337	Equipment	Cutout	Fuse, Line	33.0667	7/29/2007 5:53 PM		
Goose Rock	Garrad F1	40	38	2458	Equipment	Cutout	Fuse, Line	25.3333	12/17/2007 4:43 PM		
Goose Rock	Garrad F1	2	78	2458	Overload	None	Transformer Device	2.6	12/18/2007 8:31 PM		
Goose Rock	Garrad F1	80	148	2458	Tree/Limb in ROW	None	Recloser Device	198.6667	12/16/2007 3:46 AM		
Goose Rock	Garrad F1	7	57	2365	Tree/Limb in ROW	None	Fuse, Line	6.65	6/2/2007 5:49 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Goose Rock	Garrad F1	24	99	2365	Scheduled	None	Fuse, Line	39.6	6/6/2007 10:07 AM		
Goose Rock	Garrad F1	3	61	2340	Animal / Bird	None	Fuse, Line	3.05	7/6/2007 8:19 AM		
Goose Rock	Garrad F1	6	55	2408	Lightning	None	Fuse, Line	5.5	4/4/2007 7:04 AM		
Goose Rock	Garrad F1	6	50	2367	Lightning	None	Fuse, Line	5	5/2/2007 11:21 PM		
Goose Rock	Garrad F1	1017	148	2342	Vehicles	None	Feeder	588.7833	11/14/2007 10:41 AM		
Goose Rock	Garrad F1	577	80	2458	Unknown Cause	None	Recloser Device	769.3333	12/17/2007 3:23 PM		
Goose Rock	Garrad F1	15	96	2458	Scheduled	None	Fuse, Line	24	12/19/2007 1:14 PM		
Goose Rock	Garrad F1	8	94	2354	Tree/Limb in ROW	None	Fuse, Line	12.5333	10/19/2007 3:53 AM		
Goose Rock	Garrad F1	2	36	2344	Squirrel	None	Fuse, Line	1.2	9/26/2007 12:52 PM		
Goose Rock	Garrad F1	58	185	2339	Deterioration	Wire	Recloser Device	178.8333	9/17/2007 3:20 AM		
Goose Rock	Garrad F1	1	105	2337	Unknown Cause	None	Fuse, Line	1.75	8/10/2007 12:23 PM		
Goose Rock	Garrad F1	1	103	2337	Animal / Bird	None	Fuse, Transformer	1.7167	8/12/2007 12:54 PM		
Goose Rock	Garrad F1	8	115	2365	Tree/Limb in ROW	None	Fuse, Line	15.3333	6/5/2007 10:14 AM		
Goose Rock	Garrad F1	2	69	2365	Squirrel	None	Fuse, Line	2.2667	5/27/2007 2:34 PM		
Goose Rock	Garrad F1	15	202	2365	Tree/Limb out of ROW	None	Fuse, Line	50.5	6/24/2007 5:33 PM		
Goose Rock	Garrad F1	4	30	2340	Unknown Cause	None	Fuse, Line	2.0667	7/2/2007 11:44 AM		
Goose Rock	Garrad F1	114	120	2365	Tree/Limb out of ROW	None	Recloser Device	228	6/24/2007 5:31 PM		
Goose Rock	Garrad F1	46	175	2342	Tree/Limb out of ROW	None	Recloser Device	134.1667	10/30/2007 6:46 AM		
Goose Rock	Garrad F1	40	21	2458	Overload	None	Fuse, Line	14	12/17/2007 5:23 PM		
Goose Rock	Garrad F1	15	143	2458	Wind	None	Fuse, Line	35.75	12/16/2007 10:46 AM		
Goose Rock	Garrad F1	1	119	2348	Tree/Limb in ROW	None	Fuse, Line	1.9833	9/21/2007 7:00 PM		
Goose Rock	Garrad F1	9	65	2337	Equipment	Hot Line Clamp	Jumper	9.9	8/9/2007 8:08 AM		
Goose Rock	Garrad F1	4	51	2337	Lightning	None	Transformer Device	3.4	7/24/2007 6:02 PM		
Goose Rock	Garrad F1	2	73	2337	Squirrel	None	Fuse, Line	2.4333	7/29/2007 3:44 PM		
Goose Rock	Garrad F1	8	31	2337	Tree/Limb in ROW	None	Fuse, Line	4.1333	8/21/2007 1:56 PM		
Goose Rock	Garrad F1	58	196	2342	Woodcutter	None	Recloser Device	144.4667	11/5/2007 11:44 AM		
Goose Rock	Garrad F1	5	60	2342	Unknown Cause	None	Transformer Device	5	11/11/2007 4:08 PM		
Goose Rock	Garrad F1	1	54	2348	Tree/Limb out of ROW	None	Fuse, Line	0.9167	9/23/2007 8:02 PM		
Goose Rock	Garrad F1	58	130	2339	Scheduled	None	Recloser Device	125.6667	9/12/2007 12:43 PM		
Goose Rock	Garrad F1	3	82	2344	Unknown Cause	None	Fuse, Transformer	4.1	10/14/2007 9:56 AM		
Goose Rock	Garrad F1	3	77	2337	Squirrel	None	Fuse, Line	3.9	7/22/2007 5:00 PM		
Goose Rock	Garrad F1	9	136	2367	Deterioration	Jumper	Recloser Device	20.55	4/27/2007 6:39 PM		
Goose Rock	Garrad F1	6	33	2483	Overload	None	Transformer Device	3.3	2/5/2007 9:55 AM		
Goose Rock	Garrad F1	3	230	2353	Tree/Limb out of ROW	None	Transformer Device	11.5	6/24/2007 9:28 PM		
Goose Rock	Garrad F1	4	139	2365	Tree/Limb out of ROW	None	Fuse, Line	9.2667	6/5/2007 8:38 PM		
Goose Rock	Garrad F1	3	84	2362	Scheduled	None	Jumper	4.2	5/30/2007 2:15 PM		
Goose Rock	Garrad F1	4	86	2367	Vehicles	None	Fuse, Line	5.7333	5/15/2007 12:26 PM		
Goose Rock	Garrad F1	3	192	2365	Equipment	Transformer	Service	9.6	5/18/2007 4:38 PM		
									Total	695.57	4,410.33
Goose Rock	Schoolhouse F4	4	137	2488	Tree/Limb out of ROW	None	Jumper	9.1333	1/29/2007 1:02 PM		
Goose Rock	Schoolhouse F4	39	128	2484	Tree/Limb out of ROW	None	Recloser Device	83.2	2/22/2007 5:55 PM		
Goose Rock	Schoolhouse F4	34	184	2531	Unknown Cause	None	Recloser Device	103.7	4/16/2007 12:23 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Goose Rock	Schoolhouse F4	96	20	2337	Scheduled	None	Recloser Device	30.4	8/7/2007 10:09 AM		
Goose Rock	Schoolhouse F4	1	50	2344	Deterioration	None	Fuse, Line	0.8333	10/5/2007 10:11 AM		
Goose Rock	Schoolhouse F4	2	86	2456	Equipment	Cutout	Fuse, Line	2.8667	12/5/2007 3:58 PM		
Goose Rock	Schoolhouse F4	18	167	2344	Tree/Limb out of ROW	None	Fuse, Line	50.1	9/30/2007 5:04 PM		
Goose Rock	Schoolhouse F4	97	263	2344	Tree/Limb in ROW	None	Recloser Device	425.1833	10/9/2007 11:37 AM		
Goose Rock	Schoolhouse F4	3	44	2412	Vehicles	None	Fuse, Line	2.2	4/9/2007 1:54 PM		
Goose Rock	Schoolhouse F4	34	81	2531	Unknown Cause	None	Recloser Device	45.9	4/16/2007 4:16 PM		
Goose Rock	Schoolhouse F4	1	51	2488	Tree/Limb out of ROW	None	Fuse, Line	0.85	1/11/2007 3:29 PM		
Goose Rock	Schoolhouse F4	6	151	2348	Scheduled	None	Fuse, Line	15.1	9/19/2007 9:58 AM		
Goose Rock	Schoolhouse F4	39	53	2344	Tree/Limb in ROW	None	Recloser Device	34.45	10/2/2007 1:02 PM		
Goose Rock	Schoolhouse F4	1	48	2226	Woodcutter	None	Service	0.8	3/27/2007 5:22 PM		
									Total	602.92	804.72
Greenhall	New Zion F3	7	285	754	Tree/Limb out of ROW	None	Fuse, Line	33.25	12/23/2007 8:20 AM		
Greenhall	New Zion F3	12	50	754	Woodcutter	None	Fuse, Line	10	12/26/2007 5:02 PM		
Greenhall	New Zion F3	3	267	754	Tree/Limb out of ROW	None	Fuse, Line	13.35	12/16/2007 4:24 AM		
Greenhall	New Zion F3	1	48	746	Unknown Cause	None	Fuse, Line	0.8167	9/13/2007 9:51 PM		
Greenhall	New Zion F3	6	401	729	Tree/Limb in ROW	None	Fuse, Line	40.1	8/16/2007 9:28 PM		
Greenhall	New Zion F3	4	13	729	Animal / Bird	None	Fuse, Line	0.8667	5/29/2007 11:12 AM		
Greenhall	New Zion F3	62	23	729	Scheduled	None	Recloser Device	23.7667	5/31/2007 9:06 AM		
Greenhall	New Zion F3	2	42	729	Animal / Bird	None	Fuse, Line	1.4	6/15/2007 12:40 PM		
Greenhall	New Zion F3	15	44	714	Scheduled	None	Recloser Device	10.75	6/13/2007 1:44 PM		
Greenhall	New Zion F3	1	224	729	Tree/Limb out of ROW	None	Fuse, Line	3.7167	6/6/2007 1:57 PM		
Greenhall	New Zion F3	20	317	732	Tree/Limb out of ROW	None	Recloser Device	81.6667	5/5/2007 2:43 AM		
Greenhall	New Zion F3	4	370	725	Other Utilities	None	Jumper	24.6667	5/17/2007 9:07 AM		
Greenhall	New Zion F3	7	60	730	Lightning	None	Fuse, Line	7	2/21/2007 7:44 AM		
Greenhall	New Zion F3	4	65	729	Tree/Limb in ROW	None	Fuse, Line	4.2667	7/28/2007 3:01 AM		
Greenhall	New Zion F3	14	62	746	Squirrel	None	Fuse, Line	14.4667	10/31/2007 1:14 PM		
Greenhall	New Zion F3	1	90	754	Tree/Limb out of ROW	None	Fuse, Line	1.5	12/11/2007 2:33 PM		
Greenhall	New Zion F3	2	152	754	Equipment	Hot Line Clamp	Fuse, Line	5.0333	12/24/2007 5:54 PM		
Greenhall	New Zion F3	1	171	729	Tree/Limb out of ROW	None	Fuse, Line	2.8333	6/17/2007 4:15 PM		
Greenhall	New Zion F3	1	94	729	Lightning	None	Fuse, Line	1.5667	6/3/2007 3:17 PM		
Greenhall	New Zion F3	4	18	731	Animal / Bird	None	Fuse, Line	1.2	7/3/2007 9:50 PM		
Greenhall	New Zion F3	4	78	731	Animal / Bird	None	Fuse, Line	5.2	7/8/2007 8:09 AM		
Greenhall	New Zion F3	357	80	733	Tree/Limb out of ROW	None	Feeder	476	3/22/2007 10:05 AM		
Greenhall	New Zion F3	10	39	755	Scheduled	None	Recloser Device	6.6667	11/30/2007 10:30 AM		
Greenhall	New Zion F3	5	52	729	Lightning	None	Fuse, Line	4.3333	9/10/2007 5:57 PM		
Greenhall	New Zion F3	22	199	729	Tree/Limb out of ROW	None	Recloser Device	73.3333	9/7/2007 2:02 AM		
Greenhall	New Zion F3	5	63	730	Animal / Bird	None	Fuse, Line	5.3333	8/28/2007 12:25 PM		
Greenhall	New Zion F3	2	241	732	Equipment	Transformer	Transformer Device	8.0333	8/24/2007 7:38 AM		
Greenhall	New Zion F3	4	76	729	Lightning	None	Fuse, Line	5.0667	6/4/2007 9:05 PM		
Greenhall	New Zion F3	1	51	732	Squirrel	None	Fuse, Line	0.8667	5/13/2007 4:34 PM		
Greenhall	New Zion F3	205	147	730	Equipment	Recloser	Recloser Device	502.25	2/21/2007 12:25 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Greenhall	New Zion F3	1	4	733	Tree/Limb out of ROW	None	Fuse, Line	0.0667	3/4/2007 8:16 AM		
Greenhall	New Zion F3	63	43	733	Scheduled	None	Recloser Device	45.15	3/21/2007 9:19 AM		
Greenhall	New Zion F3	3	27	729	Animal / Bird	None	Fuse, Line	1.35	8/19/2007 7:22 AM		
Greenhall	New Zion F3	62	185	730	Tree/Limb in ROW	None	Recloser Device	190.1333	8/29/2007 1:12 PM		
Greenhall	New Zion F3	18	308	747	Tree/Limb out of ROW	None	Fuse, Line	92.4	12/23/2007 11:06 AM		
Greenhall	New Zion F3	12	59	734	Scheduled	None	Jumper	11.8	11/5/2007 9:26 AM		
									Total	1,012.62	1,710.20

SAIFI
2007 Outages

Substation	Feeder	Description	CAIDI	SAIDI	SAIFI	Plan of Action
Three Links*	3	Disputanta F3	1.61	25.17	15.59	Cleared 2007
Beattyville	2	St. Helens F2	1.60	7.73	4.85	Scheduled 2008
Oneida	3	Big Bullskin F3	1.35	6.46	4.77	Scheduled 2008
Goose Rock	1	Garrad F1	1.52	6.09	4.00	Cleared 2005
Rice	2	Station Camp F2	1.29	5.10	3.96	Cleared 2004
East Bernstadt	4	Frt Sequayah F4	1.69	6.29	3.73	Scheduled 2008
Keavy #1	2	HWY 312 East F2	1.28	4.49	3.50	Cleared 2006
Oneida	4	Spurlock F4	2.05	7.13	3.48	Cleared 2006
McKee	2	JCHS F2	0.83	2.71	3.28	Cleared 2006
Greenhall	3	New Zion F3	1.81	5.57	3.08	Scheduled 2010

*Three Links Feeder #3 has been sectionalized into two different circuits with the addition of a new substation. The addition of the substation allowed for more protection zones. In addition, the tree clearing was completed in late 2007. Both of these actions should improve the reliablity of this feeder in the future.

SAIFI

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Three Links	Disputanta F3	1	352	1470	Lightning	Transformer	Transformer Device	5.8833	8/30/2007 2:55 AM		
Three Links	Disputanta F3	3	107	1479	Scheduled	None	Jumper	5.35	9/26/2007 10:36 AM		
Three Links	Disputanta F3	59	198	1482	Woodcutter	None	Recloser Device	194.7	9/27/2007 11:41 AM		
Three Links	Disputanta F3	5	173	1373	Bad Connection	Hot Line Clamp	Fuse, Line	14.4167	10/12/2007 5:07 PM		
Three Links	Disputanta F3	1	140	1487	Squirrel	None	Fuse, Line	2.3333	6/10/2007 10:15 AM		
Three Links	Disputanta F3	1	205	1487	Tree/Limb out of ROW	None	Fuse, Line	3.4167	6/4/2007 9:10 AM		
Three Links	Disputanta F3	18	149	1487	Tree/Limb out of ROW	None	Recloser Device	33.35	6/25/2007 5:34 PM		
Three Links	Disputanta F3	2	95	1471	Large Animal	None	Fuse, Line	3.1	7/7/2007 9:24 AM		
Three Links	Disputanta F3	630	94	1471	Unknown Cause	None	Recloser Device	997.5	7/9/2007 4:29 PM		
Three Links	Disputanta F3	624	34	1471	Unknown Cause	None	Recloser Device	364	7/16/2007 7:22 AM		
Three Links	Disputanta F3	12	38	1471	Unknown Cause	None	Fuse, Line	7.6	7/16/2007 8:27 AM		
Three Links	Disputanta F3	55	134	1488	Unknown Cause	None	Recloser Device	110.2	3/28/2007 4:21 PM		
Three Links	Disputanta F3	883	82	1488	Tree/Limb out of ROW	None	Feeder	1221.4833	5/5/2007 10:03 AM		
Three Links	Disputanta F3	1	216	957	Equipment	Transformer	Fuse, Line	3.6	11/30/2007 8:39 AM		
Three Links	Disputanta F3	338	195	955	Tree/Limb out of ROW	None	Feeder	1098.5	11/27/2007 2:00 AM		
Three Links	Disputanta F3	5	74	1470	Unknown Cause	None	Fuse, Line	6.1667	8/28/2007 1:29 PM		
Three Links	Disputanta F3	2	166	1487	Unknown Cause	None	Fuse, Line	5.5333	6/5/2007 8:43 AM		
Three Links	Disputanta F3	40	243	1487	Tree/Limb in ROW	None	Fuse, Line	162	6/6/2007 7:13 AM		
Three Links	Disputanta F3	13	39	1491	Maintenance	None	Fuse, Line	8.6667	1/26/2007 2:05 PM		
Three Links	Disputanta F3	13	257	1490	Scheduled	None	Fuse, Line	55.6833	9/19/2007 8:17 AM		
Three Links	Disputanta F3	23	110	1373	Equipment	Lightning Arrestor	Fuse, Line	42.1667	10/23/2007 12:03 PM		
Three Links	Disputanta F3	4	154	1482	Lightning	None	Fuse, Line	10.3333	11/14/2007 5:09 PM		
Three Links	Disputanta F3	14	15	955	Overload	None	Fuse, Line	3.5	11/27/2007 5:35 AM		
Three Links	Disputanta F3	335	86	957	Unknown Cause	None	Feeder	480.1667	12/8/2007 7:43 PM		
Three Links	Disputanta F3	1	84	1047	Bad Connection	None	Service	1.4	12/24/2007 11:07 AM		
Three Links	Disputanta F3	1	140	1487	Vehicles	None	Jumper	2.3333	5/30/2007 4:20 PM		
Three Links	Disputanta F3	25	186	1487	Woodcutter	None	Fuse, Line	77.5	6/15/2007 9:46 AM		
Three Links	Disputanta F3	2	115	1487	Animal / Bird	None	Fuse, Line	3.8	6/16/2007 5:34 PM		
Three Links	Disputanta F3	631	20	1470	Equipment	Recloser	Recloser Device	210.3333	7/23/2007 7:54 AM		
Three Links	Disputanta F3	13	90	1471	ROW Crew	None	Fuse, Line	19.7167	7/16/2007 10:53 AM		
Three Links	Disputanta F3	18	11	1491	Scheduled	None	Fuse, Line	3.3	1/22/2007 1:50 PM		
Three Links	Disputanta F3	732	68	750	Scheduled	None	Power Supplier	829.6	11/5/2007 2:21 PM		
Three Links	Disputanta F3	23	90	1373	Tree/Limb in ROW	None	Fuse, Line	34.1167	10/23/2007 9:31 AM		
Three Links	Disputanta F3	1	115	1372	Scheduled	None	Fuse, Line	1.9167	10/9/2007 9:29 AM		
Three Links	Disputanta F3	5	23	1381	Tree/Limb out of ROW	None	Fuse, Line	1.9167	10/17/2007 6:28 PM		
Three Links	Disputanta F3	6	147	1471	Tree/Limb out of ROW	None	Wire Break	14.7	7/17/2007 6:32 PM		
Three Links	Disputanta F3	631	217	1470	Other Utilities	None	Recloser Device	2282.1167	7/19/2007 7:48 PM		
Three Links	Disputanta F3	25	157	1487	Unknown Cause	None	Fuse, Line	65	3/17/2007 9:20 AM		
Three Links	Disputanta F3	5	116	1491	Lightning	None	Fuse, Line	9.6667	2/21/2007 7:56 AM		
Three Links	Disputanta F3	23	88	1970	Lightning	None	Fuse, Line	33.35	6/30/2007 1:03 PM		
									Total	2,569.48	8,430.42
Beattyville	St. Helens F2	3	52	2053	Scheduled	None	Fuse, Line	2.55	3/13/2007 10:55 AM		
Beattyville	St. Helens F2	24	274	2053	Tree/Limb in ROW	None	Recloser Device	109.6	3/2/2007 3:06 AM		
Beattyville	St. Helens F2	12	92	2054	Scheduled	None	Fuse, Line	18.4	2/8/2007 9:35 AM		
Beattyville	St. Helens F2	9	118	2038	Unknown Cause	None	Fuse, Line	17.85	5/21/2007 9:45 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Beattyville	St. Helens F2	61	406	2061	Lightning	None	Recloser Device	388.35	7/17/2007 5:04 PM		
Beattyville	St. Helens F2	3	223	2061	Lightning	None	Fuse, Line	11.2	7/17/2007 8:32 PM		
Beattyville	St. Helens F2	9	104	2061	Unknown Cause	None	Fuse, Line	15.6	7/5/2007 2:29 PM		
Beattyville	St. Helens F2	31	63	2816	Tree/Limb in ROW	None	Fuse, Line	33.0667	6/28/2007 1:33 PM		
Beattyville	St. Helens F2	31	147	2060	Tree/Limb out of ROW	None	Fuse, Line	75.95	8/20/2007 2:10 PM		
Beattyville	St. Helens F2	710	55	2057	Tree/Limb in ROW	None	Feeder	650.8333	9/2/2007 1:40 PM		
Beattyville	St. Helens F2	1	936	2057	Tree/Limb in ROW	None	Fuse, Line	15.6	9/4/2007 7:54 AM		
Beattyville	St. Helens F2	3	144	2048	Scheduled	None	Jumper	7.2	10/2/2007 9:44 AM		
Beattyville	St. Helens F2	9	455	2065	Wind	None	Fuse, Line	68.25	12/16/2007 7:15 AM		
Beattyville	St. Helens F2	2	121	2068	Wind	None	Fuse, Line	4.0333	12/3/2007 1:10 PM		
Beattyville	St. Helens F2	24	276	2065	Wind	None	Fuse, Line	110.4	12/16/2007 8:54 AM		
Beattyville	St. Helens F2	61	92	2068	Unknown Cause	None	Recloser Device	93.5333	12/7/2007 8:20 PM		
Beattyville	St. Helens F2	43	61	2068	Unknown Cause	None	Recloser Device	43	12/10/2007 10:02 AM		
Beattyville	St. Helens F2	3	243	2065	Tree/Limb out of ROW	None	Fuse, Line	12.2	12/16/2007 9:49 AM		
Beattyville	St. Helens F2	24	221	2065	Unknown Cause	None	Fuse, Line	88	12/18/2007 11:50 PM		
Beattyville	St. Helens F2	24	177	2060	Scheduled	None	Fuse, Line	70.8	8/1/2007 10:02 AM		
Beattyville	St. Helens F2	6	33	2060	Unknown Cause	None	Fuse, Line	3.2	8/2/2007 8:13 AM		
Beattyville	St. Helens F2	45	387	2060	Tree/Limb in ROW	None	Recloser Device	290.25	8/16/2007 7:48 PM		
Beattyville	St. Helens F2	60	321	2060	Tree/Limb out of ROW	None	Recloser Device	321	7/28/2007 1:52 AM		
Beattyville	St. Helens F2	2	35	2057	Animal / Bird	None	Fuse, Line	1.1667	9/5/2007 12:14 PM		
Beattyville	St. Helens F2	3	84	2038	Tree/Limb out of ROW	None	Fuse, Line	4.2	6/7/2007 2:24 PM		
Beattyville	St. Helens F2	9	193	2038	Tree/Limb out of ROW	None	Fuse, Line	28.95	6/8/2007 7:12 PM		
Beattyville	St. Helens F2	2	50	2061	Tree/Limb in ROW	None	Fuse, Transformer	1.6667	7/8/2007 10:45 AM		
Beattyville	St. Helens F2	1	239	2038	Equipment	Transformer	Transformer Device	3.9833	6/23/2007 7:58 PM		
Beattyville	St. Helens F2	24	165	2049	Vehicles	None	Fuse, Line	66	1/2/2007 11:34 AM		
Beattyville	St. Helens F2	31	40	2049	Scheduled	None	Fuse, Line	20.6667	1/2/2007 12:39 PM		
Beattyville	St. Helens F2	706	23	2045	Vehicles	None	Feeder	258.8667	4/11/2007 8:37 AM		
Beattyville	St. Helens F2	709	39	2053	Equipment	Sleeve	Recloser Device	460.85	3/21/2007 3:41 PM		
Beattyville	St. Helens F2	23	98	2036	Scheduled	None	Fuse, Line	37.5667	5/1/2007 12:39 PM		
Beattyville	St. Helens F2	1	38	2045	Vehicles	None	Fuse, Line	0.6333	4/11/2007 9:18 AM		
Beattyville	St. Helens F2	38	248	2053	Tree/Limb out of ROW	None	Jumper	88.6667	3/3/2007 1:29 PM		
Beattyville	St. Helens F2	146	136	2038	Lightning	None	Recloser Device	261.8	6/24/2007 5:41 PM		
Beattyville	St. Helens F2	13	50	2038	Tree/Limb in ROW	None	Fuse, Line	10.6167	6/8/2007 4:11 PM		
Beattyville	St. Helens F2	7	113	2038	Scheduled	None	Fuse, Line	13.1833	6/13/2007 9:18 AM		
Beattyville	St. Helens F2	12	102	2038	Tree/Limb in ROW	None	Fuse, Line	20.6	6/6/2007 9:21 AM		
Beattyville	St. Helens F2	1	196	2065	Tree/Limb out of ROW	None	Fuse, Line	3.2667	12/24/2007 4:58 PM		
Beattyville	St. Helens F2	9	259	2065	Tree/Limb out of ROW	None	Fuse, Line	38.85	12/23/2007 11:33 AM		
Beattyville	St. Helens F2	62	820	2065	Tree/Limb out of ROW	None	Recloser Device	733.4333	12/16/2007 4:46 AM		
Beattyville	St. Helens F2	62	35	2064	Overload	None	Recloser Device	25.4333	12/16/2007 6:34 PM		
Beattyville	St. Helens F2	1	66	2064	Wind	None	Fuse, Line	1.1	12/17/2007 3:19 PM		
Beattyville	St. Helens F2	2	58	2066	Scheduled	None	Fuse, Line	1.9667	12/4/2007 10:26 AM		
Beattyville	St. Helens F2	7	60	2060	Squirrel	None	Fuse, Line	7	11/17/2007 9:42 AM		
Beattyville	St. Helens F2	6	90	2813	Squirrel	None	Fuse, Line	9	11/22/2007 7:44 AM		
Beattyville	St. Helens F2	3	59	2051	Unknown Cause	None	Fuse, Line	2.95	9/28/2007 8:01 AM		
Beattyville	St. Helens F2	2	148	2065	Scheduled	None	Wire Break	4.9333	8/22/2007 10:21 AM		
Beattyville	St. Helens F2	15	30	2067	Scheduled	None	Recloser Device	7.5	8/22/2007 4:41 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Beattyville	St. Helens F2	39	56	2055	Scheduled	None	Recloser Device	36.4	8/30/2007 10:32 AM		
Beattyville	St. Helens F2	25	128	2060	Vehicles	None	Fuse, Line	53.3333	8/7/2007 7:27 PM		
Beattyville	St. Helens F2	2	444	2060	Equipment	Cutout	Fuse, Line	14.8	8/16/2007 9:04 PM		
Beattyville	St. Helens F2	25	43	2061	Tree/Limb in ROW	None	Fuse, Line	17.9167	7/5/2007 11:40 AM		
Beattyville	St. Helens F2	9	43	2061	Scheduled	None	Fuse, Line	6.45	7/3/2007 1:02 PM		
Beattyville	St. Helens F2	9	86	2816	Unknown Cause	None	Fuse, Line	13.05	6/30/2007 12:29 PM		
Beattyville	St. Helens F2	1	303	2038	Equipment	Transformer	Transformer Device	5.0333	6/9/2007 11:33 AM		
Beattyville	St. Helens F2	33	241	2038	Unknown Cause	None	Fuse, Line	132	6/5/2007 8:35 AM		
Beattyville	St. Helens F2	3	82	2051	Scheduled	None	Jumper	4.05	2/1/2007 9:46 AM		
Beattyville	St. Helens F2	9	139	2035	Wind	None	Fuse, Line	21	12/31/2007 11:40 PM		
Beattyville	St. Helens F2	24	34	2065	Maintenance	None	Fuse, Line	13.6	12/19/2007 2:22 PM		
Beattyville	St. Helens F2	31	136	2060	Tree/Limb in ROW	None	Fuse, Line	70.2667	11/15/2007 9:39 AM		
Beattyville	St. Helens F2	6	155	2060	Equipment	Transformer	Fuse, Line	9.3333	11/16/2007 5:00 PM		
Beattyville	St. Helens F2	28	429	2065	Tree/Limb out of ROW	None	Recloser Device	200.2	12/16/2007 5:31 AM		
Beattyville	St. Helens F2	43	293	2056	Tree/Limb out of ROW	None	Wire Break	73.8167	9/11/2007 8:11 AM		
Beattyville	St. Helens F2	31	380	2060	Tree/Limb out of ROW	None	Fuse, Line	196.3333	8/19/2007 7:55 PM		
Beattyville	St. Helens F2	9	179	2060	Lightning	None	Fuse, Line	26.7	8/19/2007 8:10 PM		
									Total	2,997.28	5,460.00
Oneida	Big Bullskin F3	184	149	879	Tree/Limb in ROW	None	Recloser Device	453.8667	11/14/2007 5:44 PM		
Oneida	Big Bullskin F3	30	177	885	Equipment	Cutout	Recloser Device	89	7/11/2007 4:43 AM		
Oneida	Big Bullskin F3	20	121	861	Lightning	None	Fuse, Line	40.3333	6/3/2007 5:21 PM		
Oneida	Big Bullskin F3	192	37	1280	Other Utilities	None	Feeder	118.4	3/23/2007 12:57 PM		
Oneida	Big Bullskin F3	52	128	783	Lightning	None	Recloser Device	110.9333	5/12/2007 5:03 PM		
Oneida	Big Bullskin F3	22	20	877	Maintenance	None	Fuse, Line	7.3333	3/16/2007 9:35 AM		
Oneida	Big Bullskin F3	82	23	861	Equipment	None	Recloser Device	31.4333	5/17/2007 10:40 AM		
Oneida	Big Bullskin F3	4	142	879	Equipment	Cutout	Fuse, Line	9.5333	10/29/2007 3:13 PM		
Oneida	Big Bullskin F3	4	89	879	Unknown Cause	None	Fuse, Line	5.9333	11/2/2007 6:22 AM		
Oneida	Big Bullskin F3	20	223	882	Tree/Limb in ROW	None	Fuse, Line	74.3333	10/10/2007 1:41 PM		
Oneida	Big Bullskin F3	20	89	883	Lightning	None	Fuse, Line	29.6667	8/16/2007 8:26 PM		
Oneida	Big Bullskin F3	4	104	885	Tree/Limb in ROW	None	Fuse, Line	6.9333	7/7/2007 10:41 PM		
Oneida	Big Bullskin F3	82	80	856	Unknown Cause	None	Recloser Device	107.9667	5/14/2007 1:33 PM		
Oneida	Big Bullskin F3	82	3	861	Other Utilities	None	Recloser Device	4.1	5/18/2007 12:47 PM		
Oneida	Big Bullskin F3	5	141	757	Equipment	Cutout	Fuse, Line	11.75	4/15/2007 2:41 PM		
Oneida	Big Bullskin F3	104	90	1275	Tree/Limb out of ROW	None	Recloser Device	124.8	6/30/2007 1:30 PM		
Oneida	Big Bullskin F3	4	116	883	Tree/Limb out of ROW	None	Fuse, Line	7.7333	8/16/2007 8:53 PM		
									Total	667.67	1,234.05
Goose Rock	Garrad F1	3	125	2340	Unknown Cause	None	Fuse, Line	6.25	7/8/2007 12:47 PM		
Goose Rock	Garrad F1	3	181	2365	Tree/Limb out of ROW	None	Fuse, Line	9.05	6/5/2007 6:10 PM		
Goose Rock	Garrad F1	576	304	2412	Vehicles	None	Recloser Device	1624.9	3/27/2007 3:34 PM		
Goose Rock	Garrad F1	1	38	2478	Unknown Cause	None	Service	0.6333	3/14/2007 8:48 PM		
Goose Rock	Garrad F1	1	63	2483	Overload	None	Transformer Device	1.0333	2/11/2007 11:07 AM		
Goose Rock	Garrad F1	9	39	2488	Squirrel	None	Fuse, Line	5.85	1/24/2007 8:03 AM		
Goose Rock	Garrad F1	8	53	2337	Tree/Limb in ROW	None	Fuse, Line	7.0667	7/24/2007 10:26 AM		
Goose Rock	Garrad F1	3	116	2337	Tree/Limb out of ROW	None	Service	5.8	7/24/2007 8:34 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Goose Rock	Garrad F1	16	124	2337	Equipment	Cutout	Fuse, Line	33.0667	7/29/2007 5:53 PM		
Goose Rock	Garrad F1	40	38	2458	Equipment	Cutout	Fuse, Line	25.3333	12/17/2007 4:43 PM		
Goose Rock	Garrad F1	2	78	2458	Overload	None	Transformer Device	2.6	12/18/2007 8:31 PM		
Goose Rock	Garrad F1	80	148	2458	Tree/Limb in ROW	None	Recloser Device	198.6667	12/16/2007 3:46 AM		
Goose Rock	Garrad F1	7	57	2365	Tree/Limb in ROW	None	Fuse, Line	6.65	6/2/2007 5:49 PM		
Goose Rock	Garrad F1	24	99	2365	Scheduled	None	Fuse, Line	39.6	6/6/2007 10:07 AM		
Goose Rock	Garrad F1	3	61	2340	Animal / Bird	None	Fuse, Line	3.05	7/6/2007 8:19 AM		
Goose Rock	Garrad F1	6	55	2408	Lightning	None	Fuse, Line	5.5	4/4/2007 7:04 AM		
Goose Rock	Garrad F1	6	50	2367	Lightning	None	Fuse, Line	5	5/2/2007 11:21 PM		
Goose Rock	Garrad F1	1017	148	2342	Vehicles	None	Feeder	588.7833	11/14/2007 10:41 AM		
Goose Rock	Garrad F1	577	80	2458	Unknown Cause	None	Recloser Device	769.3333	12/17/2007 3:23 PM		
Goose Rock	Garrad F1	15	96	2458	Scheduled	None	Fuse, Line	24	12/19/2007 1:14 PM		
Goose Rock	Garrad F1	8	94	2354	Tree/Limb in ROW	None	Fuse, Line	12.5333	10/19/2007 3:53 AM		
Goose Rock	Garrad F1	2	36	2344	Squirrel	None	Fuse, Line	1.2	9/26/2007 12:52 PM		
Goose Rock	Garrad F1	58	185	2339	Deterioration	Wire	Recloser Device	178.8333	9/17/2007 3:20 AM		
Goose Rock	Garrad F1	1	105	2337	Unknown Cause	None	Fuse, Line	1.75	8/10/2007 12:23 PM		
Goose Rock	Garrad F1	1	103	2337	Animal / Bird	None	Fuse, Transformer	1.7167	8/12/2007 12:54 PM		
Goose Rock	Garrad F1	8	115	2365	Tree/Limb in ROW	None	Fuse, Line	15.3333	6/5/2007 10:14 AM		
Goose Rock	Garrad F1	2	69	2365	Squirrel	None	Fuse, Line	2.2667	5/27/2007 2:34 PM		
Goose Rock	Garrad F1	15	202	2365	Tree/Limb out of ROW	None	Fuse, Line	50.5	6/24/2007 5:33 PM		
Goose Rock	Garrad F1	4	30	2340	Unknown Cause	None	Fuse, Line	2.0667	7/2/2007 11:44 AM		
Goose Rock	Garrad F1	114	120	2365	Tree/Limb out of ROW	None	Recloser Device	228	6/24/2007 5:31 PM		
Goose Rock	Garrad F1	46	175	2342	Tree/Limb out of ROW	None	Recloser Device	134.1667	10/30/2007 6:46 AM		
Goose Rock	Garrad F1	40	21	2458	Overload	None	Fuse, Line	14	12/17/2007 5:23 PM		
Goose Rock	Garrad F1	15	143	2458	Wind	None	Fuse, Line	35.75	12/16/2007 10:46 AM		
Goose Rock	Garrad F1	1	119	2348	Tree/Limb in ROW	None	Fuse, Line	1.9833	9/21/2007 7:00 PM		
Goose Rock	Garrad F1	9	65	2337	Equipment	Hot Line Clamp	Jumper	9.9	8/9/2007 8:08 AM		
Goose Rock	Garrad F1	4	51	2337	Lightning	None	Transformer Device	3.4	7/24/2007 6:02 PM		
Goose Rock	Garrad F1	2	73	2337	Squirrel	None	Fuse, Line	2.4333	7/29/2007 3:44 PM		
Goose Rock	Garrad F1	8	31	2337	Tree/Limb in ROW	None	Fuse, Line	4.1333	8/21/2007 1:56 PM		
Goose Rock	Garrad F1	58	196	2342	Woodcutter	None	Recloser Device	144.4667	11/5/2007 11:44 AM		
Goose Rock	Garrad F1	5	60	2342	Unknown Cause	None	Transformer Device	5	11/11/2007 4:08 PM		
Goose Rock	Garrad F1	1	54	2348	Tree/Limb out of ROW	None	Fuse, Line	0.9167	9/23/2007 8:02 PM		
Goose Rock	Garrad F1	58	130	2339	Scheduled	None	Recloser Device	125.6667	9/12/2007 12:43 PM		
Goose Rock	Garrad F1	3	82	2344	Unknown Cause	None	Fuse, Transformer	4.1	10/14/2007 9:56 AM		
Goose Rock	Garrad F1	3	77	2337	Squirrel	None	Fuse, Line	3.9	7/22/2007 5:00 PM		
Goose Rock	Garrad F1	9	136	2367	Deterioration	Jumper	Recloser Device	20.55	4/27/2007 6:39 PM		
Goose Rock	Garrad F1	6	33	2483	Overload	None	Transformer Device	3.3	2/5/2007 9:55 AM		
Goose Rock	Garrad F1	3	230	2353	Tree/Limb out of ROW	None	Transformer Device	11.5	6/24/2007 9:28 PM		
Goose Rock	Garrad F1	4	139	2365	Tree/Limb out of ROW	None	Fuse, Line	9.2667	6/5/2007 8:38 PM		
Goose Rock	Garrad F1	3	84	2362	Scheduled	None	Jumper	4.2	5/30/2007 2:15 PM		
Goose Rock	Garrad F1	4	86	2367	Vehicles	None	Fuse, Line	5.7333	5/15/2007 12:26 PM		
Goose Rock	Garrad F1	3	192	2365	Equipment	Transformer	Service	9.6	5/18/2007 4:38 PM		
									Total	695.57	4,410.33
Rice Station	Station Camp F2	1033	153	2098	Equipment	Cutout	Feeder	480.5	2/21/2007 1:25 PM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Rice Station	Station Camp F2	2	79	2098	Large Animal	None	Fuse, Line	2.6333	3/10/2007 12:27 PM		
Rice Station	Station Camp F2	2	123	2098	Tree/Limb out of ROW	None	Fuse, Line	4.1333	3/12/2007 8:54 AM		
Rice Station	Station Camp F2	3	51	2098	Equipment	Cutout	Fuse, Line	2.6	3/2/2007 7:10 AM		
Rice Station	Station Camp F2	5	82	2094	Animal / Bird	None	Fuse, Line	6.8333	4/29/2007 5:21 PM		
Rice Station	Station Camp F2	1	37	2102	Lightning	None	Fuse, Line	0.6167	3/28/2007 9:10 AM		
Rice Station	Station Camp F2	85	204	2106	Equipment	Sleeve	Recloser Device	287.5833	11/16/2007 8:02 AM		
Rice Station	Station Camp F2	8	177	2129	Tree/Limb in ROW	None	Fuse, Line	23.6	12/16/2007 3:03 AM		
Rice Station	Station Camp F2	15	340	2123	Tree/Limb out of ROW	None	Fuse, Line	84.75	12/16/2007 8:33 AM		
Rice Station	Station Camp F2	85	67	2129	Wind	None	Recloser Device	96.3333	12/16/2007 5:04 AM		
Rice Station	Station Camp F2	1	83	2103	Deterioration	Wire	Service	1.3833	10/11/2007 9:19 PM		
Rice Station	Station Camp F2	1	42	2106	Lightning	None	Fuse, Transformer	0.7	8/29/2007 7:16 PM		
Rice Station	Station Camp F2	36	57	2109	Tree/Limb out of ROW	None	Recloser Device	34.2	8/20/2007 12:21 PM		
Rice Station	Station Camp F2	86	63	2109	Wind	None	Recloser Device	90.3	12/31/2007 11:56 PM		
Rice Station	Station Camp F2	23	185	2089	Tree/Limb out of ROW	None	Fuse, Line	41.5833	1/8/2007 2:57 AM		
Rice Station	Station Camp F2	1	127	2092	Overload	None	Transformer Device	2.1	1/31/2007 8:51 AM		
Rice Station	Station Camp F2	6	95	2089	Equipment	Cutout	Fuse, Line	9.5	6/3/2007 2:46 PM		
Rice Station	Station Camp F2	16	94	2104	Scheduled	None	Fuse, Line	25.0667	7/12/2007 10:32 AM		
Rice Station	Station Camp F2	2	114	2104	Equipment	Cutout	Fuse, Line	3.8	7/5/2007 9:49 AM		
Rice Station	Station Camp F2	1	110	2094	Bad Connection	Hot Line Clamp	Service	1.8333	4/28/2007 4:29 PM		
Rice Station	Station Camp F2	1	69	2092	Fire	None	Transformer Device	1.15	2/13/2007 12:05 AM		
Rice Station	Station Camp F2	8	80	2081	Scheduled	None	Jumper	10.5333	1/25/2007 10:00 AM		
Rice Station	Station Camp F2	8	264	2098	Tree/Limb out of ROW	None	Fuse, Line	35.2	3/3/2007 12:00 PM		
Rice Station	Station Camp F2	2	87	2089	Animal / Bird	None	Fuse, Line	2.9	6/1/2007 9:58 AM		
Rice Station	Station Camp F2	12	75	2077	Scheduled	None	Jumper	15	6/8/2007 9:03 AM		
Rice Station	Station Camp F2	35	124	2104	Tree/Limb in ROW	None	Recloser Device	72.3333	7/5/2007 1:55 PM		
Rice Station	Station Camp F2	36	236	2109	Tree/Limb in ROW	None	Recloser Device	141	7/28/2007 2:56 PM		
Rice Station	Station Camp F2	5	136	2109	Scheduled	None	Fuse, Line	11.3333	8/20/2007 10:00 AM		
Rice Station	Station Camp F2	15	343	2129	Tree/Limb out of ROW	None	Recloser Device	44	12/16/2007 5:52 AM		
Rice Station	Station Camp F2	1019	120	2130	Tree/Limb out of ROW	None	Feeder	2038	12/8/2007 3:23 AM		
Rice Station	Station Camp F2	1049	53	2647	Equipment	Cutout	Feeder	926.6167	11/22/2007 10:59 AM		
Rice Station	Station Camp F2	14	38	2106	Unknown Cause	None	Fuse, Line	8.8667	11/14/2007 8:54 AM		
Rice Station	Station Camp F2	8	143	2129	Tree/Limb out of ROW	None	Recloser Device	81.7667	12/23/2007 2:19 AM		
Rice Station	Station Camp F2	2	0	2129	Unknown Cause	None	Fuse, Line	0	12/16/2007 2:23 PM		
Rice Station	Station Camp F2	1	37	2089	Animal / Bird	None	Fuse, Transformer	0.6167	5/30/2007 7:26 AM		
Rice Station	Station Camp F2	2	57	2089	Animal / Bird	None	Fuse, Line	1.9	6/25/2007 8:34 PM		
Rice Station	Station Camp F2	5	33	2089	Unknown Cause	None	Fuse, Line	2.75	4/29/2007 12:52 PM		
Rice Station	Station Camp F2	8	121	2102	Deterioration	Wire	Fuse, Line	16.1333	4/21/2007 8:48 AM		
Rice Station	Station Camp F2	1	72	2102	Lightning	None	Fuse, Line	1.2	3/28/2007 11:39 AM		
Rice Station	Station Camp F2	1	40	2098	Equipment	Cutout	Fuse, Line	0.6833	3/8/2007 3:44 PM		
Rice Station	Station Camp F2	1	159	2098	Woodcutter	None	Fuse, Line	2.6333	3/8/2007 1:02 PM		
Rice Station	Station Camp F2	2	16	2092	Equipment	Cutout	Fuse, Line	0.5333	2/13/2007 12:50 PM		
Rice Station	Station Camp F2	4	51	2089	Scheduled	None	Fuse, Line	3.4667	1/30/2007 10:29 AM		
Rice Station	Station Camp F2	1	41	2089	Overload	None	Transformer Device	0.6833	1/28/2007 11:11 PM		
Rice Station	Station Camp F2	7	113	2106	Equipment	Cutout	Fuse, Line	13.1833	11/1/2007 6:19 PM		
Rice Station	Station Camp F2	16	59	2136	Tree/Limb out of ROW	None	Fuse, Line	16	11/26/2007 8:14 AM		
Rice Station	Station Camp F2	3	94	2130	Equipment	Cutout	Fuse, Line	4.7	12/10/2007 6:44 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Rice Station	Station Camp F2	130	50	2129	Tree/Limb out of ROW	None	Recloser Device	110.5	12/13/2007 6:59 AM		
Rice Station	Station Camp F2	223	140	2123	Equipment	Wire	Recloser Device	497.8	12/16/2007 7:32 AM		
Rice Station	Station Camp F2	14	129	2106	Tree/Limb out of ROW	None	Fuse, Line	30.1	10/23/2007 5:07 PM		
									Total	2,757.17	5,291.63
East Bernstadt	Ft. Sequayah F4	28	198	1870	Tree/Limb out of ROW	None	Fuse, Line	91.9333	12/16/2007 2:47 AM		
East Bernstadt	Ft. Sequayah F4	1	78	1838	Unknown Cause	None	Transformer Device	1.3	11/7/2007 7:18 AM		
East Bernstadt	Ft. Sequayah F4	32	104	1842	Tree/Limb in ROW	None	Fuse, Line	55.4667	9/7/2007 7:50 AM		
East Bernstadt	Ft. Sequayah F4	42	133	1842	Equipment	Transformer	Fuse, Line	45.9333	9/6/2007 6:43 PM		
East Bernstadt	Ft. Sequayah F4	18	56	1843	Tree/Limb out of ROW	None	Fuse, Line	16.5	8/21/2007 4:07 AM		
East Bernstadt	Ft. Sequayah F4	14	67	1822	Woodcutter	None	Fuse, Line	15.6333	5/3/2007 4:56 PM		
East Bernstadt	Ft. Sequayah F4	42	103	1835	Maintenance	None	Jumper	72.1	2/26/2007 9:08 AM		
East Bernstadt	Ft. Sequayah F4	3	47	1849	Unknown Cause	None	Fuse, Line	2.3	1/6/2007 8:46 AM		
East Bernstadt	Ft. Sequayah F4	8	136	1870	Tree/Limb out of ROW	None	Fuse, Line	18.1333	12/16/2007 8:21 AM		
East Bernstadt	Ft. Sequayah F4	28	155	1871	Animal / Bird	None	Fuse, Line	72.3333	12/7/2007 11:13 AM		
East Bernstadt	Ft. Sequayah F4	28	229	1871	Tree/Limb out of ROW	None	Fuse, Line	106.8667	12/10/2007 3:03 AM		
East Bernstadt	Ft. Sequayah F4	5	24	1839	Unknown Cause	None	Transformer Device	2	11/14/2007 7:45 PM		
East Bernstadt	Ft. Sequayah F4	3	23	1843	Animal / Bird	None	Fuse, Line	1.15	7/22/2007 8:47 AM		
East Bernstadt	Ft. Sequayah F4	3	390	1835	Tree/Limb in ROW	None	Fuse, Line	19.5	2/22/2007 4:23 PM		
East Bernstadt	Ft. Sequayah F4	680	17	1822	Fire	Pole	Feeder	181.3333	5/9/2007 3:00 PM		
East Bernstadt	Ft. Sequayah F4	3	90	1843	Tree/Limb in ROW	None	Fuse, Line	4.5	7/20/2007 3:58 AM		
East Bernstadt	Ft. Sequayah F4	681	89	1820	Equipment	Insulator	Feeder	1010.15	6/4/2007 4:31 PM		
East Bernstadt	Ft. Sequayah F4	31	59	1820	Tree/Limb out of ROW	None	Fuse, Line	30.4833	5/16/2007 5:39 PM		
East Bernstadt	Ft. Sequayah F4	28	211	1839	Tree/Limb out of ROW	None	Fuse, Line	98.4667	11/19/2007 3:29 AM		
East Bernstadt	Ft. Sequayah F4	9	55	1839	Tree/Limb out of ROW	None	Fuse, Line	8.25	11/14/2007 8:04 PM		
East Bernstadt	Ft. Sequayah F4	1	152	1837	Deterioration	Wire	Transformer Device	2.5333	9/2/2007 6:36 AM		
East Bernstadt	Ft. Sequayah F4	23	250	1839	Woodcutter	None	Fuse, Line	44.2167	8/19/2007 12:57 PM		
East Bernstadt	Ft. Sequayah F4	6	0	1852	Tree/Limb in ROW	Pole	Wire Break	500.7667	10/19/2007 3:25 AM		
East Bernstadt	Ft. Sequayah F4	26	28	1822	Tree/Limb in ROW	None	Fuse, Line	12.5667	5/16/2007 3:57 PM		
East Bernstadt	Ft. Sequayah F4	680	156	1822	Equipment	Insulator	Recloser Device	1768	5/16/2007 6:06 AM		
East Bernstadt	Ft. Sequayah F4	14	115	1843	Tree/Limb in ROW	None	Fuse, Line	26.8333	7/20/2007 4:58 AM		
East Bernstadt	Ft. Sequayah F4	8	50	1820	Animal / Bird	None	Fuse, Line	6.6667	6/7/2007 2:42 PM		
East Bernstadt	Ft. Sequayah F4	1	81	1820	Unknown Cause	None	Fuse, Line	1.35	6/10/2007 10:07 AM		
East Bernstadt	Ft. Sequayah F4	4	47	1839	Tree/Limb out of ROW	None	Fuse, Line	3.1333	11/16/2007 12:32 PM		
East Bernstadt	Ft. Sequayah F4	28	101	1838	Tree/Limb out of ROW	None	Fuse, Line	47.1333	11/8/2007 1:38 AM		
East Bernstadt	Ft. Sequayah F4	1	28	1837	Squirrel	None	Fuse, Line	0.4667	9/4/2007 4:36 PM		
East Bernstadt	Ft. Sequayah F4	31	76	1822	Tree/Limb out of ROW	None	Fuse, Line	39.2667	4/25/2007 4:54 PM		
East Bernstadt	Ft. Sequayah F4	31	66	1835	Squirrel	None	Fuse, Line	34.1	3/20/2007 7:14 PM		
East Bernstadt	Ft. Sequayah F4	1	94	1835	Maintenance	None	Jumper	1.5667	2/12/2007 2:59 PM		
East Bernstadt	Ft. Sequayah F4	6	56	1835	Squirrel	None	Fuse, Line	5.6	3/9/2007 8:09 AM		
East Bernstadt	Ft. Sequayah F4	14	57	1820	Unknown Cause	None	Fuse, Line	13.3	6/15/2007 4:54 PM		
East Bernstadt	Ft. Sequayah F4	8	236	2463	Tree/Limb out of ROW	None	Recloser Device	31.4667	6/27/2007 4:40 PM		
									Total	1,111.27	4,393.30
Keavy 1	Hwy 312 East F2	30	149	613	Equipment	Hot Line Clamp	Fuse, Line	74.5	10/2/2007 1:44 PM		
Keavy 1	Hwy 312 East F2	413	73	606	Unknown Cause	None	Feeder	502.4833	10/22/2007 9:58 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Keavy 1	Hwy 312 East F2	417	106	613	Equipment	Insulator	Feeder	430.9	12/13/2007 12:01 PM		
Keavy 1	Hwy 312 East F2	4	53	613	Squirrel	None	Fuse, Line	3.5333	12/24/2007 9:28 AM		
Keavy 1	Hwy 312 East F2	138	144	606	Tree/Limb out of ROW	None	Circuit Switcher	331.2	11/5/2007 2:58 PM		
Keavy 1	Hwy 312 East F2	19	101	613	Squirrel	None	Fuse, Line	32.3	11/25/2007 8:01 AM		
Keavy 1	Hwy 312 East F2	29	121	605	Unknown Cause	None	Fuse, Line	58.4833	5/19/2007 10:01 AM		
Keavy 1	Hwy 312 East F2	29	38	605	Unknown Cause	None	Fuse, Line	17.8833	5/29/2007 11:20 AM		
Keavy 1	Hwy 312 East F2	5	84	602	Equipment	Cutout	Fuse, Line	7	3/27/2007 8:36 AM		
Keavy 1	Hwy 312 East F2	4	55	613	Unknown Cause	None	Fuse, Line	3.5333	11/25/2007 9:28 PM		
Keavy 1	Hwy 312 East F2	3	60	599	Woodcutter	None	Fuse, Line	3	1/25/2007 12:03 PM		
Keavy 1	Hwy 312 East F2	1	125	608	Equipment	Transformer	Transformer Device	2.1	9/11/2007 3:52 AM		
Keavy 1	Hwy 312 East F2	9	77	613	Unknown Cause	None	Fuse, Line	11.55	10/14/2007 12:15 PM		
Keavy 1	Hwy 312 East F2	24	53	613	Unknown Cause	None	Fuse, Line	21.2	10/4/2007 11:28 AM		
Keavy 1	Hwy 312 East F2	22	72	605	Lightning	None	Fuse, Line	26.4	5/17/2007 5:32 PM		
Keavy 1	Hwy 312 East F2	22	54	604	Animal / Bird	None	Fuse, Line	19.4333	5/12/2007 5:47 PM		
Keavy 1	Hwy 312 East F2	413	66	606	Tree/Limb out of ROW	None	Recloser Device	302.5	11/5/2007 2:58 PM		
Keavy 1	Hwy 312 East F2	2	35	613	Squirrel	None	Fuse, Line	1.1667	12/13/2007 3:42 PM		
Keavy 1	Hwy 312 East F2	9	136	612	Tree/Limb in ROW	None	Wire Break	20.4	12/5/2007 4:37 PM		
									Total	654.10	1,869.57
Oneida	Spurlock F4	130	109	877	Wind	None	Recloser Device	236.1667	3/2/2007 2:40 PM		
Oneida	Spurlock F4	69	150	792	Scheduled	None	Jumper	140.7	6/14/2007 9:02 AM		
Oneida	Spurlock F4	13	96	861	Lightning	None	Fuse, Line	20.8	6/19/2007 3:30 PM		
Oneida	Spurlock F4	9	82	882	Unknown Cause	None	Fuse, Line	12.15	10/2/2007 8:27 AM		
Oneida	Spurlock F4	3	142	878	Equipment	Cutout	Fuse, Line	7.1	12/23/2007 9:04 AM		
Oneida	Spurlock F4	8	79	878	Unknown Cause	None	Recloser Device	10.5333	11/24/2007 3:50 AM		
Oneida	Spurlock F4	40	69	878	Unknown Cause	None	Recloser Device	46	11/24/2007 3:58 AM		
Oneida	Spurlock F4	6	72	885	Unknown Cause	None	Fuse, Line	7.2	7/13/2007 1:21 AM		
Oneida	Spurlock F4	30	41	885	Scheduled	None	Recloser Device	20.5	7/16/2007 9:08 AM		
Oneida	Spurlock F4	14	71	885	Scheduled	None	Recloser Device	16.5667	7/9/2007 8:57 AM		
Oneida	Spurlock F4	1	71	1275	Equipment	Lightning Arrestor	Fuse, Line	1.1833	6/27/2007 2:44 PM		
Oneida	Spurlock F4	1	163	861	Tree/Limb in ROW	None	Fuse, Line	2.7167	6/6/2007 8:23 AM		
Oneida	Spurlock F4	14	88	882	Vehicles	None	Recloser Device	20.5333	10/14/2007 12:44 PM		
Oneida	Spurlock F4	4	137	883	Tree/Limb in ROW	None	Fuse, Line	9.1333	8/16/2007 9:48 PM		
Oneida	Spurlock F4	39	122	883	Tree/Limb out of ROW	None	Recloser Device	78.65	8/16/2007 9:54 PM		
Oneida	Spurlock F4	1	74	861	Equipment	Lightning Arrestor	Fuse, Line	1.25	6/12/2007 5:04 PM		
Oneida	Spurlock F4	36	55	885	Unknown Cause	None	Recloser Device	33.6	7/11/2007 7:36 AM		
Oneida	Spurlock F4	14	97	882	Unknown Cause	None	Fuse, Line	22.6333	1/5/2007 7:06 AM		
Oneida	Spurlock F4	181	144	877	Equipment	Wire	Recloser Device	434.4	3/3/2007 12:26 PM		
Oneida	Spurlock F4	181	187	876	Tree/Limb in ROW	None	Recloser Device	533.6167	4/15/2007 5:54 AM		
Oneida	Spurlock F4	1	71	883	Animal / Bird	None	Fuse, Transformer	1.2	8/20/2007 8:46 AM		
Oneida	Spurlock F4	5	67	880	ROW Crew	None	Fuse, Line	5.5833	9/5/2007 12:37 PM		
Oneida	Spurlock F4	38	211	880	Tree/Limb out of ROW	None	Recloser Device	134.2667	9/22/2007 8:16 AM		
Oneida	Spurlock F4	1	146	882	Unknown Cause	None	Fuse, Line	2.4333	10/9/2007 1:07 PM		
Oneida	Spurlock F4	13	75	879	Tree/Limb in ROW	None	Fuse, Line	16.25	10/23/2007 10:06 AM		
Oneida	Spurlock F4	1	149	879	Equipment	Transformer	Transformer Device	2.4833	12/2/2007 9:56 AM		
Oneida	Spurlock F4	180	100	879	Equipment	Anchor	Recloser Device	300	11/16/2007 7:16 AM		

Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
									Total	774.63	2,117.65
McKee		1319	8	1319	Equipment	Regulator	Power Supplier	175.8667	9/2/2007 10:00 PM		
McKee	JCHS F2	9	30	1348	Tree/Limb in ROW	None	Transformer Device	4.5	10/19/2007 10:34 AM		
McKee	JCHS F2	2	32	1348	Unknown Cause	None	Fuse, Transformer	1.1	10/17/2007 9:15 PM		
McKee	JCHS F2	1	56	1325	Animal / Bird	None	Fuse, Transformer	0.9167	6/14/2007 6:28 AM		
McKee	JCHS F2	1	66	1325	Unknown Cause	None	Fuse, Transformer	1.1	6/4/2007 5:23 AM		
McKee	JCHS F2	15	94	1325	Unknown Cause	None	Fuse, Line	23.5	5/28/2007 10:32 AM		
McKee	JCHS F2	13	81	1345	Unknown Cause	None	Fuse, Line	17.55	12/10/2007 4:32 AM		
McKee	JCHS F2	520	66	1318	Tree/Limb out of ROW	None	Feeder	563.3333	8/16/2007 7:47 PM		
McKee	JCHS F2	1	39	1325	Animal / Bird	None	Fuse, Line	0.65	7/10/2007 2:35 PM		
McKee	JCHS F2	47	83	1325	Scheduled	None	Recloser Device	65.0167	5/1/2007 10:48 AM		
McKee	JCHS F2	530	42	1344	Unknown Cause	None	Feeder	371	10/25/2007 5:36 AM		
McKee	JCHS F2	2	86	1325	Animal / Bird	None	Fuse, Line	2.8667	7/10/2007 10:37 AM		
McKee	JCHS F2	5	26	1326	Tree/Limb in ROW	None	Fuse, Line	2.1667	8/25/2007 4:26 PM		
McKee	JCHS F2	47	44	1325	Scheduled	None	Recloser Device	34.4667	7/9/2007 10:00 AM		
McKee	JCHS F2	23	114	1323	Unknown Cause	Wire	Fuse, Line	43.3167	3/10/2007 10:11 AM		
McKee	JCHS F2	7	175	1320	Equipment	Transformer	Transformer Device	20.4167	1/29/2007 5:31 AM		
McKee	JCHS F2	5	101	1345	Scheduled	None	Fuse, Line	8.4167	12/3/2007 10:01 AM		
McKee	JCHS F2	520	32	1318	Lightning	None	Feeder	277.3333	8/3/2007 3:36 PM		
McKee	JCHS F2	12	83	1337	Equipment	Lightning Arrestor	Fuse, Line	16.8	9/28/2007 5:38 AM		
									Total	570.00	1,630.32
Greenhall	New Zion F3	7	285	754	Tree/Limb out of ROW	None	Fuse, Line	33.25	12/23/2007 8:20 AM		
Greenhall	New Zion F3	12	50	754	Woodcutter	None	Fuse, Line	10	12/26/2007 5:02 PM		
Greenhall	New Zion F3	3	267	754	Tree/Limb out of ROW	None	Fuse, Line	13.35	12/16/2007 4:24 AM		
Greenhall	New Zion F3	1	48	746	Unknown Cause	None	Fuse, Line	0.8167	9/13/2007 9:51 PM		
Greenhall	New Zion F3	6	401	729	Tree/Limb in ROW	None	Fuse, Line	40.1	8/16/2007 9:28 PM		
Greenhall	New Zion F3	4	13	729	Animal / Bird	None	Fuse, Line	0.8667	5/29/2007 11:12 AM		
Greenhall	New Zion F3	62	23	729	Scheduled	None	Recloser Device	23.7667	5/31/2007 9:06 AM		
Greenhall	New Zion F3	2	42	729	Animal / Bird	None	Fuse, Line	1.4	6/15/2007 12:40 PM		
Greenhall	New Zion F3	15	44	714	Scheduled	None	Recloser Device	10.75	6/13/2007 1:44 PM		
Greenhall	New Zion F3	1	224	729	Tree/Limb out of ROW	None	Fuse, Line	3.7167	6/6/2007 1:57 PM		
Greenhall	New Zion F3	20	317	732	Tree/Limb out of ROW	None	Recloser Device	81.6667	5/5/2007 2:43 AM		
Greenhall	New Zion F3	4	370	725	Other Utilities	None	Jumper	24.6667	5/17/2007 9:07 AM		
Greenhall	New Zion F3	7	60	730	Lightning	None	Fuse, Line	7	2/21/2007 7:44 AM		
Greenhall	New Zion F3	4	65	729	Tree/Limb in ROW	None	Fuse, Line	4.2667	7/28/2007 3:01 AM		
Greenhall	New Zion F3	14	62	746	Squirrel	None	Fuse, Line	14.4667	10/31/2007 1:14 PM		
Greenhall	New Zion F3	1	90	754	Tree/Limb out of ROW	None	Fuse, Line	1.5	12/11/2007 2:33 PM		
Greenhall	New Zion F3	2	152	754	Equipment	Hot Line Clamp	Fuse, Line	5.0333	12/24/2007 5:54 PM		
Greenhall	New Zion F3	1	171	729	Tree/Limb out of ROW	None	Fuse, Line	2.8333	6/17/2007 4:15 PM		
Greenhall	New Zion F3	1	94	729	Lightning	None	Fuse, Line	1.5667	6/3/2007 3:17 PM		
Greenhall	New Zion F3	4	18	731	Animal / Bird	None	Fuse, Line	1.2	7/3/2007 9:50 PM		
Greenhall	New Zion F3	4	78	731	Animal / Bird	None	Fuse, Line	5.2	7/8/2007 8:09 AM		
Greenhall	New Zion F3	357	80	733	Tree/Limb out of ROW	None	Feeder	476	3/22/2007 10:05 AM		
Greenhall	New Zion F3	10	39	755	Scheduled	None	Recloser Device	6.6667	11/30/2007 10:30 AM		

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Substation	Feeder	Customers OutInitially	Interruption Duration	Customers Served	Cause	Equipment Failure	What Is Out	Customer Hours	OutageStartTime	Tree Hours	Total Hours
Greenhall	New Zion F3	5	52	729	Lightning	None	Fuse, Line	4.3333	9/10/2007 5:57 PM		
Greenhall	New Zion F3	22	199	729	Tree/Limb out of ROW	None	Recloser Device	73.3333	9/7/2007 2:02 AM		
Greenhall	New Zion F3	5	63	730	Animal / Bird	None	Fuse, Line	5.3333	8/28/2007 12:25 PM		
Greenhall	New Zion F3	2	241	732	Equipment	Transformer	Transformer Device	8.0333	8/24/2007 7:38 AM		
Greenhall	New Zion F3	4	76	729	Lightning	None	Fuse, Line	5.0667	6/4/2007 9:05 PM		
Greenhall	New Zion F3	1	51	732	Squirrel	None	Fuse, Line	0.8667	5/13/2007 4:34 PM		
Greenhall	New Zion F3	205	147	730	Equipment	Recloser	Recloser Device	502.25	2/21/2007 12:25 AM		
Greenhall	New Zion F3	1	4	733	Tree/Limb out of ROW	None	Fuse, Line	0.0667	3/4/2007 8:16 AM		
Greenhall	New Zion F3	63	43	733	Scheduled	None	Recloser Device	45.15	3/21/2007 9:19 AM		
Greenhall	New Zion F3	3	27	729	Animal / Bird	None	Fuse, Line	1.35	8/19/2007 7:22 AM		
Greenhall	New Zion F3	62	185	730	Tree/Limb in ROW	None	Recloser Device	190.1333	8/29/2007 1:12 PM		
Greenhall	New Zion F3	18	308	747	Tree/Limb out of ROW	None	Fuse, Line	92.4	12/23/2007 11:06 AM		
Greenhall	New Zion F3	12	59	734	Scheduled	None	Jumper	11.8	11/5/2007 9:26 AM		
									Total	1,012.62	1,710.20