Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

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PUBLIC UTILITIES COMMISSION

Edward L. Reinhardt
President

May 7, 2009

The Honorable Chairman and Members of the
Hawaii Public Utilities Commission
Kekuanaoa Building
465 South King Street, First Floor
Honolulu, Hawaii 96813

Dear Commissioners:

Subject: MECO 2008 Annual Service Reliability Report

Maui Electric Company, Limited respectfully submits a copy of its 2008 Annual Service Reliability Report.

Sincerely,

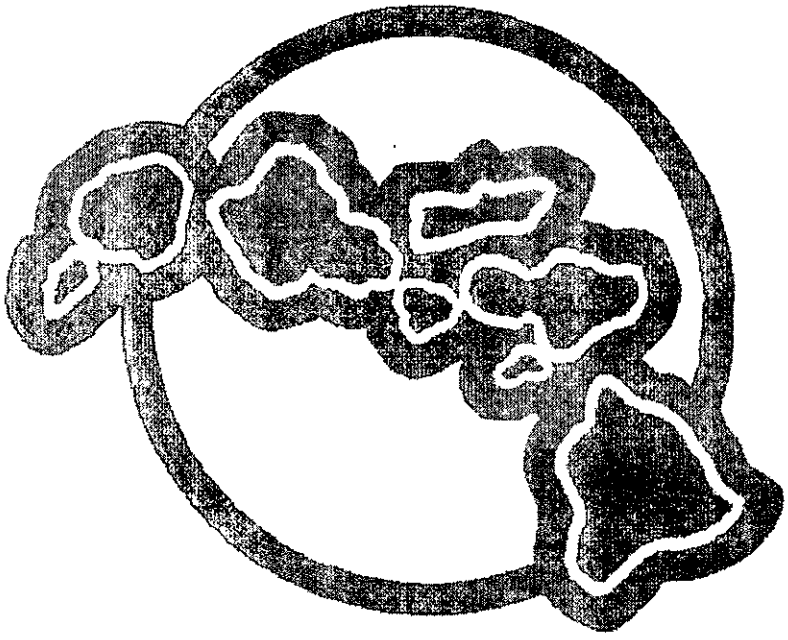
Edward L. Reinhardt

Attachment

c: Division of Consumer Advocacy (with Attachment)

ANNUAL SERVICE RELIABILITY REPORT

2008



MAUI ELECTRIC COMPANY, LIMITED

MAUI ELECTRIC COMPANY, LIMITED

ANNUAL SERVICE RELIABILITY REPORT

2008

Prepared By
Transmission and Distribution Department
Operations Division

INTRODUCTION

This is the 2008 service reliability report for Maui Electric Company, Limited (MECO). The average number of electric customers increased from 65,728 in 2007 to 66,810 in 2008 (an increase of 1.65%). The peak 2008 demand for the system was 199.0 MW (gross) that occurred on January 9, 2008. The peak 2008 demand was lower than the 2007 peak demand of 209.3 MW (gross) on November 7, 2007 (a decrease of 4.92%).

The system interruption summary for the past year and the system reliability indices for the five prior years are presented to depict the quality of service to the electrical energy consumer.

The definitions of terms, the explanation and equations of reliability indices are contained on Attachments B-1 through B-3.

The Average Service Availability Index (ASA), the System Average Interruption Frequency Index (SAIF), the Customer Average Interruption Duration Index (CAID), and the System Average Interruption Duration Index (SAID) are indicators of service reliability. These indices measure reliability in terms of the overall availability of electrical service (ASA), the frequency or number of times MECO's customers experience an outage during the year (SAIF), and the average length of time an interrupted customer is out of power (CAID). SAID is an indication of overall system reliability because it is the product of SAIF and CAID and incorporates the impact of frequency and duration of outages on MECO's total customer base (in this case, 66,810 customers).

ANALYSIS

This analysis of the system reliability for MECO is for the year 2008. To determine the relative level of reliability, the statistics for five prior years, 2003 through 2007, are used for comparison.

The reliability indices are calculated using the data from all sustained[1] system outages, except customer maintenance outages. MECO had not normalized the data for the 2003 and 2005 reliability indices. The 2004 reliability indices for MECO were normalized to exclude the effects of the January 14th Kona Storm. The 2006 reliability indices for MECO were normalized to exclude the effects of the October 15th earthquake. The 2007 reliability indices for MECO were normalized to exclude the effects of the January 29th and the December 5th Kona Storms. The 2008 reliability indices for MECO were normalized to exclude the effects of various catastrophic equipment failures and storms on Maui, Molokai and Lanai.

The data used in calculating the reliability indices was normalized in accordance with the guidelines specified in the report on reliability that was prepared for the Public Utilities Commission, titled "Methodology for Determining Reliability Indices for HECO Utilities," dated December 1990. That report indicates that normalization is allowed for "abnormal" situations such as hurricanes, tsunamis, earthquakes, floods, catastrophic equipment failures, and a single outage that cascades into a loss of load that is greater than 10% of the system peak load. These normalizations are made in calculating the reliability indices, because good engineering design takes into account safety, reliability, utility industry standards, and economics, and cannot always plan for catastrophic events.

Graphs of the ASA (Figure 1), SAIF (Figure 2), CAID (Figure 3), and SAID (Figure 4) for the six years are included.

[1] An Interruption of electrical service of 1 minute or longer

2008 NORMALIZED RESULTS

The 2008 service reliability results were normalized to exclude the effects of various catastrophic equipment failures and large storms on Maui, Molokai and Lanai. There were 36 outages in 2008 that were classified as "abnormal" situations (i.e. catastrophic equipment failures and major storms) that cascaded into a loss of load greater than 10% of the system peak load.

The 2008 service reliability results (normalized) indicate that MECO made improvements in the ASA, SAIF, CAID and SAID indices compared to 2007.

- The ASA index of 99.9805% is an improvement from 2007 and is ranked the third best ASA index of the last six years. (Higher is better.)

- The SAIF index of 1.134 is an improvement from 2007 and is ranked the second best SAIF index of the last six years. (Lower is better.)

- The CAID index of 90.28 minutes is an increase from 2007 and is ranked the worst CAID index of the last six years. (Lower is better.)

- The SAID index of 102.38 minutes is an improvement from 2007 and is ranked the third best SAID index of the last six years. (Lower is better.)

Cable faults were the leading cause of outages in 2008, with 108 outages, which accounted for 20.26% of all outages. This was a decrease of 6.1% from 2007. Outages caused by trees or branches in lines were the second leading cause of outages in 2008, with 83 outages and accounted for 15.57% of all outages. This was a decreased of 6.7% from 2007.

MECO experienced 29 load shed events in 2008. Maui experienced 5 load shed events, Molokai experienced 12 load shed events and Lanai experienced 12 load shed events in 2008.

Annual Service Reliability Indices

The normalized results for 2008, the previous un-normalized indices for 2003 and 2005 and the normalized indices for 2004, 2006 and 2007 are shown in the table "Annual Service Reliability Indices". Figures 1 through 4 contain the same data shown in graphical form as well as the 2008 outages listed by cause and associated reliability indices shown on Attachments A1 and A2, (normalized results).

MECO
Table of Annual Service Reliability Indices

SYSTEM TOTALS	2003	2004 *	2005	2006 *	2007 *	2008 *
Number of Customers	60,651	61,846	63,103	64,405	65,728	66,810
Customer Hrs. Interrupted	48,567	77,122	126,010	235,186	186,022	114,001
Customer-Interruptions	45,446	99,424	162,827	249,485	170,299	75,764
ASA (Percent)	99.9909	99.9858	99.9772	99.9583	99.9692	99.9805
SAIF (Occurrence)	0.749	1.608	2.580	3.874	2.593	1.134
CAID (Minutes)	64.12	46.54	46.43	56.56	62.52	90.28
SAID (Minutes)	48.05	74.82	119.81	219.10	162.13	102.38

* Data normalized per guidelines specified in the report on reliability that was prepared for the Public Utilities Commission, titled "Methodology for Determining Reliability Indices for HECO Utilities," dated December 1990

FIGURE 1

MECO AVERAGE SERVICE AVAILABILITY (ASA)

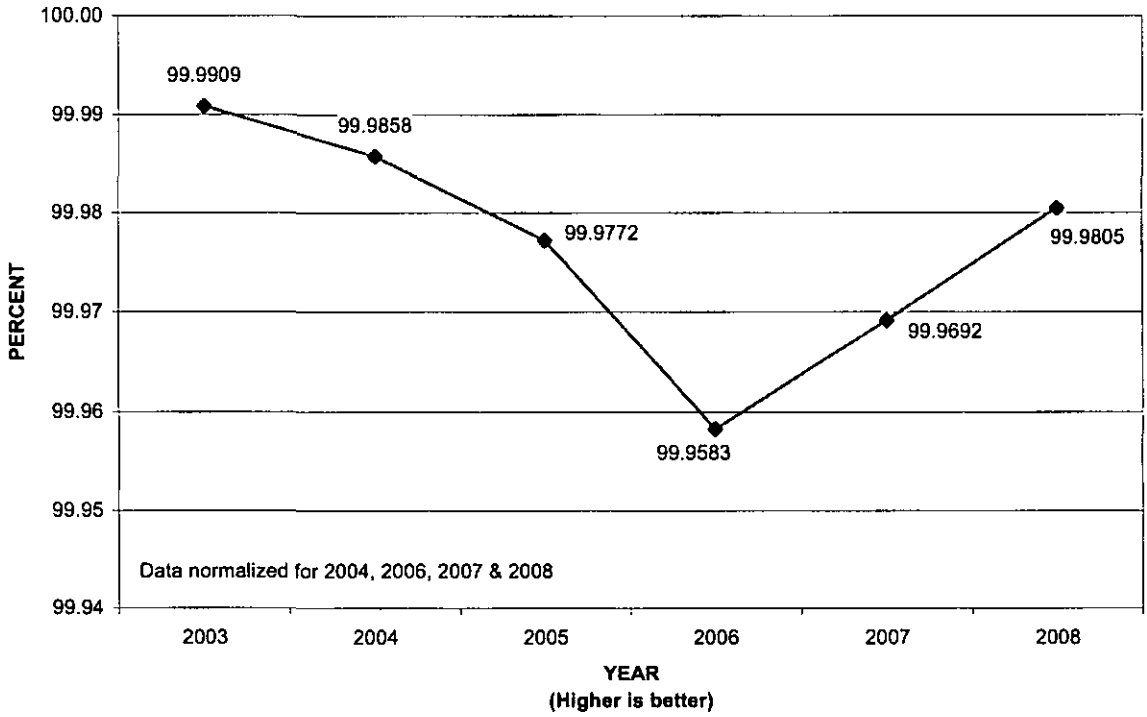
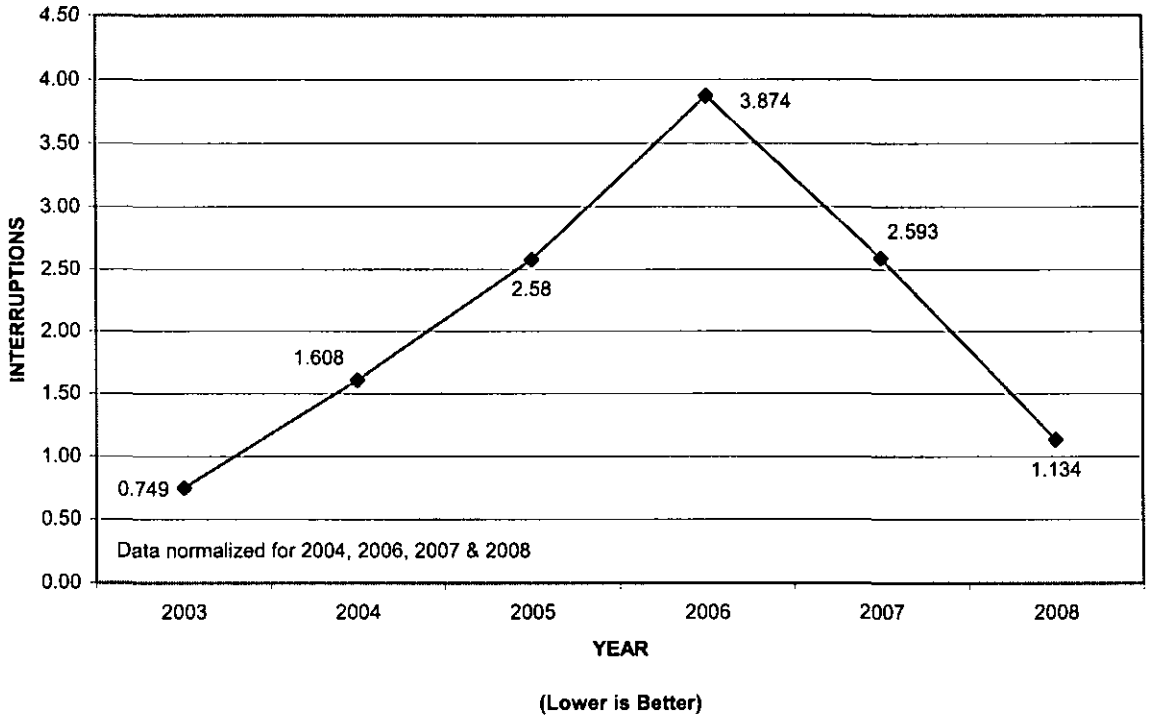


Figure 1 shows that the 2008 Average Service Availability (ASA) index has increased from the 2007 results of 99.9692% to 99.9805% during 2008. This was an increase of approximately 0.0113% in the 2008 Average Service Availability compared to the previous year. The 2008 service reliability results (normalized) showed that MECO made improvements in the SAIF and SAID indices compared to 2007, while the CAID index had increased compared to 2007.

FIGURE 2

MECO SYSTEM AVERAGE INTERRUPTION FREQUENCY
SAIF



(Lower is Better)

Figure 2 shows the System Average Interruption Frequency (SAIF) indices for the past six years. It shows that in 2008, the recorded SAIF index was 1.134 and it had decreased from 2007 by 52.3%.

A decrease in interruptions due to auto accidents, equipment failures and deterioration or corrosion contributed to a lower SAIF for 2008.

FIGURE 3

MECO CUSTOMER AVERAGE INTERRUPTION DURATION
(CAID)

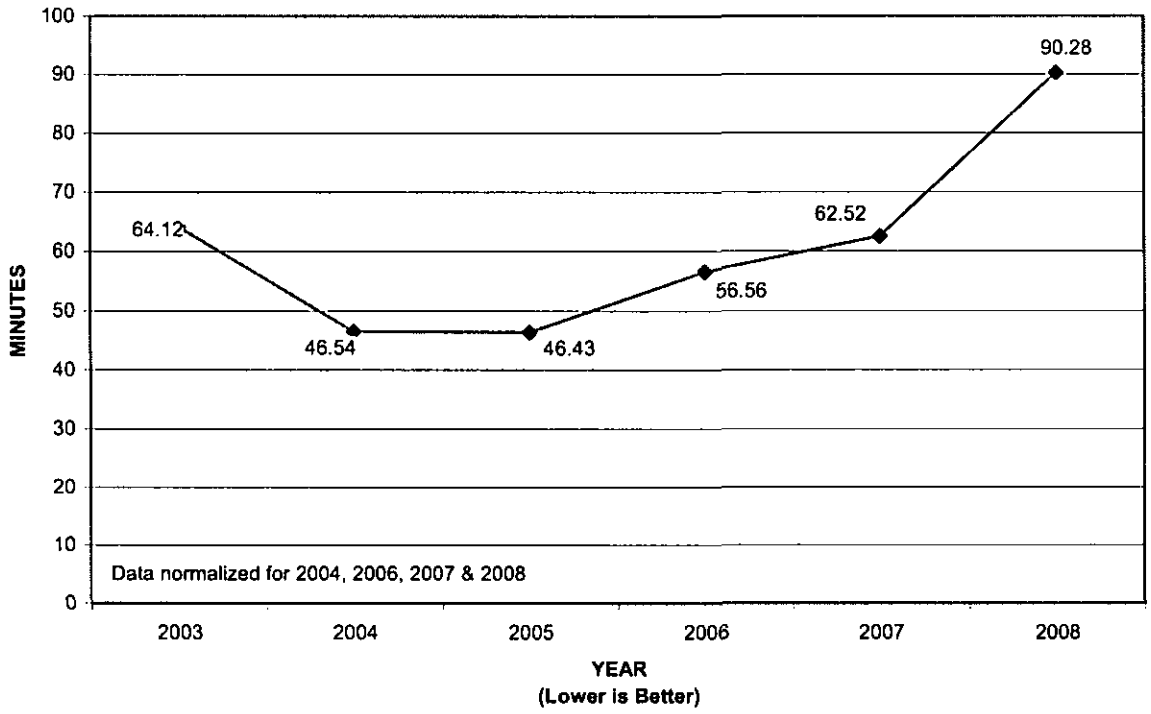


Figure 3 shows the Customer Average Interruption Duration (CAID) indices for the past six years.

The average electrical outage duration of 90.28 minutes per customer for 2008 is an increase of 44.4% from the previous year.

The contributing factors to the increase of the CAID index are outages related to high winds and trees or branches in lines. Outages due to high winds increased in 2008, which incurred 26,709.1 customer interruption hours and accounted for 23.4% of all customer interruption hours in 2008. Outages due to trees or branches in lines also increased in 2008, which incurred 26,804.1 customer interruption hours and accounted for 23.5% of all customer interruption hours in 2008. Outages related to high winds and trees or branches in lines for 2008 caused extensive damage to MECO property and required time consuming work (i.e. the replacement of poles and conductors), which increases the duration of the outage. Also, a majority of the outages caused by trees or branches in lines occurred in rural areas, which increased the duration of the outage due to the additional travel time required to reach the various outage sites.

FIGURE 4

MECO SYSTEM AVERAGE INTERRUPTION DURATION (SAID)

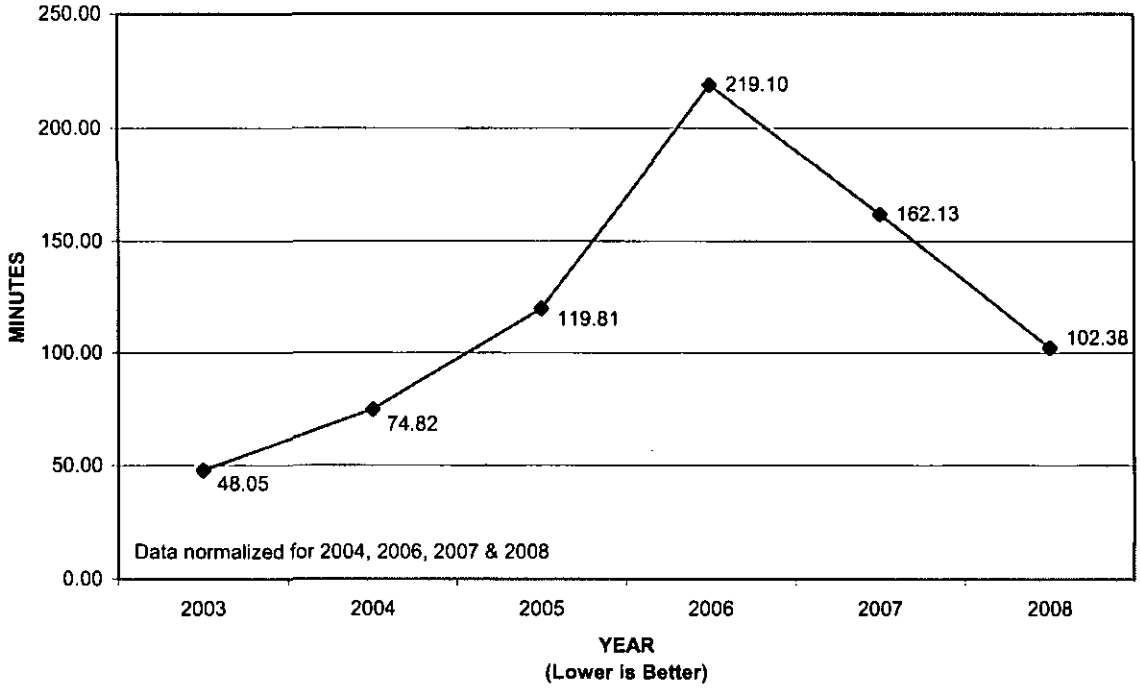


Figure 4 shows the System Average Interruption Duration (SAID) indices for the past six years. It shows that in 2008, the recorded SAID index was 102.38 and it had decreased from 2007 by 36.9%.

The SAID is the composite of both the SAIF and CAID indices and produces a broader benchmark of system reliability by combining both the duration and the number of customer interruptions during a given period of time. The lower SAID result was due to a decrease in the SAIF statistics as noted previously.

ATTACHMENT A1

Maui Electric Company System Interruption

Service Reliability - System Total

From: January 1, 2008 To: December 31, 2008

Cause	Cust-Hr	Cust-Int	SAIF	SAID	CAID	SAID Rank
07. Trees or branches in lines	26804.1	15123.0	0.226	24.07	106.34	1
10. High wind	26709.1	11178.0	0.167	23.99	143.37	2
12. Flashover	7718.7	8808.0	0.132	6.93	52.58	6
29. Unknown failure	8075.4	7600.0	0.114	7.25	63.75	5
08. Deterioration, rot, corrosion, termites	11939.7	5568.0	0.083	10.72	128.66	3
26. Maintenance - forced	1748.2	4990.0	0.075	1.57	21.02	9
13. Cable fault	7243.2	4921.0	0.074	6.50	88.31	7
17. Equipment failure	6154.5	4868.0	0.073	5.53	75.86	8
01. Automobile Accident	9173.8	3408.0	0.051	8.24	161.51	4
21. Failure of customer's electrical equipment	401.8	2514.0	0.038	0.36	9.59	18
03. Foreign objects in lines or equipment	1628.0	2137.0	0.032	1.46	45.71	10
20. Operator or switching error	283.3	1196.0	0.018	0.25	14.21	19
16. Equipment overload	1114.3	882.0	0.013	1.00	75.80	12
11. Loose connection	660.8	742.0	0.011	0.59	53.43	15
25. Maintenance - scheduled	1220.1	706.0	0.011	1.10	103.69	11
31. Mylar Balloon	469.3	390.0	0.006	0.42	72.20	17
14. Transformer failure other than overload	826.3	168.0	0.003	0.74	295.10	13
05. Contact by moving equipment	235.7	113.0	0.002	0.21	125.14	21
24. Nec. Int. to balance load or system conv.	8.1	98.0	0.001	0.01	4.97	25
09. Lightning	705.6	77.0	0.001	0.63	549.78	14
19. Faulty operation of equipment	22.8	75.0	0.001	0.02	18.27	24
02. Man or animals in lines or equipment	498.3	63.0	0.001	0.45	474.60	16
06. Excavation and construction	37.2	50.0	0.001	0.03	44.60	23
15. Transformer overload	53.7	45.0	0.001	0.05	71.62	22
27. System additions or removals	268.7	44.0	0.001	0.24	366.45	20
30. Other company personnel error	0.0	0.0	0.000	0.00	0.00	28
23. Nec. Int. to transfer load (out of phase)	0.0	0.0	0.000	0.00	0.00	27
22. Tsunami, earthquake, or flooding	0.0	0.0	0.000	0.00	0.00	30
18. Vandalism	0.0	0.0	0.000	0.00	0.00	29
04. Fire	0.0	0.0	0.000	0.00	0.00	26
Total	114000.8	75764.0	1.134	102.38	90.28	

Number of Customers for the Period 66810
SAIF = System Average Interruption Frequency
SAID = System Average Interruption Duration
CAID = Customer Average Interruption Duration
The Outage Causes are Listed in Order of its SAIF Index

ATTACHMENT A2

Maui Electric Company System Interruption

System Total

From: January 1, 2008 To: December 31, 2008

	Interruptions		*Customer Hours*	
Cause	*Number*	*% Of Total*	*Hours*	*% Of Total*
Non-Connected System Emergency	116	21.76%	39248.2	34.4%
Foreign Objects	5	0.94%	1628.0	1.4%
Contact by Moving Equipment	3	0.56%	235.7	0.2%
Excavation and Construction	2	0.38%	37.2	0.0%
Fire	0	0.00%	0.0	0.0%
Auto Accident	14	2.63%	9173.8	8.0%
Man or Animal in Lines or Equipment	3	0.56%	498.3	0.4%
Trees or Branches	83	15.57%	26804.1	23.5%
Vandalism	0	0.00%	0.0	0.0%
Customer Equipment Failure Affecting Company	4	0.75%	401.8	0.4%
Mylar Balloons	2	0.38%	469.3	0.4%
Error	4	0.75%	283.3	0.2%
Operator or Switching	4	0.75%	283.3	0.2%
Other Company Personnel	0	0.00%	0.0	0.0%
Weather	27	5.07%	27414.7	24.0%
Lightning	15	2.81%	705.6	0.6%
High Wind	12	2.25%	26709.1	23.4%
Tsunami, Earthquake or Flooding	0	0.00%	0.0	0.0%
Non-Transformer Equipment	215	40.34%	34854.0	30.6%
Loose connection	5	0.94%	660.8	0.6%
Flashover	9	1.69%	7718.7	6.8%
Equipment	16	3.00%	6154.5	5.4%
Cable Fault	108	20.26%	7243.2	6.4%
Equipment Overload	11	2.06%	1114.3	1.0%
Deterioration, Rot, Corrosion or Termites	63	11.82%	11939.7	10.5%
Faulty Operation of Equipment	3	0.56%	22.8	0.0%
Transformer	28	5.25%	880.0	0.8%
Transformer	5	0.94%	53.7	0.0%
Transformer Failure Other Than Overload	23	4.32%	826.3	0.7%
Switching	4	0.75%	8.1	0.0%
NEC Int to Transfer Load (Out of Phase)	0	0.00%	0.0	0.0%
NEC Int to Balance Load or Conversion	4	0.75%	8.1	0.0%
Unknown After Tests and Inspections	50	9.38%	8075.4	7.1%
Maintenance	80	15.01%	2968.3	2.6%
Scheduled	65	12.20%	1220.1	1.1%
Forced	15	2.81%	1748.2	1.5%
System Additions or Removals	9	1.69%	268.7	0.2%
TOTALS	533		114000.8	

DEFINITION OF TERMS

OUTAGE

The state of a component when it is not available to perform its intended function due to some event directly associated with that component. An outage may or may not cause an interruption of service to consumers depending on system configuration.

INTERRUPTION

The loss of service to one or more customers and is a result of one or more component outages.

INTERRUPTION DURATION

The period from the initiation of an interruption to a customer until service has been restored to that customer.

MOMENTARY INTERRUPTION

An interruption that has a duration limited to the period required to restore service by automatic or supervisory-controlled switching operations or by manual switching at locations where an operator is immediately available. Such switching operations must be completed in a specific time not to exceed one minute. Previous issues of this report indicated that a momentary interruption has a duration not to exceed five minutes. A December 1990 report, "Methodology for Determining Reliability Indices for HECO Utilities," indicated that momentary interruptions will have a duration less than one minute.

SUSTAINED INTERRUPTION

Any interruption not classified as a momentary interruption. Only this type of interruption is included in the reliability indices which follow: In conformance with the guidelines established in the report, "Methodology for Determining Reliability Indices for HECO Utilities," dated December 1990, a sustained interruption has a duration of one minute or longer.

CUSTOMER INTERRUPTION

One interruption of one customer.

NOTE: Interruption to customers at their request (e.g., customer maintenance) are not considered.

RELIABILITY INDICES

Reliability indices used in this report conform to standards proposed by both the Edison Electric Institute (EEI) and the Institute of Electrical and Electronics Engineers (IEEE) unless otherwise indicated in the above definitions. Four reliability indices that convey a meaningful representation of the level of reliability were selected and are presented in this report. These reliability indices are as follows:

AVERAGE SERVICE AVAILABILITY (ASA)

Total customer hours actually served as a percentage of total customer hours possible during the year. This indicates the extent to which electrical service was available to all customers. This index has been commonly referred to as the "Index of Reliability." A customer-hour is calculated by multiplying the number of customers by the number of hours in the period being analyzed.

$$ASA = \frac{\sum \text{No. of Customer Hours Actually Served during the year}}{\sum \text{No. of Customer Hours Possible during the year}} \times 100\%$$

SYSTEM AVERAGE INTERRUPTION FREQUENCY (SAIF)

The number of customer interruptions per customer served during the year. This index indicates the average number of sustained interruptions experienced by all customers serviced on the system.

$$SAIF = \frac{\sum \text{No. of Customer Interruptions Experienced during the year}}{\text{Average No. of Customers served during the year}}$$

CUSTOMER AVERAGE INTERRUPTION DURATION (CAID)

The interruption duration per customer interrupted during the year. This index indicates the average duration of an interruption for those customers affected by a sustained interruption.

$$CAID = \frac{\sum \text{Duration of Interruptions x No. of Customers affected}}{\sum \text{No. of Customer Interruptions Experienced for the year}}$$

SYSTEM AVERAGE INTERRUPTION DURATION (SAID)

The interruption duration per customer served during the year. This index indicates the average interruption time experienced by all customers serviced on the system.

$$SAID = \frac{\sum \text{Duration of Interruption x No. of Customers affected}}{\text{Average No. of Customers Served during the year}}$$