Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

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Darcy L. Endo-Omoto
Vice President
Government & Community Affairs

May 7, 2009

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PUBLIC UTILITIES
COMMISSION

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: Hawaiian Electric 2008 Annual Service Reliability Report

Hawaiian Electric Company, Inc. respectfully submits a copy of its 2008 Annual Service Reliability Report.

Sincerely,

Attachment

c: Division of Consumer Advocacy (with Attachment)

HAWAIIAN ELECTRIC COMPANY, INC.

ANNUAL SERVICE RELIABILITY REPORT

2008

Prepared by

System Operation Department
Asset Management Department

March 30, 2009

INTRODUCTION

This is the 2008 annual service reliability report of the Hawaiian Electric Company (HECO). The average number of electric customers increased from 293,893 in 2007 to 294,371 in 2008 (a 0.16% increase). The peak 2008 demand for the system was 1,227 MW (day peak); however, the highest system peak demand remains at 1,327 MW set on the evening of October 12, 2004.

The system interruption summary (Attachments A and B) for the past year and the system reliability indices for the four prior years are presented to depict the quality of service provided to the electrical energy consumer.

The definition of terms, the explanation and equations for the reliability indices are contained in Attachment C.

Indices measure reliability in terms of the overall availability of electrical service (ASA), the frequency or number of times HECO's customers experience an outage during the year (SAIF), the average length of time an interrupted customer is out of power (CAID), and the average length of time HECO's customers are out of power during the year (SAID). 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 HECO's total customer base (in this case 294,371 customers).

ANALYSIS

This analysis of the annual system reliability for HECO is for the year 2008. To determine the relative level of reliability, the statistics for four prior years, 2004 through 2007, are used for comparison.

The reliability indices are calculated using the data from all sustained[1] system outages except customer maintenance outages. If data normalization is required, it is done using 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 single outages that cascade into a loss of load 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.

[1]An interruption of electrical service of 1 minute or longer.

2008 RESULTS

Annual Service Reliability Indices

The annual service reliability for 2008 was the best in the past 5 years in terms of Customer Average Interruption Duration (CAID). The reliability results for 2008 and four prior years are shown in the Table of Annual Service Reliability Indices.

Table of
Annual Service Reliability Indices

	2004*	2005	2006**	2007***	2008****
Number of Customers	287,074	289,972	292,554	293,893	294,371
Customer Interruptions	364,491	383,410	420,749	367,837	382,124
Customer-Hours Interrupted	480,299	532,156	666,188	488,144	490,842
ASA (Percent)	99.981	99.979	99.974	99.981	99.981
SAIF (Occurrences)	1.270	1.322	1.438	1.252	1.298
CAID (Minutes)	79.06	83.28	95.00	79.62	77.07
SAID (Minutes)	100.39	110.11	136.63	99.66	100.05

NOTE:

2004*	Data normalized to exclude the 1/14/04 - 1/15/04 High Wind Outages
	Data normalized to exclude the 2/26/04 - 2/28/04 Storm
	Data normalized to exclude the 3/3/04 Pukele Outage
2006**	Data normalized to exclude the 6/01/06 Load Shedding Outage and the 10/15/06 Earthquake Outage
2007***	Data normalized to exclude the 1/29/07 and 02/02/07 High Wind Outages
	Data normalized to exclude the 11/04/07 - 11/05/07 and 12/04/07 - 12/06/07 Storms
2008****	Data normalized to exclude the 12/10/08 - 12/14/08 High Wind Outages
	Data normalized to exclude the 12/26/08 Island Wide Blackout

Figure 1: Average Service Availability (ASA)

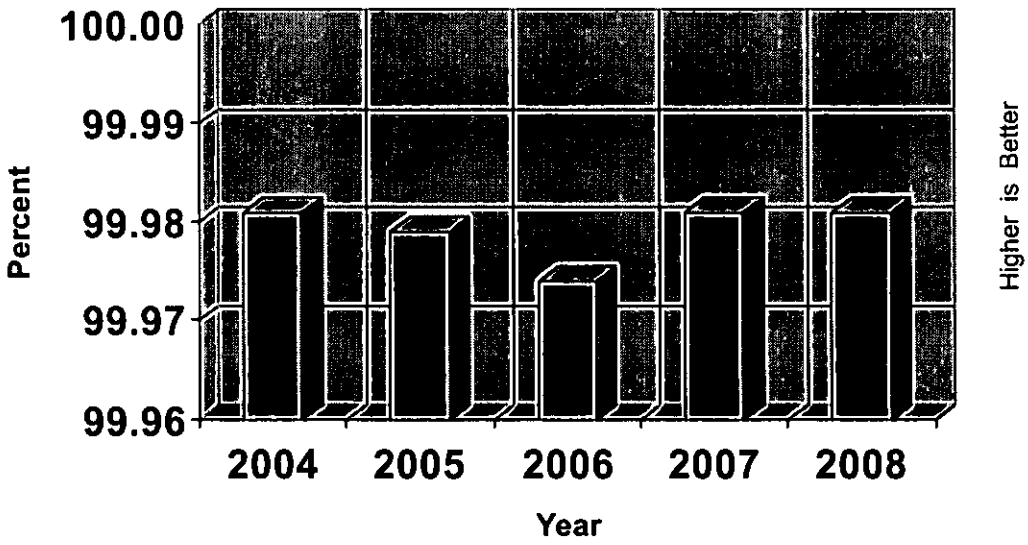


Figure 1 shows that the 2008 Average Service Availability (ASA) index remained the same compared to the 2007 results after a period of decline from 2004 to 2006. Approximately 14,287 more customers experienced sustained service interruptions during 2008 compared to the previous year, an increase of 3.9%. Also, the number of Customer-Hours Interrupted as shown in the Table of Annual Service Reliability Indices increased by 0.6% compared to 2007.

Figure 2: System Average Interruption Frequency

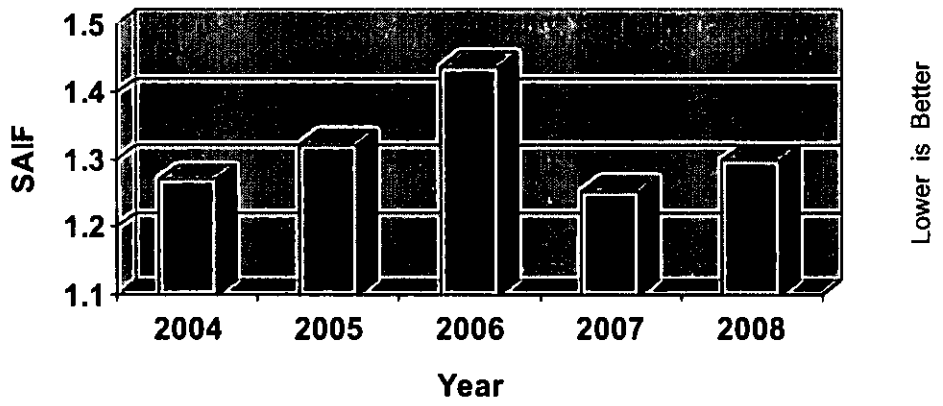
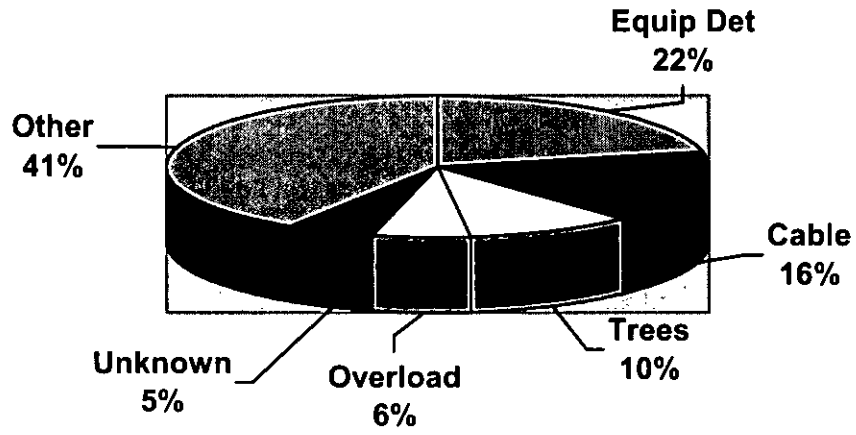


Figure 2 shows the System Average Interruption Frequency (SAIF) indices for the past five years. It shows that the 2008 SAIF of 1.298 was the third lowest in the past five years.

Figure 3: Outage Causes



The Top 5 Outage Causes, as shown in Figure 3, explained about 0.769 or about 59% of the total Customer Interruptions in 2008; these causes are "Equipment Deterioration", "Cable Faults", "Trees/Branches in Lines", "Equipment Overload", and "Unknown". All of these were also major cause factors in 2007 with the exception of "Equipment Overload" and "Unknown" which replaced "Auto Accidents" and "High Winds" as top contributors from 2007.

The number of Customer Interruptions due to "Equipment Deterioration" increased, from 64,386 in 2007 to 82,422 in 2008, an increase of 28%. The number of Customer Interruptions due to "Cable Faults" decreased from 73,965 in 2007 to 62,591 in 2008, an improvement of 15%. The continued improvement in the reduction of customer interruptions due to cable faults compared to 2006, when over 106,653 customers were affected, were due to the ongoing cable maintenance programs and the relatively dry weather in the first 11 months of the year.

Six sustained interruptions affected 10,000 or more customers during 2008 as compared to only one event in 2007. These interruptions affected approximately 92,000 customers and contributed 0.312 to the SAIF. These interruptions are summarized below:

1. March 7, 2008 – About 11,500 customers were affected when the Koolau-Kahuku and Koolau-Kaneohe 46kV lines both tripped open due to failure of a 46kV switch at the Waihee Substation. The failure occurred while both circuits were tied together during switching operations to allow crews to perform maintenance on the Koolau-Kaneohe 46kV line. The Koolau-Kahuku and Koolau-Kaneohe 46kV lines are the two main feeds to the Kaneohe and Waihee areas.

2. March 8, 2008 – About 12,500 customers were affected when the Waiau-Mililani 46kV line tripped open due to failure of a 46kV switch at the Mililani Substation. The Wahiawa-Mililani 46kV line, the alternate feeder to the

Mililani area, was out of service at the time so that crews could repair an underground cable.

3. March 17, 2008 – About 13,400 customers were affected when the Koolau-Wailupe 1 and Koolau-Wailupe 2 46kV lines both tripped open due to non-HECO tree trimmers dropping a tree into the 46kV lines in the Maunawili area. The outage occurred while both circuits were tied together during switching operations to allow crews to replace a guy wire on the Koolau-Wailupe 2 46kV line. The Koolau-Wailupe 1 and Koolau-Wailupe 2 46kV lines are the only feeds to the Hawaii Kai area.

4. October 8, 2008 – About 12,300 customers were affected when the Koolau-Wailupe 1 46kV line tripped open due to vegetation. The Koolau-Wailupe 2 46kV line, the alternate feeder to the Hawaii Kai, area was out of service so that crews could perform upgrade work on the line.

5. October 15, 2008 – About 10,000 customers were affected when the Ewa Nui 41 46kV line tripped open due to vandalism at the Waipahu Substation. The Waiau-Barbers Pt 46kV line, the alternate feeder to the Waipahu and Pearl City areas, was out of service at the time due to an earlier outage, also caused by vandalism.

6. November 19, 2008 – About 32,300 customers were affected when during the replacement of equipment at the Waiau 46 kv station involving a potential transformer secondary wiring problem; and subsequent automatic load transfers caused the Wahiawa-Mililani 46kV circuit to trip open.

Figure 4: Customer Average Interruption Duration

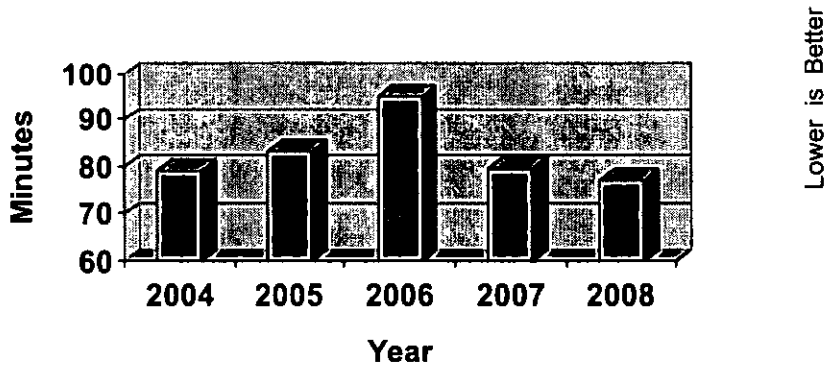


Figure 4 shows that the average duration of a customer's outage (CAID) for 2008 was the lowest in the past 5 years. This shows that a good effort was made in minimizing the time a customer was out of service. The average electrical outage duration (CAID) for 2008 was 77.07 minutes, a 3% improvement from the 79.62 minutes for the 2007 results. Improvements in outage durations compared to the

2007 results were noted for "Cable Faults" and "Equipment Deterioration", which were the top two outage causes in 2008.

Two major events affected the CAID results in 2008:

1. February 8, 2008 – Failure of a switching vault caused outages in the Hawaii Kai area affecting about 1,800 customers from 55 minutes to 14 hours and 40 minutes.

2. October 15, 2008 – Vandalism at Waipahu Substation caused outages in the Waipahu and Pearl City areas affecting about 10,000 customers from 3 hour and 2 minutes to 5 hrs and 53 minutes.

Figure 5: System Average Interruption Duration

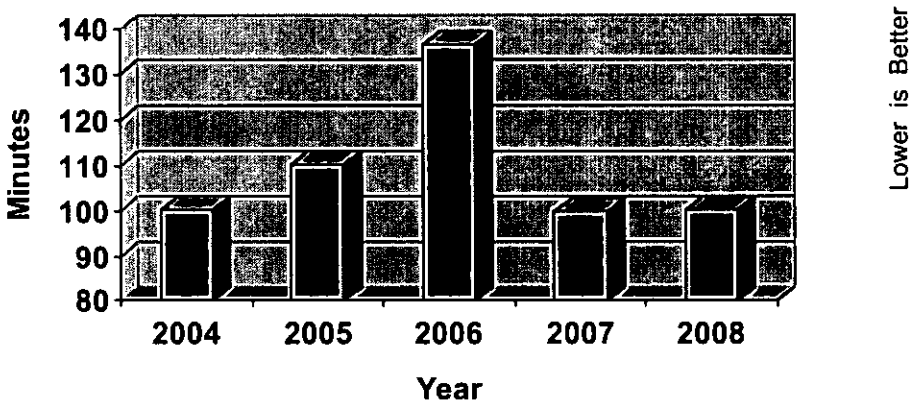


Figure 5 shows the System Average Interruption Duration (SAID) indices for the past five years. It shows that the 2008 SAID of 100.05 minutes, a 0.4% increase as compared to the 2007 SAID results, was the second lowest during the last five years. The SAID is the composite of both the SAIF and CAID indices 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 increase of the SAID result was due to an increase in the SAIF statistics.

Hawaiian Electric Company
Normalized Sustained Interruption Summary

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

Outage Cause	Customer Hours	Customer Interruptions	SAIF	SAID	CAID
EQUIP DETERIORATION	107,358.28	82,422	0.280	21.88	78.15
CABLE FAULT	79,236.20	62,591	0.213	16.15	75.96
TREES/BRANCHES IN LINES	56,303.55	38,047	0.129	11.48	88.79
EQUIP OVERLOAD	19,999.57	22,344	0.076	4.08	53.70
UNKNOWN	28,027.32	20,766	0.071	5.71	80.98
FLASHOVER	10,140.78	20,533	0.070	2.07	29.63
COMPANY PERSONNEL ERROR	11,758.60	19,991	0.068	2.40	35.29
FOREIGN OBJECT IN LINES	13,402.82	19,198	0.065	2.73	41.89
FAULTY EQUIP OPERATION	15,279.72	18,313	0.062	3.11	50.06
COMPANY SWITCHING ERROR	6,576.58	17,163	0.058	1.34	22.99
AUTO ACCIDENT	38,392.63	16,493	0.056	7.83	139.67
VANDALISM	50,592.92	13,003	0.044	10.31	233.45
MYLAR BALLOON	4,449.78	5,636	0.019	0.91	47.37
TRANSFORMER FAILURE	8,674.18	4,784	0.016	1.77	108.79
SCHEDULED MAINTENANCE	11,700.38	4,412	0.015	2.38	159.12
FORCED MAINTENANCE	5,026.05	4,268	0.014	1.02	70.66
OVERGROWN VEGETATION	2,927.43	2,763	0.009	0.60	63.57
LIGHTNING	2,680.53	2,247	0.008	0.55	71.58
CONSTRUCTION ACCIDENT	2,629.13	1,944	0.007	0.54	81.15
OTHER	5,922.40	1,556	0.005	1.21	228.37
ANIMAL IN LINES	2,529.68	1,499	0.005	0.52	101.25
CONTAMINATION FLASHOVER	1,751.38	1,112	0.004	0.36	94.50
EQUIP ROT OR TERMITES	1,293.33	325	0.001	0.26	238.77
FIRE	108.17	314	0.001	0.02	20.67
TRANSFORM OVERLOAD	244.63	167	0.001	0.05	87.89
MOVING EQUIP ACCIDENT	148.52	121	0.000	0.03	73.64
CUSTOMER EQUIP	270.08	88	0.000	0.06	184.15
MANUFACTURER EQUIP DEFECT	7.20	18	0.000	0.00	24.00
LANDSLIDE/FLOODING	3,408.18	4	0.000	0.69	51122.75
SYSTEM LOAD MAINTENANCE	2.00	2	0.000	0.00	60.00
IPP EQUIP FAILURE	0.00	0	0.000	0.00	0.00
HIGH WINDS	0.00	0	0.000	0.00	0.00
MAN IN LINES	0.00	0	0.000	0.00	0.00
CUSTOMER MAINTENANCE	0.00	0	0.000	0.00	0.00
SWITCH LOAD MAINTENANCE	0.00	0	0.000	0.00	0.00
TRANSFER LOAD MAINTENANCE	0.00	0	0.000	0.00	0.00
NATURAL DISASTER	0.00	0	0.000	0.00	0.00
Total	490,842.05	382,124	1.298	100.05	77.07

AVERAGE SYSTEM AVAILABILITY = 99.981%
NUMBER OF CUSTOMERS FOR THE PERIOD = 294,371
AUTO-TRANSFER MOMENTARY CUSTOMER INTERRUPTIONS FOR THE PERIOD = 174,935
AUTO-TRANSFER MAIF= 0.594
SAIF = SYSTEM AVERAGE INTERRUPTION FREQUENCY
SAID = SYSTEM AVERAGE INTERRUPTION DURATION (MINUTES)
CAID = CUSTOMER AVERAGE INTERRUPTION DURATION (MINUTES)

NOTES: Outage causes are listed in order of SAIF.
Outages with zero customer hours or due to customer maintenance are not included in the report.

Hawaiian Electric Company
Normalized Sustained Interruption Summary

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

Outage Cause	Interruptions Number	Interruptions % of Total	Customer Hours Number	Customer Hours % of Total
ACCIDENT	79	4.58	41,170.28	8.39
CONSTRUCTION ACCIDENT	16	0.93	2,629.13	0.54
MOVING EQUIP ACCIDENT	4	0.23	148.52	0.03
AUTO ACCIDENT	59	3.42	38,392.63	7.82
CABLE FAULT	467	27.06	79,236.20	16.14
CABLE FAULT	467	27.06	79,236.20	16.14
COMPANY ERROR	45	2.61	18,335.18	3.74
COMPANY PERSONNEL ERROR	18	1.04	11,758.60	2.40
COMPANY SWITCHING ERROR	27	1.56	6,576.58	1.34
EQUIPMENT	373	21.61	144,208.18	29.38
IPP EQUIP FAILURE	0	0.00	0.00	0.00
MANUFACTURER EQUIP DEFECT	1	0.06	7.20	0.00
EQUIP OVERLOAD	4	0.23	19,999.57	4.07
EQUIP DETERIORATION	325	18.83	107,358.28	21.87
CUSTOMER EQUIP	14	0.81	270.08	0.06
EQUIP ROT OR TERMITES	2	0.12	1,293.33	0.26
FAULTY EQUIP OPERATION	27	1.56	15,279.72	3.11
FIRE	3	0.17	108.17	0.02
FIRE	3	0.17	108.17	0.02
FLASHOVER	14	0.81	11,892.17	2.42
FLASHOVER	10	0.58	10,140.78	2.07
CONTAMINATION FLASHOVER	4	0.23	1,751.38	0.36
MAINTENANCE	476	27.58	16,728.43	3.41
SCHEDULED MAINTENANCE	375	21.73	11,700.38	2.38
SYSTEM LOAD MAINTENANCE	1	0.06	2.00	0.00
SWITCH LOAD MAINTENANCE	0	0.00	0.00	0.00
CUSTOMER MAINTENANCE	0	0.00	0.00	0.00
FORCED MAINTENANCE	100	5.79	5,026.05	1.02
TRANSFER LOAD MAINTENANCE	0	0.00	0.00	0.00
OBJECT IN LINES OR EQUIP	35	2.03	20,382.28	4.15
ANIMAL IN LINES	9	0.52	2,529.68	0.52
MYLAR BALLOON	10	0.58	4,449.78	0.91
MAN IN LINES	0	0.00	0.00	0.00
FOREIGN OBJECT IN LINES	16	0.93	13,402.82	2.73
OTHER	8	0.46	5,922.40	1.21
OTHER	8	0.46	5,922.40	1.21
TRANSFORMER	68	3.94	8,918.82	1.82
TRANSFORMER FAILURE	59	3.42	8,674.18	1.77
TRANSFORM OVERLOAD	9	0.52	244.63	0.05
UNKNOWN	67	3.88	28,027.32	5.71

Hawaiian Electric Company
Normalized Sustained Interruption Summary

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

Outage Cause	Interruptions Number	Interruptions % of Total	Customer Hours Number	Customer Hours % of Total
UNKNOWN	67	3.88	28,027.32	5.71
VANDALISM	6	0.35	50,592.92	10.31
VANDALISM	6	0.35	50,592.92	10.31
VEGETATION	79	4.58	59,230.98	12.07
TREES/BRANCHES IN LINES	74	4.29	56,303.55	11.47
OVERGROWN VEGETATION	5	0.29	2,927.43	0.60
WEATHER	6	0.35	6,088.72	1.24
NATURAL DISASTER	0	0.00	0.00	0.00
HIGH WINDS	0	0.00	0.00	0.00
LIGHTNING	5	0.29	2,680.53	0.55
LANDSLIDE/FLOODING	1	0.06	3,408.18	0.69
Total:	1,726		490,842.05	

NOTES: Outages with zero customer hours or due to customer maintenance are not included in the report.

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 the system configuration.

INTERRUPTION

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

INTERRUPTION DURATION

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

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 of 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 within this report. 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: Interruptions to customers at their request (e.g., customer maintenance) are not considered.

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:

RELIABILITY INDICES

AVERAGE SERVICE AVAILABILITY INDEX (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.

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

SYSTEM AVERAGE INTERRUPTION FREQUENCY INDEX (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.

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

CUSTOMER AVERAGE INTERRUPTION DURATION INDEX (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.

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

SYSTEM AVERAGE INTERRUPTION DURATION INDEX (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.

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