BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket No. UE-110060
Puget Sound Energy, Inc.'s
Electric Service Reliability Plan

Attachment A
Electric Service Reliability Monitoring and Reporting Plan

Docket No. UE-110060, PSE's Electric Service Reliability Plan

Attachment A
Electric Service Reliability Monitoring and Reporting Plan

Executive Summary

This is Puget Sound Energy's (PSE or the Company) Electric Service Reliability Monitoring and Reporting Plan (the Plan), required to be filed at the Washington Utilities and Transportation Commission (UTC or the Commission) according to WAC 480-100-393, Electric service reliability monitoring and reporting plan. The Plan details the electric service reliability information that PSE will be monitoring and providing in its annual electric service reliability reporting to comply with each section of WAC 480-100-393 and WAC 480-100-398, Electric service reliability report. An outline of the annual electric service reliability reporting (the Reporting Outline) is filed concurrently as Attachment B. The terms and definitions used through out the Plan and the Reporting Outline are consistent with WAC 480-100-388, Electric service reliability definitions.

Information contained in the annual reporting will help the Commission, customers, and other interested parties better understand how service reliability performance changes from year to year. PSE cautions against putting too much emphasis on the usefulness of the annual reporting in determining year-to-year trends pertaining to system performance. Factors such as variation in weather, natural disasters, and normal random variation in events such as third-party damage will all impact year-to-year comparisons of system performance. Assessing trends requires a longer-term perspective than looking for variations between two annual periods, such as comparing ten-year rolling average with a ten year baseline period. Notwithstanding the limited usefulness of using the annual reports to assess year-to-year trends, PSE believes the annual snap-shots provided in the Company's annual reliability report will help PSE in monitoring its service reliability performance and provide useful information to all interested parties as the data for a meaningful trend analysis is accumulated.

Attachment A
Electric Service Reliability Monitoring and Reporting Plan

Background

PSE submits the following Reliability Monitoring and Reporting Plan to help ensure that the Commission has the required information about PSE's electric system reliability and the information reported is sufficient and meaningful.

Delivering reliable electrical service is core to PSE's business philosophy. Developing the most appropriate and cost-effective means to meet customer reliability needs is PSE's objective. For 2003-2009, PSE received about 50 reliability-related Commission complaints per year while serving over 1,000,000 customers. This information, in combination with customers' consistent satisfaction of PSE's outage response in more than eight years of surveys and small numbers of repeated reliability complaints received by PSE through the years, indicates PSE is indeed meeting customer's reliability expectations and needs.

Definitions

AMR – Automated Meter Reading system, which is a communication network capable of providing the Company with certain information pertaining to sustained outages automatically.

Area of Greatest Concern – An area targeted for specific actions to improve the level of service reliability or quality.

Cause Codes – A list of codes used to identify the Company's best estimation of what caused a Sustained Interruption to occur. The following is the PSE interruption causes code information:

AO	Accident Other, with Fires
BA	Bird or Animal
CP	Car Pole Accident
CR	Customer Request
DU	Dig Up Underground
EF	Equipment Failure
EO	Electrical Overload
EQ	Earthquake
FI	Faulty Installation

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LI	Lightning
SO	Scheduled Outage, was WR – Work Required
TF	Tree – Off Right of Way
TO	Tree – On Right of Way
TV	Trees/Vegetation
UN	Unknown Cause (unknown equipment involved only)
VA	Vandalism

Commission Complaint – Any single customer electric service reliability complaint filed by a customer with the Washington Utilities and Transportation Commission (UTC).

Customer Complaint – Repeated Customer Inquiries relating to dissatisfaction with the resolution or explanation of a concern related to a Sustained Interruption or Power Quality. This is indicated by two or more recorded contacts in the Company's customer information system during current and prior years, where by, after investigation by the Company, the cause of the concern is found to be on the Company's energy delivery system.

Customer Count – The number of customers relative to focus of topic or data. The source of the data will be the outage reporting system that is a part of SAP, the Company's work management and financial information system.

Customer Inquiry – An event whereby a customer contacts Company's customer access center to report a Sustained Interruption or Power Quality concern.

Duration of Sustained Interruption – The period, measured in minutes, or hours or days, beginning when the Company is first informed the service to a customer has been interrupted and ending when the problem causing the interruption has been resolved and the line has been re-energized. An interruption may require Step Restoration tracking to provide reliable index calculation. As an example, two trees could be down, one taking out a major feeder on a main street affecting numerous customers, another down the line in a side street, affecting only a few customers off the major feeder. When the major line is restored and service to most customers is resumed, it is possible that the second tree will prevent resumption of service to the smaller group of customers. The Sustained Interruption associated with the second tree is treated as a separate incident for reporting and tracking purposes.

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Equipment Codes

OCN	Overhead Secondary Connector
OCO	Overhead Conductor
OFC	Overhead Cut - Out
OFU	Overhead Line Fuse / Fuse Link
OJU	Overhead Jumper Wire
OPO	Distribution Pole
OSV	Overhead Service
OTF	Overhead Transformer Fuse
OTR	Overhead Transformer
UEL	Underground Elbow
UFJ	Underground J – Box
UPC	Underground Primary Cable
UPT	Padmount Transmformer
USV	Underground Service

IEEE 1366 – IEEE Standard 1366-2003, a guide approved and published by the Institute of Electrical and Electronics Engineers that defines electric power distribution reliability indices and factors that affect their calculations.

Major Event – An event, such as storm, that causes serious reliability problems. PSE utilizes two Major Event criteria to evaluate its reliability performance: 5% Exclusion Major Event Days and IEEE 1366 T_{MED} Exclusion Major Event Days.

Major Event Days – Days when outage events can be excluded from the reliability performance calculation. The two types of Major Event Days are:

5% Exclusion Major Event Days = Days that 5% or more of electric customers are experiencing an electric outage during a 24-hour period and subsequent days when the service to those customers is being restored

IEEE 1366 T_{MED} Exclusion Major Event Days = Any days that in which the daily system SAIDI exceeds the threshold value, T_{MED}.

Outage – The state of a system component when it is not available to perform its intended function due to some event directly associated with that component. For the most part, a component's unavailability is considered an outage when it causes a sustained interruption of service to customers.

Power Quality – There are no industry standards that are broad enough to be able to define power quality or how and when to measure it. For purposes of this plan, power

quality includes all other physical characteristics of electrical service except for Sustained Interruptions, including but not limited to momentary outages, voltage sags, voltage flicker, harmonics and voltage spikes.

SAIDI – System Average Interruption Duration Index. This index is commonly referred to as customer minutes of interruption or customer hours, and is designed to provide information about the average time the customers are interrupted. The measurements used in PSE's Plan and reporting include Total methodology ($SAIDI_{Total}$), Total with 5-year-rolling average methodology ($SAIDI_{Total\ 5\ years\ Avg}$), 5% exclusion methodology ($SAIDI_{5\%}$), and IEEE methodology ($SAIDI_{IEEE}$). The performance results for each of the measurement will be calculated according to the following:

$$SAIDI_{Total} = \frac{\sum \text{All customer interruption minutes}}{\text{Total number of customers served}}$$

$SAIDI_{Total\ 5\ years\ Avg}$ = Rolling 5-year average of current year Annual $SAIDI_{Total}$ and prior four years Annual $SAIDI_{Total}$ results, excluding Annual $SAIDI_{Total}$ for 2006 or any subsequent exclusion approved by the Commission. Exclusions will be replaced by preceding Annual $SAIDI_{Total}$ performance results until there are 5 years included in the calculation of current year $SAIDI_{Total\ 5\ years\ Avg}$

$$SAIDI_{5\%} = \frac{\sum \text{Customer interruption minutes during non-5\%-Exclusion-Major-Event-Days}}{\text{Total number of customers served}}$$

$$SAIDI_{IEEE} = \frac{\sum \text{Customer interruption minutes during non-IEEE-1366-}T_{MED}\text{-Exclusion-Major-Event Days}}{\text{Total number of customers served}}$$

SAIFI – System Average Interruption Frequency Index. This index is designed to give information about the average frequency of sustained interruptions per customers over a predefined area. The measurements used in PSE's Plan and reporting include Total methodology ($SAIFI_{Total}$), Total with 5-year-rolling average methodology ($SAIFI_{Total\ 5\ years\ Avg}$), 5% exclusion methodology ($SAIFI_{5\%}$), and IEEE methodology ($SAIFI_{IEEE}$). The performance results for each of the measurement will be calculated according to the following:

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$$SAIFI_{Total} = \frac{\text{Total number of customers that experienced Sustained Interruptions}}{\text{Total number of customers served}}$$

$SAIFI_{Total\ 5\ years\ Avg}$ = Rolling 5-year average of current year Annual Total SAIFI and prior four years Annual Total SAIFI results, excluding Annual Total SAIFI for 2006 or any subsequent exclusion approved by the Commission. Exclusions will be replaced by preceding Annual Total SAIFI performance results until there are 5 years included in the calculation of current year $SAIFI_{Total\ 5\ years\ Avg}$

$$SAIFI_{5\%} = \frac{\text{Number of customers that experienced Sustained Interruptions during non-5\%-Exclusion-Major-Event-Days}}{\text{Total number of customers served}}$$

$$SAIFI_{IEEE} = \frac{\text{Number of customers that experienced Sustained Interruptions during non-IEEE-1366-}T_{MED}\text{ Exclusion-Major-Event-Days}}{\text{Total number of customers served}}$$

SQI – PSE's Service Quality Index Program was first established per conditions of the Puget Power and Washington Natural Gas merger in 1997 under Docket No. UE-960195. The SQI program has been since extended and modified in Docket Nos. UE-011570 and UG-011571 (consolidated), Docket No. UE-031946, and Docket Nos. UE-072300 and UG-072301 (consolidated).

Step Restoration – The restoration of service to blocks of customers in an area until the entire area or feeder is restored.

Sustained Interruption – Any interruption not classified as a momentary event. PSE records any interruption longer than one minute as a Sustained Interruption.

T_{MED} – The major event day identification threshold value that is calculated at the end of each reporting year for use during the next report year. It's determined by reviewing the past 5 years of daily system SAIDI, and using the IEEE 1366 2.5 beta methodology in calculating the threshold value. Any days having a daily system SAIDI greater than T_{MED} are days on which the energy delivery system experienced stresses beyond the normally expected, which are classified as Major Event Days. $T_{MED} = e^{(\alpha + 2.5\beta)}$ Where α is the log-average of the data set and β is the log-standard deviation of the data set.

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System Level Reliability and Subsystem Reliability by County

The following information by system level and county level will be monitored and reviewed in the Historical Trends and Customer Electric Reliability Complaints sections with details in appendices in each annual reporting:

A. SAIFI
B. SAIDI
C. Customer Complaints and Commission Complaints related to Sustained Interruptions
D. Customer Complaints and Commission Complaints related to Major Events
E. Discussion on how PSE uses Customer Complaints and Commission Complaints information in its circuit reliability evaluations[1]
F. Cause Code report, showing the causes of Sustained Interruptions
G. Map showing Customer Complaints and Commission Complaints on service territory map with number of next year's proposed projects and vegetation management mileage

Areas of Greatest Concern

This section of the annual reporting will include information on specific geographic areas the Company is targeting for specific actions to enhance the level of service reliability in the area. For each reporting year, PSE designates the Areas of Greatest Concern as the 50 worst performing circuits over the previous 5 years that rank worst in terms of customer interruption minutes. Each circuit is first ranked by the annual total customer interruption minutes seen by the circuit for each of the previous 5 years. The yearly ranking results are then averaged to determine the overall 50 worst circuits over the past 5 years. The following information will be reported on each of these areas:

A. Identification of each Area of Greatest Concern.
B. Explanation of the specific actions the Company plans to take in each Area of Greatest Concern to improve the service in each area during the coming year.

[1] Appendix D to Order 17 of consolidated Docket Nos. UE-072300 and UG-072301, page 8, section F

Data Collection—Methods and Issues

Each annual reporting will include an appendix on data collection methods and issues. The section will include an explanation of how the various data were collected. Changes in methods from prior reporting periods will be highlighted and the impact of the new method on data accuracy will also be discussed in the appendix.

Methods for Identifying a Sustained Interruption/When Interruption Duration Measurement Begins

A. Customer call to the Company's customer access center, either through the automated voice response unit or talking with a customer representative.
B. Customer call to a PSE employee other than through the customer access center.
C. Automated system information from the Company's AMR system (may precede customer call).
D. Possible Causes of Data Inconsistencies:
    1. If service to a customer that was affected by a service interruption remains out after the interruption has been corrected, a follow-up call from the customer may be reported as a new incident.
    2. If, during restoration activities, service technicians need to create a larger outage, those customers affected by that larger outage may not be reported as a new incident.
    3. Data entry mistakes can create inconsistencies.
    4. The greater the storm event the less time spent in recording accurate data up front due to the focus on the restoration effort.

Methods to Specify When the Duration of a Sustained Interruption Ends

A. PSE Service personnel will log the time when the problem causing the outage has been resolved.
B. Possible Causes of Data Inconsistencies:

1. There may be multiple layers of issues contributing to a Sustained Interruption for a specific customer as described in the definition of Duration of Sustained Interruption.
2. Data entry errors can affect the accuracy of the information.

Recording Cause Codes

A. Outage cause codes are reported by the PSE service technician responding to the outage location.

B. Possible Causes of Data Inconsistencies.
   1. The greater the storm the less time spent in recording accurate data up front due to the focus on the restoration effort.
   2. Restoration efforts take precedence over pinpointing the exact cause and location of the outage, especially in cross-country terrain or in the darkness.
   3. A series of outages effecting a group or groups of customers at the same time or approximate times with several causes are difficult to capture.

Recording and Tracking Customer Complaints

A. The Customer Service Representative (CSR) in Company's customer access center handling the call listens for key words and then categorizes the customer comments accordingly. The CSR creates a request for the appropriate PSE personnel to contact the customer and discuss their concerns. All contact is tracked as an inbound client comment in the Company's Customer Information System (CIS) and counted as a Customer Inquiry for electric reliability reporting purposes. When two or more Customer Inquiries on outage frequency or duration and/or power quality have been recorded in the CIS from a customer during current and prior reporting years, these Customer Inquiries together will be considered as a PSE "Customer Complaint".

B. Possible Causes of Data Inconsistencies.
   1. Data entry errors from the initial inquiry or during the feedback loop can affect the accuracy of the information.

2. High volumes of customer inquiries, during storms for example, may increase likelihood of data entry errors.

Baseline and Annual Reporting Periods

Baseline Data Reliability Statistics

Pursuant to the WAC electric service reliability requirements, the Company establishes 2003 as its baseline year as the performance from the year was about average for each of the reliability measurements. However, the Company would rather develop a baseline using multiple years to mitigate the fluctuation of reliability statistics. As noted above in the Executive Summary section, PSE cautions against use of a single year's data to assess year-to-year system reliability trends. Such trend analysis may not be meaningful and the Company feels there is limited usefulness in designating one specific year's information as a "baseline".

Timing of Annual Report Filings

PSE will be reporting data and information on a calendar year basis. The Company's annual electric service reliability reporting will be filed as part of the annual SQI and electric service reliability report with the Commission no later than the end of March of each year.[2]

[2] Order 17 of consolidated Docket Nos. UE-072300 and UG-072301, page 10, section 26

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Attachment B
Electric Service Reliability Reporting Outline

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Electric Service Reliability Reporting Outline

[Outline for the Electric Service Reliability section of the combined PSE SQI and Electric Service Reliability Annual Report. SQI measurements not related to SAIDI and SAIFI are not subject to WAC 480-100-388, WAC 480-100-393, and WAC 480-100-398 therefore the outline for the SQI section of the combined report is not included in this filing.]

SAIFI

Overview

[Brief overview of current PSE electric service reliability results. Explain Baseline figures with reference to Appendix K.]

Key measurement		Benchmark	Baseline	Current Year Results	Achieved
SAIFI $_{\text{Total Annual}}$	Total (all outages current year) Outage Frequency -- System Average Interruption Frequency Index (SAIFI)		1.24		
SAIFI $_{\text{Total 5 years Avg}}$	Total (all outages five-year average) SAIFI		1.37		
SAIFI $_{5\%}$	<5% Non-Major-Storm (<5% customers affected) SAIFI	No more than 1.30 interruptions per year per customer	0.80		☐
SAIFI $_{\text{IEEE}}$	IEEE Non-Major-Storm (T_{MED}) SAIFI		0.71		

What influences SAIFI

[Discussion of weather/tree impact, response time, causes, and any other influences]

Historical Trends for SAIFI

[Discussion of historical trends with reference to Appendixes K through M for performance results]

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Electric Service Reliability Reporting Outline

SAIDI

Overview

[Brief overview of current PSE SAIDI results. Explain Baseline figures with reference to Appendix K]

Key measurement		Benchmark	Baseline	Current Year Results	Achieved
$SAIDI_{Total\ Annual}$	Total (all outages current year) Outage Duration -- System Average Interruption Duration Index (SAIDI)		532		
$SAIDI_{Total\ 5\ years\ Avg}$	$SAIDI_{Total\ 5\ years\ Avg}$ Total (all outages five-year average) SAIDI	No more than 320 minutes per customer per year[1]	326		☐
$SAIDI_{5\%}$	$SAIDI_{5\%}$ <5% Non-Major-Storm (<5% customers affected) SAIDI		132		
$SAIDI_{IEEE}$	$SAIDI_{IEEE}$ IEEE Non-Major-Storm (T_{MED}) SAIDI		107		

What influences SAIDI

[Discussion of storms weather/tree impact, response time, causes, and any other influences]

Historical Trends for SAIDI

[Discussion of historical trends with reference to Appendixes K through M for performance results]

About Electric Service Reliability Measurements and Baseline Statistics

[Discussion of electric service reliability measurements, baseline statistics, and how they are calculated/determined including: 2003 baseline statistics, Total

[1] This SQI benchmark is effective for the 2010-2013 annual reporting periods per Order 17 of consolidated Docket Nos. UE-072300 and UG-072301. For the 1997 – 2009 annual reporting periods, the SQI SAIDI measure had been based on the $SAIDI_{5\%}$. The initial and last SQI benchmarks associated with $SAIDI_{5\%}$ were 149.4 minutes and 136 minutes per customer per year, respectively.

methodology, SQI methodology, 5% exclusion methodology, and IEEE methodology]

Major Events

[Both 5% Exclusion Major Event Days and IEEE 1366 TMED Exclusion Major Event Days]

IEEE T_{MED} Exclusion Dates	Daily SAIDI	5% Customers Out Exclusion	Cause	Span of 5% Customers Out Exclusion Dates

Areas of Greatest Concern

[Discuss the identification of the Areas of Greatest Concern, which will be 50 worst performing circuits over the previous 5 years that contributed the most customer interruption minutes. The specific actions PSE plans to take in each area to improve service will be included in Appendix N.

Customer Electric Reliability Complaints

[Discuss customer complaints related to outage frequency and power quality received via UTC/PSE during the year. List of complaints will be in Appendix O. Appendix P is a PSE electric service territory map with the number of current year complaints and the number of next year's proposed system projects and vegetation management mileage by county.]

Working to Uphold Reliability

[Discuss current system programs that are applicable to improving reliability. Examples include vegetation management, equipment upgrades, reliability initiatives, response and repair time, etc.]

Going forward

[Discuss future system programs that are applicable to improving reliability in addition to the specific actions in the targeted areas listed in Appendix N.]

Appendices

[Partial appendices list of the combined annual SQI and Electric Service Reliability Report. The list includes only electric service reliability related appendices. Appendices will be reordered and renumbered as needed.]

Appendix I: Electric Reliability Terms and Definitions

Appendix J: Electric Reliability Data Collection Process and Calculations

[Discuss of electric reliability data collection process and calculations, and changes from prior year, e.g. for the 2010 reporting, this section will include details about all the SQI SAIDI changes.]

Appendix K: 1997-current year PSE SAIDI and SAIFI Performance by Different Measurements

Appendix L: Current Year Electric Service Outage by Cause by Area

Appendix M: Historical SAIDI and SAIFI by Area

Appendix N: Areas of Greatest Concern with Action Plan

Appendix O: Current-Year Commission and Rolling-Two-Year PSE Customer Electric Service Reliability Complaints with Resolutions

Appendix P: Current Year Geographic Location of Electric Service Reliability Customer Complaints on Service Territory Map with Number of Next Year's Proposed Projects and Vegetation Management Mileage

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Attachment C
1997-2009 PSE SAIFI and SAIDI Performance
by Different Measurements

Attachment C
1997-2009 year PSE SAIFI and SAIDI Performance by Different Measurements

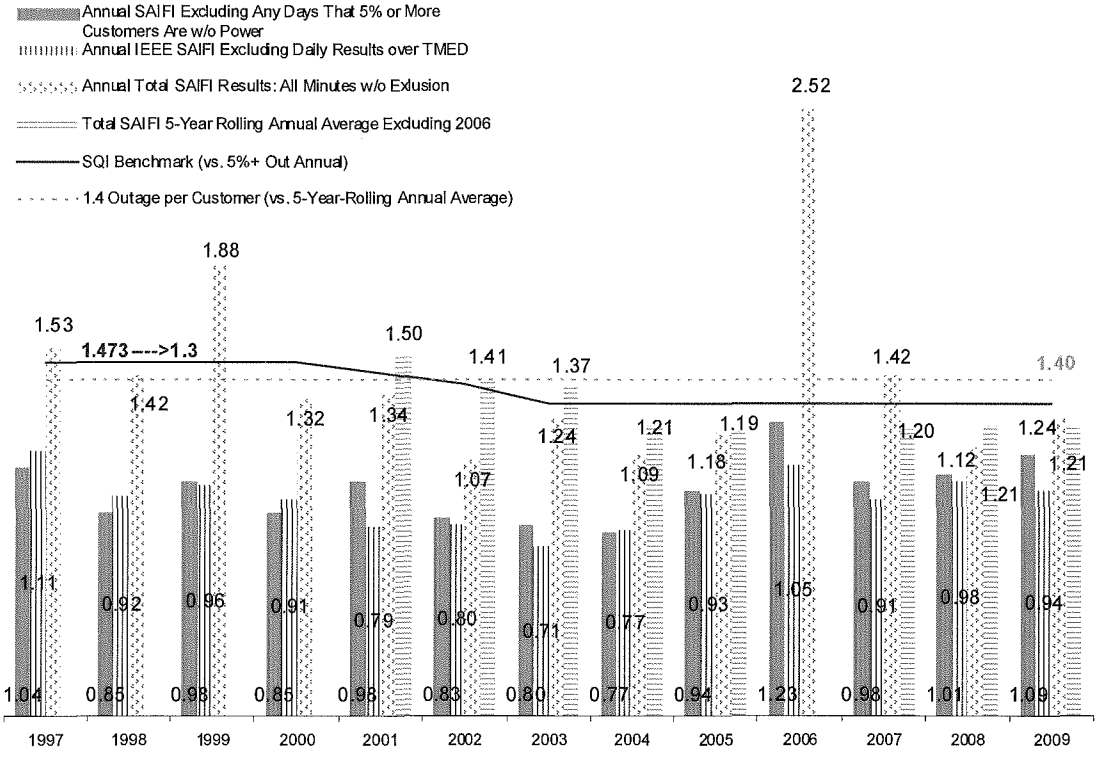
1997-2009 PSE SAIFI Performance in Different Measurements
(Average number of interruptions per year per customer)

As of January 12, 2011

Table 1: 1997-2009 PSE SAIFI Performance by Measurement by Year

		(a)	(b)	(c)	(d)	(e)
1	Calendar Year	Annual SAIFI Excluding Any Days That 5% or More Customers Are w/o Power	Annual IEEE SAIFI Excluding Daily Results over TMED	Annual Total SAIFI Results: All Minutes w/o Exlusion	Annual Total SAIFI Results Excluding 2006	Total SAIFI 5-Year Rolling Annual Average Excluding 2006
2	1997	1.04	1.11	1.53	1.53	
3	1998	0.85	0.92	1.42	1.42	
4	1999	0.98	0.96	1.88	1.88	
5	2000	0.85	0.91	1.32	1.33	
6	2001	0.98	0.79	1.34	1.34	1.50
7	2002	0.83	0.80	1.07	1.07	1.41
8	2003	0.80	0.71	1.24	1.24	1.37
9	2004	0.77	0.77	1.09	1.09	1.21
10	2005	0.94	0.93	1.18	1.18	1.19
11	2006	1.23	1.05	2.52		
12	2007	0.98	0.91	1.42	1.41	1.20
13	2008	1.01	0.98	1.12	1.12	1.21
14	2009	1.09	0.94	1.24	1.24	1.21

Chart 1: 1997-2009 PSE SAIFI Performance in Different Measurements by Year



Attachment C
1997-2009 year PSE SAIFI and SAIDI Performance by Different Measurements

1997-2009 PSE SAIDI Performance in Different Measurements
(Average number of outage minutes per customer per year)

As of January 12, 2011

Table 1: 1997-2009 PSE SAIDI Performance by Measurement by Year

		(a)	(b)	(c)	(d)	(e)
1	Calendar Year	Annual SAIDI Excluding Any Days That 5% or More Customers Are w/o Power	Annual IEEE SAIDI Excluding Daily Results over T_{MED}	Annual Total SAIDI Results: All Minutes w/o Exlusion	Annual Total SAIDI Results Excluding 2006	Total SAIDI 5-Year Rolling Annual Average Excluding 2006
2	1997	105	109	202	202	
3	1998	117	119	383	383	
4	1999	131	118	388	388	
5	2000	103	111	253	253	
6	2001	147	110	240	240	293
7	2002	106	99	215	215	296
8	2003	132	106	532	532	326
9	2004	114	115	302	302	308
10	2005	128	124	192	192	296
11	2006	213	163	2,636		
12	2007	167	143	312	312	311
13	2008	163	155	202	202	308
14	2009	190	145	215	215	245

Chart 1: 1997-2009 PSE SAIDI Performance in Different Measurements by Year