
*Final*

# Electric Service

# Reliability Report

# 2008 Annual Report

*Submitted on March 31, 2009*

In Compliance with WAC 480-100-398

# CONTENTS

# ELECTRIC SERVICE RELIABILITY REPORT
# 2008 ANNUAL REPORT

## EXECUTIVE SUMMARY

This is Puget Sound Energy's (PSE or the Company) annual Reliability Report which covers the calendar year 2008, as required by WAC 480-100-398, Electric Service Reliability Reports.

Safe and reliable electric service at a reasonable cost is one of PSE's paramount goals. Information in this report is filed to provide the Washington State Utilities and Transportation Commission (Commission) and customers with reliability metrics on the service that PSE provides its customers. Information on electric reliability is provided from several perspectives. The first perspective is provided by the traditional reliability metrics including the number and duration of outages as measured against the Service Quality Indices (SQIs) established by the Commission in 1997. The second perspective is from sub-system information relating to outages by county, circuit, and cause. The third perspective includes customer concerns about service quality and reliability, received either firsthand or through the Commission.

In 2008, SAIDI improved by 2.2% while SAIFI increased by 4.1% when compared to the same metrics for 2007. Despite SAIDI's improvements over 2007, the 2008 SAIDI did not meet the SQI. The lower than benchmark performance was mainly the result of a high number of weather events that occurred throughout the year and thus were included in the SQI calculation. Only one of the eleven weather events met the criteria of a "major event" as defined in the SQI criteria. The remaining ten events and the outages and outages minutes were included in the Company's SAIDI performance for 2008. This is compared to four of the seven weather events in 2007 that met the criteria of "major event". SAIFI, on the other hand, did meet the SQI benchmark.

At the sub-system level, the county-level SAIDI improved in five of the nine counties, while SAIFI improved in three counties. Sections IV "System Level Reliability" and V "Subsystem Reliability" of this report detail the system-wide and county reliability metrics as well as circuit results and outage causes in each county.

Customer concerns dropped in 2008, by 32% over 2007. Areas of greatest concerns are described in Section VI, "Areas of Greatest Concern". In 2008, portions of the electric system in Skagit, King, Thurston, and Kitsap/Jefferson counties are identified as Areas of Greatest Concern based on the trend in system performance, number of customers affected, and complaints.

To address the performance of SAIDI and to maintain a consistent level of SAIFI, the reliability projects along with the miles of vegetation management planned for 2009 are included in Section VI. The number of projects planned for 2009 has almost doubled over what was planned for 2008. Additionally, in early 2008, PSE initiated an additional $1.8 million worth of reliability projects as a response to a commitment to improve SAIDI. Fourteen of the eighteen projects were completed in 2008; the remaining four are in progress.

Table 1 "Summary For 2007-2008", summarizes the overall reliability results for 2008 and compares them to 2007.

**TABLE 1- SUMMARY FOR 2007- 2008**

| | 2007 | 2008 |
|---|---|---|
| **Complaints** | | |
| PSE | 32 | 40 |
| Commission | 59 | 22 |
| Total | 91 | 62 |
| **Statistics*** | | |
| Benchmark SAIDI SQI | 136 | 136 |
| SAIDI | 167.11 | 163.48 |
| Benchmark SAIFI SQI | 1.3 | 1.3 |
| SAIFI | 0.97 | 1.01 |
| Number of Customers (Avg.) | 1,053,821 | 1,068,734 |
| Number of Outages | 11,984 | 13,147 |
| **Major Events Impact** | | |
| Number of Events | 4 | 1 |
| Days | 16 | 5 |
| Total Number of Customers Impacted | 466,108 | 116,251 |
| Average Number of Customer's Impacted | 29,132 | 23,250 |
| Average Percentage of Total Customers | 3% | 2% |

* Data for SAIDI and SAIFI calculated using the SQI method - major events defined to be 5% or more customers out of service during a 24-hour period and the associated carry-forward days

## SECTION I – BACKGROUND

Electric utilities subject to commission jurisdiction are required to provide statements describing their reliability monitoring in an annual report pursuant to WAC 480-100-393 and WAC 480-100-398. These rules were adopted in the Commission's rulemaking in Docket Number UE-991168. The reliability indices are part of the quality of service which PSE provides to its customers as measured by the Service Quality Indices detailed in Docket Number UE-011570. The eleven individual indices include: (1) Overall Customer Satisfaction, (2) WUTC Complaint Ratio, (3) SAIDI (System Average Interruption Duration Index), (4) SAIFI (System Average Interruption Frequency Index), (5) Customer Access Center Answering Performance, (6) Customer Access Center Transaction Satisfaction, (7) Gas Safety Response Time, (8) Field Service Operations Transactions Customer Satisfaction, (9) Disconnection Ratio, (10) Missed Appointments, and (11) Electric Safety Response Time.

WAC 480-100-393 (3) (b) requires the establishment of baseline reliability statistics. These baseline statistics are the service quality indices established by the commission in 1997.

WAC 480-100-398 requires annual reporting of electric service reliability. This information is contained in this document, which reports Puget Sound Energy's (PSE) reliability metrics for the calendar year 2008.

In 2005, PSE met with Commission Staff to enhance the format of this report and information provided. Specific enhancements included a broadening of the definition of Areas of Greatest Concern, the inclusion of circuit data and project identification, and the comparison of metrics using the SQI methodology against the Institute of Electrical and Electronic Engineers (IEEE) methodology. In 2008 and early 2009, PSE had further discussions with both Commission Staff and the Public Counsel Section of the Attorney General's office to further enhance the content of this report.

While PSE believes that this annual report provides useful information to interested parties for the calendar year 2008, PSE cautions against putting too much emphasis on the usefulness of this information 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 comparison of system performance. A single year's result does not lend to adequate identification of the best solution for long term improvement and actions taken based on an annual snapshot may result in "band-aid" solutions which may not meet long term objectives. Notwithstanding the limited usefulness of using the

annual reports to assess year-to-year trends, PSE believes the annual snap-shots provide a useful view in context of the overall trends.

PSE's electric system covers a nine county geographical area. Refer to Appendix E for a map of the service area.

## SECTION II – METHODOLOGY

This section describes the methodology used in defining and calculating reliability metrics which are then used to evaluate performance. WAC 480-100-398 (2) requires a utility to report changes made in this methodology including data collection and calculation of reliability information after the initial baselines are set. The utility must explain why the changes occurred and how the change is expected to affect comparisons of the newer and older information.

Definitions of Areas of Concern

The definition of Areas of Greatest Concern was expanded over the original submittal which was defined by the number of customers and commission complaints. PSE now defines Area of Greatest Concern by considering the trend in system performance based on circuits that exceed the SQI, number of customers affected by those circuits, and complaints. This aligns actual planning practice with this reporting requirement. During the planning process these concerns are evaluated along with other items such as load growth, other reliability concerns or improvement opportunities, maintenance needs, municipal concerns, and corporate commitments. Solutions are proposed that attempt to meet multiple issues and stakeholder concerns. The highest valued projects across all categories move forward in the process. The planning process outlined in Section VI provides a discussion regarding the planning and optimization process.

Change to Include the IEEE Methodology

In the 2004 Annual Electric Service Reliability Report, PSE indicated that starting in 2005, reliability metrics using the IEEE standard 1366 methodology as a guideline would be included. This change and other modifications for monitoring and reporting electric service reliability information were adopted by the Commission in UE-060391. The purpose for moving to the IEEE standard 1366 methodology is to provide uniformity in reliability indices, identify factors which affect these, and aid in consistent reporting practices among utilities. $T_{MED}$ (Major Event Day Threshold) is the reliability index that facilitates this consistency. A detailed equation for calculating $T_{MED}$ is provided in Appendix A and the actual $T_{MED}$ values from 1999-2008 is provided in Appendix H.

While the IEEE guidelines provide a standard for the industry, it is important to note that companies can create a variety of definitions of an outage or sustained outage. PSE defines sustained outages as those lasting longer than one minute. IEEE defines a sustained outage to be longer than five minutes. PSE will continue to use the one minute definition as PSE believes that tracking shorter duration outages allows us to better

monitor the performance of the electric system and subsequently assess potential system improvements. It is also consistent with the definition of an outage used in the SQI methodology.

A comparison of the two methodologies is shown in Table 2 "Comparison between Methods 2004-2008". The SQI Settlement Agreement in Docket Number UE-011570 defines Major Events Days as days when five percent or more of customers are out of power during a 24-hour period and days required to restore service to those customers. For purposes of this report, this is called the "SQI method". This methodology includes days which include customers that are still without power after the first day of a major event. The IEEE 1366 methodology defines Major Event Days as those days exceeding $T_{MED}$ (Major Event Day Threshold).

**TABLE 2- COMPARISON BETWEEN METHODS 2004- 2008**

| Metrics | Year | PSE SQI Method | IEEE 1366 Method |
|---|---|---|---|
| **SAIDI** | 2004 | 112.78 | 113.75 |
| | 2005 | 128.65 | 129.82 |
| | 2006 | 214.45 | 162.97 |
| | 2007 | 167.11 | 143.51 |
| | 2008 | 163.48 | 154.78 |
| **SAIFI** | 2004 | 0.77 | 0.77 |
| | 2005 | 0.94 | 0.95 |
| | 2006 | 1.23 | 1.03 |
| | 2007 | 0.97 | 0.91 |
| | 2008 | 1.01 | 0.98 |
| **Major Event Days** | 2004 | 9 | 5 |
| | 2005 | 7 | 4 |
| | 2006 | 34 | 24 |
| | 2007 | 16 | 7 |
| | 2008 | 5 | 4 |

Both methods result in SAIDI and SAIFI metrics that are increasing starting in 2006. The number of Major Event Days varies year to year within and between both methods. The SQI Major Event Day is based on five percent of the customers out of service within a 24-hour period plus the associated carry-forward days required to restore service. The criteria for the IEEE Major Event Day is calculated annually and is based on the previous five years of daily customer outage minutes. With the IEEE method, the threshold value changes yearly, whereas the SQI method remains relatively constant (it changes slightly with the change in total number of customers each year). There does not appear to be a correlation between number of days being included in one method versus the other and the difference in SAIDI or SAIFI results using those

methods. For example, in 2006, fewer days were Major Event Days (and therefore excluded from the metric calculations) using the IEEE method versus the SQI method, at 24 versus 34, respectively. At the same time, SAIDI was also lower using the IEEE method versus the SQI method, at 162.97 versus 214.45, respectively. One might have expected a higher value for SAIDI based on the IEEE method (since less days were excluded from the calculation), but this was not the case.

Modification of County Level Metrics Methodology

In 2008, PSE made a modification in calculating the county level IEEE metrics as shown in Table 4 "2008 County Indices" and Table 7 "County Metrics". To calculate the county IEEE metrics, the major event dates, as shown in Table 6 "2008 Major Events (IEEE Method)", were excluded from each counties calculation. This is a departure from how the county metrics were reported in prior reports which excluded any day within the county that exceeded the system $T_{MED}$. The change in methodology insures that the IEEE metrics are comparable across counties but has no effect on PSE's overall IEEE metric.

## SECTION III – DATA COLLECTION/PROCESS

This section explains how PSE collects the underlying data for each annual report. The process described below identifies how an interruption is captured and documented within PSE. These interruptions are then expressed in terms of the reliability metrics SAIDI and SAIFI as discussed in the previous sections.

Methods for Identifying a Sustained Interruption

- Customer calls the Company's customer access center, either through the automated voice response unit or talking with a customer representative.
- A customer calls directly to a PSE employee rather than through the customer access center.
- Automated system information from the Company's AMR system (may precede customer call).
- Possible Causes of Data Inconsistencies:

  a) If service to a customer that previously was affected by a service interruption remains out after the problem suspected to have caused the interruption has been corrected, a follow-up call from the customer may be reported as a new incident. This can especially be the case during Step Restoration which occurs when customers experiencing an outage have their service restored in smaller groups, rather than restoring service to all of the customers at the same time.

  b) Customers may call to report a Sustained Interruption that was caused by their own equipment and not shared by other customers. If the customer's power has been restored before crews arrive to investigate, the incident may still be reported as a sustained interruption.

  c) It is likely, as with any computer information system, that the AMR reports may provide reports on some outages that were not verified. The number of such false reads, if any, has not been established.

  d) Data entry mistakes can create inconsistencies.

  e) Major storm events have an impact on data accuracy. In general, data accuracy is inversely proportional to the magnitude of the storm event.

Methods to Specify When the Duration of a Sustained Interruption Ends

- PSE services personnel will log the time when the problem causing the outage has been resolved.
- Possible Causes of Data Inconsistencies:
  a) There may be multiple layers of issues contributing to a Sustained Interruption for a specific customer as described in the above section.
  b) Data entry errors can affect the accuracy of the information.

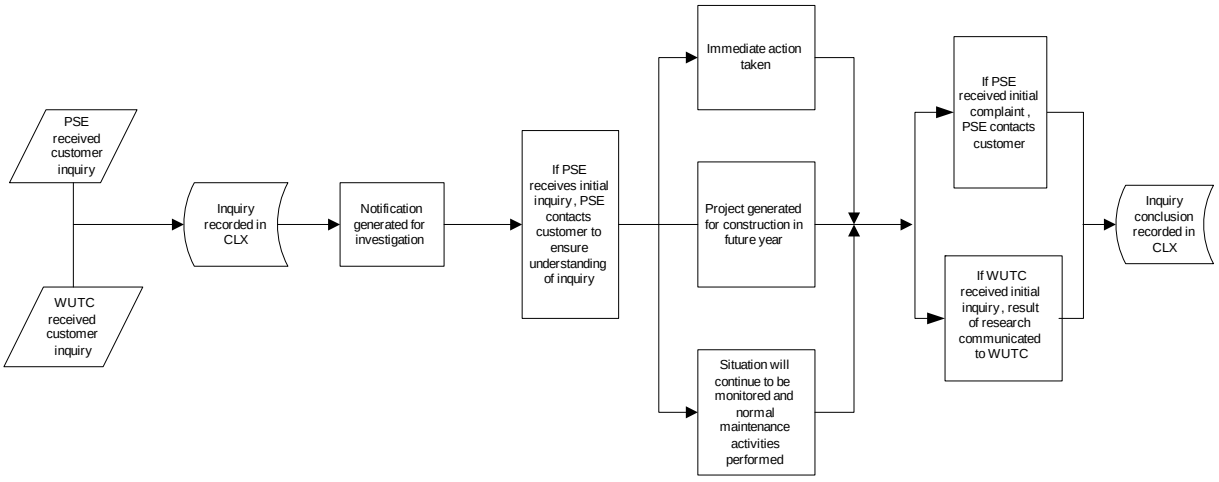
Recording Cause Codes

- Outage cause codes are reported by the PSE service personnel responding to the outage location.
- Possible Causes of Data Inconsistencies:
  a) Major storm event will have an impact of data accuracy. In general, the greater the storm the less time spent in recording accurate data up front due to the focus on the restoration effort.
  b) The cause of the outage and the location of the protective device may be separated by a significant distance. Pinpointing the exact location of the outage and the cause may be secondary to the outage restoration effort.
  c) Inspecting the distribution feeder to find temporary or momentary contacts with the distribution system is difficult.
  d) 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.
  e) Determining the difference between different cause codes is difficult in cross-country terrain and in the darkness.

Recording and Tracking Customer Complaints and Inquiries

In response to the Commission rulemaking procedure PSE developed a process to respond to customer complaints about reliability and power quality as reflected in Figure 1, "Process for Responding and Tracking Reliability and Power Quality Inquiries". The outlined process pertains to all calls received by any customer regardless of the number.

**FIGURE 1 – PROCESS FOR RESPONDING AND TRACKING RELIABILITY AND POWER QUALITY INQUIRIES**



The process is triggered by customer's voicing concerns about reliability through the Company's customer access center. The Customer Service Representative (CSR) handling the call listens for key words and then categorizes the customer comments accordingly. This has been key to obtaining accurate information from the customer and to route the information to the various groups responsible to assess the customer "inquiry." Additionally, the CSR creates a request for the appropriate PSE personnel to contact the customer and discuss their concerns. All contact is tracked via an Inbound Client Comment in the Company's Customer Information System (CLX).

In 2002 PSE implemented some enhancements to the process of logging inbound comments from customers in CLX, simplifying the number of topic and sub-topics to ensure greater data quality. PSE also enhanced the process to ensure customer feedback received outside of the customer service center (e.g. inquiries to field engineering) was posted to CLX inbound comments, thus improving our ability to track customer inquiries related to outages frequency, duration and/or power quality.

If a customer is not satisfied with the first call resolution outcome of their inquiry and has spoken with a supervisor, the customer can contact the WUTC Consumer Affairs section to file an "informal" service quality complaint. Customers can also bypass PSE and contact the Consumer Affairs section directly to file a service quality complaint. PSE staff in Olympia is contacted with the details of the complaint and has two business days to respond, but, if needed, PSE may ask for an extension of the due date. The complaint is tracked in an internal database as well as an inbound client comment in CLX.

Inbound comment topics of "outage" and "power quality" are reviewed by PSE's System Planning department. PSE provides the outage history for the circuit in question, three year history of system improvements and any future system or reliability improvements. Service Quality complaints are usually informational only meaning there is normally no corrective action required. The 2008 Commission complaints concerning outage duration/frequency and power quality are reported in Appendix C.

Possible Causes of Data Inconsistencies:

a) Using the manual process, it is possible that the feedback loop may occasionally not be closed due to data entry and tracking errors. PSE will minimize this inaccuracy by having the team involved with responding to inquiries, who are most knowledgeable about the specific situation, track customer inquiries.
b) Sources of inaccuracy include improper data entry. PSE will minimize this inaccuracy by having the team involved with responding to inquiries, who are most knowledgeable about the specific situation, track customer inquiries, which will help catch errors in data entry.

c) High volumes of customer inquiries, during storms for example, may increase likelihood of data entry errors, leading to less accurate information.

A summary report captures the inbound comments received in 2007 and 2008, with a comment topic of "outage" (frequency or duration) and/or "power quality". If only one comment has been received from any one customer within the 24-month calendar period, it will be considered a customer "inquiry" and not reportable. When two or more comments on outage frequency or duration and/or power quality have been received from a customer within the 24-month calendar period, it will be considered a "complaint" and reported in Appendix B – 2008 PSE Complaints and Resolutions. An error in the summary report was discovered this year. For the prior three years, the report only included customers who had called in both years rather than twice in the 24-month calendar period. This year's report accurately reflects two or more calls in either 2007 and/or 2008.

## SECTION IV – SYSTEM LEVEL RELIABILITY

Puget Sound Energy's overall system outage frequency (SAIFI) metric in 2008 met the established SQI. However, the overall system outage duration metric (SAIDI) in 2008 did not meet the established SQI. This was due in part to the number of weather related events in 2008 compared to 2007, 10 versus 3, that are included in the SQI calculation. That being said, improvement was made over 2007. The overall Table 3 "2008 System Indices" shows the SQI and IEEE performance of the entire system, and Table 4 "2008 County Indices" show the performance by counties using both the SQI and the IEEE methodology in 2008.

**TABLE 3 - 2008 SYSTEM INDICES**

| | SAIDI | SAIFI | Avg. Number of Customers* | Number of Outages | Number of Complaints** |
|---|---|---|---|---|---|
| **PSE SQI BENCHMARK** | 136.00 | 1.30 | | | |
| **YE ACTUALS (SQI Method)** | 163.48 | 1.01 | 1,068,734 | 13,147 | 62 |
| **YE ACTUALS (IEEE 1366)** | 154.78 | 0.98 | 1,068,734 | 13,175 | |

*Year end average customer count.
**WUTC and Customer Complaints

**TABLE 4 - 2008 COUNTY INDICES**

| | IEEE SAIDI | SQI SAIDI | IEEE SAIFI | SQI SAIFI | Avg. Number of Customers* | Number of Outages | Number of Complaints** |
|---|---|---|---|---|---|---|---|
| **Whatcom** | 118.48 | 118.56 | 0.78 | 0.78 | 95,009 | 1,265 | 5 |
| **Skagit** | 174.36 | 173.85 | 1.26 | 1.26 | 57,193 | 834 | 2 |
| **Island** | 120.07 | 118.61 | 1.02 | 1.04 | 34,861 | 539 | 1 |
| **King** | 134.64 | 150.40 | 0.77 | 0.83 | 518,257 | 5,676 | 30 |
| **Kittitas** | 171.85 | 158.70 | 0.74 | 0.70 | 11,633 | 267 | 1 |
| **Pierce** | 88.37 | 91.27 | 0.82 | 0.82 | 99,762 | 949 | 2 |
| **Thurston** | 200.12 | 185.76 | 1.11 | 1.12 | 119,405 | 1,533 | 15 |
| **Kitsap** | 261.60 | 285.77 | 1.84 | 1.84 | 114,737 | 1,792 | 5 |
| **Jefferson** | 307.80 | 307.90 | 1.89 | 1.89 | 17,879 | 320 | 1 |

*Year end average customer count.
**WUTC and Customer Complaints

To calculate the county metrics using the IEEE method, any outage occurring within the major event date (as shown in Table 6) was excluded from the calculation. This is a departure from how the county metrics were

reported in prior reports which excluded any day within the county that exceeded the system $T_{MED.}$ The change in county metric calculation does not affect the results shown in Table 3.

In 2008, PSE experienced multiple weather events throughout the year that negatively impacted SAIDI. While PSE expects to have winter weather events, in 2008, seven winter events and three summer weather events were experienced which are unusual for the region. Focusing in on 2008, there was one major event, consisting of five Major Event Days, meeting the five percent of total customers out criteria (SQI method) and there were four Major Events Days, using the IEEE methodology. The following two tables, 5 and 6, highlight the specific days under the two different criteria for comparison, and provide further information regarding customer impact and cause. Events that were greater than a $T_{MED}$ of 7.36 were removed from the SAIDI and SAIFI calculation shown for the IEEE 1366 Method on Table 6. As shown, wind and snow were contributors to these events in 2008. December 21 was the largest event day of 2008, impacting approximately 5.6% of PSE's electric customers.

**TABLE 5 - 2008 MAJOR EVENTS (SQI METHOD)**

| Major Event Days* | SAIDI | SAIFI | Cause | Customers Out | % Customers Out | Total Customers** |
|---|---|---|---|---|---|---|
| | | | | | | |
| 12/20/2008-12/24/2008 | 38.14 | 0.11 | Snow/Wind | 116,251 | 10.83% | 1,073,258 |

* The major event started at 7:00 pm on 12/20

**Average Customer Count at time of Major Event

**TABLE 6 - 2008 MAJOR EVENTS (IEEE Method)**

| Major Event Days | SAIDI | SAIFI | Cause | Customers Out | % Customers Out* | Total Customers** |
|---|---|---|---|---|---|---|
| **Threshold (TMED)** | **7.36** | | | | | |
| | | | | | | |
| 6/9/2008 | 10.53 | 0.04 | Wind | 48,071 | 4.50% | 1,068,734 |
| 12/21/2008 | 20.99 | 0.06 | Snow/Wind | 59,562 | 5.57% | 1,068,734 |
| 12/22/2008 | 8.10 | 0.02 | Snow/Wind | 19,013 | 1.78% | 1,068,734 |
| 12/25/2008 | 7.42 | 0.02 | Snow/Wind | 22,487 | 2.10% | 1,068,734 |

*Percentage based on year-end average customer count

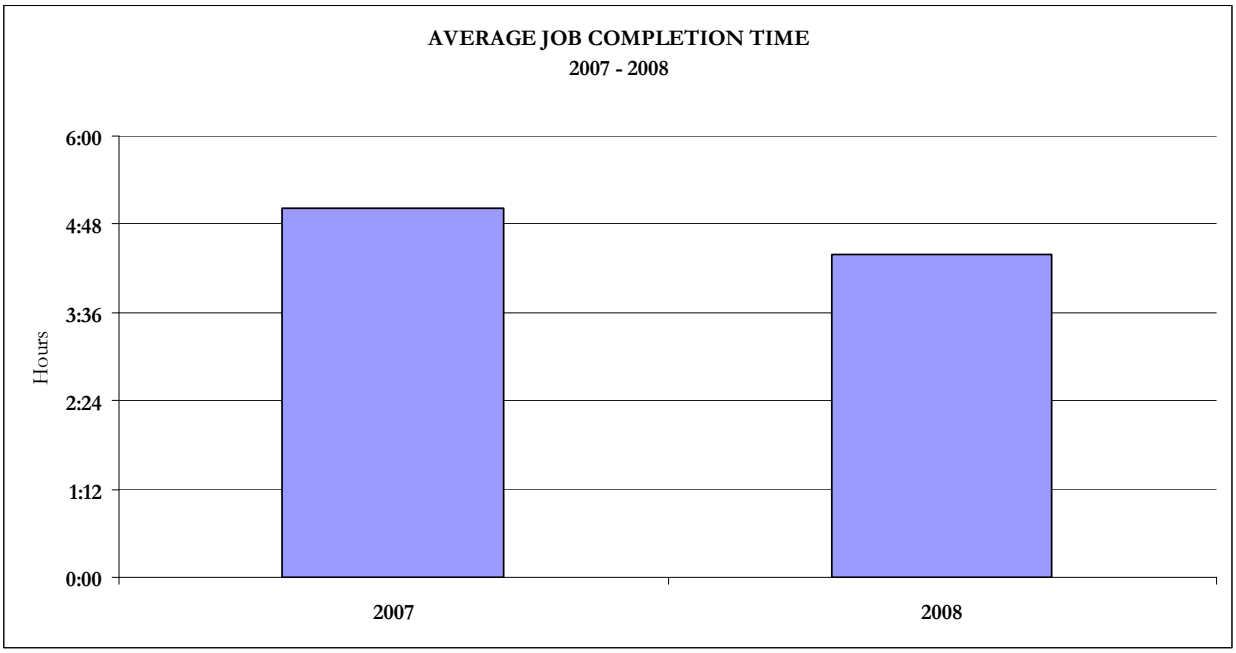
**Year end average customer count.

## Restoration Times

Restoration time also plays an important factor in PSE's overall reliability indices. Figure 2 "Average Job Completion Time" illustrates that the average completion time to restore an outage has decreased from 2007.

The average completion time includes both PSE first response and the service provider repair time. In 2007, PSE established a job completion metric with our service provider to monitor their performance. Pre-determined event types that are beyond the control of the service provider are either excluded from the metric or adjusted on a case by case basis. Examples include access issues and third party constraints that might hamper the service provider's ability to repair the outage in a timely manner. It's important to note that the SQI SAIDI only excludes outages that occur during a Major Event. It is difficult to draw a comparison between the average completion time and SAIDI.

**FIGURE 2 – AVERAGE JOB COMPLETION TIME**




**Performance of 2008 Against Prior Years**

Figure 3 "SAIDI Historical Trends" and Figure 4 "SAIFI Historical Trends" illustrate the comparison between the SQI methodology and IEEE methodology for the last ten years with the raw data in Appendix H. For the time period 1999-2005, the SQI requirements were met for each of these metrics. Clearly, this was not the case since 2006, as the SAIDI metric has missed the SQI due to the unique combination of weather events which took place during these three years. As described more fully in Section VI, PSE continues to focus on identifying projects that will reduce SAIDI, while managing other aspects of system performance. We also continue to monitor our system performance metrics with the goal of identifying trends and causes and, ultimately, identifying other possible improvements.

**FIGURE 3 – SAIDI HISTORICAL TRENDS**

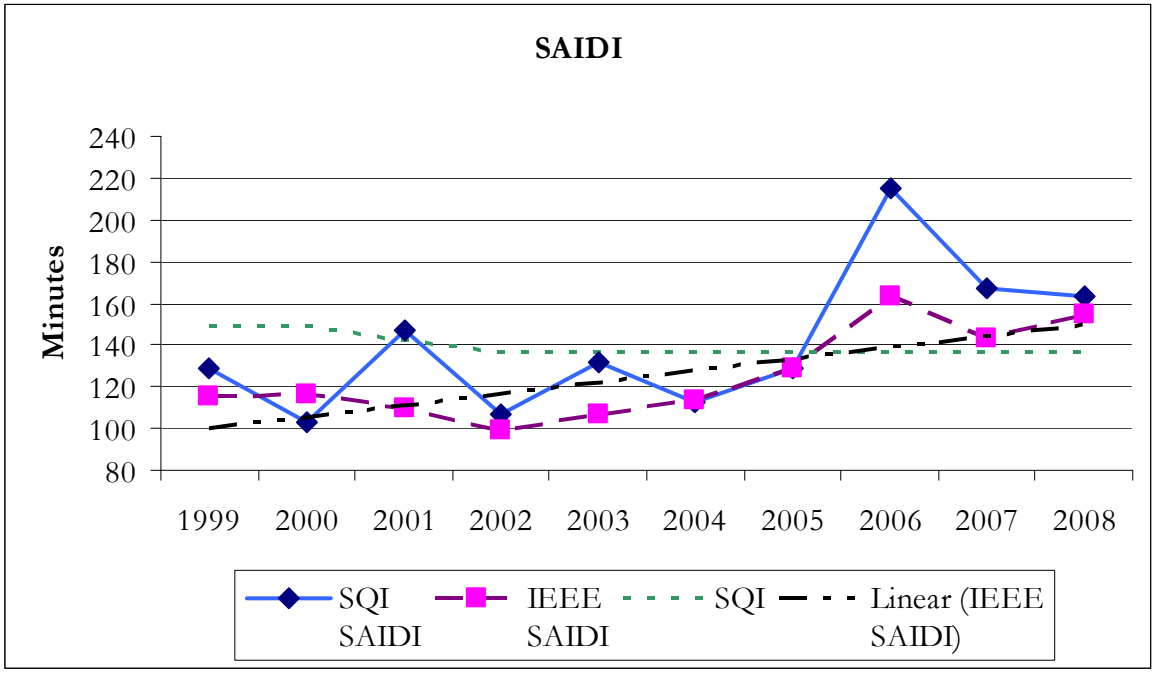
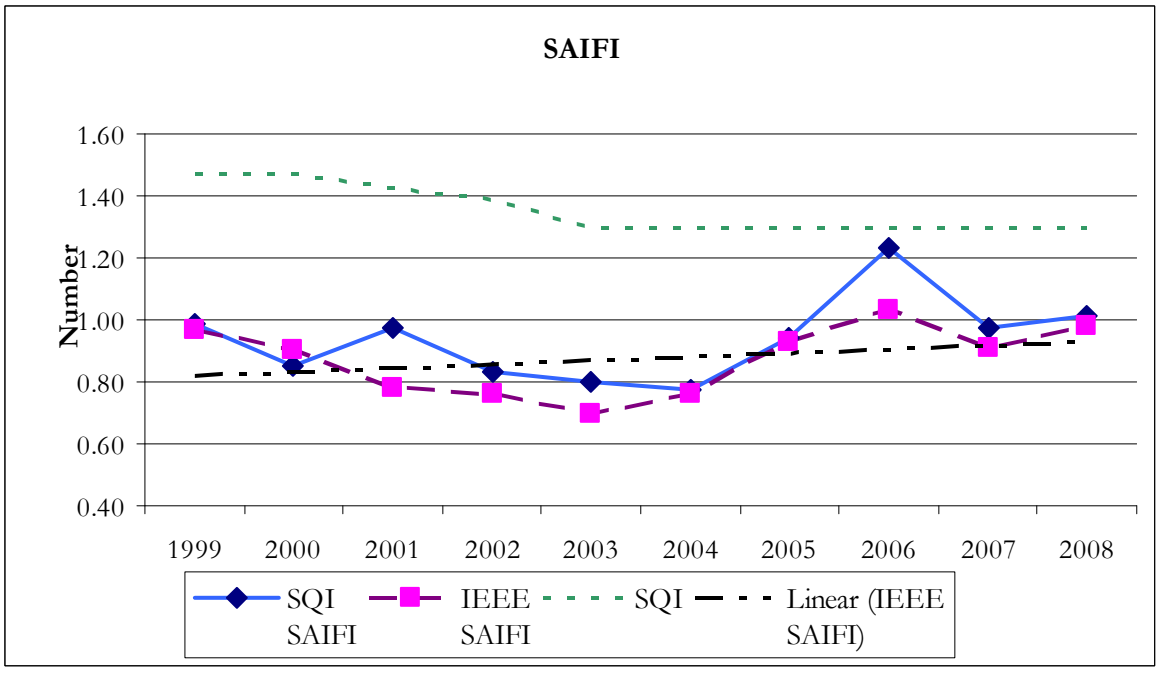



**FIGURE 4 – SAIFI HISTORICAL TRENDS**



## SECTION V – SUBSYSTEM RELIABILITY

This section reviews the reliability of PSE's system at a more detailed subsystem level. This is done by evaluating performance at the county and circuit level.

Table 7 "County Metrics", details the county reliability metrics at the end of 2008 along with 2007 and 2006. To calculate the county metrics using the IEEE method, any outage occurring within the major event date (as shown in Table 6) was excluded from the calculation. As described previously, this is a departure from how the county metrics were reported in prior reports which excluded any day within the county that exceeded the system $T_{MED}$. The IEEE county metrics for 2006 and 2007 have been recalculated to reflect the new method. To calculate the county metrics using the SQI Method, any outage occurring within a major event date (as shown in Table 5) and time was excluded from the calculation of the metrics. What can be inferred from the comparison of the IEEE statistics against the SQI statistics is that for the most part, each method excludes similar significant weather events that impact each county.

## TABLE 7 - COUNTY METRICS

| County | Year | IEEE SAIDI | SQI SAIDI | IEEE SAIFI | SQI SAIFI | SQI Total Outages | SQI Total Customers Impacted | SQI Total Customers* |
|---|---|---|---|---|---|---|---|---|
| **Whatcom** | **2008** | 118.48 | 118.56 | 0.78 | 0.78 | 1,266 | 74,370 | 95,009 |
| | **2007** | 147.97 | 135.09 | 0.94 | 0.97 | 1,094 | 90,815 | 93,636 |
| | **2006** | 165.71 | 223.49 | 0.90 | 1.14 | 1,294 | 104,355 | 91,805 |
| **Skagit** | **2008** | 174.36 | 173.85 | 1.26 | 1.26 | 837 | 71,907 | 57,193 |
| | **2007** | 127.31 | 189.04 | 0.66 | 0.79 | 801 | 44,461 | 56,453 |
| | **2006** | 178.46 | 202.62 | 0.81 | 0.96 | 829 | 53,193 | 55,440 |
| **Island** | **2008** | 120.07 | 118.61 | 1.02 | 1.04 | 539 | 36,387 | 34,861 |
| | **2007** | 159.88 | 686.42 | 0.85 | 1.63 | 551 | 55,755 | 34,308 |
| | **2006** | 212.48 | 342.20 | 1.26 | 1.78 | 603 | 60,061 | 33,767 |
| **King** | **2008** | 134.64 | 150.40 | 0.77 | 0.83 | 5,724 | 431,205 | 518,257 |
| | **2007** | 109.53 | 118.38 | 0.78 | 0.85 | 5,109 | 432,769 | 511,947 |
| | **2006** | 125.03 | 149.12 | 0.96 | 1.06 | 5,634 | 536,882 | 504,448 |
| **Kittitas** | **2008** | 171.85 | 158.70 | 0.74 | 0.70 | 264 | 8,102 | 11,633 |
| | **2007** | 61.46 | 135.11 | 0.19 | 0.42 | 248 | 4,738 | 11,304 |
| | **2006** | 245.34 | 474.81 | 0.62 | 0.85 | 282 | 9,246 | 10,926 |
| **Pierce** | **2008** | 88.37 | 91.27 | 0.81 | 0.82 | 956 | 81,320 | 99,762 |
| | **2007** | 59.23 | 57.39 | 0.52 | 0.48 | 905 | 47,556 | 98,443 |
| | **2006** | 131.48 | 191.01 | 1.11 | 1.44 | 1185 | 139,780 | 97,013 |
| **Thurston** | **2008** | 200.12 | 185.76 | 1.11 | 1.12 | 1,512 | 134,112 | 119,405 |
| | **2007** | 186.29 | 214.07 | 0.99 | 0.90 | 1,376 | 104,745 | 116,787 |
| | **2006** | 149.02 | 332.99 | 0.94 | 1.36 | 1,737 | 154,379 | 113,521 |
| **Kitsap** | **2008** | 261.60 | 285.77 | 1.84 | 1.84 | 1,731 | 210,923 | 114,737 |
| | **2007** | 272.84 | 212.15 | 1.83 | 1.66 | 1,540 | 188,279 | 113,326 |
| | **2006** | 317.14 | 338.76 | 1.69 | 1.75 | 1,920 | 195,231 | 111,656 |
| **Jefferson** | **2008** | 307.80 | 307.90 | 1.89 | 1.89 | 318 | 33,849 | 17,879 |
| | **2007** | 478.42 | 625.59 | 1.43 | 1.83 | 355 | 32,188 | 17,619 |
| | **2006** | 307.50 | 247.20 | 1.10 | 1.12 | 364 | 19,410 | 17,309 |

* Year end average customer count.

Focusing on performance at the next lower level, Table 8 "County Circuit Performance", shows the percentage of circuits in each county with 3 year averages for SAIDI and SAIFI metrics that are performing better than the PSE SQI benchmarks as calculated by the SQI Method. The circuit analysis is based on the SQI methodology where outages were excluded within the major event dates listed in Table 5, and is based on 2006 - 2008 performance data. Eight of the nine county areas had at least 50% of their circuits

performing better than the SAIDI SQI benchmark, and all nine county areas had at least 70% of the circuits performing better than the SAIFI SQI benchmark.

Only Jefferson County had less than 50% of its circuits better than the SAIDI SQI benchmark. Jefferson County has relatively few circuits when compared to the majority of other counties within PSE's electric service area. Specifically, there are 22 circuits in Jefferson County, and 35 to 549 circuits in seven of the eight other counties that PSE serves. This means that the performance of a relatively small number of circuits can have a significant impact on the percentages shown in the following table. Circuit performance is also challenged by the fact that the circuits in Jefferson County, like other circuits in rural areas, are relatively long, and exposed to more trees than the shorter circuits that are found in urban areas.

**TABLE 8 - COUNTY CIRCUIT PERFORMANCE**

| | % of Circuits Performing Better than Benchmark SAIDI SQI | % of Circuits Performing Better than Benchmark SAIFI SQI | Number of Circuits | Number of Customers Affected |
|---|---|---|---|---|
| System | 71% | 85% | 1,121 | 2,603,969 |
| Whatcom | 72% | 84% | 108 | 216,198 |
| Skagit | 69% | 79% | 68 | 149,874 |
| Island | 57% | 74% | 35 | 103,685 |
| King | 77% | 86% | 549 | 1,121,368 |
| Kittitas | 56% | 94% | 16 | 16,019 |
| Pierce | 83% | 93% | 96 | 195,607 |
| Thurston | 59% | 85% | 123 | 327,792 |
| Kitsap | 53% | 77% | 104 | 417,227 |
| Jefferson | 45% | 73% | 22 | 56,199 |

Average county SQI's not available - the above table measures circuits in each county against the company-wide benchmark SQI

**Outages By Cause**

Reviewing the cause of outages helps to better understand performance at the subsystem level. Table 9 "Outages by Cause", details the outage causes in each county in 2008. It shows that trees (TF and TO), birds and animals (BA), and equipment failures (EF) continue to be the primary reasons for outages in 2008 as in previous years. While the number of scheduled outages (SO) is significant, it is not considered a reliability concern because the scheduled outages are usually taken to perform system upgrades and maintenance, which results in higher system reliability.

## TABLE 9 - OUTAGES BY CAUSE

| | Whatcom | Skagit | Island | King | Kittitas | Pierce | Thurston | Kitsap | Jefferson | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **AO** | 22 | 20 | 5 | 117 | 8 | 27 | 39 | 31 | 6 | 275 |
| **BA** | 172 | 116 | 61 | 840 | 21 | 144 | 308 | 305 | 37 | 2,004 |
| **CP** | 34 | 22 | 4 | 79 | 5 | 30 | 31 | 18 | 3 | 226 |
| **CR** | 5 | 0 | 0 | 41 | 1 | 0 | 0 | 10 | 1 | 58 |
| **DU** | 30 | 13 | 5 | 199 | 10 | 31 | 48 | 36 | 12 | 384 |
| **EF** | 536 | 332 | 253 | 2,118 | 156 | 378 | 639 | 535 | 102 | 5,049 |
| **EO** | 27 | 12 | 7 | 31 | 3 | 12 | 20 | 20 | 6 | 138 |
| **EQ** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **FI** | 2 | 0 | 0 | 12 | 1 | 0 | 7 | 5 | 0 | 27 |
| **LI** | 25 | 5 | 2 | 76 | 10 | 28 | 12 | 2 | 9 | 169 |
| **SO** | 101 | 20 | 6 | 758 | 10 | 139 | 124 | 126 | 47 | 1,331 |
| **TF** | 115 | 144 | 95 | 510 | 11 | 92 | 140 | 127 | 24 | 1,258 |
| **TO** | 118 | 110 | 75 | 584 | 18 | 68 | 134 | 434 | 60 | 1,601 |
| **UN** | 9 | 11 | 2 | 51 | 0 | 1 | 6 | 42 | 4 | 126 |
| **VA** | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| **Misc** | 24 | 7 | 304 | 40 | 10 | 6 | 31 | 4 | 70 | 496 |
| **Total** | 1,220 | 813 | 819 | 5,460 | 264 | 956 | 1,539 | 1,695 | 381 | 13,147 |

| CAUSE CODE LEGEND | | | | | |
|---|---|---|---|---|---|
| **AO** | Accident Other with Fires | **EF** | Equipment Failure | **SO** | Scheduled Outage |
| **BA** | Bird or Animal | **EO** | Electrical Overload | **TF** | Tree-Off Right of Way |
| **CP** | Car Pole Accident | **EQ** | Earthquake | **TO** | Tree-On Right of Way |
| **CR** | Customer Request | **FI** | Faulty Installation | **UN** | Unknown Cause(Unknown Equip Involved Only) |
| **DU** | Dig Up Underground | **LI** | Lightning | **VA** | Vandalism |

Evaluating causes at a lower level to understand specific components or factors that are impacting reliability is important. Table 10 "Outages by Equipment", presents the equipment categories for the majority of Equipment Failure causes as an example of the lower level information. The classification "Equipment Failure" can be somewhat misleading, as the largest number of "failures" (39%) is attributed to the proper operation of the protective fuses due to tree contacts with power line or the overload of equipment (OCO, OFC, OFU and OTF). The other major cause of equipment failure is related to underground cable (UPC). PSE continues to invest significantly in remediating underground cable as can be seen by the number of cable projects in Table 11 "2009 County Projects and Vegetation Management."

**TABLE 10 - OUTAGES BY EQUIPMENT**

| | Whatcom | Skagit | Island | King | Kittitas | Pierce | Thurston | Kitsap | Jefferson | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fuse Operations** | | | | | | | | | | |
| **OCO** | 29 | 21 | 10 | 83 | 8 | 6 | 36 | 40 | 11 | 244 |
| **OFC** | 15 | 15 | 9 | 82 | 9 | 8 | 21 | 21 | 4 | 184 |
| **OFU** | 57 | 48 | 29 | 142 | 16 | 28 | 64 | 44 | 8 | 436 |
| **OTF** | 141 | 71 | 69 | 348 | 56 | 100 | 159 | 140 | 23 | 1,107 |
| **Fuse Total** | 242 | 155 | 117 | 655 | 89 | 142 | 280 | 245 | 46 | 1,971 |
| **Other Equipment Categories** | | | | | | | | | | |
| **OCN** | 9 | 11 | 15 | 86 | 1 | 18 | 33 | 26 | 5 | 204 |
| **OJU** | 6 | 7 | 13 | 43 | 5 | 4 | 11 | 16 | 1 | 106 |
| **OPO** | 4 | 8 | 2 | 9 | 1 | 4 | 2 | 2 | 0 | 32 |
| **OSV** | 17 | 12 | 6 | 59 | 3 | 8 | 13 | 16 | 1 | 135 |
| **OTR** | 52 | 36 | 23 | 106 | 5 | 28 | 39 | 38 | 6 | 333 |
| **UEL** | 8 | 3 | 2 | 27 | 0 | 3 | 4 | 3 | 2 | 52 |
| **UFJ** | 7 | 2 | 4 | 59 | 0 | 3 | 11 | 4 | 1 | 91 |
| **UPC** | 88 | 35 | 34 | 437 | 9 | 76 | 117 | 90 | 16 | 902 |
| **UPT** | 1 | 7 | 1 | 39 | 4 | 6 | 5 | 11 | 3 | 77 |
| **USV** | 48 | 23 | 22 | 319 | 19 | 52 | 59 | 27 | 7 | 576 |
| **Misc** | 14 | 14 | 279 | 57 | 20 | 34 | 33 | 65 | 54 | 570 |
| **Other Total** | 254 | 158 | 401 | 1,241 | 67 | 236 | 327 | 298 | 96 | 3,078 |
| **Overall Total** | 496 | 313 | 518 | 1,896 | 156 | 378 | 607 | 543 | 142 | 5,049 |

| EQUIPMENT CODE LEGEND | | | | | |
|---|---|---|---|---|---|
| **OCN** | OH Secondary Connector | **OPO** | Pole | **UFJ** | UGJ-Box |
| **OCO** | OH Conductor | **OSV** | OH Service | **UPT** | UG Padmount Transformer |
| **OFC** | OH Cut-Out | **OTF** | OH TRF Fuse | **UPC** | UG Primary Cable |
| **OFU** | Fuse Link/O.H. Line Fuse | **OTR** | OH Transformer | **USV** | UG Service |
| **OJU** | Jumper Wire | **UEL** | UG Elbow | | |

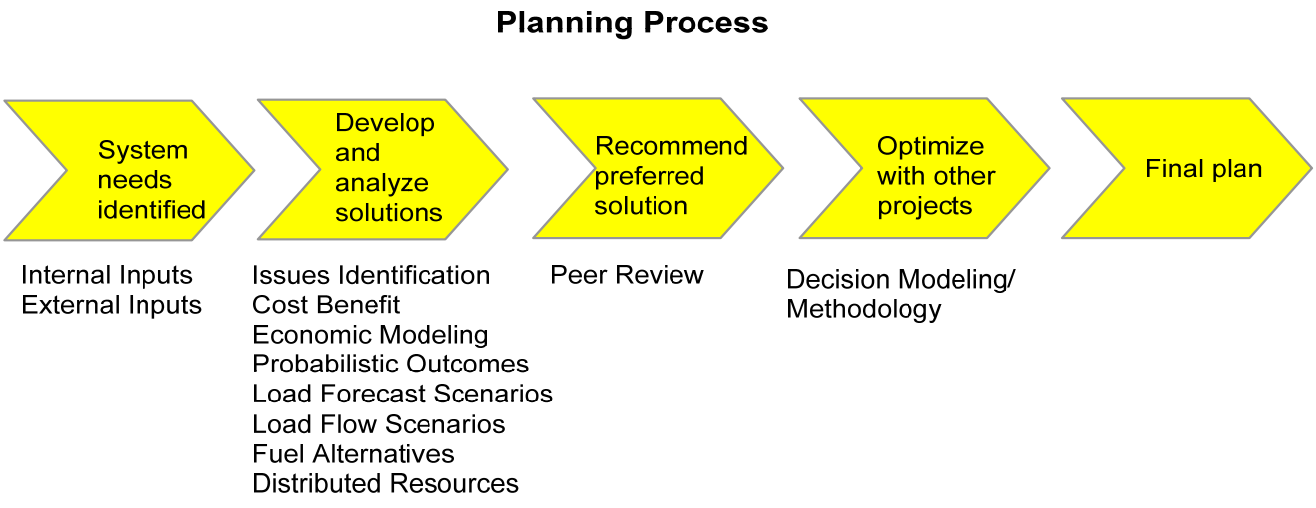
## SECTION VI – AREAS OF GREATEST CONCERN

As discussed in Section II "Methodology", for purposes of this report starting in 2006 Puget Sound Energy defines an Area of Greatest Concern by considering the trends based on circuits that exceed the SQI, number of customers affected by those circuits, and customer complaints. Based on the trends in these three metrics, pockets within Skagit, King, Thurston, and Kitsap/Jefferson counties have been identified as the Areas of Greatest Concern. These Areas of Greatest Concern provide focus for the planner in developing projects; however, all areas are continually evaluated for improvement.

How improvement projects for "Areas of Concern" are considered for funding:

The area planners study "area of concern" circuits and propose projects that will improve the reliability for those customers. The following is a description of the Total Energy System Planning (TESP) Process that the planners use to have their proposed projects considered for funding. Figure 5 - "Planning Process" also encompasses capacity projects but for the purposes of this report, we will focus on reliability criteria.

**FIGURE 5 – PLANNING PROCESS**



The goal of the planning process is to determine cost-effective ways to meet customer needs and maximize value to the company, customers and community. The "Planning Process" in Figure 5 represents the delivery system planning process beginning with an analysis of the current situation and an understanding of the existing operational and reliability challenges. Planning considerations include internal inputs such as reliability indices, company goals and commitments, and reviewing the root causes of the historic outages. In addition, external inputs such as regulations, municipalities' infrastructure plans, customer complaints and ongoing service issues are also considered. The communication received during the customer inquiry and complaint resolution process provides valuable information that field data or statistical modeling may not have revealed. PSE also conducts customer surveys to seek out general information regarding customer expectations and possible specific concerns. In July 2007, PSE completed an extensive review of its performance prior to, during and following the record-breaking windstorm that hit the Pacific Northwest in mid-December 2006. The feedback received through customer focus groups, telephone and Web surveys, provided valuable information and helped identify additional opportunities for improvement.

These inputs assist in determining specific solutions and alternatives to address the overall reliability. Each proposed project alternative is evaluated with quantitative benefits such as number of outages and customer minutes saved, number of customer of impacted and qualitative benefits such as improvement in customer complaints and customer satisfaction. Each proposed project alternative is compared using a value modeling tool that involves building a hierarchy of the value these benefits bring to the stakeholders against the project cost. Total value is optimized across the entire portfolio of system infrastructure projects (electric and gas) which results in a set of capital projects that provide maximum value to PSE customers and stakeholders.

A more detailed discussion of this process can be found in Chapter 7 "Delivery System Planning" of PSE's "2009 Integrated Resource Plan".

To assist with identifying the highest priority projects for reliability, two perspectives are developed for review by the planners:

- The 50 worst performing circuits in the Company
- The 50 worst performing circuits by planning area

There are many items to consider in developing the 50 worst circuit listing. One can develop a worst circuit listing based on circuit SAIDI, the most customer minutes outages, the highest number of outages, etc. PSE is focusing on the 50 worst performing circuits over the past 5 years that consistently contributed the most customer-minute interruptions. Each circuit is ranked for each of the previous 5 years by the total customer-minute interruptions seen by the circuit, and the worst circuits are those circuits with the highest ranking over

the past 5 years. The 50 worst circuits are the circuits with the highest ranking over the past 5 years based on the customer-minute interruptions. These circuits contribute 33% of the total companywide SAIDI minutes over the past 5 years. Appendix I - 2007 Top 50 Worst Circuits details the Top 50 Worst Circuits along with PSE's plan for system improvements on each circuit. Forty of the circuits on the list are within the four Areas of Greatest Concern. The 2008 Top 50 Worst Circuits are being reviewed for system improvements. In addition, the four regional planning teams –Whatcom/Skagit/Island, North King County, South King County, Pierce/Thurston/Kitsap/Jefferson - continually review the performance of the distribution system in their respective regions. Each team reviews the 50 worst circuits in their regions in proposing reliability projects for the upcoming year that compete with other system related projects for funding.

In addition to the annual process as described above, new projects are identified and released for construction throughout the year. These projects can be a result of a new initiative such as the 10+ year reliability roadmap, a municipality altering their infrastructure plans, or to address a resource need for a given area. In 2009, new reliability projects where the projected customer minutes saved/$1000 is greater than 100 and are determined to be needed before the next planning cycle are approved and released for construction.

Customer Concerns and Complaints

As described earlier, customer concerns and complaints are inputs to the Planning Process. Each planner investigates the outage history surrounding each customer complaint, reviews the overall circuit reliability and then prepares plan for resolution. Depending on the nature of the circuit reliability, the plan for resolution could be continued monitoring of the circuit. Or a planner may propose projects which will improve the circuit reliability. The projected improvement in customer complaints is an input in the value modeling tool, along with a number of inputs as described above. It's important to note that PSE continually investigates customer complaints and tracks ongoing service issues as they are communicated. Customers receive follow-up correspondence to discuss their concern, as well as plans for resolution.

In 2008, PSE received 40 complaints relating to reliability and power quality concerns. These complaints came through PSE's complaint process and are shown in tabular form in Appendix B − 2008 PSE Complaints and Resolutions of this report. It was discovered that there was an error in the summary report for the past three years. The report only included customers if they had called in both years rather than two or more times in the past 24 calendar months. The report has been corrected, and with this year and moving forward, PSE will report all customers who have called two or more times in the last 24 calendar months.

The Commission received 22 complaints relating to the reliability of PSE's energy delivery system. These complaints are shown in Appendix C − 2008 PSE Concerns Filed with the Commission of this report.

Appendix D is the 2007 PSE Complaints and Resolutions updated to include follow-up actions taken by PSE in 2008.

Appendix F – 2008 Areas of Greatest Concern Map graphically presents these complaints as defined by the PSE process and those complaints filed with the Commission. In addition, Appendix E – 2007 Areas of Greatest Concern Map has been included for reference and comparison. The maps indicate by county the number of customer complaints received by PSE, the number of commission complaints, and the number of reliability projects for the year following the complaints as discussed further in Section VI.

Appendix G – 2008 Geographic Location of Customer Complaints on Service Territory Map graphically maps PSE and Commission (WUTC) complaints closer to the actual geographic location of the customer.

Projects Addressing Reliability

As a result of this comprehensive process, projects planned in 2009 address reliability in all counties including those in the Areas of Greatest Concern. Overall, in 2009 PSE plans to initiate over 430 projects, and perform vegetation management on over 2,218 miles of OH distribution line across the entire system to improve reliability. While most of the 430 projects planned for 2009 are in the Areas of Greatest Concern, all projects are prioritized through the planning process, as described earlier, prioritizing the projects with the highest value to multiple stakeholders.

Table 11 "2009 County Projects and Vegetation Management" identifies the planned projects and vegetation management for 2009 by county and by type of work which solve the top causes of diminished reliability. Additional 2009 projects may be added as system issues come up during the year. In early 2008, 28 additional distributions costing over $3.8M were added to help improve SAIDI, and harden the distribution system for storms. In addition, over $1.5M distribution projects were funded later in the year to provide work to the area crews to maintain the crews in the area to respond to outages. And, a 10+ year high level reliability roadmap was developed in 2008. Specific programs, tactics, and area specific plans are currently under development for future funding. It is also important to note that all counties receive focus towards resolving these issues, though in 2009 most of the projects are focused in three of the Areas of Greatest Concern – King, Thurston, and Kitsap/Jefferson. Fewer projects were funded in Skagit primarily due to the higher cost for the reliability improvement as compared to other areas. The areas within Skagit with the greatest reliability concerns are somewhat remote and the benefit to provide additional reliability improvement is outweighed by the higher cost to provide the improvement. In addition, customers in Skagit were relatively satisfied with their reliability as only two of the sixty-two complaints were from Skagit County.

The effectiveness of the planning process can be evaluated by looking at the number of projects that are funded. While projects within the Areas of Greatest concern aren't automatically weighed more favorably, the resulting value of those projects are great enough that projects are funded through the value based model.

**TABLE 11 – 2009 PROJECTS BY COUNTY AND VEGETATION MANAGEMENT**

| | Whatcom | Skagit | Island | King | Kittitas | Pierce | Thurston | Kitsap | Jefferson | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cable Projects (EF)** | 6 | 2 | 1 | 80 | 2 | 12 | 26 | 27 | 6 | 162 |
| **Pole Replacement** | | 4 | 2 | 25 | 1 | 1 | 3 | 6 | | 42 |
| **Tree Wire (TF, TO)** | | | | 1 | 1 | | 1 | | | 3 |
| **Protection Devices (EF, BA)** | 14 | 8 | 5 | 42 | 2 | 12 | 48 | 33 | 6 | 170 |
| **Other Reliability Projects** | 11 | 3 | 4 | 26 | | 1 | 7 | 8 | | 60 |
| **Total** | 31 | 17 | 12 | 174 | 6 | 26 | 85 | 74 | 12 | 437 |
| **Vegetation Management (TF, TO) "Circuit Miles"** | 195 | 182 | 66 | 767 | 147 | 181 | 259 | 332 | 90 | 2218 Circuit Miles |

The focus on reducing the average frequency and duration of electric system outages had resulted in PSE continually meeting the established SQI prior to 2006. PSE will continue to manage the number of outages and their duration overall for the system to meet the established SQI, and will evaluate opportunities to modify sections of the electric system to perform more effectively in the environments that they are located within. In addition, PSE and its Service Provider are committed to an improving restoration times for all outages.

PSE will also continue to review the performance of the 50 worst circuits in the company with the intention of improving the reliability of these circuits as these 50 worst circuits contribute 33% of the total companywide SAIDI minutes over the past 5 years. Many improvements have been funded for each of the circuit over the past years. Some of the proposed improvements for the 50 worst circuits were not funded since other system projects for that year were more cost effective in improving overall system reliability.

Vegetation Management

PSE's vegetation maintenance program focuses on maintaining proper clearance from energized electric lines which is paramount to public safety and to prevent tree related contact outages from occurring.

Vegetation maintenance is conducted on the overhead distribution system typically every four years for lines in urban areas and every six years for lines in rural areas and on the cross-country transmission system every three years. Maintenance activities include tree trimming, removing danger trees in right-of-way corridors along with spray and mowing. In 2008, vegetation maintenance was performed on 910 miles of overhead distribution. In response to a national vegetation management standard developed by the North America Electric Reliability Corporation (NERC), PSE has begun a project to remove all vegetation with a mature height of over 15' from beneath and alongside the conductors on the 230 kV corridors. The standard requires a management plan and clearance distances which will prevent outages from effecting on this voltage lines. Penalties for outages from vegetation growing into these lines (or the lines sagging into vegetation) are very large, and PSE will complete this project early in 2010 to limit the probability of this type of outage. In 2008, 578 miles of high-voltage distribution and 327 miles of transmission corridors were maintained

PSE also continues to manage vegetation impacts with its TreeWatch Program, whose implementation was authorized by a WUTC Order in July 8, 1998. This program, which removes trees with compromised structural integrity, essentially "hardens" the electric delivery system for both routine and significant weather events. In 2008, approximately 905 miles of transmission and high voltage distribution line were worked under the TreeWatch program. Trees trimmed or removed numbered over 19,000.

In 2009, the TreeWatch program will continue with specific focus on the transmission corridors in order to remove danger trees that threaten transmission and high voltage distribution facilities, as well as distribution circuits with "pockets" of trees which threaten these lines. The overall goal is to remove or trim 10,000 off right-of-way danger trees.

The 2008 year-end results are summarized in Table 12 "2008 Vegetation Management Program".

**TABLE 12 - 2008 VEGETATION MANAGEMENT PROGRAM**

| Vegetation Management Strategies | YE RESULT |
|---|---|
| Tree Trimming - OH Distribution (miles) | 910 |
| Tree Trimming - High Voltage Distribution (miles) | 578 |
| Tree Trimming - Cross Country Transmission Corridor (miles) | 327 |
| Tree Watch - Transmission & High Voltage Distribution Lines (miles) | 905 |
| Tree Watch - Number of Trees Trimmed or Removed | 19,849 |

# APPENDIX A
# DEFINITIONS

**APPENDIX A – DEFINITIONS**

**AMR** – Automated Meter Reading system, which is a sophisticated 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.

**Area of Greatest Concern Map** – A plot of localized areas of concern on a geographic map. Areas include PSE complaints and concerns filed with the commission and projects planned.

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

**CLX** – Consumer LinX, PSE's customer information system.

**Commission Complaint** – any single concern filed by a customer with the Washington Utility and Transportation Commission (WUTC).

**Customer Complaint** – a customer comment 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 contacts to the Company over a 24-month period, 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 the Company 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.

**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 |
| **USV** | Underground Service |

**Major Event Days**– per the SQI method, a catastrophic event that exceeds design limits of the electric power system and is characterized by more than five percent of the customers out of service during a 24-hour period. Under the IEEE 1366 definition, a major event is a day in which the daily system SAIDI exceeds a threshold value, $T_{MED}$ that is determined by using the 2.5 beta method.

**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 rule, 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. SAIDI will be calculated according to the following:

$$\text{SAIDI} = \frac{\sum \text{Customer Interruption Durations}}{\text{Total number of customers served}}$$

**SAIFI** – System Average Interruption Frequency Index (sustained interruptions). This index is designed to give information about the average frequency of sustained interruptions per customers over a predefined area. SAIFI will be calculated according to the following:

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

**SQI** – Service Quality Index are the established indices per conditions of the Puget Power and Washington Natural Gas merger in 1997.

**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 interruptions longer than one minute.

**$T_{MED}$** – Tmed is the major event day identification threshold value that is calculated at the end of each reporting period (typically one year) for use during the next report period. It's determined by reviewing the past 5 years of daily system SAIDI, and using the IEEE 2.5 beta methodology in calculating the threshold value. Statistically, any days having a daily system SAIDI greater than Tmed 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 $\alpha$ is the log-average of the data set and $\beta$ is the log-standard deviation of the data set.

# APPENDIX B

## 2008 PSE COMPLAINTS AND RESOLUTIONS

## APPENDIX B – 2008 PSE COMPLAINTS AND RESOLUTIONS

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE |
|---|---|---|---|---|---|---|
| 1 | Apr 2007<br>Apr 2007 | Snoqualmie | Reliability | Snoqualmie-13 | Contacted customer to discuss concerns. | Tree trimming completed in 2007. Ongoing circuit monitoring and maintenance will continue. |
| 2 | Jan 2008<br>Jan 2008 | Sammamish | Reliability | Sahalee-13 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 3 | Jan 2007<br>Jan 2007 | Nordland | Reliability | Irondale-13 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 4 | Nov 2007<br>Jan 2008 | Tumwater | Reliability | Prine-21 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 5 | Jan 2007<br>Mar 2007<br>Mar 2007<br>Nov 2007 | Yelm | Reliability | Longmire-22 | Reported on 2007 report, no new inquiries in 2008 | A substation transformer was replaced and a new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 6 | Jan 2007<br>Nov 2008<br>Dec 2008 | Sedro Woolley | Reliability | Norlum-15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 7 | Sep 2008<br>Sep 2008 | Olympia | Reliability | Friendly Grove-16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 8 | Oct 2008<br>Dec 2008 | Duvall | Reliability | Duvall-15 | Contacted customer to discuss concerns. | System projects in 2009 will improve reliability. |
| 9 | Jan 2007<br>Jan 2007 | Bellingham | Reliability | Woburn-25 | Contacted customer to discuss concerns. | Completed system improvement projects to improve reliability. |
| 10 | Jan 2008<br>Nov 2008 | Bainbridge Island | Reliability | Port Madison-16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE |
|---|---|---|---|---|---|---|
| 11 | Jan 2007<br>Dec 2007 | Baring | Reliability<br>Power Quality | Skykomish-25 | Reported on 2007 report, no new inquiries in 2008 | Ongoing circuit monitoring and maintenance will continue. |
| 12 | Sep 2007<br>Jul 2008 | Yarrow Point | Reliability<br>Power Quality | MED -33 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 13 | May 2008<br>May 2008 | Duvall | Power Quality | Duvall -12 | Contacted customer to discuss concerns. | System project in 2009 will improve power quality issues. |
| 14 | May 2008<br>Dec 2008 | Woodinville | Reliability<br>Power Quality | Hollywood -26 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 15 | Jan 2007<br>Jan 2007<br>Jan 2007<br>Feb 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | A substation transformer was replaced. Additional system improvement projects were also completed. |
| 16 | Oct 2007<br>Oct 2007 | Federal Way | Reliability | Lakota -17 | Reported on 2007 report, no new inquiries in 2008 | One system improvement projects scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 17 | Oct 2007<br>Oct 2007 | Olympia | Reliability | West Olympia -25 | Contacted customer to discuss concerns. | System projects completed which will improve reliability. |
| 18 | Jan 2007<br>Oct 2007 | Yelm | Reliability | Longmire -22 | Reported on 2007 report, no new inquiries in 2008 | A substation transformer was replaced and a new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 19 | Jan 2007<br>Nov 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | A substation transformer was replaced and a new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 20 | May 2008<br>Oct 2008 | Bellevue | Reliability | South Bellevue -26 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 21 | May 2008<br>May 2008<br>May 2008 | Snoqualmie Pass | Reliability | North Bend -15 | Contacted customer to discuss concerns. | One system project completed in 2008 to improve reliability. |
| 22 | Jan 2007<br>Jan 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | A new substation transformer was replaced. Ongoing circuit monitoring and maintenance will continue. |
| 23 | Sep 2007<br>Sep 2007 | Blaine | Reliability<br>Power Quality | Birch Bay -12 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE |
|---|---|---|---|---|---|---|
| 24 | May 2007<br>May 2007 | Issaquah | Reliability | Lake McDonald -23 | Contacted customer to discuss concerns. | Tree trimming scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 25 | Dec 2007<br>Dec 2008 | Bremerton | Reliability | Sinclair Inlet -22 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 26 | Apr 2007<br>Apr 2007 | Port Orchard | Reliability | East Port Orchard -13 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 27 | Jan 2007<br>Apr 2007 | Snoqualmie | Reliability | Snoqualmie -13 | Contacted customer to discuss concerns. | A new substation is scheduled for construction in 2010 which will improve reliability. Ongoing circuit monitoring and maintenance will continue. |
| 28 | Oct 2008<br>Dec 2008 | Bellevue | Reliability | Bridle Trails -21 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 29 | Mar 2007<br>Mar 2007 | Yelm | Reliability<br>Power Quality | Longmire -22 | Contacted customer to discuss concerns. | Completed system improvement projects to improve reliability. Ongoing circuit monitoring and maintenance will continue. |
| 30 | Jul 2007<br>Jul 2007 | Duvall | Reliability | Duvall -15 | Contacted customer to discuss concerns. | Two system improvement projects scheduled for 2009 will improve reliability. |
| 31 | Jan 2007<br>Jan 2007 | Gig Harbor | Reliability | Fragaria -16 | Reported on 2007 report, no new inquiries in 2008 | Ongoing circuit monitoring and maintenance will continue. |
| 32 | May 2008<br>May 2008 | Silverdale | Reliability | Silverdale -17 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 33 | Oct 2007<br>Oct 2007 | Mercer Island | Reliability | South Mercer -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 34 | Jan 2007<br>Jan 2007<br>Nov 2007 | Bellingham | Reliability | Woburn -25 | Contacted customer to discuss concerns. | Completed system projects will improved reliability. Ongoing circuit monitoring and maintenance will continue. |
| 35 | Jan 2007<br>Jan 2007 | Clinton | Reliability<br>Power Quality | Langley -16 | Contacted customer to discuss concerns. | Multiyear projects including a new substation and transmission line right of way improvements will improve reliability. |
| 36 | Dec 2008<br>Dec 2008 | Vashon | Reliability | Vashon -13 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE |
|---|---|---|---|---|---|---|
| 37 | Jun 2008<br>Jun 2008 | Port Orchard | Reliability | East Port Orchard -16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 38 | Oct 2007<br>Oct 2007 | Carnation | Reliability | Tolt -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 39 | Nov 2007<br>Nov 2007 | Olympia | Reliability | McAllister Springs -16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 40 | Mar 2008<br>Apr 2008 | Bellevue | Reliability Power Quality | Somerset -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. |

APPENDIX C

2008 PSE CONCERNS FILED WITH COMMISSION

## APPENDIX C - 2008 PSE CONCERNS FILED WITH COMMISSION

PSE has provided the Commission with background information on all of the following concerns.

| No. | Date of Complaint | Location | Complaint Type | Closing Date |
|---|---|---|---|---|
| 1 | 1/28/2008 | Covington | Reliability | 1/31/2008 |
| 2 | 2/4/2008 | Gig Harbor | Reliability | 2/15/2008 |
| 3 | 2/8/2008 | Enumclaw | Reliability | 2/26/2008 |
| 4 | 2/8/2008 | Bellingham | Reliability | 3/4/2008 |
| 5 | 2/12/2008 | Sammamish | Reliability | 2/26/2008 |
| 6 | 2/14/2008 | Enumclaw | Reliability | 2/20/2008 |
| 7 | 2/14/2008 | Enumclaw | Reliability | 2/15/2008 |
| 8 | 2/15/2008 | Enumclaw | Reliability | 2/21/2008 |
| 9 | 2/21/2008 | Enumclaw | Reliability | 2/27/2008 |
| 10 | 2/21/2008 | Enumclaw | Reliability | 3/20/2008 |
| 11 | 2/28/2008 | Enumclaw | Reliability | 3/25/2008 |
| 12 | 2/28/2008 | Enumclaw | Reliability | 3/25/2008 |
| 13 | 3/28/2008 | Olympia | Reliability | 4/17/2008 |
| 14 | 4/15/2008 | Olympia | Reliability | 5/6/2008 |
| 15 | 6/17/2008 | Lacey | Reliability | 10/13/2008 |
| 16 | 6/27/2008 | Yelm | Reliability | 6/27/2008 |
| 17 | 8/25/2008 | Olympia | Reliability | 8/27/2008 |
| 18 | 12/4/2008 | Ellensburg | Reliability | 1/13/2009 |
| 19 | 3/11/2008 | Burlington | Power Quality | 3/17/2008 |
| 20 | 3/31/2008 | Des Moines | Power Quality | 4/22/2008 |
| 21 | 8/20/2008 | Duvall | Power Quality | 9/8/2008 |
| 22 | 11/12/2008 | Blaine | Power Quality | 12/16/2008 |

APPENDIX D

2007 PSE COMPLAINTS AND RESOLUTIONS

## APPENDIX D - 2007 PSE COMPLAINTS AND RESOLUTIONS

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 1 | Dec 2006 July 2007 | Olympia | Reliability | Griffin - 16 | Contacted customer to discuss concerns. | Switching and load balance was performed in Carolyn Beach development. Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 2 | Dec 2006 Jan 2007 | Clinton | Reliability | Langley - 16 | Contacted customer to discuss concerns. | Multi-year projects including a new substation and transmission line right of way improvements will improve reliability. | Whidbey Reliability Initiatives are on schedule. A new substation is scheduled for 2010 construction. |
| 3 | Dec 2006 Oct 2007 | Bellevue | Reliability | Somerset -16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 4 | Jan 2006 Mar 2007 | Olympia | Reliability | Mottman -15 | Contacted customer to discuss concerns. | Poles were replaced in early 2007 as part of the transmission line upgrade project. | Ongoing circuit monitoring and maintenance will continue. |
| 5 | Dec 2006 Sept 2007 | Renton | Reliability | Fairwood -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | One system improvement project scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 6 | Aug 2006 Oct 2007 | Bellevue | Reliability and Power Quality | Somerset -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 7 | Nov 2006<br>Jan 2007 | Concrete | Reliability | Hamilton -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | One system improvement project completed in 2008. Ongoing circuit monitoring and maintenance will continue. |
| 8 | Feb 2006<br>Jan 2007<br>Mar 2007<br>Nov 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | Longmire Substation transformer was replaced. A new circuit is to be installed from Longmire Substation to split the LON-22 load. | The new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 9 | Mar 2006<br>Jan 2007 | Kingston | Reliability | Kingston -22 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. New substation completed in late 2007 to strengthen area service. | Ongoing circuit monitoring and maintenance will continue. |
| 10 | Nov 2006<br>Nov 2007 | Sedro Woolley | Reliability | Norlum - 15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. One system improvement project completed in 2007. | Ongoing circuit monitoring and maintenance will continue. |
| 11 | Dec 2006<br>Jan 2007 | Freeland | Reliability | Freeland - 12 | Contacted customer to discuss concerns. | Multi-year projects including a new substation and transmission line right of way improvements will improve reliability. | Whidbey Reliability Iniatiatives are on schedule. A new substation is scheduled for 2010 construction. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 12 | Dec 2006 June 2007 | Lynden | Reliability | Lynden - 17 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | A new substation scheduled to be completed in 2009. Ongoing circuit monitoring and maintenance will continue. |
| 13 | July 2006 Feb 2007 | Kingston | Reliability | Kingston - 24 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 14 | Nov 2006 Dec2006 Jan 2007 Dec 2007 | Baring | Reliability and Power Quality | Skykomish -25 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 15 | Jan 2006 Feb 2006 Dec 2007 | Poulsbo | Reliability | Serwold - 14 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 16 | Nov 2006 Apr 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 17 | July 2006 Dec 2006 Oct 2007 | Federal Way | Reliability and Power Quality | Lakota -17 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | One system improvement projects scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 18 | Feb 2006 Sept 2007 | Woodinville | Reliability | Cottage Brook -13 | Contacted customer to discuss concerns. | More aggressive tree trimming being pursued in 2008. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 19 | Feb 2006 Apr 2007 | Port Ludlow | Reliability | Port Ludlow -16 | Contacted customer to discuss concerns. | One system project completed in 2007 to solve voltage concerns. | A new substation was energized in 2008 along with completion of a system improvement project. Ongoing circuit monitoring and maintenance will continue. |
| 20 | Dec 2006 Jan 2007 Oct 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | Longmire Substation transformer was replaced. A new circuit is to be installed from Longmire Substation to split the LON-22 load. | The new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 21 | Nov 2006 Oct 2007 | Clinton | Reliability | Langley -12 | Contacted customer to discuss concerns. | Multi-year projects including a new substation and transmission line right of way improvements will improve reliability. | Whidbey Reliability Iniatiatives are on schedule. A new substation is scheduled for 2010 construction. |
| 22 | Apr 2006 Feb 2007 | Normandy Park | Reliability | North Normandy -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 23 | Dec 2006 Apr 2007 | Snoqualmie | Reliability | Snoqualmie -13 | Contacted customer to discuss concerns. | Future transmission projects will strengthen area reliability. Ongoing circuit monitoring and maintenance will continue. | Future transmission projects will strengthen area reliability. One system improvement project scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 24 | Dec 2006 Feb 2007 | Newcastle | Reliability | Hazelwood -12 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |

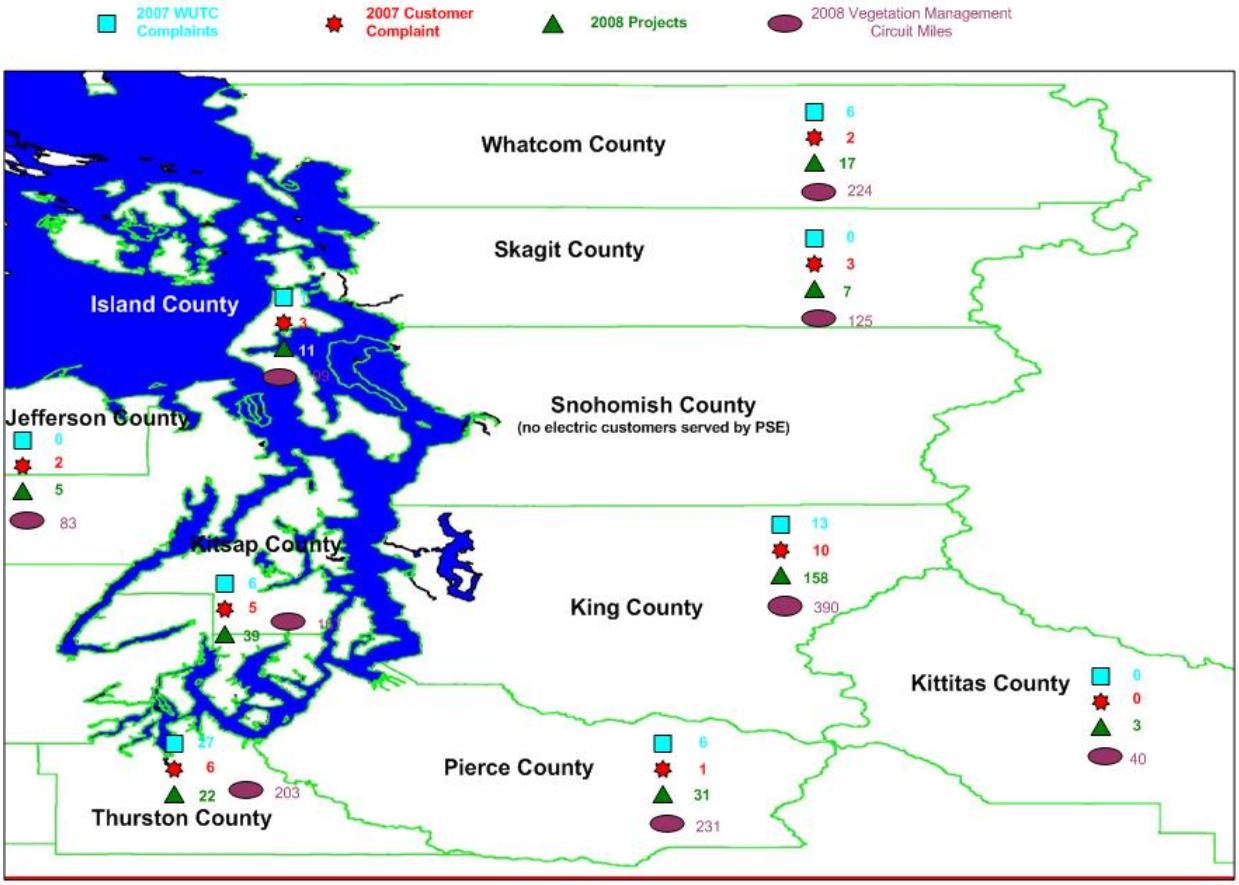
| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 25 | Mar 2006 June 2007 | Bow | Power Quality | Wilson - 16 | Contacted customer to discuss concerns. | One system project completed in 2007 to solve voltage concerns. | Ongoing circuit monitoring and maintenance will continue. |
| 26 | May 2006 Apr 2007 | Bellingham | Reliability | Lake Louise - 15 | Contacted customer to discuss concerns. | One transmission line project scheduled for 2009. | One transmission line project scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 27 | Nov 2006 Mar 2007 | Kirkland | Reliability | Rose Hill -21 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | One system improvement project scheduled for 2009. Ongoing circuit monitoring and maintenance will continue. |
| 28 | Feb 2006 Jan 2007 | Gig Harbor | Reliability and Power Quality | Fragaria - 16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 29 | Feb 2006 Nov 2006 Jan 2007 | Yelm | Reliability | Longmire -22 | Contacted customer to discuss concerns. | Longmire Substation transformer was replaced. A new circuit is to be installed from Longmire Substation to split the LON-22 load. | The new circuit was energized in February 2008. Ongoing circuit monitoring and maintenance will continue. |
| 30 | Oct 2006 Oct 2006 Nov 2006 Jan 2007 | Sedro Woolley | Reliability | Hamilton -15 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |
| 31 | Nov 2006 Dec 2007 | Gig Harbor | Reliability and Power Quality | Fragaria - 16 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | Ongoing circuit monitoring and maintenance will continue. |

| No. | Date of Complaint | Location | Complaint Type | Circuit | Response | Action by PSE | Follow Up on Action Taken by PSE |
|---|---|---|---|---|---|---|---|
| 32 | Aug 06 Mar 07 | Quilcene | Reliability and Power Quality | Silverdale -13 | Contacted customer to discuss concerns. | Ongoing circuit monitoring and maintenance will continue. | One system improvement project completed in 2008. Ongoing circuit monitoring and maintenance will continue. |

APPENDIX E

2007 CUSTOMER COMPLAINTS ON SERVICE TERRITORY MAP WITH NUMBER OF COMPLAINTS AND NUMBER OF PROJECTS PROPOSED TO ADDRESS AREAS OF CONCERN

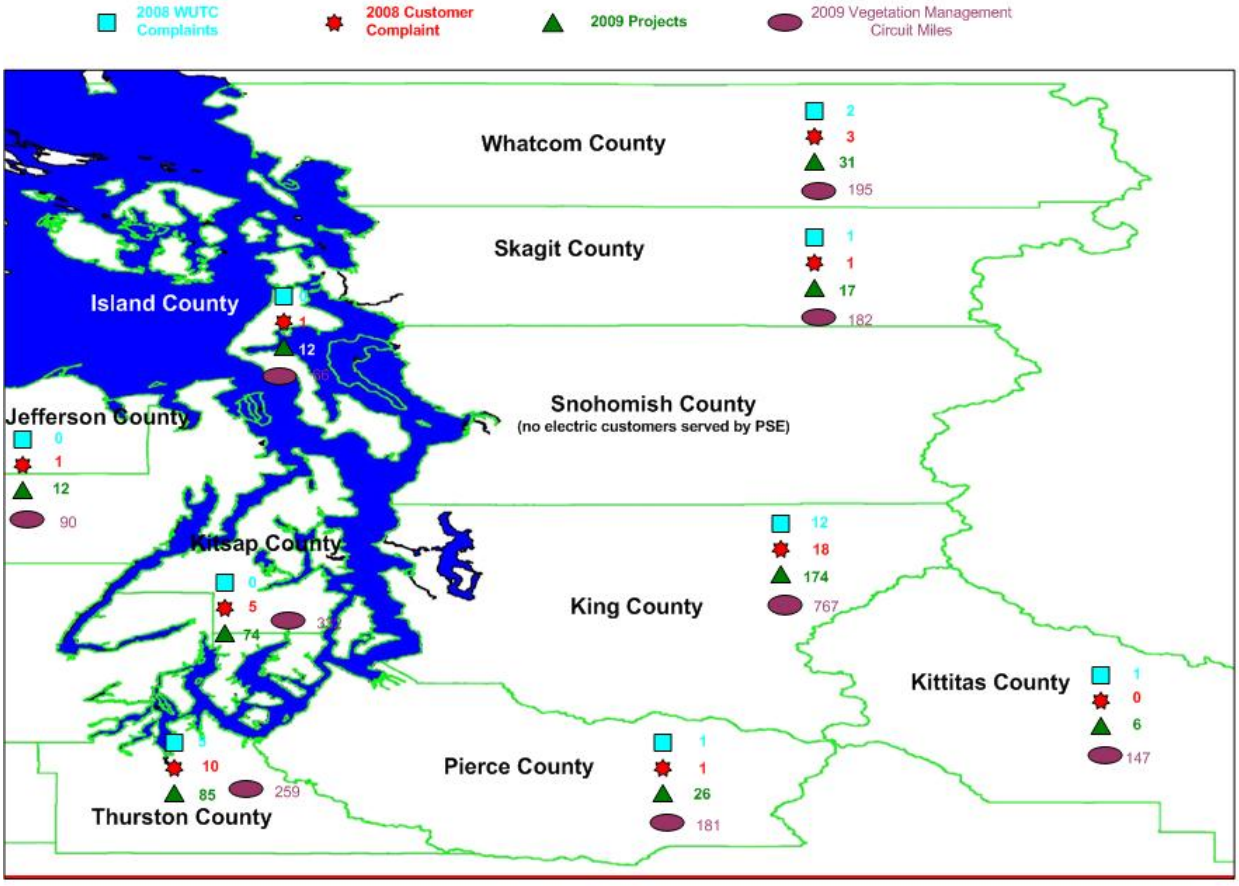
# APPENDIX E - 2007 Customer Complaints with 2008 System Projects



# APPENDIX F

2008 CUSTOMER COMPLAINTS ON SERVICE TERRITORY MAP WITH NUMBER OF COMPLAINTS AND NUMBER OF PROJECTS PROPOSED TO ADDRESS AREAS OF CONCERN

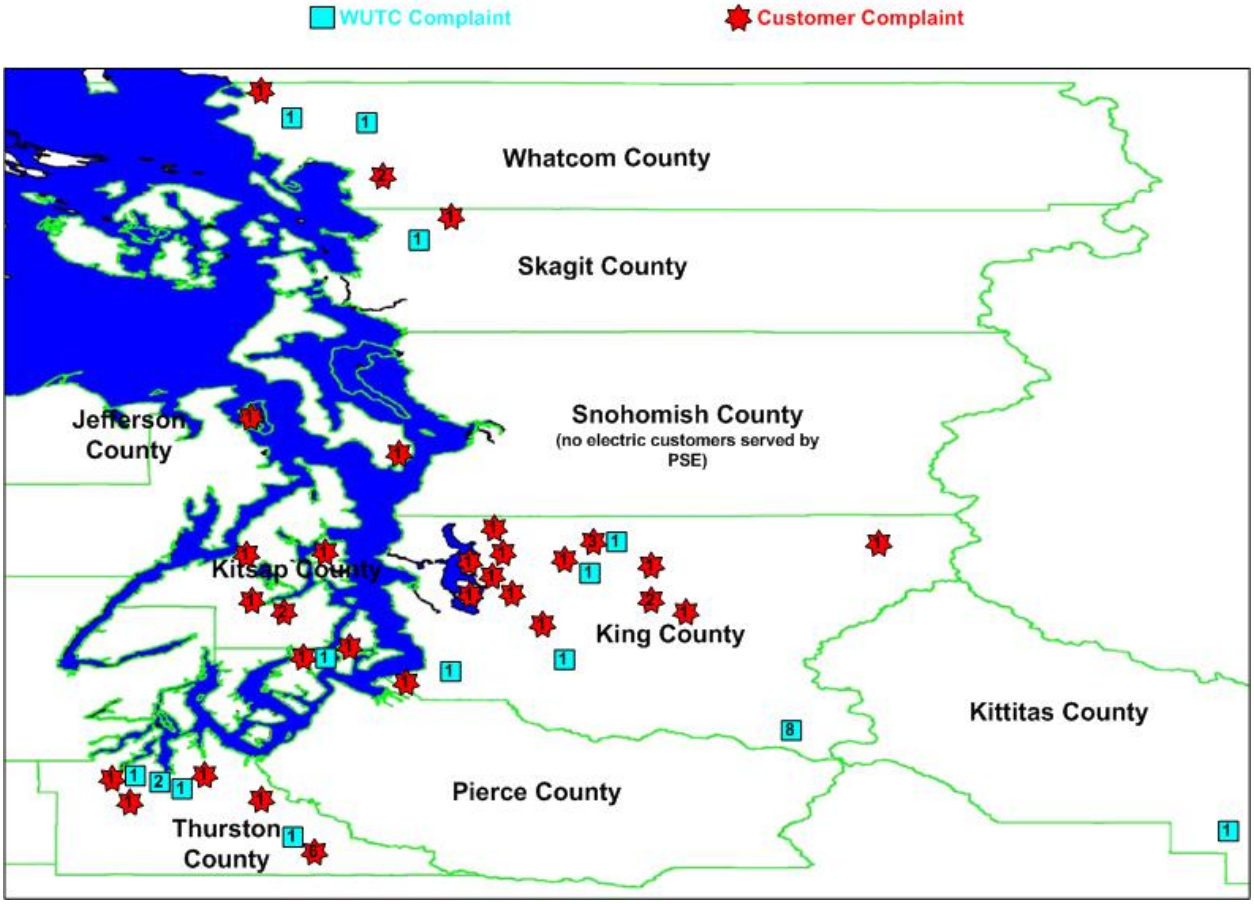
# APPENDIX F - 2008 Customer Complaints with 2009 System Projects



# APPENDIX G

2008 GEOGRAPHIC LOCATION OF CUSTOMER COMPLAINTS ON SERVICE TERRITORY MAP

# Appendix G - 2008 Geographic Location of Customer Complaints on Service Territory Map



# APPENDIX H

## 1999 – 2008 RELIABILITY DATA

**APPENDIX H – 1999 - 2008 RELIABILITY DATA**

| YEAR | SQI SAIDI | SQI SAIFI | IEEE SAIDI | IEEE SAIFI | IEEE Tmed |
|---|---|---|---|---|---|
| 1999 | 128.5 | 1.0 | 115.4 | 2.0 | 5.69 |
| 2000 | 102.6 | 0.9 | 116.5 | 1.9 | 6.16 |
| 2001 | 147.2 | 1.0 | 109.8 | 1.8 | 5.56 |
| 2002 | 107.3 | 0.8 | 99.5 | 1.8 | 5.27 |
| 2003 | 131.8 | 0.8 | 106.7 | 1.7 | 5.14 |
| 2004 | 112.8 | 0.8 | 113.7 | 1.8 | 5.22 |
| 2005 | 128.7 | 0.9 | 128.5 | 1.9 | 4.88 |
| 2006 | 214.7 | 1.2 | 163.0 | 2.0 | 4.97 |
| 2007 | 167.1 | 1.0 | 143.5 | 1.9 | 6.87 |
| 2008 | 163.5 | 1.0 | 154.8 | 2.0 | 7.36 |

APPENDIX I

2007 TOP 50 WORST CIRCUITS BY CUSTOMER MINUTES

## TOP 50 WORST CIRCUITS BY CUSTOMER MINUTES
## 5 YEAR AVERAGE

| Rank | Circuit | County | Average Customer Minutes | Action by PSE |
|---|---|---|---|---|
| 1 | Longmire-22 | Thurston | 2,834,658 | Phase II of the feeder replacement in Clearwood has been completed in 2008. Phase III is scheduled for construction in 2009 in conjunction with a Clearwood water line replacement project. Phase IV (final phase) of the feeder replacement is scheduled for completion in 2010. A second recloser and additional switches have been installed. |
| 2 | Chico-12 | Kitsap | 1,624,472 | Completed a recloser project in 2008. Substation property purchase and three phase feeder extension approved for 2009. |
| 3 | Baker River Switch-24 | Skagit | 1,223,711 | UG conversion project was approved for 2009. |
| 4 | Duvall-15 | King | 1,101,370 | The cable remediation projects were completed in 2008, and two recloser projects are approved for 2009. |
| 5 | Port Gamble-13 | Kitsap | 1,393,303 | Two regulator projects will be submitted for mid-year budget approval in 2009. |
| 6 | Silverdale-13 | Kitsap | 979,201 | Regulator project was approved for 2008 construction and will be completed by the end of the year. |
| 7 | Duvall-12 | King | 728,862 | Improvements should be seen with the tree wire projects completed in 2007 for on this circuit. |
| 8 | Vashon-13 | King | 758,582 | Two reconductor projects are approved for 2009. |
| 9 | Christensens Corner-22 | Kitsap | 585,955 | Kingston Substation has been completed and the reconfiguration of the feeder system should help improve the reliability. |
| 10 | Southwick-17 | Thurston | 653,353 | A feeder tie improvement is approved in 2009. Additional switches to sectionalize feeder area proposed in Reliability Roadmap. |
| 11 | Silverdale-16 | Kitsap | 717,327 | Feeder tie project is approved in 2009. |
| 12 | Eld Inlet-25 | Thurston | 645,779 | This circuit will continue to be monitored for potential improvements. |

| Rank | Circuit | County | Average Customer Minutes | Action by PSE |
|---|---|---|---|---|
| 13 | Longmire-23 | Thurston | 719,609 | Feeder work to split the load into two circuits is proceeding with completion in 2009. Additional switches and reclosers to sectionalize feeder were proposed in 2009 Reliability Road Map. |
| 14 | Slater-16 | Whatcom | 805,811 | Feeder tie approved for 2009. |
| 15 | Christensens Corner-25 | Kitsap | 881,042 | This circuit will continue to be monitored for potential improvements. |
| 16 | Langley-16 | Island | 608,065 | Transmission right of way enhancement and vegetation management. Maxwelton substation is planned for 2010 construction which will help improve reliability to this circuit. |
| 17 | Fall City-15 | King | 492,749 | This circuit will continue to be monitored for potential improvements. |
| 18 | Longmire-26 | Thurston | 1,023,235 | Circuit will continue to be monitored and evaluated for additional improvements. Thurston County road remediation project in 2010 may require feeder pole relocation along Vail Road SE impacting existing system. |
| 19 | Griffin-13 | Thurston | 756,950 | UG conversion project and six tree wire projects were completed in 2008. |
| 20 | Miller Bay-22 | Kitsap | 937,967 | Recloser was relocated in 2008 to better protect the circuit. |
| 21 | Freeland-12 | Island | 521,523 | A feeder tie project is expected to begin in 2009. |
| 22 | Port Gamble-12 | Kitsap | 590,366 | Two recloser projects were completed in 2008. |
| 23 | Irondale-13 | Jefferson | 775,593 | The reliability of this circuit was improved with the energization of Chimacum substation. |
| 24 | Winslow-15 | Kitsap | 660,082 | A reconductor project is approved in 2009. |
| 25 | Hamilton-15 | Skagit | 1,259,358 | Avian and Animal Protection improvements are planned for 2009. |
| 26 | Port Ludlow-16 | Jefferson | 547,459 | Completed a switch relocation in2008 which should improve reliability. |
| 27 | Irondale-15 | Jefferson | 500,570 | A tree wire project and feeder tie project were completed in 2008. |
| 28 | Nugents Corner-26 | Whatcom | 712,684 | Most 2008 customer minutes were due to a scheduled outage for transmission work. Circuit will continue to be monitored and evaluated for additional improvements. |

| Rank | Circuit | County | Average Customer Minutes | Action by PSE |
|---|---|---|---|---|
| 29 | Cottage Brook-13 | King | 789,360 | Completing two underground conversion projects and underground cable remediation project in 2009. |
| 30 | Freeland-15 | Island | 651,322 | Transmission right of way enhancement and vegetation management. Maxwelton substation is planned for 2010 construction which includes transmission improvements that will benefit Freeland substation reliability. |
| 31 | Silverdale-15 | Kitsap | 676,287 | Constructing additional phases to better enable circuit balancing and improve outage response. |
| 32 | North Bend-16 | King | 388,300 | Feeder tie project is approved in 2009. |
| 33 | Hamilton-13 | Skagit | 772,410 | Underground conversion project was completed in 2008. |
| 34 | Hickox-16 | Skagit | 499,308 | Bird diverters and guards installed in 2007 and 2008. 31 poles were replaced in 2007. This circuit will continue to be monitored for potential improvements. |
| 35 | Blumaer-17 | Thurston | 562,239 | Recloser installation was completed in 2008. |
| 36 | Orting-22 | Pierce | 855,251 | Treewire project is scheduled for 2009. |
| 37 | Somerset-15 | King | 640,531 | Replaced underground equipment in 2008 in response to outage. This circuit will continue to be monitored for potential improvements. |
| 38 | Freeland-13 | Island | 788,351 | Transmission right of way enhancement and vegetation management. Maxwelton substation is planned for 2010 construction which will help improve reliability to this circuit. Tree trimming scheduled for 2009. 2009 Shore Meadows CRP project funded. |
| 39 | Prine-21 | Thurston | 480,550 | This circuit will continue to be monitored for potential improvements. |
| 40 | Inglewood-15 | King | 401,413 | Construction of a second substation bank in 2009 will improve reliability. |
| 41 | Vashon-12 | King | 368,071 | This circuit will continue to be monitored for potential improvements. Additional reclosers will be proposed. |
| 42 | Pleasant Glade-13 | Thurston | 317,664 | This circuit will continue to be monitored for potential improvements. |
| 43 | Orting-23 | Pierce | 301,384 | This circuit will continue to be monitored for potential improvements. |

| Rank | Circuit | County | Average Customer Minutes | Action by PSE |
|---|---|---|---|---|
| 44 | Hyak-13 | King | 520,565 | An underground replacement project will be completed in 2009. |
| 45 | Inglewood-13 | King | 357,401 | Constructing a new underground feeder which replaces a cross-country overhead line. |
| 46 | Schuett-13 | Whatcom | 432,486 | Tree trimming completed in 2007. This circuit will be studied for a 2010 reliability improvement project. Circuit reliability has improved since 2006. |
| 47 | Serwold-11 | Kitsap | 283,999 | Circuit will continue to be monitored and evaluated for additional improvements. |
| 48 | Soos Creek-25 | King | 394,037 | Circuit will continue to be monitored and evaluated for additional improvements. |
| 49 | Greenwater-16 | King | 663,972 | Reliability projects currently being reviewed. |
| 50 | Lake Louise-17 | Whatcom | 463,525 | Circuit reliability is greatly improved YTD 2008. This circuit will continue to be monitored for potential improvements. |