REDACTED VERSION

January 2012 Pacific Northwest Snowstorm - After Action Review

Prepared by KEMA

June 19, 2012

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Note:

The work detailed in this report was performed by KEMA, Inc. prior to our merger with Det Norske Veritas (DNV). As of February 2012, KEMA is now known as DNV KEMA Energy & Sustainability (DNV KEMA).

1. Executive Summary

In January 2012, Puget Sound Energy (PSE) experienced a snow, ice and wind storm of a magnitude similar to the Hanukkah Eve Windstorm in 2006. In an effort to measure progress and identify areas for further improvement, PSE retained KEMA to conduct a post storm review of the January 2012 storm using the Hanukkah Eve Windstorm post storm review report as the assessment baseline. The scope of this assessment was limited to the focus areas of: 1) Energy System Restoration Plan (ESRP) execution; 2) damage assessment; and 3) internal and external communications.

KEMA's approach to performing this assessment entailed a series of interviews with PSE personnel, a review of the findings from the Hanukkah Eve Windstorm and subsequent actions by PSE, and a review of leading practices in the industry. The information obtained during this process was reviewed with PSE and documented in this report.

Overall, the difference between the Hanukkah Eve Windstorm and the January 2012 storm was quite dramatic with regards to management of the storms. The improvements that PSE implemented subsequent to the Hanukkah storm resulted in significantly improved performance during the January 2012 storm. PSE's use of social media during the storm created an industry leading practice.

The following findings are documented as conclusions in this report:

1) The ESRP was very effective in improving the management of the storm

2) Imminent response planning was proactive and anticipated the worst case scenario

3) Resource mobilization was very good

4) Event assessment and management (i.e., outage analysis, development of estimated restoration times, status provided during the storm) was effective, although challenged by the nature of the storm

5) Local Area Coordination sites were effective, but inconsistent due to differences in approaches, resources and facilities

6) Restoration execution work was effective, but opportunities for improvement exist with the Transmission Restoration Team (TRT) coordination and shutdown of the Emergency Operations Center (EOC)

7) PSE has made significant progress since the Hanukkah storm with regards to the deployment and utilization of resources, but opportunities for improvement exist

8) The damage assessment function was well planned, executed, and staffed; the process was significantly more effective and efficient than during the Hanukkah storm

9) Damage assessors received sufficient training, materials, tools and support

10) Information obtained from the damage assessment process was accurate and valuable in determining restoration work requirements and timeframes

11) Opportunities exist to better deploy damage assessment resources for more effective utilization and skills development

12) PSE was effective in communicating via channels that worked for all parties – internet, call center and in-person

13) PSE's strategy to proactively engage the media and "tell all" was successful

14) Executive visibility during the storm was a key factor in the media's treatment of PSE and in the motivation of employees

15) PSE's use of the internet/social media was a "game changer" in this event by providing a means to control the story

16) The Bothell Emergency Center was valuable and effective

17) Local Area Centers (e.g., Olympia) were effective in communicating to customers in locations where a physical presence is important

18) Customer-specific estimated restoration times are still the most important information to be communicated, and it remains a challenge to meet customer expectations regarding the level of specificity that is desired (i.e., when will *my* power be back on?)

19) External communications was dramatically improved from the Hanukkah storm, but additional progress can be made

20) Internal communications also improved significantly since the Hanukkah storm, but can still be enhanced

Based on these findings, KEMA makes the following recommendations in this report:

1) Enhance the TRT plan to improve communication and coordination with the operating bases to gain efficiencies in the restoration process and the utilization of resources

2) Enhance the ESRP and related annual training and mock event sessions to include additional focus on the EOC shut-down process and its transition of responsibilities

3) Accelerate the deployment of technologies such as iPads and GPS to facilitate the collection and communication of damage assessment data from the field

4) Conduct a comprehensive Use Case for the new outage management system to validate how it will be used to develop restoration time estimates

2. Introduction

Puget Sound Energy (PSE) is a regulated natural gas and electric utility serving more than 1.1 million electric customers and approximately 750,000 natural gas customers in 11 Washington counties – providing energy services in a territory of 6,000 square miles.

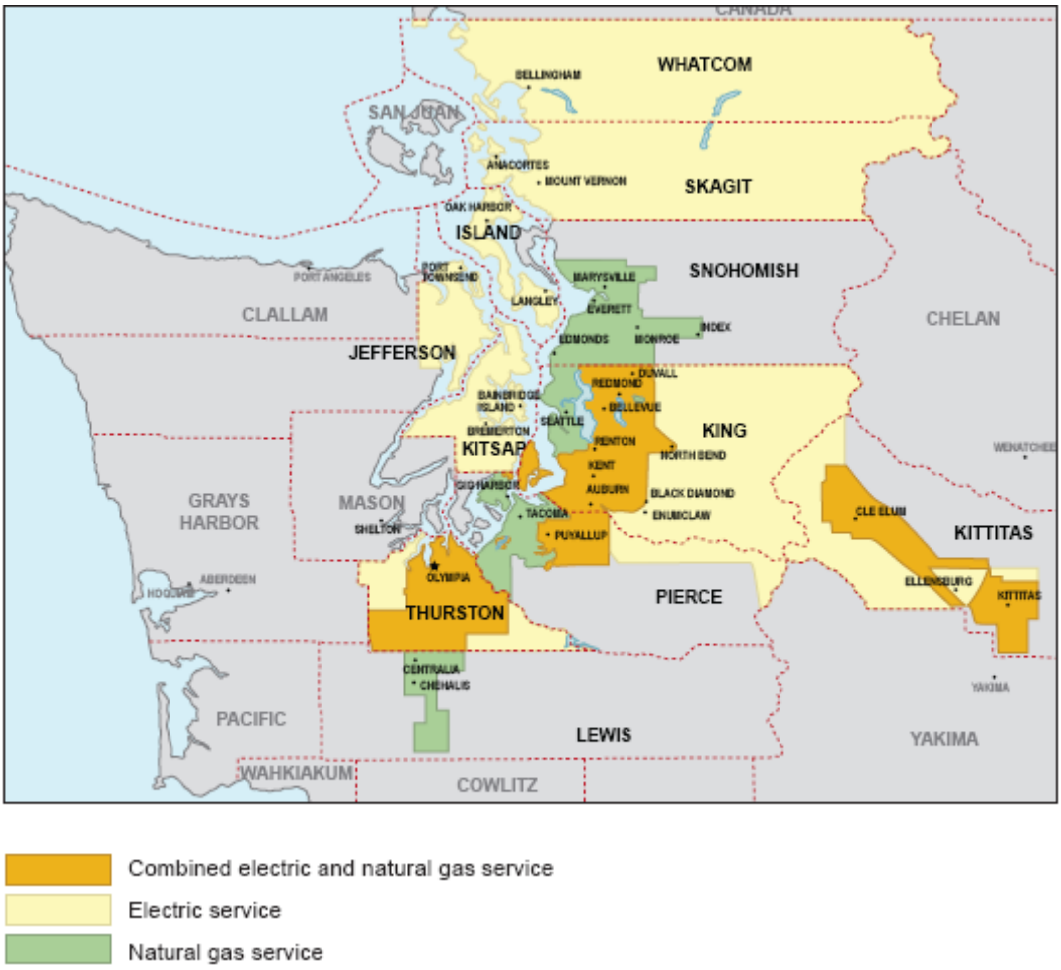

Figure 2-1: Puget Sound Energy Service Territory

PSE has five operating regions and utilizes a third-party service provider (Potelco, Inc.) for maintenance and construction services.

In accordance with PSE's Energy System Restoration Plan (ESRP), after action reviews are conducted following any emergency incident. These reviews focus on what went well and how response efforts may be improved in the future.

2.1 Background

In 2007, KEMA performed a storm restoration and readiness review of the 2006 Hanukkah Eve Windstorm for PSE. As part of this post storm review, KEMA assessed PSE's Corporate Emergency Response Plan (CERP) and its execution, and provided recommendations for improvements to procedures, processes and technologies. The findings from this assessment are summarized in Appendix B.

In January 2012, PSE experienced a snow, ice and wind storm of a magnitude similar to the Hanukkah Eve Windstorm. Known as the 2012 Pacific Northwest Snowstorm, the event was also nicknamed "Snowmageddon."

In an effort to measure the progress achieved since the Hanukkah Eve Windstorm, and identify areas for further improvement, PSE retained KEMA to conduct this post storm review of the January 2012 storm using the Hanukkah Eve post storm review findings as the assessment baseline.

This report focuses on the execution of the Energy System Restoration Plan (formerly known as CERP), with an emphasis on the communications and damage assessment areas.

2.2 January 2012 Pacific Northwest Snowstorm Summary

On Friday, January 13, 2012, the National Weather Service (NWS) in Seattle began forecasting snow to begin over the coming weekend, with heavy snow in the Olympics and Cascades. As forecasted, the storm began on Saturday, January 14th, with light snowfall in Snohomish and King Counties, and quickly spread across much of western Washington on Sunday. Snowfall continued on Monday and Tuesday (January 16th and 17th) with significant accumulations. On Wednesday a major storm system moving inland near the Columbia River resulted in near record snowfall within the southwest interior of the Puget Sound area. Six inches of snow fell in many areas around Puget Sound with ten inches or more south of Tacoma. Total snowfall for the period between January 14th and 20th ranged from approximately six inches in Kitsap County to more than two feet in some parts of Thurston County.

On Wednesday, January 18th, the snow turned to freezing rain and continued into the day on Thursday, January 19th. The ice storm warning issued by the National Weather Service on Thursday was the first ever of its type. Ice accumulations that were originally forecasted to be less than 1/10th inch south of Tacoma, ranged from 1/4th inch in King County to more than one inch in some parts of Pierce and Thurston Counties – causing extraordinary damage to PSE infrastructure in these areas.

A short-lived windstorm occurred overnight on Tuesday, January 24th, causing additional damage across much of PSE's service area.

In response to the storm, PSE employed 285 electric line and 98 tree crews. A crew is typically comprised of 3-4 qualified journey personnel. Approximately 476,000 customers experienced outages. The Emergency Operations Center (EOC) was open for eight days – from 3 PM on January 18th through 2 PM on January 26th. The last operating base open for the storm (Olympia) was closed on January 28th at 10 PM.

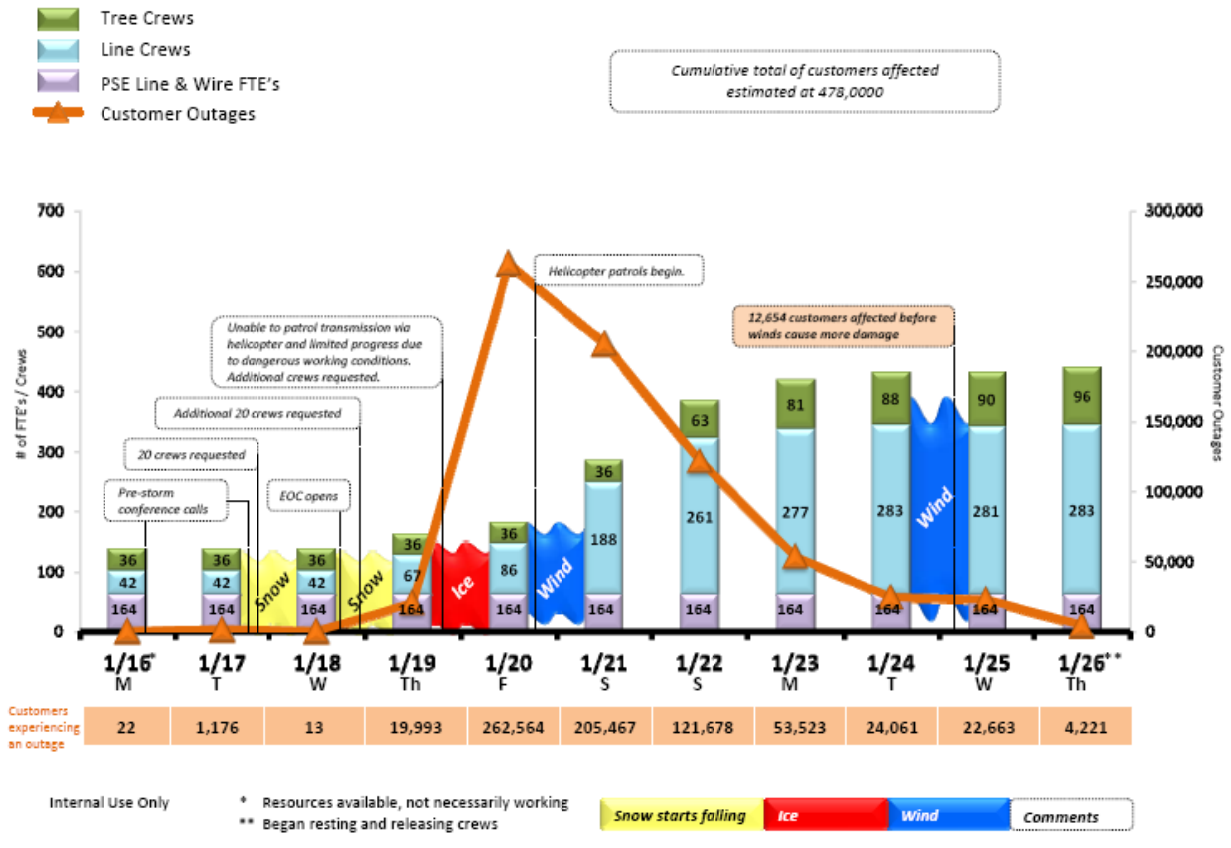

Figure 2-2: January 2012 Storm Summary

2.3 December 2006 Hanukkah Eve Windstorm Summary

The windstorm of December 14-15, 2006 (i.e., “Hanukkah Eve”) was the fourth most severe windstorm on record at the time in the Seattle area in terms of recorded wind gusts – following storms in December 1951 (unnamed), October 1962 (“Columbus Day”) and January 1993 (“Inauguration Day”). The Hanukkah Eve Windstorm had wind gusts recorded at 69 miles per hour at SeaTac airport early in the morning of December 15th. It is believed that the highest gusts for this storm were not recorded due to reporting outages at some stations.

The Hanukkah Eve Windstorm was preceded by the wettest month on record in the Seattle area with rainfall totaling 15.63 inches in November 2006. The wet conditions continued into the month of December with a total of 3.52 inches of rainfall between December 1st and the onset of the storm on December 14th. The storm itself delivered nearly an inch of rain in one hour on the afternoon of December 14th. The wet conditions resulted in soil saturation that significantly weakened the ability of large trees to withstand high winds for sustained periods.

The Hanukkah Eve Windstorm moved slowly and lost little or no intensity as it passed through the PSE service territory. The slow pace exposed the Puget Sound area to storm force winds for more than 24 hours, causing many large trees to be uprooted, and resulting in the most extensive damage PSE’s electric transmission and distribution infrastructure had ever sustained. Over 700,000 PSE electric customers, representing nearly 70% of total electric customers, lost power during this storm. The storm also resulted in 30 natural gas line breaks caused by uprooted trees. The system was restored in approximately 12 days.

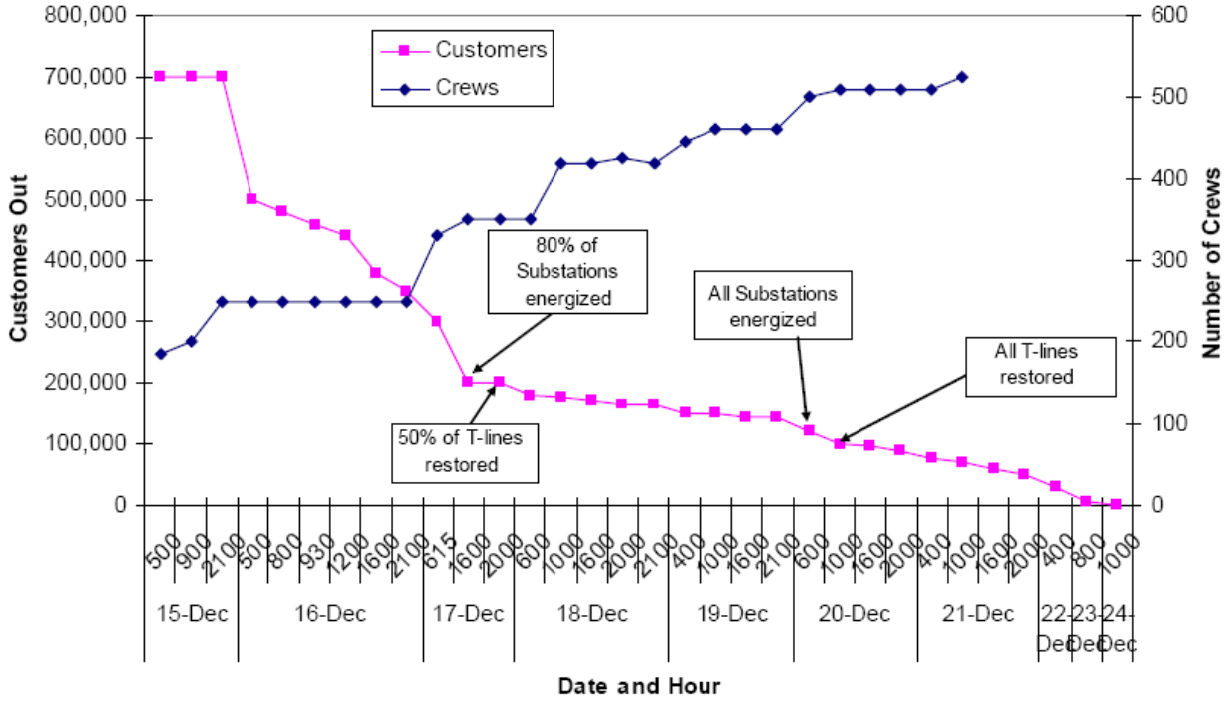

Figure 2-3: Hanukkah Eve Windstorm Summary

As noted above, PSE engaged KEMA to perform a review of performance during this storm. In conjunction with filing the KEMA report with the Washington Utilities and Transportation Commission (WUTC) in 2007, PSE submitted their position on the recommendations, as well as the actions that had been taken at that time. Relevant extracts from this submission are summarized in Appendix C.

In September 2008, PSE submitted an annual update regarding the activities that had been taken since the previous submission. Relevant extracts of this submission are summarized in Appendix D. By the time of the September 2008 update, all actions were completed related to recommendations in the Hanukkah Eve Windstorm report that are also a focus in this assessment of the January 2012 storm. As such, actions related to these recommendations are not addressed in future annual update reports to the WUTC.

2.4 Comparison of January 2012 Storm to Hanukkah Eve Windstorm

As illustrated in the chart below, the January 18-28, 2012 storm was the first storm of a similar magnitude to the December 13-28, 2006 Hanukkah Eve Windstorm – which makes it a good candidate for comparison. The January 2012 storm provided a good basis for determining how effective PSE's actions were in implementing the recommendations from the Hanukkah Eve Windstorm, and how effective the recommendations were in improving storm management performance.

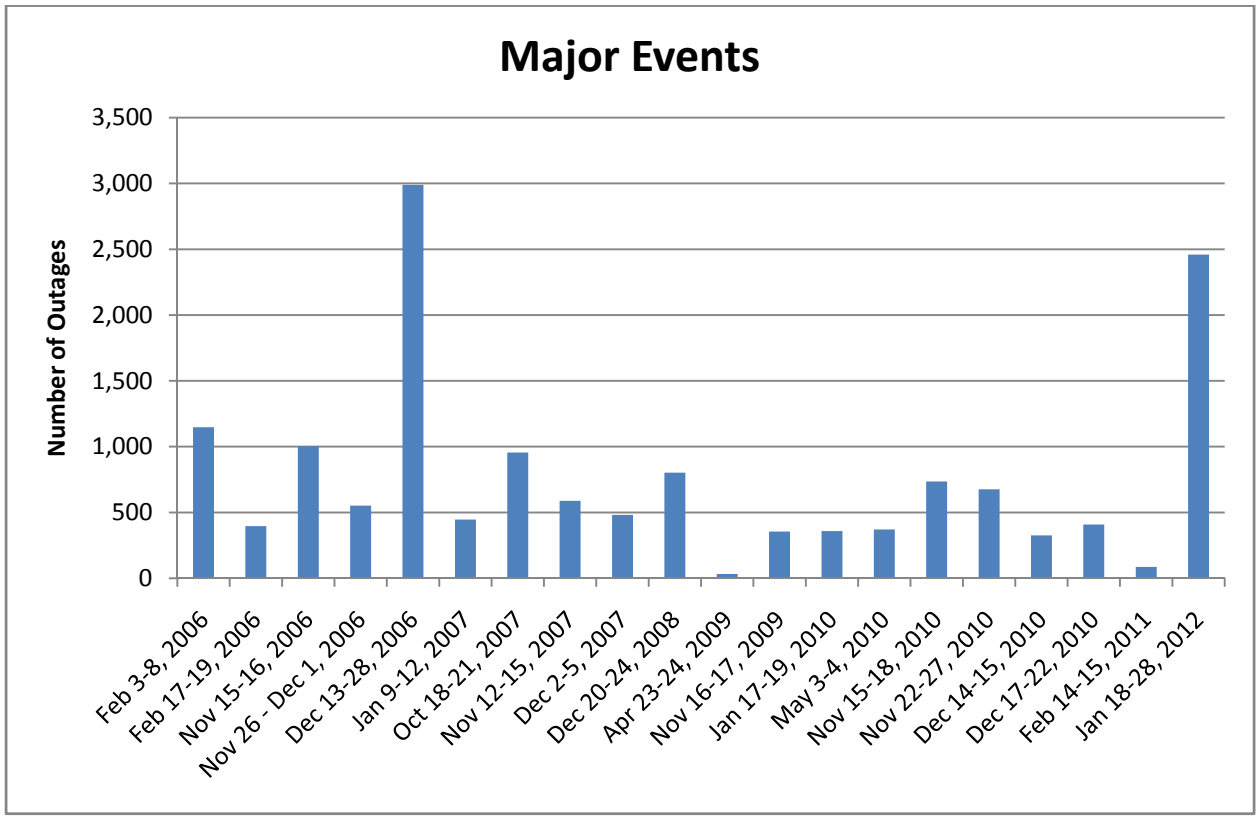

Figure 2-4: Major Event Comparisons

Both storms resulted in significant damage to PSE infrastructure, as shown in the figure below.

Comparison Data	Hanukkah Eve Storm	January 2012 Storm
Customers who lost service	700,000	478,000
Transmission lines out	85	67
Substations out	159	74
Crews	335 line; 86 tree	285 line; 98 tree
Poles replaced	1,250	209
Crossarms replaced	1,400	1,077
Fuses replaced	17,000	5,500
Overhead transformers replaced	525	285
Miles of wire restrung	100	87
Insulators replaced	10,000	2,522
Power Restoration Cost	$90 M	$ 73 M
Days before power restored	9 to 10	8

Figure 2-5: Comparison of Storm Details

3. Project Overview

This section describes the project that KEMA was engaged to perform for this report.

3.1 Purpose and Scope

The purpose of this project was to assess the execution of PSE's Energy System Restoration Plan (ESRP) during the January 2012 Pacific Northwest Snowstorm and contrast the results with the findings from the 2006 Hanukkah Eve Windstorm.

The scope of the assessment was limited to the following three areas:

1) Energy System Restoration Plan (ESRP) Execution

2) Damage Assessment (DA)

3) Communications

The remaining components of the ESRP relating to technology, logistics, and other areas will be assessed in future efforts.

The objectives of this study are to benchmark PSE's performance during the January 2012 storm relative to the baseline recommendations from the Hanukkah Eve Windstorm report, identify any remaining gaps, and make recommendations for closing the gaps based on leading industry practices.

The project objective was to review PSE's actions during the January 2012 event and perform a gap analysis to determine the following:

- Determine where PSE is in their CERP/ESRP activities since 2007
- How did PSE perform in 2012 as compared to the 2006 windstorm event
- Where are the gaps and recommendations to close those gaps
- What leading industry practices can PSE consider in their emergency response plan and actions

3.2 Approach Methodology

KEMA's approach to perform this assessment is illustrated in Figure 3-1 below:

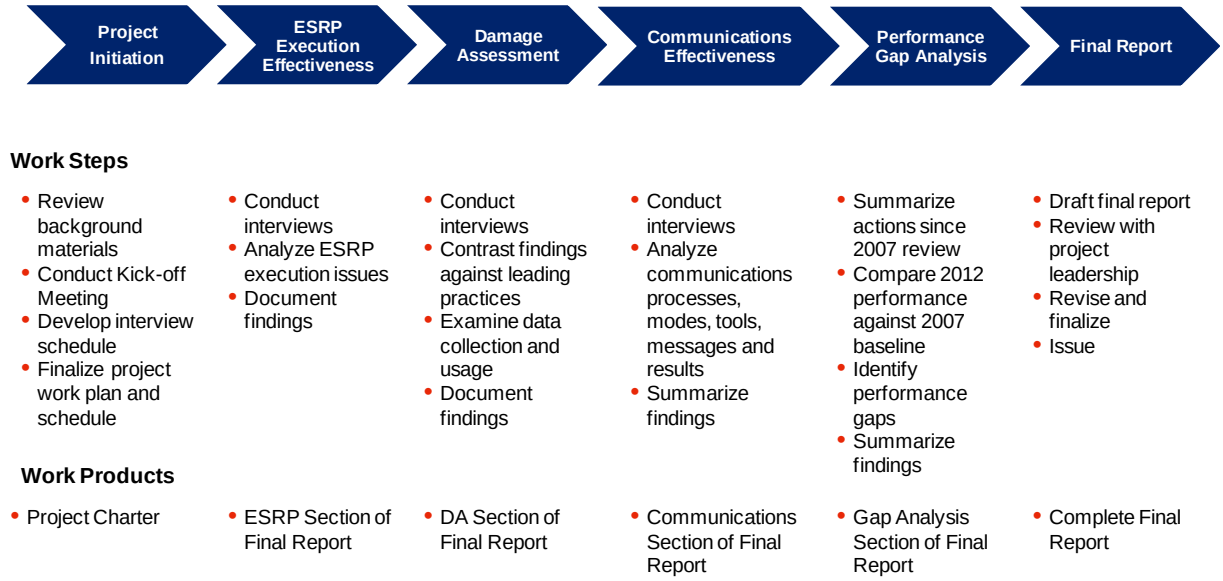

Figure 3-1: Project Approach

The methodology for collecting information included a series of group interviews, which were then documented and reviewed by PSE for accuracy. The information collected through this process was then compared with the findings from the Hanukkah Eve Windstorm report and KEMA's internal knowledge of leading industry practices. This information was then analyzed and synthesized to determine conclusions, identify areas for improvement, and develop recommendations for future actions.

The project work was conducted over a three month period from March through May 2012.

3.3 Areas of Focus

This assessment was limited in scope to the following three areas.

3.3.1 ESRP Execution

The Corporate Emergency Response Plan (CERP) that was in place during the 2006 Hanukkah Storm was updated and is now referred to as the Energy System Restoration Plan (ESRP).

The assessment of the ESRP focused on its execution during the January 2012 storm, with an emphasis on the following aspects:

- Annual planning and training
- Imminent response planning (pre-storm assessment, planning and mobilization)
- Organizational readiness to respond and staffing
- Event assessment and management (outage analysis, estimated time of restoration development, status provided during the storm)
- The Local Area Coordination (LAC) sites that were set up in Thurston County
- Restoration execution

The project assessed how well the overall plan was implemented and the results of the plan's execution during the January 2012 storm.

3.3.2 Damage Assessment

This task reviewed PSE's damage assessment activities during the January 2012 storm to assess how effective the surveys were in determining the extent of energy delivery infrastructure damage and the collected information that enabled restoration. Damage assessment was a critical component of the storm response process by providing information about the extent of the damage that must be restored – which impacted both resource requirements and restoration timeframes. The review focused on the following aspects of damage assessment:

- Processes and tools used for damage assessment

- Performance of contractor (Potelco) and PSE damage assessment surveyors
- The role of wires down guards (i.e., “Make Safe” teams)
- Information collected and methods for getting this to the Storm Operating Bases and to PSE’s Emergency Operations Center (EOC)
- The use of damage assessment data for restoration
- Issues and challenges experienced

3.3.3 Communications

Communications was a vital activity to inform PSE customers, public agencies and the media as to the status of outages and the restoration effort. This task reviewed the effectiveness of PSE’s external communication processes, tools, messages and results. Several new communications strategies and approaches were deployed during the January 2012 storm. The assessment reviewed the results of this new direction, and focused on the following aspects:

- The role of Customer Access Center’s (CAC) communication during the storm event
- Estimated time of restoration (ETR) and status message content, granularity and frequency of updates
- Communications to customers
- The ad hoc communications sites that were established by the Community and Business Service teams
- Communications to the media
- Communications to public agencies
- Modes of communications; including email, social media and others

4. Area of Focus: ESRP Execution

The Corporate Emergency Response Plan (CERP) that was in place during the 2006 Hanukkah Storm was updated and is now referred to as the Energy System Restoration Plan (ESRP). Therefore, the findings in the Hanukkah Storm report findings excerpted in the appendices refer to CERP, while this report refers to ESRP.

4.1 January 2012 Storm Findings

As described earlier, this section of the assessment of the January 2012 storm focuses on the execution of the ESRP relative to the findings from the Hanukkah Eve Windstorm. In general, the overall difference is impressive. A PSE executive stated that the January 2012 storm was the best managed storm he had experienced in his 40 year career – it was well prepared, planned, staffed and executed. There were also numerous comments made about how the overall environment (both in the EOC and Storm Bases) was more controlled and less emotional – signs of an effective plan.

Based on the information gathered during the interviews, and an analysis of data and industry practices, the following conclusions have been identified.

Conclusion #1: The ESRP was very effective in improving the management of the storm.

PSE conducts annual training, mock event, and other sessions each year to prepare for a major event such as the January 2012 storm. These sessions proved to be very effective in preparing the organization for efficient mobilization and effective execution of the ESRP during the storm.

The annual training exercises were effective in preparing individuals for their responsibilities. A few individuals noted that follow-up refresher sessions would have been helpful at the point of need just prior to beginning their work – particularly for the damage assessment function.

The Emergency Event Level model that was recommended and developed after the Hanukkah Eve storm proved to be effective in establishing the appropriate level of response. This model reflects leading industry practices, and it was truly tested by the various initial levels and quick acceleration of the January 2012 storm. The model had to ramp up quickly as a result of the ice storm that followed the snow.

The ESRP checklists that were also recommended and developed following the Hanukkah Eve storm proved to be very helpful. An improved checklist for the shutdown of the EOC may have

circumvented the transition issues that were experienced during this process. PSE should review how and if the checklist was utilized, and any changes that are needed to the checklist and its associated training prior to the next storm season.

Many resources noted that tensions and emotions were much lower during the January 2012 storm than during the Hanukkah Eve Windstorm. This situation is indicative of the presence and execution of an effective plan.

Conclusion #2: Imminent response planning was proactive and anticipated the worst case scenario.

PSE was well prepared in advance of the event. PSE participated in the initial National Weather Service briefing, and began conducting conference calls starting in the previous week in anticipation of the storm. The requests for mutual assistance were timely and proactive. The EOC mobilized at 5 AM on Wednesday, January 18th, and was ready several hours before being activated later that afternoon. All PSE resources were prepared and ready for action well in advance of the storm.

Conclusion #3: Resource mobilization was very good.

The ESRP provided a good definition of responsibilities, with clear accountabilities. The whole organization responded readily and earnestly to the event. A few individuals had to return from trips or vacation to serve their storm duty. Personnel performed their designated roles as defined by the ESRP. The organizational model remained stable for the duration of the storm, indicating that it served the needs of the storm effectively.

Conclusion #4: Event assessment and management (i.e., outage analysis, ETR development, status provided during the storm) was effective, although challenged by the nature of the storm.

The January 2012 storm was a multi-faceted storm that changed in magnitude dramatically and quickly. The storm was initially anticipated to be a snow event, and PSE was prepared and appeared to have things well under control during the first day of the storm. The ice and wind that followed the snow quickly turned the storm into a major emergency and elevated the storm to a much higher event level. As a result, PSE was somewhat over-prepared initially, but as a result was well positioned to quickly ramp-up to deal with the magnitude of the ice and wind damage. PSE also needed to transition from a tactical to a strategic approach when the storm changed from event level 1 to 2 to 3.

Conclusion #5: Local Area Coordination sites were effective, but inconsistent due to differences in approaches, resources and facilities.

The Local Area Coordination (LAC) sites that were established were very effective in supporting a more decentralized restoration approach. This model of local area coordination and decentralized control has proven to be a leading practice in the industry due to its effectiveness in deploying large numbers of resources in a short timeframe. The local sites that PSE established each reflected the unique nature of their resources and physical layout, however, this situation resulted in different levels of efficiency. While these differences will likely never be eliminated, opportunities exist to share best practices and learn from the lessons at different sites. For example, the physical space for storm rooms has shown to be a factor in their efficiency, so opportunities to improve the location of storm rooms at certain sites should be explored (e.g., South King). Sites with co-located storm rooms and customer contact functions also proved to be very effective in responding to customers with valuable information regarding restoration status.

Conclusion #6: Restoration execution work was effective, but opportunities for improvement exist with the Transmission Restoration Team (TRT) coordination and shutdown of the Emergency Operations Center (EOC).

For the most part, restoration activities during the January 2012 storm were performed in an effective manner. However, there were issues related to the activation of the Transmission Restoration Team (TRT), and the shutdown of the EOC.

Internal communication was insufficient when the Transmission Restoration Team (TRT) was activated, and the storm rooms were not aware that it was in place. As a result, these two functions did not work together as effectively as possible. Resources that had been assigned to distribution damage assessment and restoration work were subsequently reassigned to transmission work – resulting in inefficiencies. Also, the transmission and distribution restoration work was not coordinated as effectively as it could have been – for example, by focusing on the restoration of feeders associated with substations that were being brought back into service.

There were also issues associated with the transition of responsibilities when the EOC closed on January 26th. A large number of customer service orders remained to be completed, and visibility into this work, and the resources available to perform it, was not handed off effectively to the storm bases.

Conclusion #7: PSE has made significant progress since the Hanukkah storm with regards to the deployment and utilization of resources, but opportunities for improvement exist.

As previously stated, the ESRP provided clear definitions of storm duty assignments and responsibilities – and PSE resources were very effective in mobilizing and serving in their assigned roles. Overall deployment and utilization of resources during the January 2012 storm was significantly better than during the Hanukkah Eve Windstorm, and was very close to best practice in the industry.

The optimal utilization of resources is a very complex challenge, especially during an event that lasts for multiple days when the resource needs vary and shift over the duration of the time period. Several opportunities were identified where PSE can refine its approach to resource deployment:

- Improve overall tracking and accountability of resources to provide better visibility into who is available and/or deployed. The EOC experienced issues in obtaining information about resource levels and current assignments, which impacted decision-making.

- Improve utilization and deployment of key resources such as servicemen, wiremen, substation crews and others who can work outside their normal areas. Several unique resources proved to be very important in performing restoration work. PSE should review the processes associated with the use of these resources to determine how they can be best leveraged during the next event. For example, the following best practice was identified:

  – **Best Practice:** servicemen were teamed with substation wiremen to save time in performing restoration (i.e., the substation wiremen performed the switching in the substation to sectionalize and energize the line segments being restored by the servicemen)

- Refine the categorization process for the teaming of less experienced and tenured personnel with more experienced resources – to allow for continuous application throughout the event (i.e., versus primarily during initial assignments at the beginning of the storm). While this finding from the Hanukkah storm was effectively implemented, it proves to be a challenge maintaining the practice through the duration of the event.

- Refine the staffing model to reflect changing workloads as the event unfolds (e.g., 9-1-1 call takers), shift durations, and back-up resource requirements. Several statements were made regarding the shifting work requirements as the storm unfolded. Based on PSE's experience from various storm events, refined estimates can be made regarding the workloads associated with certain roles. For example, the number of 9-1-1 calls during the first days of the storm, compared to later days.

- Review the roles, positioning, and staffing of the social media team to ensure it keeps up with customer expectations as this area continues to evolve at a rapid pace. As discussed later in this report, PSE's use of social media was a significant "game changer" with regards to communications. PSE should anticipate that this role will increase (not diminish) in importance in the future, and review how it can be best positioned relative to other customer contact functions for future events.

4.2 January 2012 Storm Recommendations

Recommendation #1: Enhance the TRT plan to improve communication and coordination with the operating bases to gain efficiencies in the restoration process and the utilization of resources.

- Review and improve the tasks associated with the activation of the TRT, including internal communications and mobilization of resources – to reduce disruptions caused by shifting priorities and reassignment of resources from distribution to transmission work
- Improve coordination of transmission and distribution restoration work (e.g., coordinating work on feeders associated with a substation that will be brought back to service)

Recommendation #2: Enhance the ESRP and related annual training and mock event sessions to include additional focus on the EOC shut-down process and its transition of responsibilities.

- Review and improve the tasks and responsibilities associated with the deactivation of the EOC
- Increase focus during training and mock event sessions on the use of checklists during the shutdown of the EOC and transition of duties
- Include a large number of additional follow-on service work as a situation in the mock event sessions

5. Area of Focus: Damage Assessment

This section of the review focused on damage assessment activities to determine how effective the process was in capturing the extent of infrastructure damage and the information needed to facilitate restoration.

5.1 January 2012 Storm Findings

Based on the information gathered during the interviews, and an analysis of data and industry practices, the following conclusions have been identified.

Conclusion #8: The damage assessment function was well planned, executed, and staffed; the process was significantly more effective and efficient than during the Hanukkah storm.

The overall damage assessment process during the January 2012 storm showed significantly more rigor and emphasis than during the Hanukkah Eve Windstorm. This was evident throughout all interviews with regards to the manner in which damage assessment personnel regarded, prepared and responded to their responsibilities during the storm. The importance of the role was well understood, and performance was much improved, and the results were much better.

Conclusion #9: Damage assessors received sufficient training, materials, tools and support.

The Hanukkah Eve Windstorm findings reported several deficiencies in attendance at training sessions and in the outcomes from damage assessment activities. PSE's actions subsequent to the Hanukkah Eve Windstorm resulted in a much improved situation during the January 2012 storm.

The damage assessment training sessions were very effective in preparing assessors for their roles and responsibilities. The surveyors understood their role, its importance, and its requirements. Several damage assessors stated during the interviews that the training prepared them well for their work, but that quick follow-up sessions would have been valuable at the point of need just prior to starting their assignments.

The support tools (e.g., maps, storm bags, cell phones) were sufficient and provided to all resources.

Conclusion #10: Information obtained from the damage assessment process was accurate and valuable in determining restoration work requirements and timeframes.

Subsequent to the Hanukkah Eve Windstorm, PSE developed forms and methods to support the capture of damage assessment information from the field. These actions proved effective by facilitating the capture of good information during the January 2012 storm.

The primary mode of communicating damage assessment information was the use of cell phones by the damage assessors calling in to the storm bases. While this mode provided very timely information capture, it also had a few shortcomings. The phone lines at the storm bases and the number of damage assessment call takers sometimes restricted or hampered that ability to call in the information. Also, the person receiving the call was responsible for accurately collecting all of the necessary information correctly from the surveyor. The damage assessment call taker role proved to be an important function with deep skill requirements (i.e., to ask the right questions and collect all of the proper information over the phone).

While the damage assessment survey's data collection forms supported the process by documenting the detailed information to be collected, the forms were primarily used to facilitate the phone calls from the field. The actual data collection forms that were submitted at the end of the shift when the damage assessors returned to the storm base were mostly just filed for reference, since the information on the forms had been collected over the phone earlier in the day.

The damage assessment survey's data collection forms were very important in specifying the information to be collected from the damage assessment process, and this information was critical in determining the work that needed to be done for restoration – including materials and equipment requirements.

A very limited number of mobile data collection technologies (e.g., iPads) were used during the January 2012 storm; however, the resources that used these technologies stated that data capture times were dramatically improved – up to 50%.

Global Positioning System (GPS) units were also used on a limited basis, but proved to be very helpful for resources that were not familiar with the locations being surveyed. These units are capable of providing much richer information than is available on paper maps, and are now cost-competitive with the map books.

The primary challenge with the damage assessment information continues to be the ability to enter the information into ConsumerLinX (CLX), the PSE customer information system, for use in updating the Service Alert Map and communicating outage and restoration information internally and externally to stakeholders. While the damage assessment information contains very specific and detailed data about outages and damage, the format is not consistent with CLX, and the effort to translate it into useful CLX data input continues to be a challenge.

Conclusion #11: Opportunities exist to better deploy damage assessment resources for more effective utilization and skills development.

As previously discussed in the ESRP area of focus, PSE's plans provided clear definitions of storm duty assignments and responsibilities – and PSE and Potelco resources were very effective in mobilizing and serving in their assigned roles. Overall deployment and utilization of damage assessment resources during the January 2012 storm was significantly better than during the Hanukkah Eve Windstorm. However, this area was one in which several opportunities were identified where PSE can refine its approach to resource deployment and improve the consistency of the process across the different operating bases.

Improved skill assessment and performance feedback processes would be valuable in facilitating the most appropriate resource assignments and teaming. Performance evaluations during the storm would have been helpful in assessing the quality of the work results. A best practice that was identified during the interviews was to address this issue by conducting initial informal question and answer discussions with resources to assess their individual capabilities and experience prior to assigning them damage assessment responsibilities. Formalization of this process would be helpful in future storms.

Improved tracking and scheduling processes would also facilitate the optimal dispatch of resources. Visibility into damage assessment resources and assignments was somewhat limited in the EOC, and was also hampered by the inconsistent methods that were used in the different operating bases to assign and track resources.

Several experienced damage assessors preferred to work as damage assessors in the field rather than in the storm base as damage assessment call takers, where their skills and experience could be better leveraged.

While the A (more experienced) / B (less experienced) teaming that was developed subsequent to the Hanukkah Eve Windstorm was very effective, it proved to be more challenging to

accomplish as time went on due to resource scheduling complexities. Improved scheduling processes that incorporate these skill levels could improve this effort in future events.

The need for “Make Safe” teams was critical at certain times during the storm. Several individuals noted that all damage assessors should by qualified to serve as “Make Safe” resources to meet this demand.

Best Practices: Since local knowledge is critical, keeping damage assessors focused in the areas they assessed (versus bouncing them around) is a best practice. Also, transitioning damage assessors to the role of contract crew coordinators in the areas where they have completed their assessments is another best practice, since they have good knowledge of the area and the damage that needs to be restored. This practice worked exceptionally well in areas where damage assessors and crews were assigned by circuit (i.e., build out from the substation), as compared to areas with scattered work assignments.

5.2 January 2012 Storm Recommendations

Recommendation #3: Accelerate the deployment of technologies such as iPads and GPS to facilitate the collection and communication of damage assessment data from the field.

Experience gained during the January 2012 storm showed that data entry times could be cut in half by automating the current paper-based data collection form. Data could also be electronically transmitted from the field rather than called in on a phone – which would improve accuracy, eliminate bottlenecks associated with the call takers, and reduce the manual paperwork associated with the end-of-day submission of forms. Devices might also be used to capture pictures and communicate other useful information (such as geographic coordinates) back to the storm centers.

GPS has reached a price-point where it is competitive with paper maps – with greater accuracy and more extensive and up-to-date content. Navigation, traffic, and road closure information is also available using GPS – which could be helpful to DA drivers who are not familiar with the territory they have been assigned.

6. Area of Focus: Communications

This section focused on the effectiveness of PSE's communications processes, tools, messages and results during the January 2012 storm as compared to the Hanukkah Eve Windstorm.

6.1 January 2012 Storm Findings

Based on the information gathered during the interviews, and an analysis of data and industry practices, the following conclusions have been identified.

Conclusion #12: PSE was effective in communicating via channels that worked for all parties – internet, social media, call center and in-person.

The communication situation was the most dramatic improvement between the Hanukkah Eve Windstorm and the January 2012 storm. These improvements occurred across all channels in which PSE communicated to customers, stakeholders and the media. The recommendations and actions taken since the Hanukkah Eve storm proved to be very effective – and the results impacted all aspects of the storm response.

Conclusion #13: PSE's strategy to proactively engage the media and "tell all" was successful.

Based on findings and recommendations from the Hanukkah Eve Windstorm, PSE made extensive changes to the overall approach to communications – moving to more of a "full disclosure" strategy of sharing all relevant information.

PSE also adopted a much more proactive approach to interacting with the media, and focused resources on working directly with public broadcasting companies and providing them with guidance on where to find crews working in the field. The content and timing of information provided by PSE coincided with news schedules, putting PSE in the position of providing the information to be broadcast, rather than having the media come up with their own content.

PSE maintained this proactive strategy throughout the duration of the storm, and remained the "go to" source of information for the media, enabling PSE to "own" the story and not lose control of it as the days progressed.

PSE's approach of full disclosure and proactive strategy aligned very well with the use of the internet and social media – where immediate, relevant and informative content is critical to engagement.

Conclusion #14: Executive visibility during the storm was a key factor in the media's treatment of PSE and in the motivation of employees.

PSE executives were very visible during the storm. The Chief Executive Officer (CEO) talked directly to every television station, participated with work crews in a press conference with the Governor, and rode with one of the damage assessors to survey a circuit. The Vice President of Corporate Affairs was in the field in front of cameras almost continuously throughout the duration of the storm. Other executives were equally visible at the EOC, storm bases, local area sites and other locations.

These actions, combined with PSE's focus on providing the media with work crew locations, status updates, and photo opportunities, resulted in significantly more positive news stories than during the Hanukkah Eve Windstorm. The media's perception of PSE's handling of the storm was a reflection of how they were treated themselves. PSE was much more aggressive in putting executive officers in front of news cameras. The officer messages were not aimed at defending company actions, but in defending the trust in the company. These messages were very effective and allowed PSE to be a medial force.

Executive visibility during the storm was mentioned in several interviews, and it was apparent this level of senior management involvement also served to motivate employees and gave them pride in their work.

Conclusion #15: PSE's use of the internet/social media was a "game changer" in this event by providing a means to control the story.

Social media did not exist at the time of the Hanukkah Eve Windstorm, and mobile devices did not provide the level of internet connection available during the January 2012 storm. This area provided PSE with the opportunity to greatly advance their communication strategy, and PSE was very effective in taking advantage of the power of the social media channels.

PSE's postings on Twitter were soon picked up by public broadcasting companies, and essentially replaced information formerly obtained via wire services. By having media outlets re-transmit PSE Twitter messages, PSE did not need to purchase radio time or TV spots in order to get its message out. The leverage associated with Twitter feeds was unprecedented.

PSE also mobilized a team to interact via Facebook. As a result, page views went from 40 per day on January 17th to over 15,000 on January 20th. Facebook also enabled more personal interactions with customers by providing individual responses on a first name basis. The success of this strategy was evident when PSE customers came to the defense of the company in reacting to unreasonable posts by other customers.

The power of the social media channel was reflected by their impact on call center volumes. Information provided via Facebook and Twitter made a significant change in the number of calls to the Customer Access Center (CAC) – both up and down. When the center experienced difficulties with phone lines, this information was communicated via the internet, and call volumes decreased as customers diverted to internet channels. Likewise, when PSE posted via the internet that damage restoration estimates would be available, call volumes increased significantly.

PSE hired approximately two dozen contract photographers to capture pictures from the field and post them on Flickr. These photos were extremely powerful in providing visualization of the conditions and work being performed in the field. Stakeholders were immediately able to see the situations PSE was facing, and quickly recognized the challenges involved. Views of PSE pictures on Flickr went from a few hundred per day prior to the storm, to nearly 500,000 on January 20th – and over two million total shortly after the storm.

Flickr, combined with media television coverage, was very effective in helping customers to understand the extent of damage and the conditions restoration crews were working in to restore power. The result of these channels was a significant increase in customer goodwill.

PSE's own website, www.pse.com, was another very important internet access channel. The Service Alert Map was very helpful in communicating information to customers. However, the map was impacted by the quality of data fed from CLX, and was not as powerful as the technology would have supported.

Based on current trends in the use of mobile devices and internet connectivity, PSE should anticipate increased volume via all internet channels in the future. Customer use of these channels, and customer expectations regarding the information that will be provided, will only increase in the future. As these channels continue to provide richer, more complete, and more timely information, customers will likely turn to them first before using their phone to call the CAC. Once customers realize they can obtain the same (or better) information via the internet than via the call center, the tip in balance between these two channels will shift.

Conclusion #16: The Bothell Emergency Center (BEC) was valuable and effective.

The Bothell Emergency Center (BEC) was established after the Hanukkah Eve Windstorm, and the January 2012 storm was the most significant event since its creation. The mock storm drills conducted every October proved to be effective in preparing BEC for this storm. The organizational model implemented at BEC was effective, and the resources were well prepared for their roles. There is a need for a communications person in the Customer Access Center (CAC) and a representative in the EOC.

The call escalation process used by the CAC and BEC was effective and worked well. This process was refined as the result of recommendations from the Hanukkah Eve Windstorm.

Conclusion #17: Local Area Coordination Sites (e.g., Olympia) were effective in communicating to customers in locations where a physical presence is important.

The decision to open Local Area Coordination (LAC) sites was made very early in the storm, allowing the centers to be mobilized and effective when needed. The centers were most effective in areas like Olympia that were the hardest hit by the storm, and had a history of a large number of face-to-face interactions with customers. Opportunities exist to increase the number of LAC sites in future events by utilizing mobile units.

The most effective (i.e., best practice) location had a local customer service office located next door to the operating base. This configuration allowed visibility into the storm board using a liaison who could communicate the status information back to customers. As a result, walk-in customers were provided with the most accurate and complete information available regarding the status of their specific outage.

The ability to replicate this configuration at other locations is very dependent upon the physical layouts and facilities involved. Potential problems occur when crews and heavy equipment are operated in close proximity to walk-in customers.

In some locations, there was a need to better coordinate/organize the deployment of community relations teams. The interactions between this team and the storm room work best with an established structure and protocol.

Conclusion #18: Customer-specific estimated restoration times are still the most important information to be communicated, and it remains a challenge to meet customer expectations regarding the level of specificity that is desired (i.e., when will *my* power be back on?).

One of the most significant problems identified from the Hanukkah Eve Windstorm was the issue of providing customers with estimated time of restoration (ETR) information. This remained a problem during the January 2012 storm. The call center stated their biggest issue was not being able to tell customers their specific ETR.

CLX did not provide valid or timely information, which impacted the Service Alert Map on www.pse.com, and information available to call center resources via the system. The integrated voice response unit (IVRU) was also not effective during the storm due to the issues with CLX.

Accurate overall estimates of restoration times were developed in the storm bases, but this information could not be translated for communication to customers via CLX at the call center or Service Alert Map. The estimates by area and city could not be converted into data that aligned with CLX.

PSE needs to develop a consistent model for capturing and communicating ETR information internally and externally to all stakeholders. The new outage management system is anticipated to provide this solution, but the manner in which it will be delivered is not clearly understood.

Conclusion #19: External communications was dramatically improved from the Hanukkah storm, but additional progress can be made.

As previously discussed, the difference in communication between the Hanukkah Eve Windstorm and the January 2012 storm was significant, with greatly improved effectiveness during the January 2012 storm. However, additional improvements can still be made.

Customer education remains an issue as customers do not always understand the process in which power is restored, and the reasons why they might still not have power when their neighbors have been restored. An opportunity exists to provide this education via the internet. Suggestions were made during the interviews regarding these topics and use of YouTube or www.pse.com as a channel. Directing customers to this material on the internet could reduce the number of phone calls related to these questions.

Opportunities exist to build on the success of using Flickr by including additional photos taken by damage assessors and other parties. It was noted during the interviews that a large number

of pictures were taken for the purpose of damage assessment, but these photos remained within the DA function for internal use only and were not shared with the communications department for potential posting to Flickr.

Opportunities exist to not only capture these additional photographs, but also to link them to customer outages and the Service Alert Map by geo-coding the locations. This enhancement would allow customers to not only know why their service is out, but also see pictures of the specific damage that is impacting them.

Use of social media can be expected to increase in the future as mobile devices and connectivity continue to improve. Therefore, PSE should treat this channel as one on par with the call center and walk-in customer contacts. The positioning and alignment of the social media team should be reviewed to ensure consistency with regards to messages and approach with these other channels. Opportunities for increased efficiency should be anticipated.

Conclusion #20: Internal communications also improved significantly since the Hanukkah Storm, but can still be enhanced.

As previously described, significant improvements in internal communication were evident during the January 2012 storm. However, additional improvements can still be achieved.

As stated in the section above, there is an opportunity to better integrate the social media team with other customer contact functions, such as the call center.

Information sharing with the BEC can also be improved. The center was not aware of some messages that were released via the internet and/or to the media, and was therefore not sufficiently prepared to respond to the phone calls that resulted from the release of this information. BEC resources should be informed in advance, and provided the opportunity to prepare responses to anticipated questions. BEC management should also be notified regarding messages that can be expected to impact call center volumes and the need for additional (or fewer) resources.

Communication with field base resources can be improved to provide information in a format that can be easily viewed and understood. Many of these resources rely on the use of Blackberries for communication, and the status updates that were provided on spreadsheets could not be viewed on their screens.

6.2 January 2012 Storm Recommendations

Recommendation #4: Conduct a comprehensive Use Case for the new outage management system to validate how it will be used to develop restoration time estimates.

Although technology is not within the scope of this review, the need for the new outage management system was driven by recommendations from the Hanukkah report, and the use of the system is vital to communicating estimated restoration timeframes to customers. PSE should test the functional capabilities of the new system to perform this role while it is still under development, rather than wait until it is needed in an actual event and take the risk that it won't perform as anticipated. The Use Case should entail a "worst case" storm scenario:

- Transmission and substation level outages
- Distribution feeder level outages
- Lateral outages, with cold load pick-up fuse failures
- Service level outages, including potheads and non-pay customers

A. List of Interviews

Date	Focus Area	Attendees
9-Mar	Kick-off Meeting: Project Scope & Approach	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED. (Business Continuity Manager) NAME REDACTED (Director System Planning) NAME REDACTED (Director Electric Operations) NAME REDACTED (Director Contractor Management) NAME REDACTED (Director Communications)
19-Mar	Damage Assessment: Field Operations	NAME REDACTED. (Manager Business Continuity & Emergency Management) NAME REDACTED. (Business Continuity Manager) NAME REDACTED. (Contract Manager) (worked as Local Area Coordination Site Manager during storm) NAME REDACTED (Manager Electric Operations-Meter Relay) NAME REDACTED. (Supervisor Engineering-Electric First Response) (worked as DA and in operating base during storm) NAME REDACTED (Quanta VP/Director of Operations) NAME REDACTED (Manager Contract Management) (via phone)
20-Mar	Damage Assessment: Base Operations	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Business Continuity Manager) NAME REDACTED (Manager Electric First Response – N. and S. King County) NAME REDACTED (Quanta/Potelco Manager – N. King County Operating Base) NAME REDACTED (Supervisor System Operations-Day) NAME REDACTED (Sr. Engineering Specialist-N. King Region - represented Electric First Response Supervisor role during storm) NAME REDACTED (Quanta/Potelco Engineering Supervisor, Thurston County -worked as Damage Assessment Coordinator) NAME REDACTED - via phone (Supervisor Substation Operations – Southwest Region) NAME REDACTED - via phone (Manager Contractor Management - worked as manager for one of the Local Area Coordination Sites in Thurston County during storm)

Date	Focus Area	Attendees
26-Mar	Communications: Corporate	NAME REDACTED. (Manager Business Continuity & Emergency Management) NAME REDACTED. (Business Continuity Manager) Betancourt, Terri-Ann (Manager Public Relations) NAME REDACTED (Manager Creative Services) NAME REDACTED (Public Relations Analyst)
26-Mar	Communications: Bothell Emergency Center	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Business Continuity Manager) NAME REDACTED (Supervisor Customer Services) NAME REDACTED (Manager Customer Access Center) NAME REDACTED (Manager Reporting & Analysis) NAME REDACTED (Director Customer Care)
27-Mar	Communications: Vice President	NAME REDACTED (V.P. Corporate Affairs) NAME REDACTED (Director Communications)
28-Mar	Communications: LAC / Olympia	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Business Continuity Manager) NAME REDACTED (Director Community & Business Services - South East) NAME REDACTED (Director Community & Business Services – King County) NAME REDACTED (Major Accounts Executive)
28-Mar	Damage Assessment: Field Operations	NAME REDACTED. (Manager Business Continuity & Emergency Management) NAME REDACTED (Business Continuity Manager) NAME REDACTED (Consulting Engineering Specialist) NAME REDACTED (Quality Assurance Inspector)
23-Apr	ESRP: System Operations Managers	NAME REDACTED. (Manager Business Continuity & Emergency Management) NAME REDACTED (Manager Electric Operations-Substations) NAME REDACTED (Manager Electric Operations-Meter Relay) NAME REDACTED (Manager Electric Operations-EFR Central)
23-Apr	ESRP: System Operations / Load Office	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Supervisor Power Dispatch) NAME REDACTED (Manager Electric Operations-System Operations) NAME REDACTED (Supervisor-System Operations Day) NAME REDACTED (Manager Construction Management) NAME REDACTED (Transmission Contracts Engineer)

Date	Focus Area	Attendees
		NAME REDACTED (Sr. Project Manager)
23-Apr	ESRP: EOC Directors	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Director System Planning) NAME REDACTED (Director Thermal Resource) NAME REDACTED (Director Electric Operations) NAME REDACTED (Quanta VP/Director of Operations) NAME REDACTED (Director Contractor Management) NAME REDACTED (Director Transmission)
24-Apr	ESRP: EOC Managers	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Manager Transmission Contracts) NAME REDACTED (Manager Standards) NAME REDACTED. (Business Continuity Manager) NAME REDACTED – (Manager Quality Control – Quanta)
25-Apr	ESRP: Electric Operations Director	NAME REDACTED. (Director Electric Operations)
25-Apr	ESRP: Field Storm Room	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Manager Contractor Management-Potelco) NAME REDACTED (Contract Manager-PSE-Quanta) NAME REDACTED – (Quanta/Potelco Manager – Thurston County Operating Base) NAME REDACTED (Manager Electric Operations-EFR Regional) NAME REDACTED – (Quanta/Potelco Manager – N. King County Operating Base) NAME REDACTED (Sr. Engineering Specialist-N. King Region) NAME REDACTED (Supervisor Electric First Response-S. King) NAME REDACTED (Supervisor Electric First Response-Southern) NAME REDACTED – (Quanta/Potelco Manager – S. King County Operating Base) NAME REDACTED (Supervisor Engineering-Electric First Response) (worked as DA and in operating base during storm)
22-May	Final Presentation	NAME REDACTED (Manager Business Continuity & Emergency Management) NAME REDACTED (Director Electric Operations) NAME REDACTED (Director Contractor Management) NAME REDACTED (Director System Planning) NAME REDACTED (Director - Transmission)

Date	Focus Area	Attendees
		NAME REDACTED (Director Communications) NAME REDACTED (Quanta VP/Director of Operations) NAME REDACTED A. (Business Continuity Manager)

B. 2006 Hanukkah Eve Windstorm Findings

Conclusion 4.3.2: The stewardship of the emergency response plan is well-managed and executed; however, some parts of the organization perceive the effort as corporate bureaucracy.

The CERP was managed by a central organization, and other corporate organizations as well as field operations appeared to understand the plan and its outlined roles and responsibilities. At the same time, some departments appeared to view the emergency plan as a corporate exercise that was to be acknowledged by all involved, but that the responsibility and ownership for the plan belonged to the administering organization.

Conclusion 4.3.3: The application and execution of the CERP is not fully institutionalized within PSE and Potelco.

The PSE emergency plan appeared to be well understood by the personnel with defined EOC roles and responsibilities. However, the further operations were removed from the EOC organization the more the operations became a function of local management style, experience, practices and preferences.

Conclusion 4.3.4: Emergency response roles are defined but the process needs to be refined.

During the restoration, many PSE employees appeared to have assigned themselves to emergency response roles based on their own perceptions of resource needs. Matching skills to position requirements in this emergency was suboptimal. PSE employees consistently referred to people by name, rather than their emergency response roles, when explaining processes and results.

Conclusion 4.3.6: During the storm, effectiveness of Operations Base management was impacted by the magnitude of the damage in their area of responsibility, but PSE quickly adjusted its plan.

KEMA did see evidence that the bases generally functioned well in their storm roles, but that the geographic areas covered was excessive in several cases. PSE took the initiative to create smaller more workable area coordination centers for several key areas that were hard hit by the storm. In addition, PSE created a transmission restoration priority coordination group to manage

the entire transmission line restoration effort. Crews were then assigned to this area coordination and took on the full restoration within the area.

Conclusion 4.3.7: PSE adapted to the unique challenges very well.

PSE did an excellent job of identifying CERP's shortcomings and overcoming each with a modification to the plan or process. Examples included:

- The creation of the area coordination centers
- The escalated call handling situation, which required development of a process, identification of resources and the training of those resources
- Adopting a more robust materials resupply process which got extraordinary quantities of materials to the crews in a very timely fashion
- The increased logistical effort to house 500 crews when many of the hotels were already booked by locals
- As areas were being completed, the resources were quickly moved to support other areas in need
- The formation of a separate transmission group at the EOC to focus exclusively on the repair of the transmission system
- The division of normal crews to support the foreign line crews brought in to fix the distribution system
- The overall resilience of all the PSE and Potelco personnel to adjust to continually changing needs by performing additional roles that they hadn't previously performed

Conclusion 4.3.9: PSE had a formal damage assessor training program, but it did not provide the number of qualified assessors required for an event of this magnitude.

PSE's service provider arrangement provided that Potelco was responsible for coordinating damage assessment through the dispatch of its damage assessment teams, and by requesting assistance from PSE for circuit patrol and other damage assessment as required. For normal storms experienced by PSE, the process worked very well. However, the magnitude of the Hanukkah storm was so great that it completely exhausted available damage assessors at both Potelco and PSE. This situation required PSE to reach deeper into its ranks for damage

assessors who had less T&D and geographical system experience. The lack of trained damage assessors further slowed the damage assessment process.

Conclusion 4.3.10: PSE conducted damage assessment training just prior to the beginning of the storm season, but attendance was low.

PSE smartly arranged its training just prior to the storm season, during August and early September. For the 2006 season, seven training sessions were identified around the company. Approximately 124 PSE and Potelco personnel were identified for this training exercise, but only 49 (or 40% of the identified personnel) attended. This performance may have impacted the number of qualified assessors available for the storm on December 14-15.

Conclusion 4.3.13: PSE's CERP does not include checklists for before, during or after the emergency.

Role-specific checklists were not available to ensure employees completed all expected tasks, obtained all information needed, or provided proper feedback to customers and other stakeholders.

Recommendation 4.4.1: Expand the company emergency response capability through enhanced personnel utilization.

KEMA recommended the following actions:

- Enhance skill and process training for experienced and new employees
- Provide detailed definition of ownership of responsibilities across positions
- Institute broader and more consistent participation of PSE representatives in local government emergency operations
- Develop succession plan for key positions

Conclusion 5.3.2: PSE did not use its inherent knowledge and experience to convey to its customers an initial estimate of the restoration duration.

- Some experienced PSE employees realized very early after the storm abated that system damage was extensive and the restoration would be protracted. While it was clear to those experienced professionals that the restoration period would be five to seven or more days, this information was not communicated within PSE or to customers.

Conclusion 5.3.3: PSE does not have a storm classification methodology to estimate storm impacts and resource requirements before and shortly after a major storm strikes.

A storm classification methodology could provide PSE with initial information for its customers before damage assessment is completed. After the storm the methodology may draw on PSE's SCADA, EMS and AMI systems to provide additional data to refine the early restoration estimate.

Recommendation 5.4.1: Develop a storm categorization methodology and tailor aspects of the CERP to the various levels of storms.

KEMA recommended:

- Building a database of historical storm data
- Reviewing and documenting historical damage by areas
- Documenting a process for developing early storm restoration estimates based on available information, historical data and personnel experience

Conclusion 6.3.1: Crew requirements estimation can be more effective by employing a consistent methodology used by all Operations Bases and the EOC.

There were no quantitative or documented methods or guidelines for estimating crew requirements, estimates were based solely on experience and "feel" for the situation. As a result, it was difficult for management to accurately quantify resource requirements to determine the need for additional crews and resources in each area – and to develop high level restoration time estimates.

Conclusion 6.3.2: There is a formal damage assessment process, but it did not scale sufficiently to provide adequate and timely information to management during the December 14-15 storm.

The damage assessment process that was in place had worked well for smaller (i.e., 30 hour or less) events, but did not scale well for an extremely large event such as the Hanukkah storm - for the following reasons:

- There were not enough qualified damage assessors to complete the required assessments in the target time of 24 hours

- The process of entering damage assessment data directly into CLX could not support the volume of data being collected and provide the EOC a clear picture of the extent of damage in any area

Conclusion 6.3.3 Crew foremen provide direct feedback on the extent of repairs required and an estimated completion time; however, this completion time may not be the same as restoration time.

When an assigned crew reached a work site, they performed a quick analysis of what must be repaired and the time needed to complete the repairs. This information was radioed back to the Storm Board so the CLX specialist could enter it into the CLX system. However, the information was not always useful in determining the restoration of service time as there were often other problems both up and down stream that prevented the restoration of power to customers.

Recommendation 6.4.1: Enhance the damage assessment capability and process to provide better and faster estimates of restoration time and resource requirements:

- Enhance Damage Assessor training through more detailed technical content, extended training time, and qualifications screening for participants
- Revise the DA process to include specific methods for estimating restoration times and manpower requirements
- Formalize the information requirements and process for Damage Assessors in the field

Conclusion 7.3.1: The event's scale and magnitude strained PSE's emergency response process.

PSE had a well-defined and documented emergency response plan that anticipated various types of events and disasters, and detailed specific response processes and responsibilities. The Hanukkah Eve Windstorm, however, was the first extreme event to truly test the emergency plan, and the breakdown of some critical processes was evident. While the efforts of personnel often overcame process issues, the need for extra effort indicated that parts of the plan should be reviewed for potential improvement.

Conclusion 7.3.2: As restoration time and external pressures increased, EOC processes and functions appeared to become more ad hoc.

Some management directives at EOC were initiated without knowledge of affected Operations Bases and personnel in those bases. The directives were apparently initiated as a response to pressure from external influences that created a sense of urgency among EOC management to take action.

The EOC formed local area coordination groups at the field level and those involved in this effort considered them successful. However, some operations base staff considered this interference by the EOC that created additional work for the operations base.

The EOC's expectations of the volume and detail of information from the field increased as each day passed. Company personnel felt an obligation to deliver more detail as restoration time increased. In any storm event, the public reasonably expects that the utility will have and relay better information about restoration time as each day passes. In this restoration effort, however, the quality of information did not appear to improve as time passed.

Conclusion 7.3.6: Coordination of Operations Base activities and the EOC are sometimes strained and counterproductive.

EOC operational decisions were imposed upon Operations Base management. This was recognized as a sometimes necessary action; however, coordination with the local operations base should be an integral part of any such action. The Transmission Restoration Team exemplified effective coordination, while some local area coordination groups demonstrated less coordination.

Conclusion 7.3.7: Operations Base effectiveness is generally determined by local Potelco and PSE leaders, which extends to overall operation of the storm board and effective coordination of resources in the field.

Some personnel were more effective in leading storm restoration operations than others. Often this effectiveness was a result of the individual's operational knowledge and their experience in similar events.

A risk that was identified in the PSE service provider model was that it could be unclear who owned the customer restoration effort in the field. In a storm restoration, all Operations Base and EOC managers must be well-versed in both storm restoration procedures and the chain of command that is ultimately accountable for all operational decisions. There cannot be ambiguity

between PSE and Potelco management as to who is in charge and responsible for restoration at any location.

Conclusion 7.3.8: The abundance and backlog of requests for clearances delayed crews in the initiation of repairs.

It was noted in several interviews that crews routinely waited upwards of two hours to obtain clearances before starting work. This meant that four to eight people could not perform meaningful repairs until the clearance was obtained, thereby further delaying restoration. Further, PSE customers observing crews may have believed the crews were simply not working.

Conclusion 7.3.9: Potelco crew members were wisely assigned to foreign crews to take clearances.

Potelco crew members were assigned to foreign crews as crew coordinators to ensure each crew had knowledge of switching and clearance processes. This practice essentially reduced the number of Potelco crews available to do repairs; however, without this action, foreign crews would have been much less productive. Without compromising safety, this assignment enhanced the foreign crews' ability to work effectively on the PSE system with a higher level of efficiency than would otherwise be available.

Recommendation 7.4.1: Institute consistent accountability for executing the storm plan.

KEMA recommended the following actions:

- Review documentation of operating base management process
- Establish performance metrics
- Clarify roles of PSE and the service provider

Recommendation 7.4.2: Formalize local area coordination and transmission restoration priority activities.

KEMA recommended PSE develop a local area coordination plan that:

- Documents the necessary logistics issues and plans

- Establishes trigger points that launch the strategy
- Develops appropriate clearance request and execution procedures

Conclusion 8.3.1: PSE provided consistent customer messages, but customers needed more localized information. The Community Relations Managers (CRM) took the initiative to find more specific information.

PSE did not move to regional/local restoration estimates until four days after the beginning of the storm. PSE employees, specifically the CRMs, filled the gap between corporate and local information needs by working directly with the Operations Bases to develop specific restoration information for governmental customers. Some CRMs reported that PSE's Corporate Communications staff wanted to use a single company report for consistent messaging, but the CRMs knew the corporate message did not meet local needs. Corporate Communications did not have the manpower to staff local Operations Bases; therefore, CRMs supported the corporate effort by engaging the local media when they visited Operations Bases to gather information.

Conclusion 8.3.2: Instead of waiting for a definitive damage estimate, PSE should have communicated the severity of the outage to its customers sooner.

Lacking specific information to communicate the severity of the outage in terms such as the expected length of the restoration (number of days), PSE added stress to its customers during the restoration. Early in the process, experienced PSE personnel estimated complete restoration would take five to seven days or more. It was reasonable to expect that PSE's customers be told the potential extent of the storm event outage, even if a customer or area specific estimate could not be provided early in the restoration process. This information would have allowed PSE customers to make better decisions about how to best cope with the outage.

Conclusion 8.3.3: PSE's initial communications to customers lacked specificity and provided limited actionable information during the first three days of the restoration.

While PSE did provide frequent updates during the initial three days of the restoration process, its communications during that period did not use clear language nor provide a specific estimate of the number of days it would take to restore power; instead, terms such as "extended," "numerous," "several," "number of," "perhaps longer," and "likely longer" were used frequently in PSE messages to customers.

Conclusion 8.3.4: Early in the restoration, PSE had no plans to communicate with customers at company facilities, but it adjusted its communication protocol once the magnitude of the situation was understood.

To obtain restoration information, customers visited PSE's corporate office and Operations Bases, which were not initially staffed to handle "walk-in" communications. Once PSE recognized the situation, it placed laptop-equipped employees in position to take customer outage reports and provide restoration estimates, when available, to customers.

Conclusion 8.3.5: Responsibility for communication with critical customers, such as key customers, the media and municipalities, is assigned in the CERP to the communications coordinator, but that process was not consistently executed.

In its CERP, PSE defined the emergency response role of the Community Relations Managers as the Communications Coordinator working at the Operating Base. The tasks assigned to the Communications Coordinator covered a wide range of assignments. Some CRMs chose to remain at the Operating Base to maximize their ability to obtain timely information, while others chose to serve customers on-site or by telephone. The magnitude of the storm magnified the communications and PSE's messaging was not viewed as responsive or useful by some governmental stakeholders.

Conclusion 8.3.6: PSE did not use prepared or prepaid messages to convey information directly to customers and thus was subject to the media's discretion and editing of PSE's intended message.

By relying on the media's discretion to transmit PSE's restoration messaging to customers, PSE created the possibility that it would lose control of its intended message. PSE did not use or consider the purchase of radio airtime as a method of communicating with customers.

Conclusion 8.3.7: Faced with limited information flow automation, PSE continued its practice of scheduled conference calls initiated by the EOC. However, more localized information was obtained by employees directly contacting the Operations Base.

PSE had limited systems capability to communicate the status of the emergency restoration process internally to its employees and Potelco. Therefore, PSE continued its practice of regularly scheduled conference calls initiated by the EOC. The conference calls provided a wide range of information throughout the process. CRMs were able to obtain high level restoration status to assist their roles as Communications Coordinators and supplemented it with calls to

Operations Bases. The call center stationed an employee at the EOC to monitor the conference call and then follow up for further detailed information. Major Accounts also utilized the EOC conference call to assemble information to respond to their customers, but needed to supplement the EOC conference call with calls directly to field personnel.

Recommendation 8.4.1: Create an integrated corporate and local communication strategy that is scalable to storm severity.

PSE should have a communications strategy that scales to various levels of storm response. This strategy should also recognize the need for different messages and delivery across the service territory to address specific local situations.

Conclusion 9.3.1: PSE call center technology is marginal for high-volume of calls during restoration effort.

During the Hanukkah Eve Windstorm, about 500 telephone trunk lines fed PSE's 200-seat call center. In theory, this meant that the first 200 calls would go to the CSRs and the next 300 would initially go to the IVRU. Additional calls beyond the first 500 would be sent to the local carrier network cloud to be processed in a fashion similar to the IVRU. Other types of emergency calls would go to the next available agent. While this call routing capability gave the customer an answered call, it provided very limited customer information.

Conclusion 9.3.2: PSE augmented its call center staffing to handle inbound calls.

When faced with a significant increase in call volume, PSE's call center management developed a recruiting and training program to train and support over 200 additional call takers. This program included one to two hours of training for CLX data input and customer interaction. The program was implemented at three different call center training sessions throughout the day to accommodate volunteer employees. However, due to a lack of planning, too many people tried to organize or recruit non-call center staff and were doing so in an unorganized manner.

Conclusion 9.3.5: PSE's inbound network communications system does not differentiate by the geographic origination of a call; however, PSE's call center staff did develop regional restoration information and used the IVRU effectively to provide available restoration information to inbound-calling customers.

PSE's network did not differentiate calls based on their automatic number identifier (ANI). To mitigate this limitation, PSE's call center implemented IVRU messaging that allowed customers to select a location and receive an update. Had geographical routing been available, PSE

customers could have accessed the available (and potentially more accurate) restoration information for their area more rapidly.

Conclusion 9.3.6: PSE's inbound call system does not automatically generate individual restoration estimates.

While CLX is designed to provide outage restoration estimates, the lack of restoration estimates, plus the many limitations of CLX and how it is utilized by PSE, precluded or negated the effective use of this capability. Additionally, as configured, CLX was limited by trunk line capacity.

Conclusion 9.3.7: To respond to calls escalated from the call center and other sources, PSE developed an escalated call follow-up process.

As the restoration progressed, many customers requested escalation of their calls to PSE management. PSE developed a process to handle, review and respond to these calls. The PSE employees assigned to answer escalated calls were recruited and received preliminary training. Their limited training included a focus on calming down customers and assuring them they had not been forgotten within the restoration process. Beginning on Day 5, PSE assigned 10 special field crews to escalated calls. These field crews performed special repairs such as removing downed wires from driveways to allow customers to safely leave their homes.

Conclusion 9.3.8: Due to incomplete restoration information, CSRs could not provide many customers with timely and accurate restoration estimates.

A CSR or a customer using the IVRU can access restoration estimates if they have been entered into CLX. Some Operations Bases did not keep the CLX data entry current as their presumed priority was customer restoration. Due to the magnitude of the damage including extensive transmission system impacts, restoration times were generally not provided in CLX for the first three to five days after the storm. When the repairs were completed, the original event in CLX was closed. If a customer had a secondary source for the outage (e.g., service down) CLX would report the customer's outage as resolved even though the service was still down.

Recommendation 9.4.1: Formalize a customer escalated call process.

KEMA recommended that PSE:

- Document the escalated call processes established in the December 2006 storm
- Design logistics to support this process
- Design information flows to inform management of calls/responses

Recommendation 9.4.2: Use local carrier phone network in front of CLX/IVRU to enhance call-taking capacity and capabilities.

Moving the local area communications network from the back-end of the call-taking process to the front-end would allow PSE to handle a greater volume of calls. The increased call volume could then, through Automated Number Identification (ANI), have a unique restoration message, while allowing non-electric and emergency gas calls to proceed to the call center. An added benefit to this configuration is a potential reduction in the number of trunk lines coming into the call center.

C. PSE Actions Submitted in 2007 with KEMA's Hanukkah Eve Windstorm Report

PSE accepted KEMA's Recommendation 4.4.1 regarding enhanced personnel utilization.

During the period June through October 2007, 667 of PSE's 2,400 employees were provided emergency response assignments for storm activations. Those assigned "damage assessor" and "contract crew coordinator" as their primary role were required to participate in training; employees assigned to other roles were offered opportunities to participate in training or storm planning orientations. Ninety seven percent of the assigned damage assessors participated in the required training, and 75% of those with other emergency response assignments participated in training or storm planning orientations. The training and orientation sessions, as well as a storm/emergency drill will be repeated annually.

In October 2007 a session was held to review the KEMA report recommendations and actions taken by PSE in preparation for the 2007-08 storm season. PSE developed and incorporated into the plans a new emergency response role titled "EOC Liaison" to act as the PSE liaison with state or county emergency operations centers. PSE categorized employee assignments to enable teaming less experienced and tenured personnel with more experienced resources during assignments.

PSE accepted KEMA's Recommendation 5.4.1 and developed and implemented emergency event levels to be used for both electric and natural gas events. The CERP will incorporate the three emergency event levels and will scale response activities accordingly – to be completed by year-end 2007.

PSE accepted KEMA's Recommendation 6.4.1 regarding enhancements to damage assessment capabilities, but separated the actions associated with technology to be addressed independently. PSE saw damage assessment and technology as separate recommendations.

PSE increased the number of damage assessors from 79 in 2006 to 178 in 2007. PSE had a total of 96 employees with "Damage Assessor" as their primary role in storm response, and another 83 employees with damage assessment as their secondary role. Rosters reflected 193 participants in training, indicating some employees who have other emergency response assignments also participated in the damage assessment sessions.

PSE and Potelco identified employees with more experience and skills as “A” damage assessors, and those with less experience as “B” damage assessors – with the intent to team A and B members for storm response.

Training was significantly enhanced from previous years, and added skills testing and practical experience. The DA forms were enhanced to include estimated manpower requirements and provide detailed damage descriptions for the operating base to use in preparing crew assignments.

PSE retained KEMA to develop a damage assessment strategy and examine leading practices in the industry for modeling storm damage and corresponding restoration time estimates.

PSE did not accept KEMA’s Recommendation 7.4.1 regarding accountability for executing the storm plan. PSE believed that the appropriate level of accountability currently exists and that no changes in contracts or operating base management processes are necessary at this time.

PSE accepted KEMA’s Recommendation 7.4.2 to formalize the establishment of local area coordination sites. PSE developed a Local Area Coordination (LAC) Plan document in October 2007 that was incorporated into operating base and EOC resource materials.

System Operations developed, in support of the LAC Plan, Local Area Coordination Clearance Procedures to assist in reducing the delays for crews waiting for switching and clearance orders.

PSE documented the establishment of the Transmission Restoration Team. The plan document formalizes a process to centralize and prioritize transmission restoration when major damage of PSE’s transmission system has occurred.

PSE accepted KEMA’s Recommendation 8.4.1.

PSE detailed the approach used by the Corporate Communications, Customer Services and the Operations departments to collaborate on external messages prior to issuing or posting information about disruption of service. The approach ensures the accuracy and consistency of information provided to customers by way of various communications channels. The Corporate Communications department manages a communications process that scales to the three storm event levels.

PSE formalized the process for managing escalated customer calls. A “communications lead” role in each operating base was developed, a list of qualified employees identified for this role

was identified, and orientation was completed. Logistics to support the process included the establishment of the Bothell Emergency Center (BEC), and the identification of qualified staff for PSE corporate headquarters. Officers of PSE were provided emergency response roles for "Major" events, including a group of officers identified to support escalated calls.

PSE accepted KEMA's Recommendation 9.4.2 in concept, with implementation in two phases.

Phase I implements the local carrier's EZ Route VRU in conjunction with PSE's VRU to overflow callers to a recorded message with information specific to their community, possibly using zip codes to channel information. The development of a requirements document was initiated.

Phase II requires data interface and integration between CLX and the local carrier to allow customers calling into the system to be recognized by their phone number. A requirements gathering, cost/benefit analysis and a project scope will commence in 2008.

D. PSE 2008 Action Update

In September 2008 PSE filed an update with the WUTC summarizing the actions taken during the year relative to KEMA's recommendations in the Hanukkah Eve Windstorm report. PSE's actions during 2008 relative to these recommendations are summarized below.

PSE reported the following actions relative to Recommendation 4.4.1 regarding enhanced personnel utilization:

- PSE conducted follow-up on the training sessions and any absences
- Emergency Response positions were identified for PSE and its Service Providers; training and orientation for these positions will be done annually and is under way for the upcoming storm season
- Mock storm/emergency communication exercises were conducted on August 7 and August 28, 2008 with two additional exercises scheduled in September 2008
- PSE will host 2008 "pre-winter storm" meetings with eight county emergency management agencies

PSE reported the following actions relative to KEMA Recommendation 5.4.1 regarding a storm categorization methodology:

- PSE updated its CERP plan such that it is based around the implementation of the three emergency event levels to be used for both electric and natural gas events
- Departments such as Operations, Customer Service, and Corporate Communications use the levels to drive departmental specific response actions
- Regardless of event level, once damage assessment is underway, PSE's goal is to communicate to customers and communities the overall scope or projected duration of the restoration effort within 24 hours, (e.g., Restoration efforts are estimated to last 4 days); communicate regional or county level restoration estimates within 48 hours, (e.g., Thurston County customers are estimated to be restored by 12 midnight, Friday); and community restoration estimates within 72 hours, (e.g., Customers in Bellevue are estimated to be restored by 6 a.m. on Saturday).

- PSE was in the process of reviewing basic storm data collected since 2002 to be used as an initial source of information for general estimates of restoration time ranges

PSE reported the following actions relative to KEMA Recommendation 6.4.1 regarding enhanced damage assessment capabilities:

- PSE reported an increased number of damage assessors from the 79 assigned in winter 2006/07 to a pool of 202.

- Now 105 PSE employees have “Damage Assessor” (DA) as their primary storm role, and another 97 have damage assessment as their secondary role.

- Potelco identified 44 DA’s for a combined total of 246 potential damage assessors.

- A dedicated Damage Assessment Training Guide was created for the 2008-09 storm season, and copies were provided to each DA in training classes and inserted into storm bags stored at each operating base.

- To enhance damage assessment “bench strength,” PSE will continue to classify damage assessors into A and B Teams. “A Team” assessors are those having greater experience, or are employees who work with the electrical system in a technical manner; “B Team” assessors are those with less experience. In smaller events, A and B Team assessors will be paired together to facilitate cross-training. In large events, A and B Team assessors will be paired with a driver and fielded independently to ensure maximum resource utilization.

- PSE retained KEMA to assist in developing a damage assessment strategy based on historical data (system damage, weather, restoration times, etc.) to further enhance the ability to provide early restoration estimates. Additionally, KEMA was tasked with examining leading damage assessment practices in the industry in modeling storm damage and corresponding restoration time estimates. To better address PSE’s current technological state, PSE refocused the KEMA analysis from damage data collection/analysis to industry-leading damage assessment practices.

- KEMA completed its survey and provided PSE a report in May 2008. In general, the results of the survey affirmed that PSE’s current damage assessment practices were valid based upon the current outage technologies utilized.

- Through training, Damage Assessors were made aware of PSE's commitment to provide corporate and regional estimates to customers by the 24, 48, and 72 hour time frames - and their role and how it fits in determining these estimates.

- PSE reported the status of actions related to Recommendation 6.4.1 to be complete as of August 30, 2008.

PSE did not accept KEMA Recommendation 7.4.1 and believes that the appropriate level of accountability currently exists and with its Service Providers. The Potelco/PSE Fall Joint Leadership Meeting was scheduled for October 2008 and included a review of Corporate Emergency Response Plan updates/changes. EOC and operating base orientations are being held in October.

PSE reported the following actions relative to KEMA Recommendation 7.4.2 regarding local area coordination and transmission restoration priority activities:

- PSE documented its Local Area Coordination (LAC) and Transmission Restoration Team plans and inserted them into EOC and Operating Base Plan documents

- Preliminary LAC sites have been identified and associated resource plans completed

- PSE has contracted with Base Logistics to provide site plans for regional staging areas as well as LAC sites

- Local area coordination plans will be exercised as a part of the 2008 mock storm exercises

In September 2008, PSE reported that they had refined their Web-based Service Alert Map display at www.pse.com. The outage map display will now be enabled during Level 2 and 3 events to help communicate the overall outage impact and restoration progress across PSE's service area.

PSE conducted two tabletop exercises specific to storm communications in 2008. Exercise objectives for these sessions were as follows:

- Following the storm communications plan

- The formulation and communication of 24, 48, and 72-hour messaging

- Coordination and consistency of messaging between Corporate Communications, Access Center, Community Relations, Major Accounts, etc.

PSE reported the following actions relative to KEMA Recommendation 9.4.1 regarding an enhanced customer escalated call process:

- PSE identified 15 employees to serve in the capacity of Communications Lead; and the new function will be exercised as a part of the 2008 mock storm sessions. This role will respond to specific customer inquiries from major accounts or key business customers (e.g., schools, healthcare facilities, grocery store chains, area shelter locations, etc.) by working with the Major Account Representative(s) in the EOC to coordinate the response. The role will also take escalated calls from the EOC, Customer Access Center, or the Executive Office. This process is also supported by the Bothell Emergency Center which had been created to facilitate operations at PSE's Bothell Access Center (Call Center) during emergency events by pre-assigning job duties and responsibilities.

PSE reported the following actions relative to KEMA Recommendation 9.4.2 regarding the use of a local carrier phone network in front of CLX/IVRU to enhance call-taking capacity and capabilities:

- Phase I of KEMA Recommendation 9.4.2 was completed. The plan uses Qwest's (local carrier) EZ Route IVRU in conjunction with PSE's IVRU to overflow callers to a recorded message with information specific to their community based on their automatic number identifiers (ANIs) (for PSE's IVRU) or zip code (for Qwest IVRU). Customers have the opportunity to be re-routed back to PSE if they wish to speak to a live representative. The Community Messaging System was moved into production in May, 2008.

- For Phase II, PSE investigated KEMA's recommendation to use the local carrier phone network in front of PSE's CLX/Interactive Voice Response Unit (IVRU) to enhance call-taking capacity. PSE worked with Qwest to cost out a solution for providing 500 ports. Based on the cost and the value added PSE decided not moving forward with Phase II.

The actions described above completed PSE's activities related to these recommendations in the Hanukkah Storm report and all actions associated with these recommendations are not addressed in future reports to the Washington Utilities and Transportation Commission (WUTC).