In addition to these T&D entity actions, several industrial customers along the Texas Gulf Coast indicated they routinely employ a variety of insulator coatings to mitigate for contamination that includes silicone grease and vulcanized rubber products. Insulators are cleaned using specialty brushes, blasted with various media (e.g. walnut hulls), and/or hand wiped with demineralized water, naphtha, or isopropyl alcohol solutions to remove the silicone coatings. They indicated generally satisfactory results from these actions, which has been employed for up to twenty years in some cases.

Best Practices

There exists a significant amount of literature devoted to the issue of electrical system insulator contamination and mitigation activities. Although much effort has been devoted to the topic, it is very difficult to get insulator maintenance right - easy to get the timing wrong and very costly to maintain insulators in general. For example, a company may plan to clean insulators at the end of a dry season, but the rain or fog comes a few weeks too early and flashovers occur. The use of composite or resistive glaze insulators can improve the flashover performance, but in severely contaminated areas they tend to suffer aging effects which makes it necessary to do costly insulator replacements. Thus, a company cannot "buy" itself out of problems.

Some entities have employed enhanced monitoring systems to trend contamination on insulators. These are discussed considerably in available literature. However, these systems are not widely used in the industry partly because they are expensive and because currently they are generally less reliable than the insulators they are monitoring.

In addition to maintenance activities and advanced technological applications, entities, like some discussed above, have taken undertaken infrastructure improvements to improve contamination performance. These include replacing insulators with less contamination-susceptible insulators, modifying the current insulator profile to improve flashover performance, and more radically, re-designing the transmission line and substation equipment to increase insulation distances. However, although the number of outages experienced is much less, it is still not completely eliminated, which raises an important consideration.

It is accepted practice not to design external insulation for 100% failsafe operation. Thus a certain outage rate must be accepted. Unfortunately, contamination events may affect a larger part of the system, which obviously has greater consequences than, for example, a lightning event where only one circuit is generally involved at a time. Therefore, a facility owner must consider the consequences of its design assumptions based on the environment in which the equipment operates, and effectively implement a maintenance strategy that appropriately balances the risk of flashover against customer and regulatory reliability expectations. These concepts are discussed at length in the current literature, from which a framework of contamination best practices is identified.

Largely, the listing of activities identified in the consolidation of survey results constitutes such a listing of industry best practices. What is necessary to supplement these practices is an effective overarching framework within which to apply these activities. It is with this objective in mind that the following best practice discussion is offered.

There are several primary reference documents that address electrical insulation appropriate for this discussion of optimal insulator performance under contamination conditions. Two documents originate from CIGRE, the International Council on Large Electric Systems, two documents are from Eskom, the South African electric public utility, and the International Electrotechnical Commission (IEC) has recently published a standard covering the selection and dimensioning of insulation with respect to contaminated areas based on the CIGRE work.

- CIGRE Document 158, "Polluted Insulators: A Review of Current Knowledge" is a June, 2000 copyrighted publication that provides compiles the current state of knowledge on contamination effects in terms of the flashover process, pollution severity measurement, test procedures, design practices, and maintenance procedures.
- CIGRE Document 361, "Outdoor Insulation in Polluted Conditions: Guidelines for Selection and Dimensioning" is a June, 2008 document that offers a performance-based methodology for matching the application and environment to the characteristics of insulators.
- Chapter 5 of Eskom's "The Fundamentals and Practice of Overhead Line Maintenance" addresses maintenance of insulators.
- Chapters11-12 of Eskom's "The Practical Guide to Outdoor High Voltage Insulators" addresses inspection and analysis techniques
- IEC Technical Specification 60815: Guide for the selection and dimensioning of high-voltage insulators for polluted conditions, Parts 1-3

Generally, these documents and various other publicly available references cite the following activities that should be undertaken in response to known or suspected contamination-related outages. Three main alternatives exist to mitigate the effects of contaminated insulators: select the proper insulator for the environment, maintain the insulators, or eliminate the source of the pollution. CIGRE document 361 speaks extensively to the proper selection of insulators, which is predicated upon having basic information available such as the insulator's application, electric system parameters, an understanding of the environment in terms of types and severity of pollution and the climates for the area, and any other constraints that would be important to consider. The general principles presented I the CIGRE documents have been subsequently formalized into a set of IEC standards (IEC 60815, Parts 1-3). Details of these actions are left to these reference materials. However, generally, the process involves:

1. Identify the specific environmental conditions and times of the suspected contamination outages to identify meaningful trends. For example, outages that tend to occur during the overnight or early morning periods in the spring and fall months when condensation levels are at its highest would tend to indicate contamination as the source. The outage

would be different if the outages typically occurred in the day hours in the spring only that might be typical of streamers from nesting birds.

Also noteworthy is the climatic trend information, particularly the total amount and maximum density of local rainfall to which the equipment is subjected.

2. Perform an environmental assessment to identify the site-specific pollution severity level as described in section 4.3 of CIGRE 361. This should encompass the determination of the type and severity of pollution/contamination, whether it be marine (sea salt), desert (sand and other insolubles), and/or industrial or agricultural (cement, soot, etc.). Contamination severity is quantified through the Equivalent Salt Deposit Density (ESDD) that measures highly dissolvable salts; and, the Non-soluble Deposit Density (NSDD) for assessing low dissolving salts. Other methods also available to assess pollution density such as the Directional Dust Gauge (DDG) method, but ESDD and NSDD are more commonly used. The above mentioned methods to determine the contamination severity have been standardized in IEC 60815-1.

   If possible, entities should consider performing this environmental assessment for several locations of interest across its geographic footprint over the course of a complete year at a minimum. To obtain a spectrum of useful information, entities should also consider, in addition to in-service insulators, installing a representative sample of insulators the entity utilizes or is considering for use in a variety of configurations (e.g. horizontally mounted, vertically mounted, perpendicular to coastline, etc.). Differences in the mounting arrangements for the same type of insulator may cause pollution to accumulate at different rates in the same environment. This collective body of information could then be evaluated to determine a pollution index over the testing timeframe.

   Another key aspect of this assessment is to create a relationship between the level of accumulated contamination and the amount of rainfall. This is vital during drought conditions in order to determine thresholds for adjusting maintenance program strategies that would proactively mitigate the potential for insulator flashovers.

3. Utilize the pollution index to select the number and type of insulators for a given location. Based on the pollution levels, the entity should be able to estimate a total required leakage distance that it must satisfy when identifying and selecting appropriate insulators. Then using information about the existing installed insulators, develop a prioritized list of locations in which enhanced mitigation is required, either through more aggressive maintenance practices, modifications to the insulators to increase its flashover performance, and/or alternately, installation of new insulators more appropriately designed for the particular application. The principles of the CIGRE Document 361 and IEC standard 60815, parts 1-3 could be used to implement this dimensioning framework.

4. An entity may determine, when considering the lifecycle benefits of investment cost, ongoing maintenance costs, and replacement costs, that it is appropriate to adjust maintenance practices on the insulators or install other measures to improve flashover performance. Using historical experience, the site specific pollution severity value, the importance of the customers served, and other factors that may be important to the entity, a variety of measures is available.

Insulator washing is a common practice to eliminate contamination, although it is difficult to establish the proper periodic interval to be extremely effective. Live line washing is possible but the risk to flashover is considerable and requires skilled operators and specialized equipment. Washing of outaged equipment achieves similar benefits but requires long equipment outages to accomplish. Neither cleaning method addresses "instantaneous" pollution that develops from the settling of a conductive fog layer on an otherwise clean insulator.

Application of silicone greases to the insulators is the next enhanced maintenance approach. The grease improves the surface flashover performance, addresses instantaneous pollution, and generally lengthens maintenance cycles. A disadvantage of using grease is that it is sticky and may saturate quickly with contaminants in dusty environments. However, the labor and material costs are considerable and requires long outages to complete. Additional labor is needed periodically to remove the grease before new grease can be applied. Overall lifecycle costs of grease application are the highest of any maintenance option discussed.

Applying silicone rubber coatings to porcelain or glass insulators provides similar benefits to grease but is generally less costly over its lifecycle. However, in lieu of this approach, entities often choose to replace the insulators with polymer insulators. Relative to grease, silicone coatings provide a longer life and lower flashover risk.

In order to improve insulator performance, entities sometimes add booster sheds or other creepage extenders to the insulators themselves to alter the profile of the equipment.

Often the lowest risk and most permanent solution is to replace an insulator with one that is properly designed and suited for the conditions.

5. A key part of an entity's maintenance activities regarding insulator performance is increased inspections of the equipment to determine its current state of contamination and flashover potential. Visual inspections, using infrared or ultraviolet cameras, require skilled personnel familiar with insulator performance but can be performed on the ground or aerially.

   By themselves, visual inspections are inconclusive without supplemental enhanced monitoring systems such as continuous leakage current monitoring systems or other devices as discussed in the reference materials. Insulators may appear contaminated with inert materials that perform well, or impacted by a salt layer that exhibits no obvious discharge when dry, but one that can quickly flashover when moistened.

Conclusions and Recommendations

Several T&D utilities and industrial customers have experienced numerous outages in the spring 2011 that are attributable to contamination and lack of rainfall, particularly in the Texas Gulf Coast area. Whereas some entities have undertaken numerous maintenance and equipment improvement opportunities to improve insulator performance, the collection of available literature on the subject suggests a more comprehensive approach might be appropriate.

As a first step, entities should assess the nature of the contamination problem – a chronic one that would suggest more intensive remedial actions, or more incidental outages. With this understanding of the nature of the issue, entities can then evaluate its next steps, which may include determination of the site-specific pollution severity level, correlation of the pollution severity value to minimum insulator performance characteristics(informed by outage experience), and identification of the relationship between contamination levels and rainfall that would be particularly useful during drought conditions. Also based on this information, adjustments to maintenance schedules for equipment washing and greasing should be made, and determinations as to how to permanently improve performance should be identified. This could include the application of silicone coatings, use of RTV insulator coatings, additive measures to adjust insulator profiles, and/or equipment change-out to better match operating and environmental conditions.

Recommendation 17

For entities experiencing potential or actual contaminated-related outages as discussed in the five-step framework for contamination mitigation, perform a general assessment of the adequacy of presently used insulation levels with respect to contamination performance and develop an appropriate action plan to improve the flashover performance of its insulators. This may be a comprehensive environmental assessment to determine its site specific pollution severity index and relationship between contamination and rainfall levels.

Recommendation 18

Entities should identify the optimal maintenance strategy for insulators, which includes the selection of the most appropriate remedial actions and maintenance intervals.

Recommendation 19

Entities should continue to support research and development efforts to improve the current base of knowledge regarding insulator contamination, to develop better contamination monitoring tools, and introduce increasingly effective insulator designs that are less prone to contamination-related flashovers.

VI. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

This report addresses the requirement of the PUCT to provide a report to the Texas Legislature that satisfies Senate Bill 1133 regarding extreme weather preparedness of generating entities within Texas. These entities were required by P.U.C. Subst. R.25.53 to develop and submit an emergency operations plan (EOP) to the PUCT, which included a general expectation to address extreme weather preparedness. Quanta Technology reviewed the summary and full EOPs and evaluated their contents relative to a set of eleven criteria developed based on findings of the FERC Report on the February 2011 cold weather event and NERC lessons learned on cold weather generator operations. The EOPs were again reviewed to determine whether generating entities had incorporated extreme hot and cold weather best practices also identified in this report.

Generally, generating entities provided summary descriptions of their EOPs to the PUCT that lacked the detail necessary to effectively evaluate them against the developed criteria. Only after the full plans were requested did a more detailed review occur. Lacking more specific PUCT guidance on extreme weather preparedness, these detailed EOPs contained a general framework for extreme weather preparedness but were inconsistent in terms of contents and depth of detail, if extreme weather preparedness was addressed at all. Further, the EOPs did not consistently address the findings from the February 2011 event or the NERC lessons learned in their EOPs, understanding that some of these procedures may reside in documents other than the EOP. Although much work has been undertaken over the past eighteen months to address the recommendations, some EOPs have not been updated to incorporate this work. Many entities focused on emergency response activities and personnel safety versus extreme weather preparedness to maintain unit availability. Where extreme weather preparedness was addressed, extreme weather operating and design limitations were not well-documented except in the case of wind turbines, which indicated automatic shutdown would occur when outside the hot and cold design temperature limits. If extreme weather checklists were available, they were generally thorough. The best practice plans included detailed plans for the scope of equipment to be addressed, timelines for implementation, personnel involved in the preparation activities, and ongoing checks to assure the integrity of the protection processes.

The list of identified best practices mainly targeted steam generators and combustion turbines as the majority of issues experienced during the extreme weather events affect the equipment located therein and not at wind turbines, etc. Development of EOPs that include extreme weather preparedness, pre-seasonal review through training and drills, and routine preventive maintenance of equipment susceptible to extreme weather impacts serve as a path to increased unit availability during these events. Unfortunately, these activities have not been largely institutionalized as findings from historical extreme weather events have continued to identify the need to incorporate these practices into the planning and operating framework at the generating plants. . Reviewing the relative cost of the various best practices, there are certain lower cost practices that succeed in being highly effective in reducing the risk of plant shutdown and should be considered for implementation. These include understanding and documenting weather sensitive critical equipment and plant design limits, and training all impacted personnel on the implementation of extreme weather preparedness strategies ahead of each peak season.

Although several municipal entities not under the PUCT's jurisdiction provided EOPs as well, their availability was driven by the spirit of voluntary cooperation. It is clear, however, that not all entities required to provide its EOPs to the PUCT responded accordingly.

Quanta Technology also assessed the ability of the ERCOT grid to withstand extreme weather events, using anticipated weather patterns for the upcoming year. Whereas the areas outside the ERCOT footprint were robust with respect to resource adequacy for the foreseeable future, projections that bore out in practice in the 2011/2012 Winter and 2012 Summer, ERCOT's reserve margins under normally studied conditions were marginally adequate for the Summer 2013. For 2014 and beyond, reserve margins were consistently below the target value. To address this issue, entities are in the process of restoring mothballed units to meet the target reserve level. However, when a concatenation of events occurs such as higher than forecasted customer demand (using a 1 in 10 forecast or greater), generating plant outages greater than expected, and loss of generation resulting from drought impacts, reserve levels quickly dwindle and a shortfall in capacity could easily be experienced in the summer 2013 period and beyond. Because of the dramatic improvement in drought conditions in Texas in 2012, its potential impact on the availability of generating resources is significantly lessened. For winter, even with this combination of factors, reserve levels could fall below the required threshold for implementing an emergency energy alert but not to the extent of a shortfall in capacity relative to customer demand, unless a more extreme generator outage scenario similar to February 2011 is experienced. However improbable, this potential reinforces the need to ensure generators are best prepared for maintaining unit availability during extreme weather conditions.

The Texas grid was also assessed to determine the transmission system's ability to deliver power where needed in the midst of extreme weather conditions. Quanta Technology determined that the transmission system is generally robust and capable of serving the customer demand in extreme weather conditions. There is sufficient resiliency in the transmission system to withstand multiple generation or transmission outages that might be the result of storms, floods, or wildfires under the studied scenarios. However, Quanta Technology identified 18 counties within Texas that were identified as areas of concern based on the vulnerability of the system to common mode impacts using an historical analysis of hurricanes, tornadoes, extreme hot and cold weather, and drought. These areas also contained a significant amount of local generation and were identified with higher than average vulnerability indices based on the technical studies performed. Of the areas on this "watch list", two in particular merit particular attention due to their significant vulnerability index, which would suggest the areas are a potential trigger for a more widespread event across the grid. Accordingly, the generating entities in these areas of concerns should be especially attentive to implementing the recommendations contained in this report and summarized below.

Quanta Technology also reviewed instances of electric facility contamination that occurred on electric facilities along the Texas coast and throughout the state. Based on the review of these events and upon review of the wealth of literature available on the topic of contamination, a list of best practice activities is offered that includes a thorough evaluation of outages suspected to be contamination-related to identify trends and performance of a site-specific pollution severity assessment in order to determine an appropriate strategy to address problem areas. Appropriate improvement strategies would necessarily consider the relationship between environmental and operating conditions relative to the design assumptions used to select insulators to determine if optimal performance is best achieved at a reasonable lifecycle cost through replacement or enhanced maintenance approaches.

Summary of Recommendations

1. The PUCT should consider standardizing information to be prepared and filed as part of the EOPs. The eleven following areas should be considered areas to be addressed in the form determined appropriate by the PUCT.
    - Awareness of plant (generator and plant equipment) weather design limits
    - Understanding of the critical failure points within the plant
    - Address if the plant expects to operate during extreme weather
    - Did the plan provide specific checklists for plant personnel
    - Process for identification of imminent weather events
    - Inventory of pre-arranged supplies for extreme weather events
    - Training for extreme weather events
    - Drills for extreme weather conditions
    - Alternative fuel testing
    - Staffing levels during an extreme weather event
    - Review of actual extreme weather events for lessons learned
2. To the extent the legislature believes this is an important endeavor, the legislature could consider extending the PUCT's jurisdiction over MOUs that own generation and require them to file EOPs. This will help to ensure all EOPs address the specific areas of weatherization required to ensure extreme weather preparedness and equipment reliability.
3. The PUCT should consider how best to ensure that all entities have appropriate EOPs, whether by filing complete plans, allowing a more detailed summary, or affidavits indicating the plan is complete.
4. Thermal generation that is susceptible to drought conditions should ensure its extreme hot weather plans as identified in Recommendation 1 are documented and implemented. In addition, owners of these generating plants should proactively evaluate the feasibility of securing additional water resources to mitigate the drought effects, including the following:

- Securing rights to additional water resources
- Access to new groundwater sources
- Building pipelines to access to alternate water sources

5. ERCOT should continue to perform the Seasonal Assessment of Resource Adequacy (SARA) analysis and refine as necessary to proactively evaluate unique events like drought. ERCOT should maintain frequent dialogue with impacted entities to inform its findings.

6. For the 18 counties identified as areas of concern in the Impact Matrix, the PUCT and ERCOT should consider more frequent engagement with the facility owners in these areas to keep an ongoing pulse on the state of the electric system and entity emergency preparedness. This could include near real-time system-health monitoring for the areas potentially at-risk with respect to the common mode impacts considered in the impact analysis.

7. Facility owners in the 18 areas of concern should ensure their emergency preparedness plans for extreme weather are up to date and incorporate the appropriate best practices as identified in this report.

8. The PUCT should initiate a more detailed review of the two "outlier" buses and associated areas as determined by the VAT indices to ensure a complete understanding of the current state of readiness for extreme weather events.

9. Transmission planners should routinely consider multiple contingency events on buses and surrounding areas identified as the higher ranked facilities from the VAT analyses in their planning analyses.

10. Generating entities within Texas should develop a comprehensive extreme weather preparedness program that considers and addresses each of the items identified in the best practices discussion identified above.

11. The PUCT is encouraged to explore an effective mechanism that requires entities to analyze and incorporate these best practices and those from future analyses of extreme weather events into a comprehensive extreme weather preparedness plan (EOP). The PUCT should then require these plans to be maintained, updated when necessary, and verification provided that the seasonal preparations, including training, have been executed to sufficiently prepare plant operating personnel for these extreme weather scenarios.

12. PUCT should continue to work with the Texas Regional Entity, ERCOT, SPP, SERC, and WECC to enhance outreach programs for extreme weather preparedness.

13. PUCT should continue to monitor the development of the NERC continent-wide standard for winter weatherization practices.

14. Identify best practices for conservation for power plants that "Reduce, Recycle and Reuse" water supplies that may include:

- Non-consumptive versus consumptive water use
  - Return once-through cooling water to reservoir for reuse
  - Wastewater or recycling systems, allowing:
    - Reuse of graywater for flushing toilets or watering landscape
    - Recycling of wastewater through purification at a water treatment plant.
    - Use storm water runoff where appropriate
    - Rainwater harvesting
- Conduct water lines leak detection surveys and repair and maintain equipment to minimize water loss
- Monitor and optimize water quality and quantity for decreased usage
- Remain aware of best management practices by participating in water conservation technical organizations
- Evaluate water efficiency processes and technologies when considering capital investments
- Ensure water usage optimization by review of standard operating procedures
- Minimize cooling water consumption
- Use chemical suppressants to minimize water usage for fugitive dust
- Use of xeriscaping on facility properties
- Continue employee education on water conservation and drought mitigation efforts

15. Generate and share ideas to prolong existing cooling reservoirs at power plants to include:

- Uses alternative sources or lower quality of water where feasible
- Evaluate pump/piping configurations (placement, arrangement and size) to maximize reservoir capacity and greatest operational range
- Build / Improve infrastructure to access remote water sources and improved water storage to minimize transport losses
- Procure additional water supply where feasible and support development of additional water sources
- Add / Adjust pumping capability and schedule to optimize water sources with variable availability
- Evaluate use of municipal effluent as primary or secondary water source
- Add / adjust pumping capability and schedule to optimize water sources with variable availability

- Evaluate water treatment technologies to allow use of lower quality water sources for certain processes (for example, conductivity controllers)
- Upgrade processes to minimize water consumption
- Use collected storm water runoff
- Coordinate water withdrawal with surrounding entities to ensure adequate supply
- Decrease evaporative losses (storage reservoirs)

16. Generating entities in actual or potentially drought-stricken areas should review their current water conservation plans to identify any needed adjustments or improvements in advance of the upcoming peak season. This evaluation should include a review of cooling tower efficiency, effective management of reservoir water temperatures to optimize availability at peak times, and consider alternate dry cooling tower approaches.

17. For entities experiencing potential or actual contaminated-related outages as discussed in the five-step framework for contamination mitigation, perform a general assessment of the adequacy of presently used insulation levels with respect to contamination performance and develop an appropriate action plan to improve the flashover performance of its insulators. This may be a comprehensive environmental assessment to determine its site specific pollution severity index and relationship between contamination and rainfall levels.

18. Entities should identify the optimal maintenance strategy for insulators, which includes the selection of the most appropriate remedial actions and maintenance intervals.

19. Entities should continue to support research and development efforts to improve the current base of knowledge regarding insulator contamination, to develop better contamination monitoring tools, and introduce increasingly effective insulator designs that are less prone to contamination-related flashovers.

VII. APPENDIX 1 – SENATE BILL NO. 1133

By: Hegar S.B. No. 1133

A BILL TO BE ENTITLED
AN ACT

relating to a report by the Public Utility Commission of Texas on the ability of electric generators to respond to abnormal weather conditions.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:
SECTION 1. Subchapter A, Chapter 186, Utilities Code, is amended by adding Section 186.007 to read as follows:

Sec. 186.007. WEATHER EMERGENCY PREPAREDNESS REPORT.
(a) In this section, "commission" means the Public Utility Commission of Texas.

(a-1) The commission shall analyze emergency operations plans developed by electric utilities as defined by Section 31.002, power generation companies, municipally owned utilities, and electric cooperatives that operate generation facilities in this state and prepare a weather emergency preparedness report on power generation weatherization preparedness. In preparing the report, the commission shall:

(1) review the emergency operations plans currently on file with the commission;

(2) analyze and determine the ability of the electric grid to withstand extreme weather events in the upcoming year;

(3) consider the anticipated weather patterns for the upcoming year as forecasted by the National Weather Service or any similar state or national agency; and

(4) make recommendations on improving emergency operations plans and procedures in order to ensure the continuity of electric service.

(b) The commission may require an electric generation entity subject to this section to file an updated emergency operations plan if it finds that an emergency operations plan on file does not contain adequate information to determine whether the electric generation entity can provide adequate electric generation services.

(c) The commission may adopt rules relating to the implementation of the report described by Subsection (a-1).

(d) The commission shall submit the report described by Subsection (a-1) to the lieutenant governor, the speaker of the house of representatives, and the members of the legislature not later than September 30, 2012.

(e) The commission may submit subsequent weather emergency preparedness reports if the commission finds that significant changes to weatherization techniques have occurred or are necessary to protect consumers or vital services, or if there have been changes to statutes or rules relating to weatherization requirements. A report under this subsection must be submitted not later than:

(1) March 1 for a summer weather emergency preparedness report; and

(2) September 1 for a winter weather emergency preparedness report.

(f) The emergency operations plans submitted for the report described by Subsection (a-1) and any subsequent plans submitted under Subsection (e) are public information except for the portions of the plan considered confidential under Chapter 552, Government Code, or other state or federal law. If portions of a plan are designated as confidential, the plan shall be provided to the commission in a redacted form for public inspection with the confidential portions removed. An electric generation entity within the ERCOT power region shall provide the entity's plan to ERCOT in its entirety.

SECTION 2. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2011.

VIII. APPENDIX 2 – TRE RESPONSE TO FEBRUARY 2011 FERC-NERC REPORT

REDACTED

NOT AVAILABLE IN THE PUBLIC VERSION OF THE DOCUMENT

IX. APPENDIX 3 – ELECTRIC SERVICE EMERGENCY OPERATIONS PLANS

§25.53. Electric Service Emergency Operations Plans.

(a) Application. Unless the context clearly indicates otherwise, this section is applicable to electric utilities, transmission and distribution utilities (TDUs), power generation companies (PGCs), retail electric providers (REPs), and the Electric Reliability Council of Texas (ERCOT), collectively referred to as "market entities," and electric cooperatives ("cooperatives") and shall refer to the definitions provided in the Public Utility Regulatory Act §11.003 and §31.002. For the purposes of this section, market entities and cooperatives are those operating within Texas.

(b) Filing requirements. Each market entity shall file with the commission a copy of its emergency operations plan or a comprehensive summary of its emergency operations plan, as required in subsection (c) of this section, by May 1, 2008. To the extent significant changes are made to an emergency operations plan, the market entity shall file the revised plan or a revision to the comprehensive summary that appropriately addresses the changes to the plan no later than 30 days after such changes take effect.

(c) Information to be included in the emergency operations plan.

(1) TDUs and electric utilities shall include in their emergency operations plans, but are not limited to, the following:

(A) A registry of critical load customers, as defined in §25.497(a) of this title (relating to Critical Care Customers), directly served. This registry shall be updated as necessary but, at a minimum, annually. The description filed with the commission shall include the location of the registry, the process for maintaining an accurate registry, the process for providing assistance to critical load customers in the event of an unplanned outage, the process for communicating with the critical load customers, and a process for training staff with respect to serving critical load customers;

(B) A communications plan that describes the procedures for contacting the media, customers, and critical load customers directly served as soon as reasonably possible either before or at the onset of an emergency affecting electric service. The communications plan should also address its telephone system and complaint-handling procedures during an emergency;

(C) Curtailment priorities, procedures for shedding load, rotating black-outs, and planned interruptions;

(D) Priorities for restoration of service;

(E) A plan to ensure continuous and adequate service during a pandemic; and

(F) A hurricane plan, including evacuation and re-entry procedures (if facilities are located within a hurricane evacuation zone, as defined by the Governor's Division of Emergency Management).

(G) Following the annual drill, the utility shall assess the effectiveness of the drill and modify its emergency operations plan as needed.

(H) An affidavit from the market entity's operations officer indicating that all relevant operating personnel within the market entity are familiar with the contents of the emergency operations plan; and such personnel are committed to following the plan and the provisions contained therein in the event of a system-wide or local emergency that arises from natural or manmade disasters except to the extent deviations are appropriate under the circumstances during the course of an emergency.

(2) Electric utilities that own or operate electric generation facilities and PGCs shall include in their emergency operations plans, but are not limited to, the following:

(A) A summary of power plant weatherization plans and procedures;
(B) A summary of alternative fuel and storage capacity;
(C) Priorities for recovery of generation capacity;
(D) A pandemic preparedness plan; and
(E) A hurricane plan, including evacuation and re-entry procedures (if facilities are located within a hurricane evacuation zone, as defined by the Governor's Division of Emergency Management).
(F) An affidavit from the market entity's operations officer indicating that all relevant operating personnel within the market entity are familiar with the contents of the emergency operations plan; and such personnel are committed to following the plan and the provisions contained therein in the event of a system-wide or local emergency that arises from natural or manmade disasters except to the extent deviations are appropriate under the circumstances during the course of an emergency.
(G) Following the annual drill, the utility shall assess the effectiveness of the drill and modify its emergency operations plan as needed.

(3) REPs shall include in their filing with the commission, but are not limited to, an affidavit from an officer of the REP affirming that it has a plan that addresses business continuity should its normal operations be disrupted by a natural or manmade disaster, a pandemic, or a State Operations Center (SOC) declared event.

(4) ERCOT shall include in its filing with the commission, but is not limited to, an affidavit from a senior operations officer affirming the following:

(A) ERCOT maintains Crisis Communications Procedures that address procedures for contacting media, governmental entities, and market participants during events that affect the bulk electric system and normal market operations and include procedures for recovery of normal grid operations;

(B) ERCOT maintains a business continuity plan that addresses returning to normal operations after disruptions caused by a natural or manmade disaster, or a SOC declared event; and

(C) ERCOT maintains a pandemic preparedness plan.

(d) Drills. Each market entity shall conduct or participate in an annual drill to test its emergency procedures if its emergency procedures have not been implemented in response to an actual event within the last 12 months. If a market entity is in a hurricane evacuation zone (as defined by the Governor's Division of Emergency Management), this drill shall also test its hurricane plan/storm recovery plan. The commission should be notified 21 days prior to the date of the drill.

(e) Emergency contact information. Each market entity shall submit emergency contact information in a form prescribed by commission staff by May 1 of each calendar year. Notification to commission staff regarding changes to its emergency contact information shall be made within 30 days. This information will be used to contact market entities prior to and during an emergency event.

(f) Reporting requirements. Upon request by the commission or commission staff during a SOC inquiry or SOC declared emergency event, affected market entities shall provide updates on the status of operations, outages and restoration efforts. Updates shall continue until all event-related outages are restored or unless otherwise notified by commission staff.

(g) Copy available for inspection. A complete copy of the emergency operations plan shall be made available at the main office of each market entity for inspection by the commission or commission staff upon request.

(h) Electric cooperatives.

(1) Application. This subsection is applicable to electric cooperatives, as defined in the Public Utility Regulatory Act §11.003, that operates, maintains or controls in this state a facility to provide retail electric utility service or transmission service.

(2) **Reporting Requirements.** Each electric cooperative shall file with the commission a copy of its emergency operations plan or a comprehensive summary of its emergency operations plan by May 1, 2008. The filing shall also include an affidavit from the electric cooperative's operations officer indicating that all relevant operating personnel within the electric cooperative are familiar with the contents of the emergency operations plan; and such personnel are committed to following the plans and the provisions contained therein in the event of a system-wide or local emergency that arises from natural or manmade disasters, except to the extent deviations are appropriate under the circumstances during the course of an emergency. To the extent significant changes are made to an emergency operations plan, the electric cooperative shall file the revised plan or a revision to the comprehensive summary that appropriately addresses the changes to the plan no later than 30 days after such changes take effect.

(3) **Information to be included in the emergency operations plan.** Each electric cooperative's emergency operations plan shall include, but is not limited to, the following:

(A) A registry of critical load customers, as defined in §25.497(a) of this title, directly served, if maintained by the electric cooperative. This registry shall be updated as necessary but, at a minimum, annually. The description filed with the commission shall include the location of the registry, the process for maintaining an accurate registry, the process for providing assistance to critical load customers in the event of an unplanned outage, the process for communicating with the critical load customers, and a process for training staff with respect to serving critical load customers;

(B) A communications plan that describes the procedures for contacting the media, customers, and critical load customers directly served as soon as reasonably possible either before or at the onset of an emergency affecting electric service. The communications plan should also address its telephone system and complaint-handling procedures during an emergency;

(C) Curtailment priorities, procedures for shedding load, rotating black-outs, and planned interruptions;

(D) Priorities for restoration of service;

(E) A plan to ensure continuous and adequate service during a pandemic;

(F) A hurricane plan, including evacuation and re-entry procedures (if facilities are located within a hurricane evacuation zone, as defined by the Governor's Division of Emergency Management);

(G) A summary of power plant weatherization plans and procedures;

(H) A summary of alternative fuel and storage capacity; and

(I) Priorities for recovery of generation capacity.

(J) Following the annual preparedness review, the electric cooperative shall assess the effectiveness of the review and modify its emergency operations plan as needed.

(4) Preparedness Review. Each electric cooperative shall conduct an annual review of its emergency procedures with key emergency operations personnel if its emergency procedures have not been implemented in response to an actual event within the last 12 months. If the electric cooperative is in a hurricane evacuation zone, this review shall also address its hurricane plan/storm recovery plan. The commission shall be notified 30 days prior to the date of the review.

(5) Emergency contact information. Each electric cooperative shall submit emergency contact information to the commission by May 1 of each year.

(6) Reporting requirements. Upon request by the commission or commission staff during a SOC inquiry or SOC declared emergency event, affected electric cooperative shall provide updates on the status of operations, outages and restoration efforts. Updates shall continue until all event-related outages are restored or unless otherwise notified by commission staff.

(7) Copy available for inspection. A complete copy of the emergency operations plan shall be made available at the main office of each electric cooperative for inspection by the commission or commission staff upon request.

X. APPENDICES 4– 9

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NOT AVAILABLE IN THE PUBLIC VERSION OF THE DOCUMENT

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