



State of Rhode Island and Providence Plantations

DEPARTMENT OF ATTORNEY GENERAL

150 South Main Street • Providence, RI 02903
(401) 274-4400 - TDD (401) 453-0410

Peter F. Kilmartin, Attorney General

May 17, 2012

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Luly Massaro, Clerk
Division of Public Utilities and Carriers
89 Jefferson Blvd
Warwick, RI 02888

Re: Docket No. D-11-94

Dear Ms. Massaro,

Enclosed please find an original and a copy the following documents for filing with the Division of Public Utilities and Carriers ("Division"):

1. Review of National Grid Storm Preparedness, Response and Restoration Efforts Prepared by Power Services, Gregory L. Booth PE, PLS ("Review"); and
2. Response to: National Grid (Narragansett Electric Company) April 19, 2012 Response to Rhode Island Division of Public Utilities and Carriers' Review Of National Grid Tropical Storm Irene Preparedness, Response and Restoration Efforts ("Response").

(National Grid's Response to the Division's Review was filed with the Division on April 19, 2012.) For the reasons set forth therein, the Advocacy Section of the Division requests that the Division adopt the Review and Response and require that National Grid implement the recommendations identified in Section 3 of the Review, Pages 50-64 as it deems are in the overall best interest of National Grid's customers.

Very truly yours,

Leo J. Wold
Assistant Attorney General

cc: Jennifer Brooks Hutchinson, Esq.



**STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
WARWICK, RHODE ISLAND**

DOCKET D-11-94

RESPONSE TO:

**NATIONAL GRID (NARRAGANSETT ELECTRIC COMPANY)
APRIL 19, 2012 RESPONSE TO RHODE ISLAND DIVISION
OF PUBLIC UTILITIES AND CARRIERS' REVIEW OF
NATIONAL GRID TROPICAL STORM IRENE
PREPAREDNESS, RESPONSE, AND RESTORATION
EFFORTS**

Prepared By:



Gregory L. Booth, PE, PLS
1616 E. Millbrook Road, Suite 210
Raleigh, North Carolina 27609
May 16, 2012

State of Rhode Island
Division of Public Utilities and Carriers

**STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
WARWICK, RHODE ISLAND**

DOCKET D-11-94

RESPONSE TO:

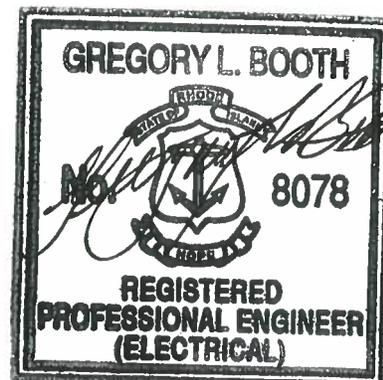
**NATIONAL GRID (NARRAGANSETT ELECTRIC COMPANY)
APRIL 19, 2012 RESPONSE TO RHODE ISLAND DIVISION
OF PUBLIC UTILITIES AND CARRIERS' REVIEW OF
NATIONAL GRID TROPICAL STORM IRENE PREPAREDNESS,
RESPONSE, AND RESTORATION EFFORTS
May 16, 2012**



Engineering & Management Services®

Engineering License No.: 5923
d/b/a Power Services and Consulting, Inc.
1616 East Millbrook Road, Suite 210
Raleigh, North Carolina 27609
Phone: (919) 256-5900

I hereby certify this document was prepared by me or under my direct supervision. I also certify I am a duly registered professional engineer under the laws of the State of Rhode Island, Registration No. 8078.



Gregory L. Booth, PE

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1. Introduction

The Narragansett Electric Company d/b/a National Grid (“National Grid” or “Company”) submitted a response to the State of Rhode Island Division of Public Utilities and Carriers (“Division”) dated April 19, 2012 (the “National Grid Response”)¹ in regard to Gregory L. Booth’s² February 2012 report on National Grid’s Storm Preparedness, Response, and Restoration Efforts (the “Booth Report”). The Company’s response addressed:

- A. System Reliability Concerns, including:
 - 1. Storm Hardening and Impact of Trees
 - 2. Engineering Analysis and NESC Standards
- B. Electric Emergency Plan (“EEP”) and After Action Reviews, including:
 - 1. Planning Scenarios and Decentralization
 - 2. Resource Coordination
 - 3. Damage Appraisal
- C. Communications and Outreach

The Company acknowledges some of the observations in the February 2012 Report prepared for the Division and details areas it is working on to improve, specifically in the areas of Resource Coordination and Damage Appraisal. National Grid’s Response also outlines areas of disagreement with the Booth Report. The following response is intended to bring some level of closure, particularly on areas of disagreement. It is essential to recognize that the review of National Grid’s Storm Preparedness, Response, and Restoration Efforts dated

¹ National Grid, Response to RIDPUC’s Review of National Grid Tropical Storm Irene Preparedness, Response, and Restoration Efforts, April 19, 2012.

² The Report was authored by Gregory Booth, PE, but the review also involved several other professionals in the firm of PowerServices, Inc., a professional engineering and management services consulting firm.

February 2012 must be placed in the context that National Grid controls not only the flow of data from a storm event, but more importantly controls the accuracy of the collection process and thoroughness of the post-storm assessment process. The Booth Report was prepared not only in the context of the data requests and information obtained from National Grid, and the completeness, or lack thereof, of the post-storm data collection and assessment but, just as important is the considerable utility response experience of the PowerServices team (See the attached experience summary for the PowerServices, Inc. team involved in the evaluation, which served as the basis for both the February 2012 Report and this May 16, 2012 Response to the National Grid's Response) involved in the report preparation and assessment of the data. The Booth Report also draws upon Hurricane Irene response information collected from other utilities along the East Coast and within the North East by an experienced team that has dealt with dozens of hurricane events, including the effects and aftermaths. This response to the Company's response will focus primarily on the areas of continued disagreement rather than re-addressing the areas of apparent acknowledgement by the Company of issues and areas in which the Company has identified that they will be taking further actions and steps for improvement.

2. Responses to National Grid Report Responses

A. System Reliability Concerns

1. Storm Hardening and the Impact of Trees

We do not believe our report significantly discounts the impact of tree failures on the outages. As it relates to more than ten years of

reliability assessments and the Company's implementation of both the feeder hardening program and its feeder reliability assessment and feeder ranking, we do find that the Company has qualified utility personnel evaluating each feeder. The Company's feeder evaluations should not be just for reliability concerns associated with animals, deteriorated equipment, and lightning, but the overall quality and ranking of the feeders which, per our understanding, has included pole strength, the amount of joint use attachers and their impact on pole strength, the overall quality of the line construction strength to withstand ice and tropical windstorms and other storm events, together with the general quality of the circuits to be in full compliance with the National Electrical Safety Code ("NESC") and the construction standards of the company based on feeder hardening and overall enhanced system reliability and feeder reliability improvement. Our comments relative to the feeder hardening program point to whether the historical programs have had sufficient and appropriate focus on the systems' ability to perform under storm conditions, including ice storms, snow storms, and tropical wind storms. To the extent that the prior programs have been deficient in these areas, and as the Company is embarking on new inspection and maintenance program processes, these issues should be incorporated. The incorporation of practices to improve system performance during storm events may drive future operating initiatives including: shorter life cycles for key pole facilities, pole inspections and maintenance, heavier and more

frequent pole guying, and the addition of a system reliability component to Vegetation Management planning.

Furthermore, based on our observations, we believe that the level of pole failures and other failures that we have seen require a level of improved post-storm assessment to clearly define whether they are due to tree failures versus other line equipment, such as insulator ties, wrap ties, preformed ties, or other system equipment failures. The simple statement by the Company, as contained on page 3 of their report³, “The Company’s interruption records show more than a 1,873% increase in the average daily number of full-tree failures caused interruptions for the four days of the storm (8/28/11-8/31/11) as compared to that same metric for all of the previous days in August of 2011 (8/1/11-8/27/11).”, is in our opinion is a 50,000 foot view of the issues rather than a detailed assessment of all of the feeder outages. We submit that useful system performance metrics can be derived as the Company commits to completing adequate post-storm assessments using data collected from this storm and future events. Our team’s experience with tropical storms and, more significantly, hurricanes, did not exhibit the level of National Grid failures seen with this tropical storm and, therefore, still leaves open the issue of failures beyond simply full-tree failures.

³ National Grid Response, at p. 3.

2. **Engineering Analysis and NESC Standards**

We continue to have concern and disagreement with the Company in this area. The Company has addressed the major transmission structure failure in its response⁴; however the Company conceded that the failed pole “was not retained for examination” and “ the Company’s usual detailed analysis of its condition and the cause of the failure could not be done”. It is our opinion that prudent utility practice would be to perform a post-transmission structure failure analysis and we would anticipate that the Company’s North American Electric Reliability Corporation (“NERC”) documentation would indicate that a company under those standards would, in fact, perform a post-transmission structure failure analysis. The transmission structure clearly failed either due to a design flaw, an installation flaw, or a maintenance deficiency. Furthermore, the transmission structure accounted for nearly 50% of the customers which were outaged. In addition, the Company stated,⁵ “...this structure was more than thirty (30) years old and may not have had all of its original strength as a result of decayed or mechanical damage such as woodpecker holes.” From the Company’s statements, this raises a concern with the maintenance efforts that have occurred involving National Grid’s transmission structures. The Company is implying that the failed structure may be beyond its reliable expected life. From a post-

⁴ National Grid Response, at p. 3-4, footnote 7.

⁵ National Grid Response, at p. 3-4, footnote 7.

storm assessment and reliability standpoint, the Company has made no indication of any efforts to address the other pole structures in this transmission line that were constructed at the same time as this failure (30 years ago) using the same materials and maintenance standards.

Regarding third party pole attachments, the Company, in its paragraph A.2. response⁶, indicates its lines meet or exceed the strength requirements of the NESC. That would certainly be the expectation and, in fact, would be customary good utility practice. However, the Company states⁷ “While the Company acknowledges that some joint-use parties do not follow the appropriate process to license and obtain approval for their attachments to the Company’s distribution poles, where that process is followed adequate pole strength is assured.” National Grid does not explain when in the process it realizes that (1) third party attachers did not follow the appropriate process, (2) what the Company does in those instances, or (3) how they quantify the magnitude of the issue. PowerServices’ experience is that in recent years (the last 10 years or so) pole attachers, particularly cable and broadband companies across the United States, have followed a typical practice of failing to obtain permits and licenses for attachments including cable overloading, and attachment to or increasing facilities on electric utility poles without the appropriate engineering assessment,

⁶ National Grid Response, at p.3.

⁷ National Grid Response, p.4.

particularly for pole strength. Our observations of the National Grid system in Rhode Island and of the failures in this storm continue to lead us to believe that appropriate make ready work has not been completed for pole attachers, thus leaving distribution lines without the customary factor of safety for pole strength. Since the Company now has an I&M program and previously had a program for evaluating each of its feeders and feeder reliability, such programs should include in their focus whether the attachers on the feeders have licenses, and if the attachments meet both the Company standards and the NESC pole strength and clearance requirements. From the Company's response, we can find no indication that the Company plans to address its joint use attachments through a system inventory and NESC pole audit process. We still take the position that unauthorized joint use attachments and upgrades, even by the Company's admission, are a condition which can exist on the system and that only in those cases where the Company's process is followed is adequate pole strength assured. As is customary in the practice and teaching of the NESC "You get what you inspect, not what you expect.", thus meaning that if you have not, in fact, inspected the attachments and continue to monitor the attachments on your poles, then you will have pole attachers without licenses reducing the NESC strength requirements of your pole lines.

B. Electric Emergency Plan (“EEP”) and After Action Reviews,

C. Communications and Outreach

I do not believe there is any need to dispute the Company’s paragraph B. or the Company’s paragraph C., since the Company recognizes there are improvements and enhancements combined with acknowledging that there are areas that require additional structure for future storm events.

3. Conclusion

We believe, based on our original report position, our current position, and the report response from National Grid, that there remains a gap in, primarily, the issues associated with NESC strength concerns. I believe that the Company’s inspection and maintenance programs and feeder reliability assessments need to include components which address the location of power lines relative to trees, the inclusion of pole attachers that have not proceeded through the appropriate licensing and “make ready” process for line strengthening, and overall line assessment and performance capability and risk in a storm event, be it a hurricane, tropical storm, ice storm, snow storm, or other severe storm event for which an electric utility system should have a degree of resiliency. Most importantly, transmission system failures should receive a comprehensive post-failure analysis in order to not only determine the failure, but to mitigate future failures and to appropriately address NERC compliance requirements of the bulk electric system. That being said, there are many areas in which the Company can be proud of its restoration successes, including the very hard work of its dedicated employees, particularly its line crews.

**ATTACHMENT
PROJECT TEAM
EXPERIENCE**

PROJECT TEAM

PowerServices, Inc. personnel have over 30 years of experience with similar system reviews and studies. Following is a sampling of a few of these system reviews and studies:

- Jersey Central Power & Light / First Energy reliability assessment for the New Jersey Board of the Public Utilities. Gregory Booth and R.L. Willoughby were the senior members of this evaluation process.
- Halifax Electric Membership Corporation ice storm, storm restoration, and performance assessment. Gregory Booth and R.L. Willoughby were the senior members of this restoration effort and evaluation process.
- Rhode Island Division of Public Utilities and Carriers reliability assessment and continued review of process. Gregory Booth was the senior member of this assessment and continued review.
- Municipal Utility Underground Consortium / Florida Public Service Commission project Docket Nos. 070231-EI, 080244-EI, and 080522-EI for storm hardening and undergrounding assessment. Gregory Booth and R.L. Willoughby were the senior members of this undergrounding assessment.
- Delmarva Power Company / PHI Virginia Jurisdiction for A&N Electric Cooperative condition assessment. Gregory Booth and R.L. Willoughby were the senior members of this condition assessment.
- Allegheny Electric Cooperative / PREA condition assessment and reliability testimony before the Pennsylvania Public Utilities Commission. Gregory Booth and R.L. Willoughby were the senior members of this condition assessment, and Gregory Booth provided the reliability testimony.
- Sandhills, LLC emergency plan and storm restoration preparedness plan preparation for the Fort Bragg Military Base. Gregory Booth was the senior member of this emergency plan and storm restoration preparedness evaluation.

PROJECT TEAM *(Continued)*

Brief summaries of the PowerServices' key project team members' experience follows. All members of the project teams are located in and work out of our Raleigh, North Carolina or Orlando, Florida business offices.

Gregory Booth, President, is a Registered Professional Engineer in over 20 states and the District of Columbia, with over 40 years experience in engineering, financial, and management services experience assisting local, state, and federal government units, municipal electric systems, rural electric and telephone cooperatives; investor-owned utilities, industrial customers and privately owned businesses, including some 300 utility clients in 38 states. He brings this wealth of experience to bear in management consulting and representing clients as an expert witness in regulatory proceedings, private negotiations, and litigation.

Specific Experience Summary

During Mr. Booth's 44 years of experience, he has been involved in the emergency response for electric utilities across many states involving the loss of power to major regions, cities and communities as a result of a varying degree of manmade causes and natural disasters. Mr. Booth led the emergency response restoration of power for the Outer Banks of North Carolina after a barge severed the Oregon Inlet Bridge on which the transmission line was attached and serving the entire Outer Banks. This included the emergency response plan arrangement for distributed generation located at each of the critical load centers and the arrangement for continual distribution of fuel while temporary transmission cable facilities were being designed and implemented. Mr. Booth provided the active engineering and implementation of emergency response after hurricane Floyd flooded dozens of substations including a 230 kV to 115 kV transmission station serving several counties. Mr. Booth's involvement included the emergency restoration plans including bringing substations back online even though in many cases there was 8 to 12 feet of water in some of these substations. This included restoration of power to customers in the City of Greenville and surrounding county, the City of Wilson and surrounding county, Town of Tarboro and surrounding county, and the City of Rocky Mount and surrounding county, just to name a few of the utility facilities impacted. Mr. Booth and his team have assessed the emergency response capabilities of numerous utilities, including Halifax EMC after a hurricane response situation and an extensive

PROJECT TEAM (Continued)

assessment including emergency response capabilities associated with Jersey Center Power and Light for the board of public utilities in New Jersey. Mr. Booth provides 24-7 engineering emergency response services to clients along the east coast, including a significant number of clients in the hurricane corridors of North Carolina and Virginia. Mr. Booth is involved with assistances with virtually all hurricane events including wind and flooding damages. Some examples of the disasters and storm and reliability assessments Mr. Booth has served an active role in include:

- *The outage and disruption of all services to the Outer Banks of North Carolina due to a barge destroying a section of the Oregon Inlet Bridge which not only carried all traffic on and off the island, but also supported the only electrical transmission service to the island. Mr. Booth was the electric utility's representative in the N.C. Emergency Management Center coordinating all resources and activities among all state agencies and utilities for the electric utility until electric service could be stabilized through the distribution of mobile generation at 6 substation sites and a temporary submerged transmission cable system.*
- *Mr. Booth coordinated the restoration of power to a large portion of eastern North Carolina after hurricane Floyd flooded not only communities and cities, but put over 12 feet of water in some transmission to transmission and transmission to distribution substations. This affected many counties and 5 large cities served by electric municipal systems, as well as many small communities served by electric cooperatives. This experience included Mr. Booth planning and designing the restoration of power to a 230 kV to 115 kV substation serving three counties while the substation still had over 10 feet of water in it.*
- *Mr. Booth has evaluated the condition of systems for reliability and storm capability in New Hampshire, New Jersey, Rhode Island, and Pennsylvania in the Northeast, Maryland and Virginia on the eastern shore, and North Carolina and Florida in the south. This experience includes projects for the Rhode Island Division of Public Utilities, New Jersey Board of Public Utilities and before the Pennsylvania Public Utilities Commission for a statewide utility. Additionally, this included the evaluation of the value of undergrounding and storm hardening for hurricane mitigation in Florida with a report presented to the Florida PSC.*
- *Mr. Booth has evaluated the storm response and preparedness of utilities in ice storm events in North Carolina, and has assisted utilities with the enhancement of their emergency preparedness, storm response, and mutual aid plans for large utility groups and joint utility agreements.*
- *Mr. Booth has experience with over 300 utility clients and Public Utility Commission clients, including work for NHPUC and reliability assessment projects for commissions and others in some 40 states.*
- *Mr. Booth prepared the initial emergency response plans and storm restoration and outage response plans submitted to Fort Bragg military base in North Carolina for Sandhills Utilities and for the Sunny Point Army Arsenal Base for the electric utility supplier.*
- *Mr. Booth is a member of the IEEE Distribution Subcommittee on Reliability and IEEE STD 1366-2003.*

PROJECT TEAM (Continued)

R.L. Willoughby, Vice-President, has over 40 years experience with operations, maintenance, and management of utility systems. He has worked with all aspects of utility operations and management, including 8 years as an electric utility director, and 7 years as a city manager. From January 2000 through December 2005, he served on the Board of Directors for two nationally recognized Joint Municipal Power Agencies, and one Joint Municipal Assistance Agency.

Specific Experience Summary

Mr. Willoughby has provided a range of consulting services to many of our clients, including municipalities, investor-owned utilities, and private sector companies regarding many electric issues. In his past experience, he served as a line foreman with an electric utility contractor, where he supervised crews of electric line workers, and held various positions working with electric utility facilities with utility entities. He has advised many of our clients on energy efficiency matters, how to best set up their facilities, including overhead and underground distribution facilities, inside the fence power supply arrangements, etc. Throughout his career, he has attended numerous seminars, short courses, and continuing education courses in electric utility engineering and management. In addition, he has obtained the following experience:

- *Mr. Willoughby served on the ElectriCities of North Carolina's Board of Directors, and in 2001 was Vice Chairman and in 2002 was Chairman of ElectriCities' Board of Directors. ElectriCities is the management organization for the two municipally owned power agencies in North Carolina, the North Carolina Eastern Municipal Power Agency (NCEMPA) and the North Carolina Municipal Power Agency 1 (NCMPA1), who are the full requirements providers for 51 municipal electric utilities in North Carolina, with a combined annual demand of 2300 megawatts. ElectriCities also functions as a Joint Municipal Assistance Agency with 90 members in North Carolina, Virginia, and South Carolina, which provides customer service, safety training, emergency and technical assistance, and government and legal affairs services to ElectriCities' members, and is also a member of the State Emergency Response Team (SERT) in North Carolina. This team insures proper flow of information to maximize resource allocation during state emergencies.*
- *Early in Mr. Willoughby's career, he constructed and installed overhead and underground electric distribution facilities, and also had to respond to power outages 24 hours a day for a one-week rotation every 4-5 weeks.*
- *His storm restoration experience has been focused on the hurricanes, tropical storms, severe thunderstorms, high winds, and ice storms outages that North Carolina experiences. He has been responsible for power restoration during all types of inclement weather in the capacity of line worker, supervisor, and manager throughout his career.*

PROJECT TEAM (Continued)

- *As City Manager of Washington, North Carolina, Mr. Willoughby was the head of the City Government when his electric utility system experienced 5 named storms. The storms were Hurricane Fran in 1996, Hurricane Bertha in 1996, Hurricane Bonnie in 1998, Hurricane Dennis in 1999, and Hurricane Floyd in 1999.*
- *The utilities Mr. Willoughby has worked for used typical budgeting guidelines for accounting of expenses. The major groupings were Administration, Support Services, Operations & Maintenance, and Capital. Within O&M and Capital budgets, the utilities further delineated between underground and overhead. When a major storm was approaching their facilities, they would sometimes set up specific cost centers for that event within the subcategories. Regardless, the utilities always had separate cost center to identify their costs for underground repairs, overhead repairs, or capital expenses for each. Although keeping exact track of labor costs in a storm restoration effort may be difficult, Mr. Willoughby feels that keeping track of the materials used in storm restoration is necessary to determine the labor involved in the restoration event by analyzing the breakdowns of materials used.*

Mike Taylor, Director of Substation & Relay Engineering is a Registered Professional Engineer with an MBA and 39 years experience in engineering, operations, maintenance and management of electric utility systems. He has worked with one investor-owned utility, one electric cooperative, and two municipal electric systems, in addition to being a consultant for dozens of cities and other utilities. He has been responsible for the design/construction of 38 new or major modification substation projects, and for the operation and maintenance of 47 substations through his 18 years of electric utility employment.

Specific Experience Summary

Following is additional experience Mr. Taylor has performed involving storm restoration and assessments:

- *Mr. Taylor has worked on storm restorations during at least 7 major storms and multiple smaller storms at Duke Power Company, City of Gastonia, Davidson EMC, and City of High Point.*
- *Mr. Taylor participated as part of a team in development and implementation of emergency preparation plans at Davidson EMC and City of High Point, two of the larger electric utility systems in North Carolina.*
- *Mr. Taylor has prepared 15 Long Range Planning Studies for various municipalities and cooperatives, as well as multiple sectionalizing studies.*
- *Mr. Taylor has designed about 20 substations, in addition to multiple transmission and distribution lines.*
- *Mr. Taylor participated as part of our corporate team that performed the condition assessment and valuation of Delmarva facilities in Virginia.*
- *Mr. Taylor was also responsible for developing and administering the O&M program at two electric utilities.*

PROJECT TEAM (Continued)

Lloyd Shank, Jr., Senior Project Manager, is a Registered Professional Engineer in North Carolina and Florida and manages our Florida offices with 36 years experience in engineering, design, and management experience. As a utility director in High Point, N.C. he was responsible for management, engineering and operations for over 50,000 utility accounts. He also has experience with supervising distribution, transmission, and substation maintenance and testing, as well as with managing storm recovery and system planning projects. As a utility director Mr. Shank managed the installation and integration of two successful demand load management systems. Mr. Shank has experience in evaluating the green house gas mitigation of various alternative energy resources. Mr. Shank recently provided seminars on insulation coordination and arc flash to the FMEA E&O Workshop, and recently contributed an article on electric system planning in the January 2010 issue of Relay magazine. Mr. Shank is a former President of FMEA, and served on the Board of Directors and the Risk Oversight committee of FMFA.

Specific Experience Summary

Mr. Shank lived in New Hampshire in 1968. As an Electric Utility Director for thirty years he has experienced, directed, and managed the response to two tornadoes, four hurricanes, several major ice storms, and multiple large wind storms. The following further identifies Mr. Shank's experience with storm restoration efforts:

- *Mr. Shank was honored by a Resolution of Appreciation by the City of Washington Park, NC and was given the Sterling Award by the City of Leesburg, FL for his work in reducing the affect and number of outages and for an expeditious response to restoration of power.*
- *In Mr. Shank's position as the Director of Electric and Gas Utilities in Leesburg, FL, he managed the mutual aide response and recovery of natural gas to 3000 homes in the City of Leesburg within less than a week after an itinerant contractor struck a four inch, 6000 pound pressure gas line.*
- *In addition to a record of expeditious recovery of utility services his record also shows that there has never been a recordable accident during the recovery of any of the emergencies he has directed.*
- *Mr. Shank has attended FEMA training in the "incident command system" of approaching the management of emergencies, and has directed and participated in the preparation of Emergency Operating Plans for the City of High Point, NC and the City of Leesburg, FL, along with representing his departments in the planning of their response just before major storms arrived.*
- *As a member of the Board of Directors and as President of the Florida Municipal Electric Association, he participated in review of the multiple mutual aide agreements between municipal, investor owned, and electric cooperative utilities across the State of Florida.*

PROJECT TEAM (Continued)

- *During his tenure as President of the North Carolina Association of Municipal Electric Systems (NCAMES), he participated in writing the mutual aide agreement adopted by all of the 72 municipal electric systems in North Carolina. This was the first statewide agreement between cities to render mutual aide. One of the unique features of the agreement was the establishment of both eastern and western state emergency coordinators and backup coordinators. These voluntary positions provided a single source of contact for cities wishing to receive additional aide and a single coordinator of the distribution of aide. In severe storms, these positions also serve to contact contractors and personnel in other states to come to the aide of systems experiencing emergencies.*
- *Mr. Shank also served on the Board of Directors of ElectriCities of North Carolina when they extended their mutual aide agreement to one of the state's major investor owned electric utilities. The result was that cities were able to send aide to the investor owned utility when they were overwhelmed with a hurricane.*
- *In addition, Mr. Shank served as the western North Carolina coordinator for over ten years. During that time, he coordinated assistance to two hurricanes affecting eastern North Carolina and several ice storms in western North Carolina.*

Mike Jenkins, Senior Project Manager, is a registered Professional Engineer in several states with 29 years of experience working with electric utilities in nearly all aspects of power system engineering, system operations and utility management. His involvement with utilities across the nation has provided a wide ranging perspective of E&O practices, power supply issues and Smart Grid Challenges. This experience proves to be a fundamental asset as he routinely provides instruction to fellow industry personnel and leaders through training classes and publications. He received his Bachelor of Science Degree in Electrical Engineering from Clemson University, Clemson South Carolina. He is a member of IEEE – PES, National Society of Professional Engineers, Clemson University Power Engineering and Research Association and Professional Educators of Technical Colleges.

Specific Experience Summary

- *District Area Supervisor for Post Katrina storm assessment for Entergy Corp in Louisiana.*
- *Consulting Services to the Oklahoma Electric Cooperative Association for Post Ice Storm Assessment and FEMA reimbursement procedures – 2007*
- *Consulting services to Colorado Association of Electric Cooperatives and Louisiana for storm emergency restoration procedures, system strengthening plans.*
- *Project Manager for post storm assessment, safety audit and FEMA reimbursements at Kenergy, Kentucky following the 2008 major ice storm.*
- *Project Manager for the post ice storm system assessment, line construction design and repairs and FEMA reimbursements for Hawkeye REC, Iowa.*
- *System strength evaluation and hardening evaluation of Florida Electric Keys Cooperative following the 2005 hurricane season.*

PROJECT TEAM *(Continued)*

- *Storm Emergency manager for all outage restoration efforts and post storm activities at Blue Ridge EC, SC.*

Micheal White, Senior Project Manager, is a registered Professional Engineer in several states with 15 years of experience working with electric utilities in nearly all aspects of power system engineering and utility technology. His involvement with utilities across the nation has provided a wide ranging perspective of E&O practices, Smart Grid Challenges, and utility management. He received his Bachelor of Science Degree in Electrical Engineering from Clemson University, Clemson South Carolina. He is a member of IEEE, National Fire Protection Agency, and Clemson University Power Engineering and Research Association.

Specific Experience Summary

Mr. White has been involved in over two dozen storm events, including ice, wind, and hurricanes.

- *Experience with outage management systems*
- *Has worked with crews, organized outages from hand and using OMS software*
- *Has created FEMA storm damage reports, worked in the capacity of crew bird dog, and provided subsistence for crews*
- *Has coordinated bird dogs (field coordinators) and organized communications effort*