

April 19, 2012

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Clerk
Rhode Island Division of Public Utilities and Carriers
89 Jefferson Boulevard
Warwick, RI 02888

**RE: Docket No. D-11-94 – Review of National Grid Tropical Storm Irene Preparedness,
Response, and Restoration Efforts
National Grid Response**

Dear Ms. Massaro:

Enclosed are five (5) copies of National Grid's¹ response to the Rhode Island Division of Public Utilities and Carriers' Review of National Grid Tropical Storm Irene Preparedness, Response, and Restoration Efforts dated February 2012.

Thank you for your attention to this transmittal. If you have any questions, please feel free to contact me at (401) 784-7288.

Very truly yours,



Jennifer Brooks Hutchinson

Enclosures

cc: Leo Wold, Esq.
Steve Scialabba, Division

¹ The Narragansett Electric Company d/b/a National Grid (referred to herein as "National Grid").

National Grid

The Narragansett Electric Company

**Response to Rhode Island Division
of Public Utilities and Carriers'
Review of National Grid Tropical
Storm Irene Preparedness,
Response, and Restoration Efforts**

April 19, 2012

Docket No. D-11-94

Submitted to:
Rhode Island Division of Public Utilities
and Carriers

Submitted by:
The logo for National Grid, featuring the word "national" in a light blue sans-serif font and "grid" in a darker blue sans-serif font.

INTRODUCTION

The Narragansett Electric Company d/b/a National Grid (“National Grid” or “Company”) submits the following response to the Rhode Island Division of Public Utilities and Carriers’ (the “Division”) Review of National Grid Storm Preparedness, Response, and Restoration Efforts dated February 2012 and prepared by Gregory L. Booth, PE, PLS of Power Services (the “Booth Report”) as part of the Division’s review in this proceeding. In his report, Mr. Booth makes several findings and recommendations with respect to the Company’s preparedness and storm response. This response will address three significant areas of concern identified by Mr. Booth. First, Mr. Booth questions the Company as to “why the system did not perform better under a tropical storm event with relatively low wind speeds” and refers to the Company’s “Storm Hardening” program that was implemented as part of the Company’s reliability enhancement process.¹ Second, Mr. Booth asserts that the Company’s Electric Emergency Plan (EEP) was an ineffective tool during storm recovery planning and preparation, and that the Company should have been better prepared given the advance notice of the storm’s path and projected strength.² Last, Mr. Booth makes certain recommendations regarding the Company’s external communications.³ This response will discuss the improvements that the Company has made to its outreach efforts following Hurricane or Tropical Storm Irene (“Irene” or the “storm”).

The Company appreciates the opportunity to review and respond to the Booth Report, and takes seriously Mr. Booth’s findings and recommendations. As further discussed below, the Company continues to implement certain initiatives resulting from its After Action Reviews (“AAR”) in the wake of Irene.

COMPANY RESPONSE

A. System Reliability Concerns

The Booth Report makes several findings and draws many broad conclusions regarding the strength and reliability of the Company’s distribution lines and structures under tropical storm wind forces. However, the Booth Report does not take into account the length of the storm and the sustained duration of wind, or the impact that trees had on the distribution line failures and pole damage. This section of the response will address those concerns.

1. Storm Hardening and Impact of Trees

Mr. Booth asserts that the Company implemented a “Storm Hardening Program” as part of its reliability enhancement process, and he further questions why, given the dollars expended on that program, did the electric distribution system not perform better in a tropical storm event with relatively low wind speeds.⁴ The Company’s Feeder Hardening Program is designed to address reliability concerns due to animals, deteriorated equipment and lightning; however, this program

¹ Booth Report, at p. 70.

² Booth Report, at pp. 35, 42.

³ Booth Report, at pp. 62-63.

⁴ Booth Report, at p. 70

is not intended to address worse case scenario storm events as described in the Booth Report. Although Mr. Booth gives considerable attention to wind speed in his report, there is very little discussion regarding the duration of those winds or the impact that trees had on the extent of the damage to the Company's structures. Although Irene was downgraded from a hurricane to a tropical storm, it, nonetheless, maintained enough strength to cause significant tree damage. The storm remained over Rhode Island throughout the day, with sustained winds of 37 mph and gusts up to 83 mph. The lengthy duration of these strong winds along with average rainfall amounts of 2-4 inches, which caused saturated soils, created favorable conditions for a relatively high incidence of full tree failures. Many healthy trees were tipped over at the root/soil interface point, resulting in blocked roads, damaged homes and numerous broken utility poles, cross arms and conductors. The photographs in Appendix A of this response taken at Rome Avenue, Providence illustrate two significant tree failures that caused damage to the Company's electric distribution poles and equipment, and gas main system. 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).

2. Engineering Analysis and NESC Standards

Mr. Booth further asserts that the Company's damaged facilities were not designed to appropriate reliability standards, and that the facilities should have been designed and maintained for worst case conditions beyond tropical storm wind forces.⁵ The Company's construction standards and design practices ensure that the Company's lines meet or exceed the strength requirements of the NESC. The Company's distribution construction standards make conservative assumptions about conductor sizes, line angles, equipment weights and sizes and joint user attachments. This ensures that all distribution poles meet NESC strength requirements and that most distribution poles exceed those requirements. The Company's transmission design practices include all NESC strength requirements and other design cases, which supplement the NESC.

As a result of Irene, the Company replaced 207 poles. This is less than 0.07% of the more than 300,000 poles in Rhode Island. Most of the failed distribution poles were related to tree damage.

The Company disagrees with the conclusions in the Booth report that the failures experienced in the Company's distribution system stem from "insufficient engineering design standards, construction practices, or maintenance and system replacement or rehabilitation standards anticipated by the NESC."⁶ The Company's experience during Irene, as in other major weather events, was that most of the distribution line damage resulted from fallen trees and limbs or other flying debris, and not because of insufficient engineering design.⁷

⁵ Booth Report, at p. 47.

⁶ Booth Report, at p. 48

⁷ The Company acknowledges that one transmission structure failed under assumed winds of 50 mph during Irene, and that this failure occurred at loads well below the design loads for the structure. This transmission line structure, on the L14 line, is the only known failure during the storm that was not related to tree damage. In this case, the structure design met all of the Company's design requirements as well as those of the NESC. The actual conditions

In support of this broad assertion of insufficient engineering design standards, the Booth Report relies on a photograph of a broken distribution pole.⁸ Based on this photograph, Mr. Booth concludes that "it is obvious the damaged facilities . . . were not designed, constructed, and maintained to proper industry standards."⁹ The pole shown in this photograph was broken by the impact of a tree on the wires of the line, and not by the wind force exerted on the poles and wires. The tree was near or behind the position from which the photograph was taken, and may not have been readily apparent from this photograph. The conductors normally rest on top of the insulators on the cross arm and at the top of the pole, and are held on the insulators with tie wires that are tied around the top of the insulator and along the conductors in either direction from the insulator. This arrangement holds the conductor to the top of the insulators for all design conditions. The fact these tie wires can break under the impact of a tree is neither a design deficiency nor an installation deficiency. One of the three wires at the top of the pole is still attached to the pin insulator; one wire has pulled off its supporting insulator and one wire was broken, but is not visible in the photograph. This type of damage is consistent with a fallen tree, and not with a failure caused by high winds. The photographs in Appendix A further illustrate the type of damage caused by fallen trees. These unquantifiable stresses associated with the impact of trees are beyond the scope of routine design.

The Company agrees with Mr. Booth's description of the NESC strength requirements and agrees that these requirements apply to poles with all the attached equipment, including those of third parties.¹⁰ The Company's distribution construction standards already include conservative assumptions about conductor sizes, line angles and equipment weights and sizes, including those of common third party attachments. A shared responsibility model is used to identify the effects of an additional attachment to an existing pole when that pole is jointly owned with Verizon. The Company and Verizon jointly identify the full scope of make ready work required to allow another attachment to the pole. Clearance, strength and pole condition are included in the Company's process to ensure all NESC requirements are met when identifying required make ready work. 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.

during the storm, to the extent known, did not exceed the structure design conditions. However, this structure was more than thirty (30) years old and may not have had all of its original strength as a result of decay or mechanical damage such as woodpecker holes. Because the failed pole was not retained for examination, the Company's usual detailed analysis of its condition and the cause of the failure could not be done. While the Company agrees that there was a strength issue with this pole as it existed in the field at the time of the storm, the Company does not believe that this indicates any issue with the design of the structure.

⁸ Booth Report, at p. 49, Figure 11.

⁹ Booth Report, at p. 48.

¹⁰ Booth Report, at p. 49-50.

B. Electric Emergency Plan (EEP)¹¹ and After Action Reviews

In his report, Mr. Booth asserts that the Company's EEP is so general and non-specific that it does not serve as a useful tool during storm planning or storm recovery. The EEP is intended to be a high-level, tactical document, not an operational field guide for local service personnel as the Booth Report suggests. In his report, Mr. Booth notes several deficiencies with the EEP, including the lack of planning scenarios to prepare for the challenges created by an incident on the magnitude of Irene, the lack of coordination required to address widespread outages, the lack of a true decentralized storm management organization, and an inadequate damage assessment process.¹² This section of the response addresses these concerns.

1. Planning Scenarios and Decentralization

The incident classification levels described in the EEP include preparation for an incident on the magnitude of Irene, as well as procedures to decentralize and manage distribution system recovery in the local service units. For example, incident classification level 5 includes any restoration that may last more than 72 hours, and the EEP describes a procedure for decentralization to the substation level, which is typically considered the most localized response organization in the industry. The EEP also incorporates, by reference, the Company's SRP, which presents a scalable approach to storm events based upon the type, severity, and impact, and allows more information to be available to management as the event unfolds.

2. Resource Coordination

The Company agrees with Mr. Booth's findings and recommendations with respect to procuring additional restoration resources, and has already taken steps to address these concerns. As part of its AAR, the Company is in the process of implementing certain initiatives to improve its level of preparedness for future storm events, which includes reaching outside of the Company's traditional resources as follows:

- a. The Company has been expanding relations with line contractors based outside of the Northeast and Eastern Coast Regions. This effort is intended to provide additional sources of restoration crews in the future.

¹¹ The Company has revised the name of the EEP to Emergency Response Plan; however, to maintain consistency with the Booth Report, this response continues to refer to the plan as the EEP.

¹² The Booth Report also noted two deficiencies with respect to the Company's new US Strategic Response Plan ("SRP") dated June 17, 2011 and the implementation of the Company's System Response Team ("SRT"). The first deficiency is that the EEP is not tied to the SRP. See Booth Report, at p. 35-36. This was an oversight and has since been corrected in the EEP. The second deficiency is that the Company failed to implement the System Response Team ("SRT") as provided in the Company's SRP, which Mr. Booth asserts, "denied National Grid of the wisdom and experience of top [C]ompany leaders." See Booth Report, at p. 36. However, fourteen of the fifteen core members of the SRT were fully engaged during Irene. Five of the six expanded team members were also engaged. These SRT members were at the Northborough EOC throughout the storm. As such, it was not necessary to formally convene an SRT.

- b. The Company is collaborating with Electric Edison Institute and the Mutual Assistance Groups to identify improvements and document processes involved in expanding Mutual Assistance requests outside of the Regional Mutual Assistance Groups.

3. Damage Appraisal

In his report, Mr. Booth asserts that the Company's damage appraisal process did not adequately scale to assess damage created by the storm, and damage assessments were not completed within the timeframes planned for in the Company's EEP.¹³ He also asserts that inefficiencies with the damage assessment process led to delays in the communication of estimated restoration times and ineffective crew deployment.¹⁴

Damage appraisal / assessment is not a singular process for the Company and the process was not executed as such during Irene. The process of damage assessment, as described in the Booth Report, is not a limiting factor to the deployment of crews and / or the preparation of Estimated Times of Restoration ("ETR").

During the early stages of system evaluation, multiple avenues are utilized to provide insight into the damage and the deployment of resources. Field resources often provide feedback on damage while doing initial make-safe activities and responding to the most critical calls. The Company also deploys aircraft for evaluation of damage, beginning with the transmission and sub-transmission facilities, with transmission being the first step in restoration priority. The Company deploys crews based on a restoration model of feeder priorities, and the cities and towns priority requests from the municipal rooms and our community liaisons in the field. Based on these initial reports regarding the type and estimated amount of damage, high level ETRs are developed. The Company acknowledges that this is an area that requires additional structure for future storm events, and the Company is undertaking steps to improve this process. Additionally, the Company acknowledges that it did not timely complete damage assessments of the phase 1 feeder evaluations and the phase 2 taps off of the mainline in accordance with the EEP, as noted in the Booth Report, and the Company is taking steps to address these deficiencies as part of the Company's AAR following Irene and the October Snow Storm. Certain key changes are as follows:

a. Initial Survey of Damage

The Company plans to employ a statistical sampling approach based on geographical areas rather than circuits. Once a specific amount of data is available to extrapolate the damage to an area, the Company believes this will provide a better initial ETR. The Company is currently evaluating how many resources by area will be required, and comparing that demand to the number of available resources. The Company plans to locate external resources to appropriately scale the efforts based on the area impacted. The Company has a

¹³ Booth Report, at p. 44.

¹⁴ Booth Report, at pp. 45, 56-57.

modified version of this process in place for incidents in the near future, and expects to have a robust process model for deployment in June of 2012.

b. Damage Assessment Improvement

The Company is reviewing by survey the skill sets of employees with damage assessor storm assignments, and is making adjustments to ensure that there is optimal alignment between skill sets and damage assessment responsibilities. This is also being scaled against recent storm events to determine the gap in resources, and the Company plans to implement external resources as part of this initiative. The Company will also implement training to enhance the skills set of these resources.

c. Twenty-four Hour Assessment Activities

The Company has adopted a plan that will allow damage assessment activities to take place around the clock for future storms. It will be done as conditions permit in order to ensure a safe execution of the resources.

C. Communications and Outreach

The Company continues to expand its partnerships with all levels of state and local government to better serve its customers during emergency events. Some of these initiatives are as follows:

1. National Grid Senior Leadership has established a quarterly meeting with State and RIEMA leadership to review the Company's storm preparation plan and readiness.
2. The Company is working with its local communities, including public works and First Responders, to establish five or six Regional Zones with dedicated National Grid, state, and local crews that will be dedicated to clearing roadways of any electrical hazards. This collaborative effort will expedite the opening of roadways to allow emergency personnel to respond to any public safety issues.
3. The Company is conducting town-by-town meetings throughout the year with local officials on storm/emergency response.
4. The Company has hosted three annual meetings with First Responders all across the state to review its "Blue Sky" day emergency procedures and its storm response.
5. The Company is working on developing a formal First Responder training program for gas and electric emergencies and expects to roll out this training in mid-2012.
6. The Company will assign Community Liaison's to communities during major storm events to provide specific community updates on critical restoration efforts and overall ETRs. These individuals will be provided with electrical distribution maps

that will help tell the story of what is happening and what needs to be done in each city or town.

CONCLUSION

Although Irene was downgraded from a hurricane to a tropical storm, it was nonetheless a historical and unprecedented major weather event in Rhode Island. The Company is proud of its restoration successes noted in the Booth Report, and acknowledges that there are areas for improvement. The Company continues to do what it can to improve upon its preparedness and restoration efforts for future storm events. The Company looks forward to continuing to work with the Division and other stakeholders to implement these improvements for future storms.

APPENDIX A

**PHOTOGRAPHS OF TREE DAMAGE
ROME AVENUE, PROVIDENCE, RI**



