



THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 09-01-A

Report of
Unitil/Fitchburg Gas and Electric Light Company
on the
2008 Winter Storm

Volume I: Report

February 23, 2009

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I. INTRODUCTION

Fitchburg Gas and Electric Light Company ("FG&E" or the "Company") hereby files its Report on the 2008 Winter Storm as directed by the Massachusetts Department of Public Utilities (the "Department") in its Order to Open Investigation in D.P.U. 09-01. Section I of the Report provides an overview of the Report and a procedural background. Section II includes descriptions of the 2008 Winter Storm, FG&E's electric facilities and the impact of the storm on the Company's electric system. Section III provides responses to the specific requests for information posed by the Department regarding FG&E's planning and response for the 2008 Winter Storm.

A. Overview

1. Unitil's Response to the 2008 Ice Storm

The December 2008 ice storm ("2008 Ice Storm") was unprecedented in its impact on New England, on Unitil Corporation's ("Unitil") electric system, and on our customers.¹ The storm damaged the Company's electrical system in Massachusetts and New Hampshire far beyond anything Company management or the crews involved in the restoration had ever seen before. The electrical system has been restored, with entire sections having been rebuilt in a matter of days, but some customers who lived through

¹ Unitil Corporation ("Unitil") is a public utility holding company. Unitil's principal business is the local distribution of electricity and natural gas throughout its service territory in the states of New Hampshire, Massachusetts and Maine. Unitil is the parent company of three wholly-owned distribution utilities: i) Unitil Energy Systems, Inc. ("UES"), which provides electric service in the southeastern seacoast and state capital regions of New Hampshire, including the city of Concord, New Hampshire, ii) Fitchburg, which provides both electric and natural gas service in the greater Fitchburg area of north central Massachusetts, and iii) Northern Utilities, Inc. ("Northern Utilities"), which provides natural gas service in southeastern New Hampshire and portions of southern and central Maine, including the city of Portland and the Lewiston-Auburn area. In addition, Unitil is the parent company of Granite State Gas Transmission, Inc., an interstate natural gas transmission pipeline company that principally provides interstate natural gas pipeline access and transportation services to Northern Utilities in its New Hampshire and Maine service territories. Together, Unitil's three distribution utilities serve approximately 100,300 electric customers and 69,300 natural gas customers.

the experience and felt frustrated with the Company continue to express their dissatisfaction. Unitil is committed to providing its customers with safe and reliable service. As described herein, Unitil is proactively reviewing its practices and procedures to record lessons learned from the 2008 Ice Storm and implement changes to ensure timely restoration of service and effective communications in future major storms.

2. Unprecedented Damage to Unitil's System

On December 11, 2008, a destructive ice storm devastated portions of New England and New York State. Over two inches of rain fell in an unusually broad geographic region of subfreezing temperatures, resulting in ice accumulations of as much as an inch or more on utility poles, tree limbs and branches. The weight of the ice caused limbs and sometimes whole trees to come crashing down onto large portions of Unitil's electrical infrastructure – snapping utility poles in half, knocking down electrical lines and tearing meters from homes.

President Bush issued emergency declarations for Massachusetts on December 12, 2008, and January 5, 2009, and for New Hampshire on December 13, 2008, and January 2, 2009. Disaster declarations were declared by both Governor Patrick in Massachusetts and Governor Lynch in New Hampshire. Emergencies were declared by a total of 88 communities in Massachusetts. Municipal officials and employees, including police and fire department, the National Guard and other first responders all contributed to the storm response effort.

The damage in large areas of Massachusetts and New Hampshire was unprecedented: an estimated 1,200,000 electric customers across the Northeast were affected. While many utilities were affected, the communities in North Central

Massachusetts and Central and Western New Hampshire were particularly hard hit. Unitil was among the hardest hit of all utility systems in the region, as the 2008 Ice Storm caused widespread outages in all three of the company's electric services areas: at the peak, power was disrupted to nearly two-thirds of the company's customers, including 41,000 in New Hampshire and all 28,500 of Unitil's customers in Massachusetts. The map below shows the percentage of customer outages by town for Unitil's three services areas.

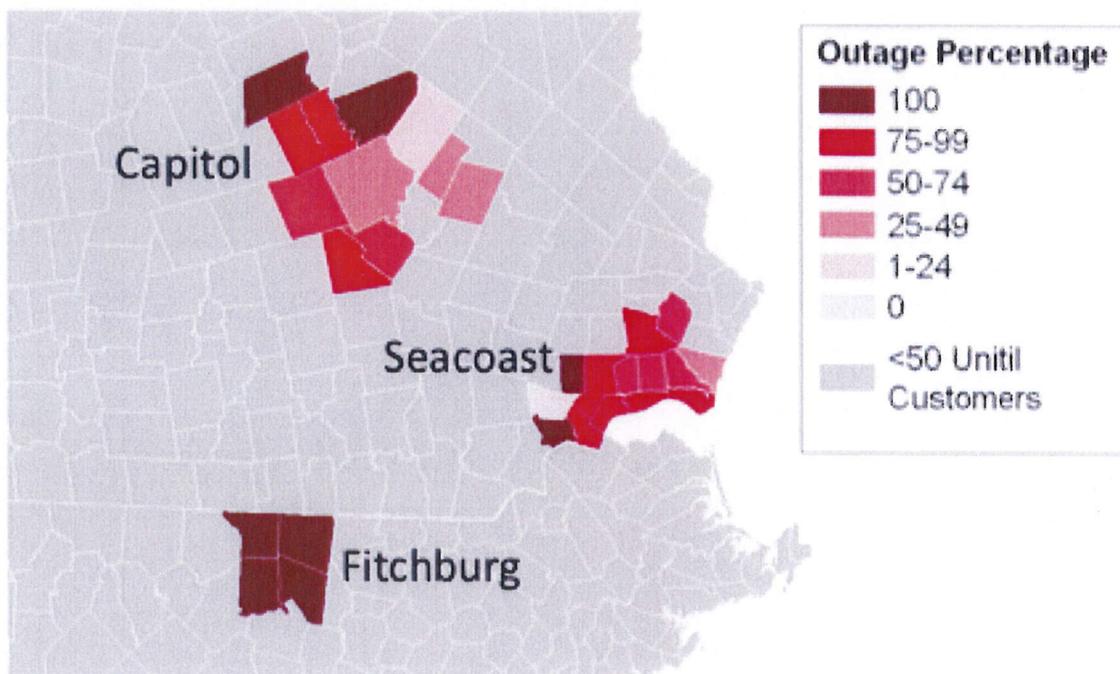


Figure 1.

The reports of customer outages on December 11 and 12 was an early indicator of the extent of the damage to utility systems in the region, but only as the effort to assess damages began did the extent of the damage to all components of the electrical system become apparent. Damage occurred on transmission and sub transmission lines, primary and secondary circuits and individual services. Such widespread damage distinguishes this storm from prior storms. In some cases, whole segments of the electrical system

were demolished and needed to be rebuilt in a matter of days. Rather than a handful of individual services needing repair at the end of the restoration effort, thousands of individual services needed to be repaired. Many customers also needed the service of an electrician to repair customer-owned equipment. A full description of the 2008 Ice Storm and its impact is provided in Section II of this Report.

3. Resources: Limited Availability of Crews

Unitil, like all utilities, maintains a complement of full-time, year-round workers sufficient to maintain normal operations. In the case of an emergency or disaster, Unitil supplements those workers with contractors or personnel from other utilities. These mutual aid protocols were followed for the 2008 Ice Storm, but the demand for outside resources across the region was extraordinary – there were simply not enough trained and equipped utility workers available to assist all the region's utilities with restoration efforts. For example, on an initial post-storm conference call, the New England Mutual Aid Group ("NEMAG") requested more than 500 crews – but only approximately 100 were available in New England. The NEMAG later coordinated additional resources through other mutual aid groups outside the New England area, including the New York Mutual Aid Group (NYMAG) and the Mid-Atlantic Mutual Aid Group (MAMAG) which provided needed resources to Unitil and other New England utilities.

Unitil repeatedly sought additional crews through the restoration period, but was unable to obtain firm commitments for sufficient resources until Friday December 19, when National Grid agreed to release a contingent of 40 contract crews for work the following day. On Saturday, December 20, the Governor of Massachusetts, the Chair of the Department and other state officials called Unitil and asked what resources were

needed to further assist in the restoration process. Additional resource commitments, including additional transmission crews, supplemental utility crews with management personnel and support services including supply chain personnel, damage assessors and service trucks, were secured later that day from National Grid. Section III.A.2(c) of this Report provides a full description of the deployment of crews and personnel during the storm.

4. Results: Time-Consuming Restoration

Given the enormous effort required to rebuild the system, the resources available to the Company, and the need to address transmission and main distribution lines first, the progress from the perspective of some customers and area public officials was painfully slow. The chart below shows for FG&E's service areas the pace of restoration that was achieved. The left-hand scale shows the number of customers out of service, while the right-hand scale shows the number of crews available for the restoration effort.

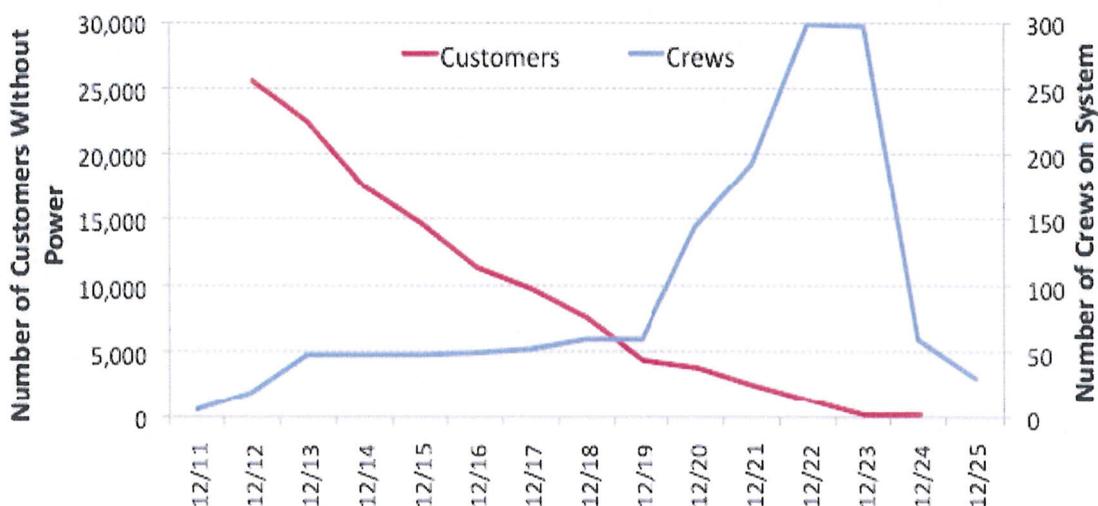


Figure 2.

In most restoration efforts, the customer outage curve typically drops off much faster and then flattens out as initial efforts to repair transmission lines, substations, and main distribution lines restore power to large numbers of customers. However, this storm

required substantial repairs to restore the main lines, as shown above in the first week of the restoration effort, followed by efforts to repair and restore many smaller circuits and numerous individual customers. This continued and sustained effort to reduce customer outages in a straight-line pattern during the second week was made possible by the substantial increases in the number of crews after December 20.

The Company completed restoration of the last known individual service on December 25 and also responded to scattered new outages caused by a wind storm which affected the region on Christmas day. Like the devastation the 2008 Ice Storm left in its wake, the work required to restore power to all of Unitil's service territories was unprecedented; at the conclusion of the Massachusetts restoration effort, the workforce deployed in that territory was nearly ten times larger than the workforce deployed in the most destructive prior storm, the 1996 snow storm that devastated North Central Massachusetts and resulted in outages of one week. In total, Unitil had to repair or replace a significant amount of its electrical infrastructure.²

5. Communication: An Expanding Information Gap

The damage from the 2008 Ice Storm was unprecedented and so was the demand for information from customers and the public. At times throughout the outages, Unitil's telephone system at Unitil's Call Center in Concord, New Hampshire (the "Call Center"), including its Integrated Voice Response System ("IVR") that provides tailored storm-messaging capability, was challenged with respect to its capacity to handle the

² Over 36 miles of new wire was installed in less than two weeks in order for FG&E to fully recover from the storm. And yet, this represents only a small portion of the wire downed and requiring repair, as most of the wire taken down by falling trees during the 2008 Ice Storm was spliced and reinstalled. In total, Unitil estimates that 150 to 200 miles of its roughly 500 miles of overhead lines were downed during the storm.

overwhelming number of calls coming in from all three service areas. As the days wore on, customers wanted more detailed information and they increasingly wanted to talk to a customer service representative ("CSR") rather than hear a recorded message. Customer anxiety and frustration increased, leading to longer call handle times and an increased number of escalated calls requiring supervisor involvement. Customers also increasingly demanded information the Company could not provide, such as when their service would be turned on and when a crew would be coming to their street and house. The table in Section III.A.6(a) shows how Unitil's Call Center was inundated for the duration of the Storm.

A number of customers were unable to reach the Call Center, and there was dissatisfaction with the information available. Customers began to call any of the Unitil telephone numbers, including administrative offices and Distribution Operating Centers ("DOC") to try to get information. Customers also began appearing at the Company's facilities seeking information and, in some cases, demanding that their power be restored. All available professional or administrative personnel at Unitil were recruited to provide supplemental customer services, both at the Call Center and at the various Unitil locations. Frustrated customers also turned to local emergency and public officials seeking information they could not get from Unitil.

Unitil's communication efforts were also compromised by the difficulty of providing accurate estimated restoration times. As the initial damage assessment was being performed and the extent of the damage became apparent, Unitil's focus shifted to power restoration. However, as the restoration proceeded and repairs to secondary lines and individual services proved to be more extensive and time-consuming than initially

estimated, the estimated restoration times increased. This led to customer confusion, anxiety and a loss of confidence in the information being provided by Unitil.

Rumor control also proved to be a significant problem for Unitil during the restoration process. Every effort was made to immediately dispel incorrect or misleading information, whether it came to us from customers, public officials or the media, but the problem persisted and compounded the difficulties of communications.

6. Lessons Learned: Changes for Addressing Another Unprecedented Storm

Despite the significant and sustained efforts of Unitil employees and the outside crews that assisted in the restoration, we understand why some customers and public officials are not satisfied with the length of time it took to restore power after the 2008 Ice Storm. In addition, we are well aware that our communication procedures and information led to significant frustration and, in some cases, to a loss of trust. To help us understand what we can do better, Unitil engaged Robert C. Yardley, former Chairman of the Department, to help conduct an internal self-assessment of our restoration plans and efforts. While that assessment and the lessons learned will not be complete for a few more weeks, in this Report Unitil has identified areas where our policies, practices and procedures should be changed to enhance our ability to meet major storms in the future. As more fully described in Section III.A.11, these changes and enhancements will be in the following areas:

Storm Readiness include activities throughout the year that serve to prepare Unitil and the electric transmission and distribution system for a significant storm, including the Emergency Restoration Plan ("ERP"). There are several modifications to storm readiness

practices that Unitil is currently addressing. The overriding objective is to modify the ERP to handle a storm of the magnitude of the 2008 Ice Storm. The effort to modify the ERP has already begun. Although Unitil believes that its capital and maintenance expenditures, as well as the more specific tree-trimming and pole maintenance/replacement policies are adequate, it will review these practices with the state regulatory authorities and local communities.

Storm Preparations and Restoration include activities that prepare Unitil to respond to an impending storm, coordinate the mobilization of necessary resources, including outside crews if needed, perform initial and detailed damage assessments and restore power. Practices that will be addressed based on the experience gained during the 2008 Ice Storm include the approach to retention of outside crews, organization of logistics support activities, early and more detailed damage assessment, estimating total crew days likely to be required, preparing crews for the following day's activities, and communications between crews in the field and storm restoration managers.

Public Communications include the processes used to communicate with the media, elected officials, and other public officials during a significant outage. Unitil believes that changes must be made in how it communicates with the general public, and elected and other public officials, including how it uses the media to do so. The quality of information that is relied upon in these public communications must also be enhanced. In at least one respect, by establishing an Emergency Information Center ("EIC"), changes have already been implemented during the preparations for two storms in January, 2009.

Customer Communications include Call Center operations and public outreach. The frequency of public communications and the quality of information affected the performance of the Call Center as the number of customers trying to get through to a CSR placed extraordinary stress on the call-handling capacity of the Call Center and on the representatives handling the calls. Unitil will be proposing changes that increase the ability of the Call Center to handle a spike in the number of incoming calls. Since the storm, Unitil has expanded the number of phone lines in the Call Center from 72 to 120, in accordance with a plan devised in preparation for the addition of Northern Utilities.

Unitil's commitment to service, reliability, customer satisfaction and corporate citizenship includes a commitment to institute the changes that are needed to provide exemplary performance in restoring power and communicating with customers in major storm events in the future. Unitil welcomes the Department's guidance and direction in this effort.

B. Procedural Background

On January 7, 2009, pursuant to its supervisory authority under M.G.L. c. 164, §76, as well as its authority to establish service quality standards and to review service quality performance by electric utilities under M.G.L. c. 164, §1E, the Department initiated this proceeding to investigate the efforts by the Commonwealth's four electric utilities to prepare for and restore power after the 2008 Ice Storm. Specifically, in its Vote and Order to Open Investigation, the Department stated that the purpose of the investigation is to "evaluate the adequacy of the Electric Companies' storm response/emergency restoration plans, examine each company's implementation of its

plan, and identify improvements to company activities to mitigate the impact of future storm-related outages."

The Department stated that its inquiry would focus on the following topics: (1) content and adequacy of company storm response/emergency restoration plans; (2) preparation for and management of the restoration efforts with respect to the service disruptions caused by the 2008 Winter Storm; (3) the degree of inter-company cooperation with respect to storm preparation and response, including the sharing of response crews, damage assessment personnel, outage restoration management and oversight personnel, and system infrastructure inventories; (4) procurement and allocation of mutual aid crews from out-of-state; (5) communications with state and local public safety officials; (6) internal company communications; (7) dissemination of information to the public; (8) transmission maintenance and outage scheduling; and (9) identification of company practices that require improvement. The Department established specific reporting requirements for the Electric Companies which are listed and responded to in Section III of FG&E's Report.

On January 8, 2009, the Department issued a Notice of Public Hearing and Request for Comments into the preparation and performance of FG&E and docketed the FG&E proceeding as D.P.U. 09-01-A. The Department held public hearings on January 27, 2009 and February 3, 2009 in Fitchburg and Lunenburg, respectively, to receive comments from the public about FG&E's storm preparedness and restoration activities. Public officials and customers expressed frustration and dissatisfaction with the length of the restoration effort and lack of information during the extended outage. The public was

also given the opportunity to submit written comments to the Department on or before February 5, 2009.

II. THE 2008 ICE STORM AND ITS IMPACT ON UNITIL'S INFRASTRUCTURE

A. Description of the 2008 Ice Storm

On the afternoon of December 11, National Weather Service ("NWS") advisories were in effect for Massachusetts and New Hampshire, as indicated in Figure 3.

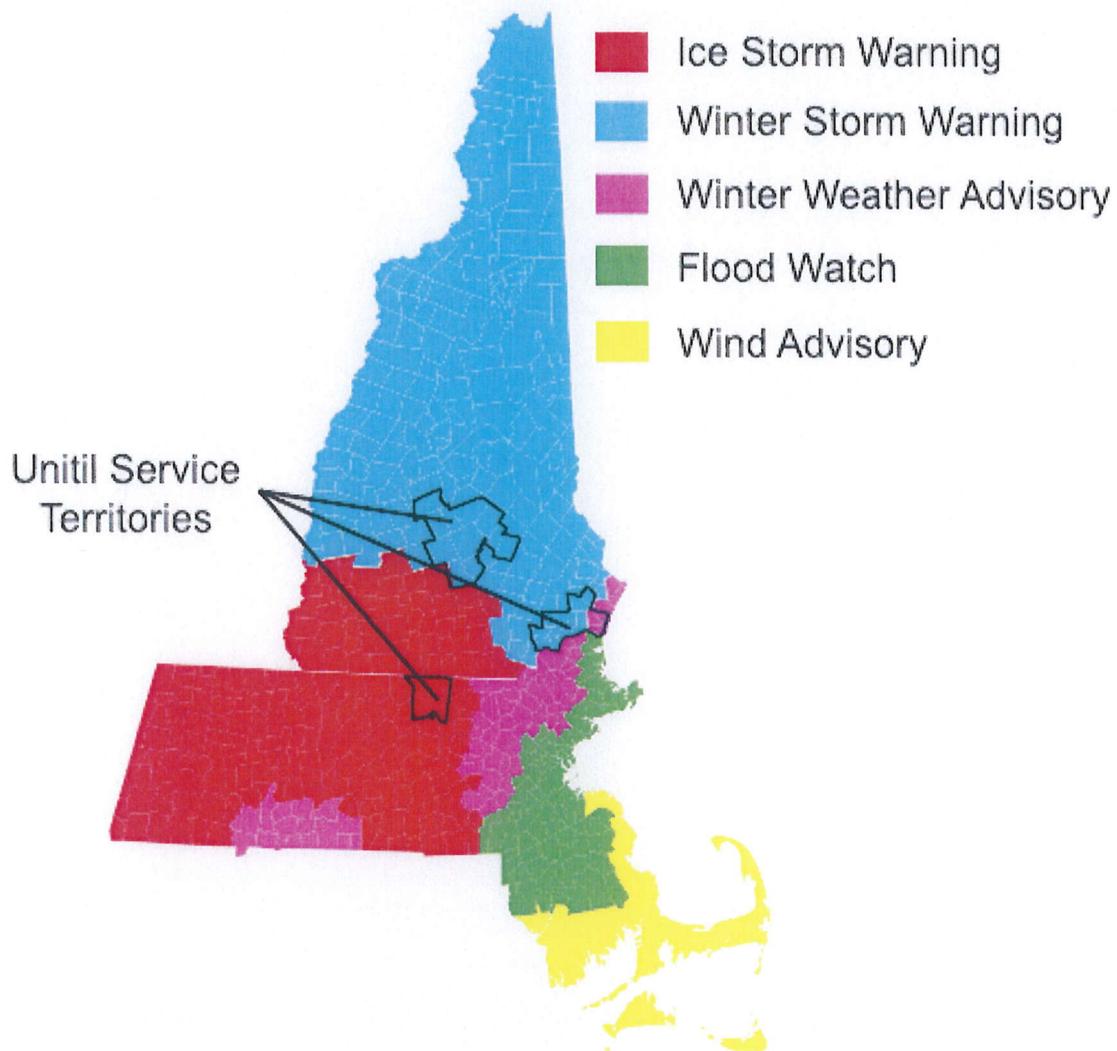


Figure 3 National Weather Service Weather Advisories³

³ Source: National Weather Service. A Winter Storm Warning indicates heavy snow or significant ice accumulations. A Winter Weather Advisory indicates a combination of winter

The NWS Ice Storm Warning advisories predicted considerable power outages and ice accumulations "between one half and one inch...with dangerously higher amounts possible."⁴

The 2008 Ice Storm was highly unusual in the breadth and extent of its damage, with freezing rain conditions reported from at least as far south and north as Luzerne County, Pennsylvania, and Penobscot County, Maine.⁵ Weather stations in Fitchburg, Massachusetts, Concord, New Hampshire, and Portsmouth, New Hampshire reported freezing rain over a period of several hours, starting throughout the day on Thursday, December 11, and continuing into the early hours of Friday morning.⁶ Surface air temperature throughout the region, the other essential ingredient for formation of ice from freezing rain, is shown in Figure 4. Unitil's three divisions are outlined in black, with their respective observed precipitations.

weather (snow, freezing rain, sleet, *etc.*) that presents a hazard, but does not meet warning criteria.

⁴ National Weather Service, Taunton, Massachusetts Office, issued December 10, 2008, at 4:10 p.m.

⁵ As reported by airport (METAR) weather stations. Not all locations reporting freezing rain necessarily experienced surface icing, due to temperature variations.

⁶ Portsmouth, New Hampshire, is used as a proxy for Unitil's Seacoast division because it is the closest METAR station. Freezing rain was first reported in Concord and Portsmouth at 8:00 a.m. and in Fitchburg at 6:00 p.m.

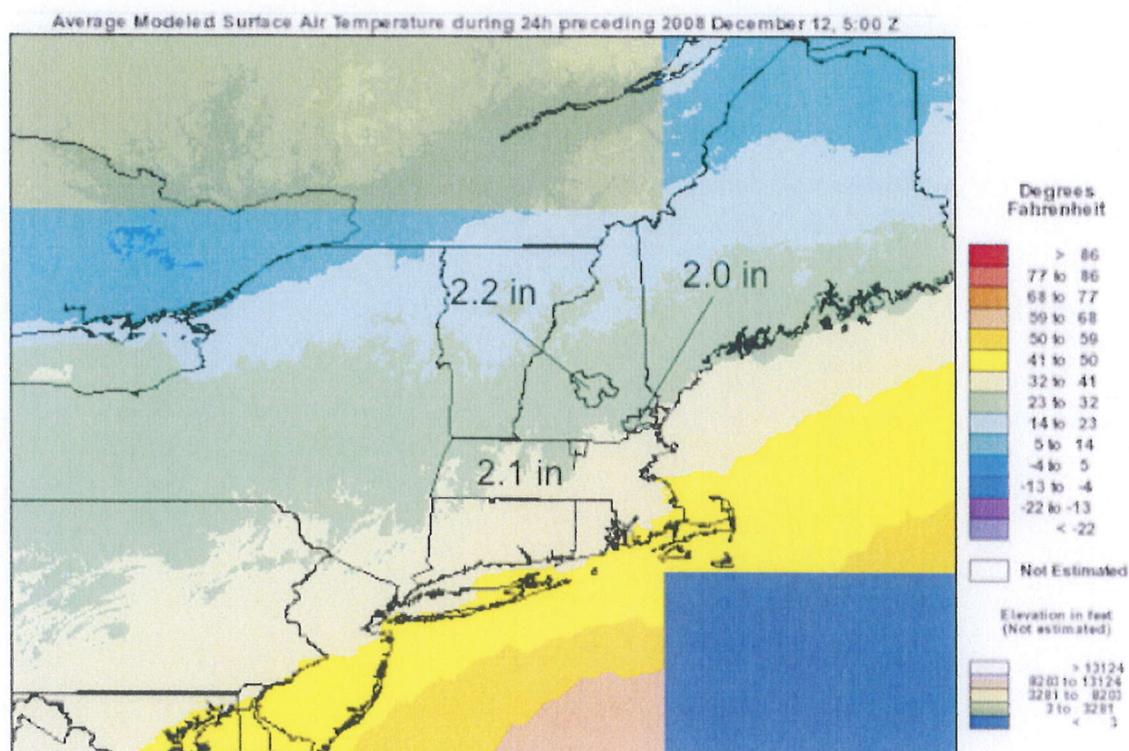


Figure 4. Surface Air Temperature and Observed Precipitation – December 12⁷

As shown in Figure 4, Unitil's service areas had both high amounts of liquid precipitation and freezing temperatures in the danger zone of 23 to 32 degrees Fahrenheit.

The National Oceanic and Atmospheric Administration ("NOAA") and the NWS have not yet prepared official maps of the total weather effects experienced during the 2008 Ice Storm, but in a Public Information Statement issued on December 13, the NWS reported ice accumulations of half an inch in towns as far apart as Ashfield, Massachusetts, and Hudson, New Hampshire, with three-quarters of an inch reported in Townsend, Massachusetts. The Windblown ski area in New Ipswich, New Hampshire, the town just north of Ashby, reported seeing an inch and a half of ice accumulation.⁸

⁷ Source: National Weather Service.

⁸ Source: Windblown Winter Weekly, December 12, 2008.

<http://www.windblownxc.com/Pages/conditions.html>. In comparison, the NWS reported seeing

Regional news sources reported significant icing for the entire Northeast. The Boston Globe, for example, described "a massive winter storm that encrusted the region in an inch-thick sheet of ice."⁹

Unitil was not the only utility that experienced extreme outages as a result of the 2008 Ice Storm, as utilities across the state and region reported more than one million customers out at the peak.¹⁰ Public Service Company of New Hampshire ("PSNH") spokesman Matt Chagnon spoke with Plymouth State University professor of meteorology Dr. Eric Hoffman about how the storm affected New Hampshire.¹¹ Dr. Hoffman described the storm as follows:

First, this storm was typical of a winter storm that causes damage to the electric grid in NH from our studies. But what made it atypical was two things: one was the amount of precipitation was very, very large and a good chunk of the precipitation fell in the freezing rain category. Often with the storms we see a narrow band where there's freezing rain and more often some wet snow and sleet but in this case there was more of a large area of freezing rain and in addition to that we got a lot of precipitation much more than we would normally get from a winter storm.¹²

When asked if he had ever seen a storm with this set of conditions before, Dr. Hoffman replied:

No, not in my lifetime. There certainly have been storms with large amounts of freezing rain. So these freezing rain events certainly occur.

as much as an inch of ice on surfaces in Kentucky following the late-January 2009 storm that resulted in extended outages.

⁹ "Nearly 1 million remain without power after ice storm,"

http://www.boston.com/news/local/breaking_news/2008/12/ice_storm_leave.html, December 12, 2008.

¹⁰ Including customers in Massachusetts, New Hampshire, Vermont, Connecticut, Maine, New York and Pennsylvania.

¹¹ Source: http://64.140.220.121/psnhnews2/images/file/Eric_Hoffman_Interview-final.mp3.

¹² PSNH further explains in their report on the 2008 Ice Storm that the narrow geographical bands described by Dr. Hoffman tend to be on the order of 10 to 20 miles wide. Source: *New Hampshire Ice Storm 2008: Record Outage Record Recovery*, Public Service of New Hampshire, p. 5.

No, I have not personally experienced this in my lifetime. I have not been in the WRONG place at the RIGHT time.

Comparisons have been drawn in the Massachusetts public hearings to the December 1996 storm (Unitil's next largest storm) and its aftermath. The 1996 event was two snowstorms on December 6 and 7 that left a combined 23 inches of heavy wet snow. Unitil restored power to its Fitchburg customers after the first storm, but took approximately a week to restore power to over 15,000 customers after the second storm. While significant, this storm required 151 crew days¹³ to restore power in Fitchburg whereas the 2008 Ice Storm required 1,401 crew days. Damage reports from the 2008 Ice Storm's aftermath described general devastation, with downed whole trees and impassable roads throughout central Massachusetts and New Hampshire. These reports are consistent with the generally understood effects of ice storms shown in Figure 5, although even this list does not encompass all the types of damage seen in the 2008 Ice Storm, which included whole trees being snapped in half or uprooted by the weight of accumulated ice.

¹³ Storm Report submitted to the Department on January 15, 1997, p. 6.

Freezing Rain Induced Event and Structural Damage Occurrence	Increased Ice Accumulation
Slippery roads	
Minor ice accumulation on trees	
Tree induced outages (communications and power distribution systems)	
Bending birch trees	
Broken branches on susceptible trees	
<i>Characteristics:</i> fine branching, included bark, unsound wood, broad or unbalanced crowns, old or injured trees (Examples: poplars, soft maples, beeches, willows, trees at edges of a clearing or pruned on one side)	
Outages to transmission lines caused by galloping (wind-induced)	
Broken branches on resistant trees	
<i>Characteristics:</i> coarse branching, excurrent branching pattern, narrow crowns, young, sound trees (Examples: white oaks, black walnut, interior forest trees)	
Outages, not caused by trees, in the distribution system	
Broken branches on resistant coniferous trees	
Outages, not caused by trees, in the transmission system	
Communication tower failures	

Figure 5. Types of Structural Damage Associated with Increased Ice Accumulation¹⁴

Unitil's own customers testified to the extent of the damage at the public hearings held in Fitchburg and Lunenburg, and in their filings in DPU Docket 09-01-A. Some of their descriptions of damage included:

- "[T]rees falling on her screen house, her electric poles and everywhere else knocked over." (Volume A-1, page 139, lines 11-13)
- "Trees all over the city are down." (Volume A-1, page 216, line 14)
- "The night of the storm, we listened to a lot of trees snapping for over an hour before we finally lost power." (Volume A-1, page 245, lines 11-13)
- "This storm, we have seven acres of woods, basically, and we lost the tops of a lot of trees, most of the trees." (Volume A-2, page 216, lines 13-15)
- "Trees - they crushed four corrals, they crushed the barn." (Volume A-2, pages 26-7)

Governor Patrick declared a State of Emergency on the morning of Friday, December 12, which remained in effect until December 29. Governor Lynch also

¹⁴ Richard J. Hauer, Jeffrey O. Dawson, and Les P. Werner. 2006. *Trees and Ice Storms: The Development of Ice Storm-Resistant Urban Tree Populations*, Second Edition. Joint Publication 06-1, College of Natural Resources, University of Wisconsin-Stevens Point, and the Department of Natural Resources and Environmental Sciences and the Office of Continuing Education, University of Illinois at Urbana-Champaign.

declared a State of Emergency on December 12. The damage was severe enough that President Bush signed Emergency Declarations for nine counties in Massachusetts and ten counties in New Hampshire on December 13.¹⁵ On a more local level, 88 communities in Massachusetts made local emergency declarations.¹⁶

Following the storm, Governor Patrick called the Massachusetts National Guard, which initially mobilized about 500 members to help with road clearing and cutting limbs and debris, according to a statement from Maj. Gen. Joseph Carter.¹⁷ The National Guard was brought into Ashby to clear roads so that utility crews arriving from other states to assist in Unitil's restoration effort could reach the town, which was hit especially hard. The National Guard Bureau reported on December 16 that additional personnel were called up to bring the total to around 1,500.¹⁸ In response to a request for assistance from Massachusetts, the Connecticut National Guard deployed a specialized unit consisting of 23 personnel with chainsaws and mobile excavation equipment. The New Hampshire National Guard was deployed as well, to assist with storm cleanup in New Hampshire starting on December 12.¹⁹

B. Impact of the 2008 Ice Storm on Unitil's Electric Facilities

At the peak of the storm, 100 percent of customers served by FG&E were offline due to the loss of power into the Flagg Pond Substation, FG&E's connection to the

¹⁵ Source: FEMA National Situation Update for December 14.

<http://www.fema.gov/emergency/reports/2008/nat121408.shtm>.

¹⁶ Source: http://www.eagletribune.com/punews/local_story_350005713.html.

¹⁷ Source: <http://www.thebostonchannel.com/cnn-news/18257352/detail.html>.

¹⁸ Source: http://www.ngb.army.mil/news/archives/2008/12/121508-Guard_responds.aspx.

¹⁹ Source: <http://www.governor.nh.gov/news/2008/122208.html>.

electric grid.²⁰ However, even after power began to flow again from the grid in the early morning hours of December 12, 22,513 FG&E customers remained without power Due to damage to Unutil's transmission and distribution infrastructure. Across Unutil's three service areas, approximately 70,000 customers were without power at some point following the storm.²¹ Figure 1 on page 3 shows the peak percentage of customer outages in each town in which Unutil serves more than 50 customers.

The level of damage throughout Unutil's three divisions, and the need to rebuild entire sections of the distribution network, resulted in the extended restoration period because each completed repair restored only a small number of customers.²² Table 1 details the components used in the restoration process.

	Fitchburg	Seacoast	Capitol	Total
Feet of Primary Wire Replaced	146,226	53,482	8,590	208,298
Feet of Secondary and Service Wire Replaced	46,503	28,042	2,898	77,443
New Poles Set ²³	212	52	15	279
Crossarms	281	210	29	520
Transformers	170	50	21	241
Fuse Links	2,000	1,100	600	3,700
Splices	6,000	4,000	4,000	14,000

Table 1. Winter Storm 2008 Materials Usage

The more extensive damage reflected in the Fitchburg territory is consistent with the damage reported in neighboring communities outside the Unutil territory. For example, in the neighboring town of New Ipswich, New Hampshire, Public Service of

²⁰ Power from the grid to the Flagg Pond Substation was interrupted on December 12 at 1:07 a.m. due to tree contact on the National Grid transmission line from Bellows Falls to Flagg Road, causing the entire FG&E service area to lose power.

²¹ Unutil's three divisions did not experience peak outages simultaneously, due to the progression of the storm.

²² In Ashby, for example, virtually all the distribution lines in the town were down and the system had to be rebuilt section by section.

²³ This reflects only poles set by Unutil. Verizon also set a similar number of poles in its pole maintenance areas which are not included in this number.

New Hampshire reported that at least 200 utility poles either broken or damaged, requiring replacement, and stated that the entire town needed to be rewired because of the numerous breaks in electrical cables.²⁴ An anecdotal report by Lora de Plante of the New Hampshire Disaster Animal Response Team, and a resident of New Ipswich, said the devastation following the ice storm was unprecedented. "I was in Hattiesburg (Miss.) in Katrina, and it reminds me of Hattiesburg," she said, conjuring images of downed telephone poles, utility wires and trees that rivaled the ruin after the hurricane that took down New Orleans and much of the Gulf Coast.²⁵ This type of damage was virtually identical to the damage experienced in Fitchburg's territory just south of the border.

To put these numbers in perspective, in the course of a normal year, FG&E installs 39,655 feet of primary wire, 47,769 feet of secondary wire, 170 poles, and 272 crossarms. Thus, FG&E installed almost four years worth of primary wire in two weeks.

This extraordinary effort was accomplished while crews in the field faced several challenges, due to both the nature of the damage and the weather. The roads in many places were impassable following the storm due to fallen trees and branches and downed wires, and damage was still occurring as trees continued to fall from the weight of the ice during the early stages of damage assessment and restoration. As shown in Figure 6 below, it was unusually cold in all three Unitil divisions during the two weeks following the storm, with two substantial snowstorms moving through the region on the second weekend. This was followed, finally, by heavy rain on Christmas Eve and high winds that passed through on Christmas morning, resulting in additional outages. These wintery conditions made life difficult for both residents and crews.

²⁴ "Saturday's New Hampshire ice storm blog: Power won't be back soon; more shelters open", Manchester Union Leader, 12/13/08

²⁵ "New shelter opens in New Ipswich", Nashua Telegraph, 12/21/08

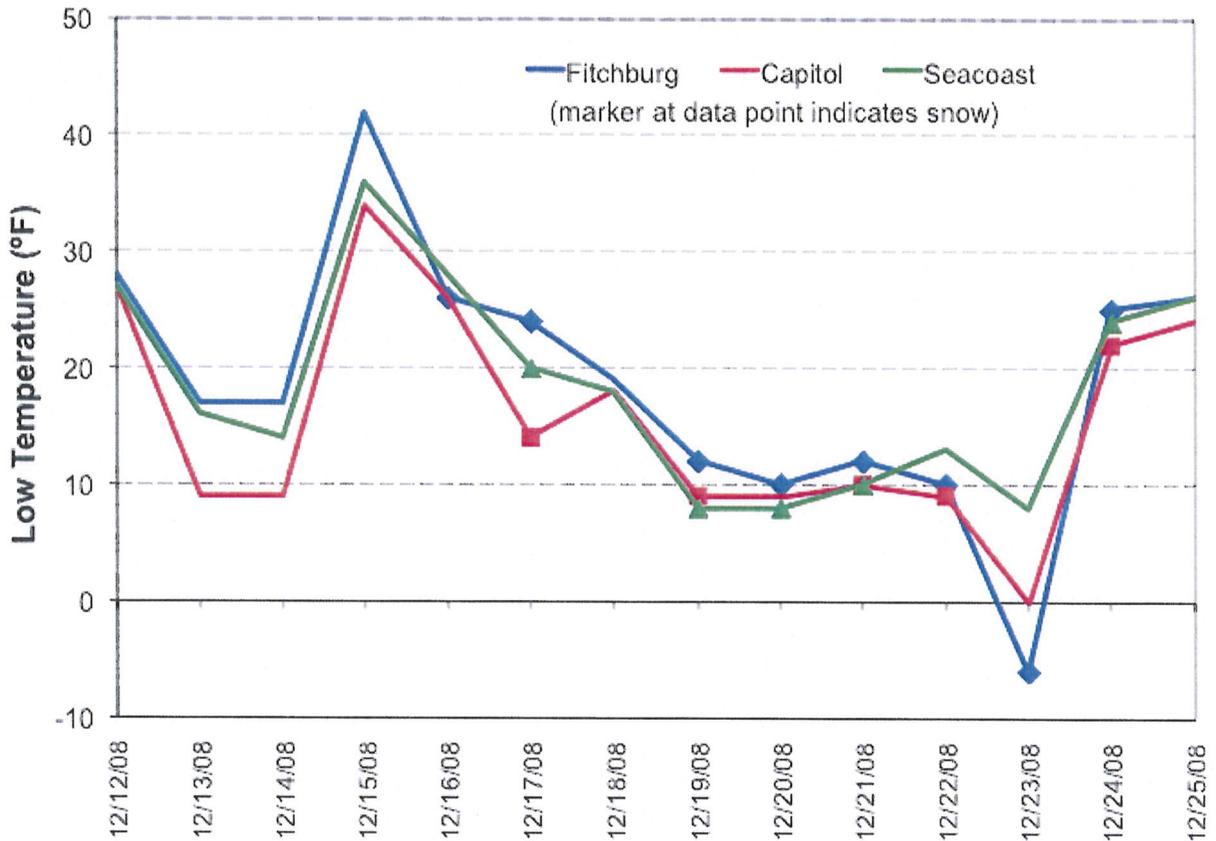


Figure 6. Weather Conditions During Restoration Process²⁶

Since the end of the restoration event, FG&E has completed more than 400 crew hours of additional work to address all temporary repairs completed during the storm. Typical work includes pole transfers, straightening leaning poles, replacing crossarms, and making other temporary repairs permanent. In addition, FG&E has completed an aerial patrol of the 69kV subtransmission system and identified areas where additional work will be required to make minor repairs for damage incurred during the storm. Typical work includes replacing static wire that came down during the storm. It is expected that this work will be completed by mid March.

²⁶ Source: METAR weather station data

III. RESPONSE TO DEPARTMENT DIRECTIVES

A. FG&E Responses

The following section presents a description of FG&E's planning and preparation for emergencies, the Company's performance during and after the 2008 Ice Storm and recommendations to mitigate the impact of future storm-related outages. The Department has directed Electric Companies to respond to specific reporting requirements and thus FG&E's descriptions of its planning and performance is organized in accordance with the outline and information requests included in the Department's Order of January 7, 2009, in D.P.U. 09-01.

1. Restoration Plans and Assessment

(a) *Provide copy of active storm/emergency restoration plans*

Unitil/FG&E's ERP is presented in Attachment III.A.1(f).²⁷ It presents an overview of the restoration process and priorities, defines organizational and functional responsibilities, identifies communications protocols, and describes, in some detail, the framework required to restore power in the event of a major storm or other emergency event. The ERP is not intended to provide a fixed set of rigid operating procedures, but instead establishes a response and restoration framework designed to be adaptable and flexible depending on the nature and extent of a specific emergency. In essence, the plan acts as a guide to efficiently and effectively ramping up Unitil's normal operating procedures and resources in response to an emergency situation, and does not require an entirely new organizational structure or specialized workforce to be implemented.

FG&E's ERP guides internal and external resources in their coordinated efforts to quickly and efficiently restore power and communicate with customers, public safety

²⁷ FG&E's ERP is a 'living' document that is periodically modified to address changing circumstances. The document included as Attachment III.A.1(a) is the active ERP.

officials and government representatives. It has been adequate to respond to significant outages that have occurred subsequent to the 1996 storm, and FG&E believes that it continues to provide an adequate basis to respond to winter storms reaching the severity of the 1996 storm.

However, the nature and extent of damage to FG&E's systems caused by the 2008 Ice Storm far exceeded the damage from the 1996 storm or any storm experienced by FG&E. As a result, although the ERP provided a basis for FG&E's core activities in response to the 2008 Ice Storm, with the benefit of hindsight, Unitil has concluded that it is not adequate to respond to a storm that inflicts widespread damage across a broad geographic region and results in a loss of power to a significant number of FG&E's customers, such as the 2008 Ice Storm. FG&E is in the process of revising its ERP to take into account the lessons learned from the 2008 Ice Storm.

FG&E's ERP is organized into the following Sections:

Section 1 Discusses the Restoration Process

Section 2 General Information

Section 3 Deals with the Mobilization Procedure

Section 4 Description of Functions

Section 5 Public Information

Section 6 Human Resources

Section 7 Outside Crews

Section 8 Lodging and Food

Section 9 Critical Facilities

FG&E addresses each of these Sections in turn as a means to compare its activities in response to the 2008 Ice Storm to the framework of functions, roles and responsibilities called for in the ERP.

(b) *Compare activities taken in response to Winter Storm 2008 to the procedures called for in the company's restoration plan*

The ERP provides the framework of functions and responsibilities for the many stages of power restoration from an early damage assessment through restoration of the last customer. Unitil generally followed the steps outlined within this framework and many are standard industry restoration practices. In certain instances, however, Unitil was forced to improvise and the plan was modified during the storm to respond to conditions on the ground. Although the ERP framework provided appropriate guidance for FG&E's response to the 2008 Ice Storm, there were specific details that did not take into account the massive damage caused by a storm of this magnitude and/or that had to be revised so FG&E could more appropriately respond to safety and restoration needs in light of the severity of the storm. The following discussion summarizes the extent to which FG&E operated within or deviated from the framework of its ERP in response to the 2008 Ice Storm.

ERP Section 1: Restoration Procedure

Section 1 provides a summary of the procedures, priorities and objectives of the ERP. It deals with plan activation and early assessment, and sets forth the objectives of the restoration plan and the priorities of safety and restoration. It also describes the functional organization to be followed and the protocol for plan activation and early assessment, and sets forth the objectives for the flow of information while the plan is activated. Generally speaking, Unitil followed the framework set forth in the plan to achieve its objectives and applied the priorities and protocols provided therein whenever practicable, taking into account modifications in approach necessitated to respond to the

specific "real time" facts and circumstances of the 2008 Ice Storm and its devastating impact on the electric system.

The ERP was activated by the Emergency Operations Manager on the morning of December 12. Activities following the initiation of the ERP included the following:

- Unitil relied on its "trouble ticket" system (described more fully *infra*) to immediately begin an initial assessment of the nature and extent of the damage to its system. However, because 100% of Fitchburg's customers were initially without power, this information was of limited value, and personnel immediately began early damage assessment.
- Based upon information that was available in the initial aftermath of the storm, the Restoration Coordinator determined that the restoration would take several days.
- The safety and restoration priorities set forth in the ERP were followed.
- Outage and "wire down" information was received, processed and forwarded for action. The Restoration Coordinator prioritized and coordinated the dispatch and completion of necessary work. Distribution System Inspectors ("DSIs") and line crews responded to live (sparking or arcing) wire down reports quickly, however the quantity of non-live wire down reports was so large that it was not possible to respond to each one until they were addressed through the restoration.
- Public Service Announcements ("PSAs") were issued between one and five times per day.
- The ERP provides that attempts be made by Customer Service to contact as many Life Support Customers as prevailing conditions permit when an outage is projected to last longer than eight hours. The Call Center attempted to contact life support customers that reported outages on December 12 and 13 with information about the extent of the outage and the availability of shelters, and the company continued to provide this information thereafter by means of PSAs and contact with media and public officials. All life support and medical emergencies reported to the company were forwarded to the EOC. As main lines were restored and the company began to address local restoration, these reported issues were prioritized for response.
- Unitil followed the framework set forth in the organization chart in the ERP to fulfill the required functional assignments and responsibilities for the event. *See* Sections 3 and 4 below.

- Unitil personnel attended meetings at municipal Emergency Operations Centers ("EOC"), and beginning on December 19 were embedded in the Fitchburg and Lunenburg EOCs. Operations personnel communicated with public safety officials on such matters as down wires and accessibility of public ways.

The ERP provides a framework for the management of safety and emergency restoration activities. The ERP is intended to be a flexible and adaptable document that can be modified and altered based upon the particular characteristics and circumstances of the emergency event. Based on the magnitude and impact of the 2008 Ice Storm, Unitil has determined that to better respond in future storms, the organizational structure/information flow of the ERP should provide for greater involvement of centralized management and support functions. Additional discussion of recommendations for future revisions to the Company's restoration plan is contained in Section III.A.11 below.

ERP Section 2: General Information

Section 2 describes the process by which the ERP is maintained and updated and the organization of the ERP document. Accordingly, this section of the ERP was not applicable during the storm and is not discussed in this response.

ERP Section 3: Mobilization Procedure

Section 3 deals with the activation and implementation of the ERP and the procedure for mobilizing resources based on the anticipated level of damage to the system. It also deals with the weather forecasting function and has several provisions dealing with equipment, *e.g.* vehicles, telephones and radios.

Unitil closely monitored weather forecasts in the days and hours leading up to 2008 Ice Storm. It quickly became apparent that, consistent with the provisions of the ERP, this storm would constitute an "Energy Delivery System Emergency" which required activation of the ERP. As defined in the ERP, such an event exists if there is a "[l]oss of 10% or more of our customers for an anticipated period of more than six hours, or [a]ny high profile event" which would "impact a large cross section of the community." As required by the plan, the Electric Operations Manager activated the ERP in the morning hours of December 12, 2008. The plan was deactivated on December 29, 2008.

Given the enormity of the storm, there was no need to do a phased implementation by invoking either a monitoring level or standby level. The Company moved to its "Full Implementation Level" and mobilized resources in expectation of a major outage in response to the weather forecast. Then, based upon the devastating damage sustained, the Company moved to a "Declared Emergency Level" immediately. Consistent with the provisions of the ERP, Unitil took the following actions:

- Notification of the activation of the ERP was accomplished by the issuance of PSAs to all appropriate Unitil personnel as well as the Department and the Massachusetts Emergency Management Agency ("MEMA"). Staff was alerted during the day on December 11 that they might need to report to work that evening.
- All Unitil vehicles were considered under the control of the Restoration Coordinator who was responsible for the assignment or reassignment thereof and all available vehicles were assigned to restoration tasks. In addition, private vehicles owned by Unitil employees were utilized when necessary.
- The Transportation Coordinator took responsibility for keeping all radio equipment operational 24 hours a day. At one point, the radio system experienced problems due to power loss and a generator was dispatched to solve the problem. Cellular telephones were also utilized to facilitate communications to the extent that service was available.

- The Customer Service Center was on call 24 hours a day from December 11 through December 26, 2008 and a member of the Customer Service management team was available through the Systems Dispatcher at all times. Customer service telephone numbers were made available to customers.

ERP Section 4: Description of Functions

Section 4 describes the roles and responsibilities involved in the activation and implementation of the ERP, from those of the Restoration Coordinator to those fulfilled by CSR. As a result of the overwhelming force and impact of the storm and the challenges of the ensuing restoration activities, FG&E had to employ a flexible approach involving several personnel to fulfill some of these responsibilities:

- The responsibilities for Communications Coordination were initially split between communications staff, responsible for issuing PSAs and responding to media inquiries, and operations personnel maintaining communications with community officials. As the event continued, communication and business services staff took an increasing role in community liaison activities. Outreach included regular issuance of PSAs, appearing at Mayor's press conferences and radio interviews. All incoming media inquiries were responded to throughout the event. All personnel involved worked extended hours.
- Initially the role of the Municipal Field Coordinator was handled by operating personnel in the EOC, however as the event continued and the demand for information continued to accelerate, the responsibilities shifted. Operations maintained contact with emergency personnel and business services staff began to assist in communications with other public officials. By the end of the event, business services personnel were assigned to coordinate with the company EOC and to serve as liaison to the four communities. Individuals were embedded in both the Fitchburg and Lunenburg EOCs and direct phone and email contact was provided to municipal officials. All personnel worked extended hours.
- The Manager of Customer Service performed the Pre-Emergency Preparation tasks set forth in the ERP. Life support customers were addressed as discussed in section III.A.1.1 above. Call backs to customers to confirm restoration were not conducted due to the widespread damage to secondary lines and services and the expectation that the call backs would have created additional customer frustration.

- As per the ERP, CSR staff were notified on December 11 of the staffing plan as well as their additional responsibilities. Trouble tickets were entered for every customer who contacted the Company by all avenues, whether phone call, web report, or walk-in. All CSRs began working 12 hour shifts on Friday, December 12 and the 12 hour shifts continued through December 24.
- The functions of the Safety and Facilities Coordinator set forth in the ERP were performed, with some minor variations required by the exigent circumstances. Normal security precautions were maintained prior to and during the storm. The authorized personnel list included Unifit personnel and outside crew rosters. Identification materials were not provided to all outside crews, however, because of the number of outside crews. Safety instructions were provided to internal and outside crews. Most safety staff worked longer than 12-hour shifts due to the circumstances.
- The Restoration Coordinator is familiar with and coordinates updates to the ERP along with other DOC functional staff. The Restoration Coordinator managed personnel, including inventory managers, as called for in the ERP. All Emergency Period tasks set forth in the ERP were completed, and restoration updates were provided as information was requested and available. Work periods were longer than 14 hours, however, due to the scope of the restoration work.
- Additionally, the roles of the System Dispatcher, Recovery Analyst, Distribution System Inspectors, Crew Escort, Field Damage Assessor, Logistics Coordinator, Payroll, and Transportation / Radio Systems were all carried out as contemplated by the ERP, with variations made only as required by the severe impact of the storm. Notably, many personnel worked longer shifts than described in the ERP. Additionally, crew time reports could not always be completed at the end of shifts, due to the volume of crews. Non-live wire down damage assessment reports were communicated at the end of the day due to the volume of activities. Finally, crew sheets were signed by local supervisors rather than payroll.

There will be clean-up of these role definitions in the revised ERP to reflect the experience during 2008 Ice Storm.

ERP Section 5: Public Information

Section 5 of the ERP provides procedures and contact information for coordination of internal and external communications, including dissemination of

information to Unitil's customers, public officials and members of the public. For the most part these internal and external communications procedures were followed during the storm, with some adaptations required due to the length and severity of the event.

Contact information was continually updated throughout the event.

- FG&E's communications were coordinated internally. The Company EOC maintained incoming data in an outage reporting system which provided the basis for drafting PSAs. The PSA information, including estimated times for restoration, was cleared through the EOC prior to release. The PSAs were then circulated internally and externally, and provided baseline information on storm restoration. The outage reporting system also provided information internally, and was supplemented frequently by direct communications with EOC personnel via phone, cell phone, and email.
- A pre-storm PSA was issued to all media outlets as well as local officials. Communication staff remained available throughout the event to respond to media and public inquiries.
- A dedicated line was set up for communications from emergency personnel to the EOC. During the event, the number for this line was released to the public and it became compromised. An alternative dedicated line was then established.
- FG&E issued from one to five PSAs daily to update customers, local and state officials, media and the public on the status of outage and restoration progress.
- In addition to the daily PSAs, FG&E personnel attempted to respond to all inquiries from state officials and there were numerous calls with various officials throughout the event. Daily calls with state officials were instituted as a follow up to the conference call with Governor Patrick on December 20.
- Communications personnel attended many of the Mayor's press briefings, provided numerous radio interviews and responded to all incoming media inquiries.
- Progress on restoration activities was communicated to Communications and Customer Service personnel as information became available.

- As the event continued, demand for communications escalated and additional company personnel were brought in to assist with this function.
- Unitil's CSRs fielded thousands of calls reporting outages and downed lines, and corresponding "trouble tickets" were automatically generated and transferred to the Dispatch Center for appropriate response activities. In normal circumstances, these "trouble tickets" would be used to identify problem locations, sort and then prioritize for repair. Given the system-wide devastation caused by the storm, however, it was necessary to re-build entire sections of the system so the protocol for prioritizing repair based on these incoming reports of outages and dispatching crews to individual trouble locations had to be altered. As a result, the restoration efforts were prioritized to commence with the transmission system, and then work out to substations, individual circuits and so on until finally restoring service to individual customers. At each stage, individual customers in a particular location might resume service, while others in the same area might not resume service due to individualized damage issues.
- Customers were advised to contact the Call Center to provide information to be forwarded to the EOC. Unitil's Call Center continued to field calls throughout the restoration.

Notwithstanding Unitil's/FG&E's continuing and sustained efforts to meet the public information needs in accordance with the provisions of this section of the ERP, it became apparent during the extended restoration efforts that certain aspects of the ERP relating to communications with customers and local officials did not meet those needs in the face of a storm of this magnitude. Unitil took steps to adapt its response, but recognizes that provisions in the ERP should be permanently modified to incorporate lessons learned and to ensure improved communications for future storms. An additional discussion of the Company's communication efforts and challenges that were encountered is presented in Section III.A.7 below. Specific lessons learned and recommendations for improved communications are explained in more detail in Section III.A.11 below.

ERP Section 6: Human Resources

This section addresses primary and secondary roles and responsibilities in the event of an emergency response, and specifies periodic ERP review, training and equipment maintenance. Unitil/FG&E complied with the provisions of this section and believes it served an important function in coordinating emergency response and restoration activities, even in the face of the severity of 2008 Ice Storm. However, Unitil believes a clarification of primary and secondary roles and responsibilities, and contingencies for additional secondary assignments in areas such as the Call Center, would be appropriate for future storms of this magnitude.

- ERP responsibilities were assigned primary and backup personnel consistent with the Functional Chart in Section 1 of the ERP. The magnitude of the storm and extended period of outage necessitated flexibility and adaptation of roles as the event developed, sometimes resulting in additional personnel being assigned to key positions to facilitate response efforts.
- The ERP was reviewed and updated in August 2008 by the restoration coordinator and DOC functional staff.
- Emergency equipment was checked regularly: onsite generator was tested weekly, and the radio system UPS annually.
- Emergency supplies were inventoried and replenished as required.

ERP Section 7: Outside Crews

Section 7 identifies specific contractors that can be called upon, describes logistic support at a relatively high level, and refers to the Edison Electric Institute ("EEI")

Mutual Assistance Roster. This roster was kept with the ERP and was used to request outside crews.²⁸ In addition, and as described in Section III.A.2 below, FG&E participated in all NEMAG calls and actively pursued outside crews in anticipation of, and for the duration of, the restoration period. Efforts to retain outside crews in the New England area were difficult due to the unprecedented demand for such crews caused by the wide-spread and extensive damage caused by the storm. Unitil was successful in lining up 40 crews as a result of the NEMAG mutual aid process, though ultimately some of these crews declined and did not come.

Section 7 also outlines the procedure for organizing outside crews, a procedure FG&E followed.

- FG&E's Logistics Coordinator was given notice of the expected time of arrival and of the number of outside crews.
- All crews came with their own equipment and transportation and all reported to the Fitchburg DOC (with the exception of the National Grid crews that arrived on the ninth day of the storm and reported to a separate staging center at the Lunenburg High School). There, they were given assignments and provided with escorts when necessary.
- Communication between crews and the Emergency Restoration Center was maintained via cellular telephone and crews' departure dates were noted.
- Logistics personnel arranged for accommodations as described in the following Section.

ERP Section 8: Lodging and Food

Section 8 describes the procedures for providing meals and to outside crews.

Except insofar as the large number of crews necessitated booking rooms at hotels other

²⁸ Since joining NEMAG in 2007, Unitil has not relied on the EEI mutual assistance rosters.

than the two mentioned by name in the ERP, logistics personnel generally followed the procedures outlined therein.

- Most hotel rooms, though not all, had two beds and were directly billed to FG&E.
- Direct billing arrangements were made with several local restaurants and other meals were reimbursed pursuant to the petty cash procedure.
- Restaurant and logging arrangements were reviewed and updated in advance of the restoration.

ERP Section 9: Critical Facilities

Section 9 of the ERP describes "critical facilities," which are given priority treatment during the restoration of electric service. In addition to the list contained at Section 9, FG&E maintains a separate list of other critical facilities which guides the priority of its restoration efforts; this list follows the schedule of priorities set forth in Section 1.03.02 of the ERP. *See Attachment III.A.1(b)(9)*. Following the storm, FG&E gave priority to restoration of service at critical facilities in the manner required by the ERP.

- (c) *Assess performance based on above comparison, identify critical causes and failures, and recommend changes to restoration plans that flow from this analysis*

Unitil is continuing to conduct a critical and objective self-assessment of its performance in response to the widespread devastation caused by the 2008 Ice Storm. To that end, Unitil is compiling a detailed list of "Lessons Learned" and recommendations for future modifications to its ERP. Once Unitil completes its self-assessment, the final list of proposed modifications will be provided to the Department.

At this stage, Unitil has identified the areas summarized below for recommended changes to its ERP. Specific recommendations within each area are set forth in more detail in Section III. A. 11 below. Unitil remains committed to proactively taking steps to ensure sufficient preparation for storms of this magnitude in the future, and welcomes the Department's review and guidance in this endeavor.

(i) Storm Readiness

Unitil believes that its capital and maintenance expenditures, including the more specific tree-trimming and pole maintenance/replacement policies, are adequate and that the devastating impact of the storm was not related to any deficiency in equipment or system maintenance. However, the company will review these practices with the Department and local communities to determine if any improvements can be made.

With respect to the ERP, Unitil has identified specific practices that are candidates for modification in order to ensure the company is better able to respond to a storm that causes extensive damages across a large geographic region.

(ii) Storm Preparations and Restoration

Practices that can be improved based on the experience gained during the 2008 Ice Storm include the approach to retention of outside crews, staffing of logistics support personnel, early and more detailed damage assessment, estimating total crew days likely to be required, preparing crews for the following day's activities, and communications between crews in the field and storm restoration managers.

(iii) Public Communications

Unitil believes that improvements must be made in the process of communicating with the general public, the elected and other public officials as well as the use of media

to do so. The information that is relied upon in these public communications must also be improved. In at least one respect, the establishment of an EIC, changes have already been implemented.

(iv) Customer Communications

The frequency of public communications and quality of information also affected the performance of the Call Center as the number of customers trying to get through to a CSR placed extraordinary stress on the call-handling capacity of the Call Center and on the representatives handling the calls. Although increased and more informative communications to customers on the status of restoration ultimately would not have expedited restoration of their service during this storm, Unitil recognizes that more proactive dissemination of such information and increased Call Center capacity for storms of this magnitude could help decrease customer frustration during extended outages, and increase overall customer satisfaction.

2. Determination of Crew Needs and Allocation of Company Crews, Contractor Crews, Mutual Aid Crews, and Tree Crews

For FG&E's day-to-day operational needs and construction activities, FG&E's line resources consist of five overhead bucket crews (*i.e.*, an aerial lift truck), each staffed by two full time, qualified lineworkers, as well as an underground crew and substation crew. On a routine basis, these crews perform a variety of work on FG&E's system, including construction, operations, and maintenance of the overhead and underground electric distribution system, as well as selective work on the transmission system. FG&E's bucket crews are also assigned to perform pole-sets on an as-needed basis. FG&E also has one digger/auger truck to assist its lineworkers in performing this pole work. FG&E's

lineworker crews provide emergency response coverage on a 24/7 basis and are placed on standby on a rotating basis.

When FG&E's workload dictates, or when specialized equipment (*e.g.* off-road vehicles) are required, FG&E supplements its full-time lineworker resources with several outside qualified contractors with whom Unitil has developed a good working relationship over the years. A list of these contractors is provided in the ERP (*see* Attachment III.A.1(a)). Many of these contractors have worked on Unitil's system for several years and have demonstrated efficient, effective and safe work practices. There are also a number of other contractors whom are routinely engaged on similar activities on Unitil's New Hampshire system, and are available to assist FG&E if additional support is required. Because of the seasonal nature of certain aspects of FG&E's operating and maintenance activities, it is more efficient and cost-effective for Unitil to supplement its internal crews with outside contractors. The amount of contractor line crews (two-man bucket crews) working on FG&E's system at any given time varies, depending upon the season or the circumstances.

With respect to tree trimming, although the FG&E lineworkers are trained to perform tree work, they only do so in emergency situations to restore power to customers. Unitil does not have any full time tree trimmers on staff, so these resources are all contracted out pursuant to bid. Tree crews are comprised of a bucket truck, with between a 55- to 75-foot reach, a brush chipper, and hand-operated power equipment. Like FG&E's outside lineworker contractors, the Company maintains a list of tree trimming crews that it relies upon to safely perform trimming of vegetation around

energized conductors and equipment. FG&E's vegetation management practices and policies are described in Section III.A.9, *infra*.

If a contractor crew is working on Unitil's system, and a storm or other emergency is anticipated that could cause damage to the electrical system, Unitil has the right of first refusal for the services of that contractor. In other words, if a contractor is currently engaged by Unitil in Unitil's territory and its services are requested by another utility, the contractor is obligated to complete the work required on Unitil's system until "released" by Unitil to the other entity.

In the event of a pending storm in the region that Unitil anticipates could result in interruption of service to its customers, Unitil assesses whether its current system resources, *i.e.*, internal complement of crews and its external pool of outside contractors, is sufficient. If the determination is made that additional resources are likely to be needed, Unitil looks to its remaining list of regular contractors to supplement the crews already on the system. As described below, Unitil is also a member of NEMAG, and participates on conference calls on a regular basis with other utilities around the region in event of a weather-related or other emergency.

Unitil's operational resources, comprised of its in-house line worker crews, its list of outside contractor crews and its ability to call upon additional resources through NEMAG, as well as from other utilities in the region, have been sufficient to handle FG&E's ongoing maintenance and construction activities as well as the one- to three-day outages that are more typical of the major storms that affect one of Unitil's service areas at a time. Unitil is sufficiently geographically dispersed that the likelihood that a major storm will impact all of its divisions simultaneously is small, allowing the company to

divert resources to the area of its system experiencing the brunt of the damage. The 2008 Ice Storm was unprecedented in the magnitude and breadth of the destruction across Unitil's entire system in a two-day period. Unitil's next largest storm and its aftermath, the December 1996 storm, required 151 crew days to restore power, whereas the December 2008 Winter Storm required 1,401 crew days.

(a) *Provide copies and/or descriptions of mutual assistance agreements*

NEMAG was formed in 2007 by a group of New England and Canadian electric utilities to facilitate the ability of the member utilities to come to each other's assistance in an emergency. NEMAG fills a needed gap in emergency preparedness because there is no regional emergency coordinator or agency with responsibility for allocating resources among electric utilities in New England in the event of a major storm on an "as needed" basis. Prior to the formation of NEMAG, Unitil and its fellow New England utilities relied on informal efforts to work cooperatively with each other during a storm or other emergency. These arrangements were primarily relationship-driven and relied upon the ability and willingness of the counterparts of the operational personnel at each company to work together to restore outages across each other's systems. The purpose of NEMAG was not to supplant this cooperative approach, but to supplement it with a formal process to facilitate a coordinated system-wide response to regional emergency situations that impact all New England utilities.

The current draft of the NEMAG Agreement is provided as Attachment III.A.2(a).

(b) *Describe procedure for obtaining mutual aid crews*

The procedures for obtaining mutual aid crews under NEMAG are set forth in Section 3.0 of the NEMAG Draft Agreement. In summary, Section 3.0 provides that any

NEMAG member may request that a conference call be scheduled for any "generation, transmission and/or distribution-related incident or event." The Current Leadership (selected from the NEMAG membership in alphabetical order) coordinates the conference call with the other members via email and/or text or voice notification applications, and oversees the call format as the Host.

On the conference call, the Host takes a roll-call of participating members; each participating member provides a summary of its position, including current weather conditions, in its own service territory. Each member provides the projected impact of the current emergency, the date and time of the predicted damage, or if damage has already occurred, a current damage assessment, and an estimate of the time needed to complete a final assessment. Each participant provides, in alphabetical order, a resource update as to its current needs and/or available resources. Each participant is asked to confirm whether or not any other (non-NEMAG member) utility has requested mutual assistance. Prior to conclusion of the call, the Host will schedule an additional conference call, if the circumstances require. Depending upon the nature of the event, calls are scheduled every 12 hours until the collective restoration activities are completed, or a majority of the participating members agree to no longer scheduling calls. During the 2008 Ice Storm the last conference was held on December 12 because all requests for crews were satisfied at this stage of the storm. The Host records and maintains call minutes, and the outcomes of action items that arise from the calls.

As required under Section 4.2 of the NEMAG Agreement, resource transfers between utilities are documented by execution of the NEMAG Mutual Assistance Agreement, or if the utilities are members of EEI, by execution of the EEI's Mutual

Assistance Agreement in accordance with the *"Suggested Governing Principles Covering Emergency Assistance Arrangements between Edison Electric Institute Member Companies."* Return of either an executed copy of the NEMAG or the EEI Mutual Assistance Agreement by the requesting company to the responding company is construed as the formal start of the rendering of mutual assistance under Section 4.2.2 and 4.2.4.

(c) *Provide time line of calls to engage mutual aid crews*

Unitil was aggressive in its efforts to engage the assistance of mutual aid crews in response to the 2008 Ice Storm. At the outset of the storm, Unitil had secured commitments for 40 mutual aid crews, which, with its own 31 in-house and outside contractor crews, brought the total number of crews available to assist with Unitil's restoration efforts to 71.²⁹

On December 10, 2008, based upon preliminary weather forecasts of severe conditions consisting of freezing rain and a cold mass moving into region with temperatures in the upper 20s, Unitil began to prepare for the possibility that an ice storm was approaching the northeast and would hit its service territories within the next twenty-four hours. Consistent with the Company's practice prior to any major storm or weather event that could cause damage to electric facilities or impact service reliability, the Director of Electric Operations and the division Electric Systems Managers monitored the progress of the storm through regular (hourly) weather forecasts and email notifications.

²⁹ As described below, however, the 14 contractor construction crews released by Dayton Power & Light, which were equivalent to 42 crews (28 bucket trucks and 14 digger trucks), fell through and significantly impacted Unitil's available resources.

At approximately 4:00 p.m. on December 10, the Director of Electric Operations scheduled an 8:00 a.m. conference call the following day with the Electric Systems Managers to review the status of the weather and to discuss Unitil's potential need for additional resources and mutual aid crews in Massachusetts and New Hampshire. Late in the afternoon of December 10, the members of NEMAG scheduled a conference call for 8:30 a.m. the following day to address each member's need for additional crews and other resource allocation issues.³⁰

The weather forecast on the morning of December 11 indicated that by the late afternoon the storm would be moving into the region, and was expected to continue throughout the evening and night. The forecast also indicated that each of Unitil's three divisions could be affected by the storm, which raised concerns regarding allocation of Unitil's in-house and contractor crews between systems, and increased the likelihood for the need to enlist the assistance of mutual aid crews through NEMAG. On the 8:30 a.m. conference call with NEMAG participants, the members discussed the weather, crew availability, and other items according to the protocols and procedures set forth in the NEMAG Agreement. On this call it was apparent that all of the New England utilities anticipated that the pending storm would impact their service territories. Accordingly, crew shortages were likely. Because the storm had not materialized over New England, but was expected to move across the region during the afternoon hours and into the evening of December 11, another conference call was established for 6:00 a.m. the following day.

At approximately 8:00 a.m. on December 11, while Unitil was still assessing its potential need to call upon mutual aid crews, Unitil put its operations personnel on notice

³⁰ A detailed chronology of the calls for mutual aid is provided below.

of the potential need to report to work later that evening when the storm was projected to arrive. Unitil also alerted its 11 on-system contractor crews that their services would likely be required to aid in restoration. Unitil also notified its contractor tree crews that their services would be required for restoration services. Immediately prior to the storm, Unitil had 25 crews available.³¹

On the 6:00 a.m. conference call with NEMAG on December 12, participants began with a summary of their individual damage assessments, crew availability and/or requirements. Most participants in New England reported troubles on their systems, and most participants, including Unitil, requested mutual aid. Specifically, Unitil reported approximately 61,000 customer outages system-wide and all of its 28,500 customers in Massachusetts. After power began to flow again from the grid in the early hours of December 12, over 22,500 FG&E customers still had no power. Unitil made an initial mutual aid request for 30 bucket crews based upon current customer outages. Another conference call was established for 12:00 noon that would include the NYMAG and the MAMAG.

During the noon call, Unitil requested an additional 10 crews, bringing the total amount requested to 40 mutual aid crews. The following are the mutual aid resources that Unitil secured on the noon NEMAG conference call on December 12:

³¹ Seven UES Capital, 12 UES Seacoast, six FG&E.

Exelon/Philadelphia Electric Co ("PECo")	10 crews and support personnel
Henkels & McCoy (a line contractor released by PECo)	10 crews
Davis H. Elliot (a line contractor released by Dayton Power & Light ("DP&L"))	14 crews and support personnel
Serco (a line contractor released by DP&L)	6 crews

Based on conversations with the contractor Davis H. Elliot, the 14 crews released by DP&L were construction crews of which a single "crew" was comprised of two bucket trucks, a digger truck, and a general foreman in a pick-up truck. In total, this would have provided Unitil with 42 additional crews (28 bucket trucks and 14 digger trucks). At 2.00 p.m. on December 12, Unitil also secured six crews from O'Donnell Line construction, Nashua, New Hampshire. Including Unitil's 25 crews, consisting of 14 in-house crews and 11 contractor crews, the total number of crews committed to Unitil on December 12 was 71.

As explained further in Section III.A.2(e), later in the day of December 12, the large contingent of construction crews released by DP&L notified Unitil that they were not able to secure resources to come to Unitil's assistance. The loss of a significant number of mutual aid crews within hours of the last NEMAG conference call was a major blow to Unitil's restoration efforts. Once the available resources had been assigned by NEMAG on the noon call, by the time the Director of Electric Operations emailed NEMAG for additional assistance, no additional crews were available.

The following is the chronology of Unitil's requests for mutual aid and assistance from other utilities during the 2008 Ice Storm:

Wednesday, December 10

NEMAG participants were contacted via e-mail by Bangor Hydro Electric Company at approximately 3:00 p.m. and a conference call was scheduled for December 11 at 8:30 a.m. to discuss the progress of the pending ice storm.

Thursday, December 11

On the 8:30 a.m. conference call, NEMAG participants discussed the current status of the weather, crew availability, and other items according to protocols established in the NEMAG agreement. Because the storm had not materialized over New England, but was expected to move across the region through the afternoon hours and into the evening, another conference call was established for 6:00 a.m. the following morning, December 12.

Friday, December 12

The 6:00 a.m. conference call began with an overview of each participant's damage, crew availability and/or requirements for additional crews. Most participants in New England experienced troubles on their systems, and most participants requested mutual aid. Unitil requested 30 bucket crews based upon current outages and customers out of service. At this time, participants reported ice accretions ranging from 0 to .5 inches, with predictions for up to one inch in some areas. Because it was apparent that the needs of the NEMAG group exceeded available resources, another conference call was established for 12:00 noon that would include NYMAG and MAMAG.

At 12:00 noon on December 12, the NEMAG conference call was expanded to include NYMAG and MAMAG. With the addition of the MAMAG, utilities outside New England were offering assistance to NEMAG participants. Unitil requested 40 bucket crews. On this call, Unitil secured a commitment for 10 crews along with support personnel from Exelon/PECo, 10 crews from Henkels and McCoy, a line contractor released by PECO, and six crews from Serco, a line contractor released by DP&L in Ohio. In addition, Unitil secured 14 construction crews from Davis H. Elliot, a line contractor released by DP&L. Later in the day on December 12, however, Unitil was informed that these 14 construction crews were no longer available.³² In total, Unitil secured 26 bucket crews and associated support personnel from the NEMAG call.

At approximately 2:00 p.m. on December 12, Unitil secured six crews from O'Donnell Line Construction from Nashua, New Hampshire, bringing the total

³² As described above, these 14 construction crews released by DP&L were the equivalent of 42 crews to Unitil (*i.e.*, 28 bucket crews and 14 digger trucks).

number of crews to 32. (These additional six crews were obtained outside the Mutual Aid process.)

Saturday, December 13

Due to the loss of the Dayton contractor, Unitil sent e-mails to NEMAG participants requesting additional resources. Negative responses were received from Northeast Utilities/PSNH and National Grid, both of whom described how they had also lost resources made available during the NEMAG conference call on December 12.

Unitil placed additional calls to the Reading and Taunton Municipal Light Departments requesting additional resources. These municipal utilities declined Unitil's requests because they were already engaged in restoration efforts in Sterling, Massachusetts, and would be unable to provide mutual assistance to Unitil.

The 10 PECO and 10 Henkels & McCoy crews arrived from Pennsylvania at approximately 2:00 p.m. on December 13, and commenced work in Ashby and Townsend.

Sunday, December 14

Unitil called PECO seeking additional PECO resources, or resources from the region, to assist Unitil. PECO put Unitil in contact with Service Electric, a contractor located in Chattanooga, Tennessee. Through this effort, Unitil secured 26 bucket trucks, 13 digger trucks, and other support personnel, to be dispatched to Unitil's service territory immediately, and were scheduled to arrive by Monday, December 15.

On December 14, in response to Unitil's mutual aid request, Central Maine Power ("CMP") informed Unitil that they were still in active storm mode and could not make crews available. Unitil renewed its request for additional resources from CMP, if and when they became available.

Monday, December 15

Service Electric out of Tennessee notified Unitil that they had encountered difficult travel conditions, that they would be staying overnight en route, and that their arrival would be delayed until Tuesday, December 16.

Tuesday, December 16

Unitil sent another e-mail request to NEMAG participants requesting additional resources. The only utility that responded was NSTAR, to the effect that it was

also depleted of crews and due to concerns with pending severe weather, was unable to release crews to Unitil.

Unitil received a call from National Grid indicating the possibility of being able to supply crews to assist Unitil, pending an internal conference call at 8:00 p.m. When Unitil returned the call at approximately 10:00 p.m., National Grid stated that due to the pending severe weather, National Grid was no longer in a position to come to Unitil's assistance. NSTAR had recalled crews working at National Grid, which depleted National Grid's resources, and National Grid itself may have been seeking additional resources.

Friday, December 19

Unitil was contacted by National Grid indicating that they expected to release contractor crews to other utilities as their restoration neared completion, and offering crews to Unitil. Unitil requested 40 bucket crews which was the maximum it could accommodate at the time with available support staff. Later that evening, Unitil received confirmation that National Grid was releasing approximately 40 crews to Unitil, coming from three different contractors (Midwest, Carr & Duff, Energy Group). These crews reported to Fitchburg for work on Saturday December 20. Unitil was thereupon removed from National Grid's list of utilities requesting crews.

Saturday, December 20

Representatives from the Commonwealth of Massachusetts (Undersecretary of Public Safety and a representative of MEMA) arrived in Fitchburg approximately mid-day and met with representatives of Unitil management to assess the situation in Unitil's Massachusetts territory. Based on this discussion, a list of needs was discussed, and a conference call was established for later that afternoon. This conference call included the Governor and Lieutenant Governor of Massachusetts, the Chairman of the Department, the Undersecretary of Public Safety, representatives of MEMA, other public officials and Unitil management. As a result of the call, the Chairman of the Department contacted each of the other Massachusetts utilities and asked them to call Unitil as quickly as possible to determine if they could provide needed support.

Senior representatives of each of the other Massachusetts electric utilities contacted Unitil within a short time following the conference call. As a result of this contact, National Grid determined that it would be able to provide the type of support requested by Unitil. Representatives from National Grid arrived in Fitchburg late in the day to identify locations for staging crews, and to make logistical arrangements. A staging site was identified in Lunenburg and arrangements were made to establish the staging area in time to deploy a large number of crews the following morning. Arrangements were also made to

mobilize approximately 50 crews starting first thing in the morning on December 21.

Sunday, December 21

The first large contingent of crews (approximately 50 crews) was brought in by National Grid, and reported to the Lunenburg staging area. Also, significant support staff arrived including approximately 28 damage assessors, and various field supervisors. Based on the extent of damage still remaining and the results of detailed damage assessment, National Grid committed to securing an additional 80 crews, as well as additional field supervision, to increase restoration resources the following day.

Monday, December 22

An additional 80 crews from National Grid started working first thing in the morning. Crews reported to the same staging areas in Lunenburg, as well as to a second staging site established in Fitchburg. In addition, 28 additional crews were released from Unitil's Seacoast territory and reported to Fitchburg.

Tuesday, December 23

Work continued. No significant change in crews involved in the restoration effort.

Wednesday and Thursday, December 24 and 25

As the holiday was approaching, many of the contractors working on the system requested release or simply left. Unitil made phone calls to other Massachusetts utilities, as well as Asplundh Construction. National Grid made calls to its various contractors. Unitil secured six bucket crews from NSTAR, and National Grid also secured 21 crews to cover the crews leaving for the holiday. In total, Unitil was able to secure 59 crews for December 24 and 29 crews for December 25.

(d) *Describe how decisions for crew allocation were made*

During the 2008 Ice Storm, as the damage assessment estimates were completed, the Restoration Coordinator began to form full restoration estimates; that is, the approximate date and time when electric service to all customers would be restored. This estimate was based upon the amount of repair work required and the total number of

resources available. Since multiple locations were engaged in restoration during the 2008 Ice Storm, resources were allocated based upon these restoration estimates.

Unitil's goal was to accomplish full restoration to all customers at approximately the same time. Therefore, the DOC that had the most amount of damage was assigned the greatest amount of resources. If any DOC completed restoration while others were still engaged, those resources were then assigned to the other location.

Throughout the restoration period, FG&E's estimates for full restoration were longer than that of Unitil's New Hampshire divisions. As a result, on-system resources were relocated to FG&E. In addition, all the crews acquired through the NEMAG process, as well as other line resources acquired as described in Section III.A.2(c), were assigned to the FG&E operating center. As well as line crews, other resources were also heavily weighted to FG&E, including engineering personnel, and other management personnel.

(e) *Discuss whether there were delays in crew availability/arrivals*

As described above, the most serious setback or delay that Unitil experienced was the cancellation of the large contingent of contractor crews from Davis H. Elliot released by DP&L within hours of securing their commitment. Once the available resources had been assigned by NEMAG, on the noon call on December 12, no further NEMAG calls were scheduled. When the Director of Electric Operations emailed NEMAG for additional assistance, no additional crews were available. This cost Unitil 420 crew days

(assuming these crews would have stayed for 10 days),³³ out of the total 1,401 crew days ultimately required to restore service to FG&E's customers.

In addition, as noted above, the scheduled arrival of Service Electric out of Tennessee on December 15 was delayed by 24 hours due to difficult travel conditions. Severe weather conditions also impacted the ability of other utilities in the region to release crews to assist Unitil. For example, NSTAR was forced to decline Unitil's request for additional resources due to pending severe weather.

(f) *Provide crew assignments, by date, location of work, and description of work performed*

The crew assignments by town are approximations of the average crew complements for the day indicated. It should be noted that crew assignments varied throughout the restoration period in response to critical customer outages and changing priorities. Crew assignments and locations changed during each day of the restoration process as crews completed repairs and were dispatched to new trouble locations.

A crew, for the purposes of this response, is considered to be two workers and a vehicle. The crew assignment information in this response was compiled from crew sheets, contractor invoices, and personal accounts from the event.

The spreadsheet provided as Attachment III.A.2(f) is broken down by town and the circuits associated with those towns. The description of work assigned has been broken down into a three categories:

Overhead Line Repairs – Overhead line repairs are generally completed by line crews in bucket trucks, line crews with digger trucks or climbing poles. Overhead line repairs consist of: emergency response to medical and critical customers, pole replacements, pole transfers, replacing down conductors, replacing broken crossarms,

³³ Based upon the crew complements of 28 bucket crews and 14 digger trucks described above, these crews would have worked for 10 days.

replacing failed transformers, repairing service conductors, and distribution switching.

Tree Trimming – Tree trimming activities in the attached spreadsheet were carried out by contract tree crews. These crews were generally assigned to areas ahead of the line crews completing overhead line repairs. However, the line crews completing overhead line repairs are also equipped to be able to remove small to moderate size limbs that require a minimal amount of trimming.

Subtransmission Line Repairs – The repairs to the subtransmission system were completed by a combination of bucket trucks and off-road equipment. These repairs were generally replacing down conductors, removing large trees, and completing switching operations.

3. Damage Assessment

(a) *List all available damage assessment personnel*

The following numbers of field personnel and engineering department staff were assigned to perform damage assessment: Electric Operations (4); Gas Operations (6); Energy Measurement & Control (9); Engineering (6); Facilities (1).

(b) *Describe timing of damage assessment and provide all supporting documentation*

FG&E's initial damage assessment process began on December 12, when the first outages were reported, and was completed on December 16. A detailed damage assessment began on December 21 and was completed on December 22. *Ad hoc* damage assessment was turned in by crew guides between the initial and detailed damage assessment.

The initial damage assessment was performed by 26 FG&E staff, including system engineers, field supervisors, meter mechanics, other staff with knowledge of electric systems, gas workers, and individuals that were capable of conducting field inspections and marking issues on circuit maps distributed for these purposes. This initial

damage assessment was necessary at the outset of the storm because it facilitated the critically important decision-making process in terms of the allocation of resources and the direction of crew assignments. The initial assessment of FG&E's 30 overhead distribution circuits was completed on December 16.

As discussed in Section III.A.1., the ERP calls for an initial damage assessment to be performed, followed by a more detailed damage assessment as the restoration process is carried out. Due to the unprecedented nature of the 2008 Ice Storm and the need to act as efficiently and comprehensively as possible in the early stages, the damage assessors focused their initial effort on the primary distribution lines because these lines needed to be restored before services to individual customers could be restored. The initial damage assessment entailed a survey that began at each substation and focused only on the three phase primary system. Field notes were captured by marking up circuit maps and collecting critical information such as broken poles, damaged equipment and downed wires. As the damage assessments were completed for each circuit, the field notes were returned to the office where they were tallied during the overnight hours. The completed packages were then ready for assignment as described in the next section.

The initial assessment was required because the magnitude of the storm and logistical effort to complete a detailed assessment early in the storm would have overwhelmed available resources that would be required to carry out the ERP's detailed assessment. As a result, the initial damage assessment was very valuable in assigning crews early in the storm. The damage assessment effort continued throughout the storm as needed to stay ahead of incoming crews and continue to prioritize the broader restoration effort.

A detailed damage assessment process for the remaining restoration effort began on December 21 and was completed on December 22. As described in Section III.A.2(c), National Grid's damage assessors arrived to assist with the detailed damage assessment across FG&E's entire distribution system on December 21, 2008. National Grid brought in 28 damage assessors, who were paired into teams and sent out to drive circuits prioritized for reassessment based on the estimated number of customers still without power.

The detailed damage assessment included a full survey of the system identifying all repairs that were needed including primary, secondary and service type repairs. The damage assessment teams once again began at the substation and surveyed the entire circuit for all repairs that were needed in order to fully restore power. This proved to be a valuable approach as many new repairs were identified on the three phase primary system from branches and limbs that had fallen after the initial damage assessment. As the damage assessment teams completed their survey, the completed damage assessment forms were returned to the office where they were summarized on a spreadsheet to calculate the number of crew hours required to complete the repairs. The completed packages were then ready for assignment as described in the next section.

The overall damage assessment process was complicated by the fact that new damage continued to appear in the days after the storm had passed as ice-laden trees continued to crack and fall. The fact that many public roadways were impassable for up to three days after the storm also delayed the initial damage assessment. For these reasons, and due to the extent of the damage to FG&E's primary distribution lines, detailed damage assessment was not completed until December 22.

(c) *Describe procedure and timing for translating damage assessment into crew orders*

Damage assessors began initial damage assessment immediately on December 12 and continued the initial damage assessment throughout the early days of the restoration.³⁴ Field notes from initial damage assessment were returned to the office in the form of marked up circuit maps and hand written notes. These notes identified broken poles, downed conductors, broken crossarms, damaged transformers, and other information important to the dispatch of repair crews. The initial focus of this assessment was the primary distribution system (especially the mainlines of circuits), major roads, and a preliminary assessment of damage by town. The notes from this damage assessment were reviewed and organized in the nighttime hours when most repair crews were resting. Office staff organized the damage assessment and developed estimates for the time of repair. This information was then combined to develop the total estimated time to complete repairs to the three phase primary distribution system (in crew hours). Work was prioritized by comparing the ratio of the number of customers without power per circuit to the estimated number of crew hours of repair time. Crew assignments were prioritized to address the circuits with the highest ratio (*i.e.* the largest number of customers restored for the least amount of repair time).

A table showing how this information was developed and organized is provided below. This spreadsheet was used as a living document. Therefore, there is no spreadsheet saved for each time the remaining work was evaluated.

³⁴ Early efforts to complete damage assessment were hampered by the number of roads closed or blocked by fallen trees and downed utility infrastructure.

Circuit	Town	Circuit Customer Count	Customers Out	Estiamted Crew Hour Remaining	#Cust/Crew Hour	Rank
11W11	F	2835	4	8	0.5	12
39W18	T	2023	1	240	0.0	21
22W1	F	2133	36	15	2.4	5
40W40	F	1689	159	10	15.9	3
15W16	T	1451	78	48	1.6	7
31H34	F	1400	0	6	0.0	22
30W31	L	1198	2	68	0.0	20
39W19	A	1377	292	450	0.6	10
30W30	L	1153	22	64	0.3	16
31W37	L	1135	1	30	0.0	19
31W38	L	1016	34	48	0.7	9
20H22	F	1052	413	22	18.8	1
25W27	F	569	9	16	0.5	12
11H10	F	672	0	0	0.0	22
50W51	F	625	177	87	2.0	6
21W36	F	601	154	50	3.1	4
25W28	F	569	0	58	0.0	22
11H11	F	478	0	0	0.0	22
40W39	F	433	0	0	0.0	22
20H24	F	315	0	24	0.0	22
35H35	F	233	0	5	0.0	22
50W56	F	145	1	12	0.1	18
50W55	F	135	1	0	0.0	22
15W17	T	345	9	15	0.6	11
40W38	F	1	1	8	0.1	17
21F41	F	0	0	12	0.0	22
1W2	F	2313	407	25	16.3	2
1W4	F	2475	4	9	0.5	14
1W6	F	64	10	10	1.0	8
1W1	F	28	9	20	0.4	15
20W42	F	4	0	0	0.0	22
Total		28470	1824	1360	2.9	

Table 2. Circuit Priority Table.

Information from initial damage assessment was also used to develop crew packages, which included marked up maps and other information needed to effectively dispatch repair crews. Crew assignments were prepared during the overnight hours each night and were ready each morning when crews reported for the day's work. This process was repeated throughout the restoration in an attempt to remain focused on restoring the largest amounts of customers in the least amount of time. Essentially, once the damage assessment was completed and organized, it was ready to be handed out to the crews. This generally occurred over the course of about 6-8 hours each night. Many of these

damage assessors later served as "bird dogs" that guided outside crews on the same circuits that they had assessed, increasing the efficiency of restoration work.

Detailed damage assessment consisting of much more detailed evaluation circuit-by-circuit, pole-by-pole, and customer-by-customer, did not take place until later in the restoration. For all practical purposes, this level of detailed assessment was neither practical nor necessary during the early stages of the restoration. Whereas detailed damage assessment normally focuses on separate and distinct problems that are easily identifiable and can be organized and prioritized for repair, the damage to the electrical system was so extensive that virtually every portion of the overhead system sustained severe damage. This had the effect of changing the restoration protocol from more normal circumstances. Instead of prioritizing and dispatching crews to individual trouble locations as would normally occur, restoration proceeded in order of priority starting with the transmission system, then substations, then the mainline of circuits, and so on until finally restoring service to individual homes. Thus, damage assessment initially focused only on obtaining critical information, and organizing this information to ensure efficient dispatch of repair crews in order of priority.

When detailed damage assessment was conducted later in the restoration, it provided more detailed information of the remaining work and included a page of notes for every location requiring repair. The damage assessment notes were combined by circuit and returned to the office. Similar to the first assessment, the total repair time was calculated for each circuit and summarized in a spreadsheet. Once the damage assessment for each circuit was summarized, the package was ready to be assigned to the crews. These packages were again prioritized based upon the largest quantity of

customers still without power. At the end of each day, crews returned the completed packages or partially completed packages. During the evening hours while most crews were resting, crew assignments would again be created for the following morning. Storm room operations were a 24-hour operation throughout the restoration period.

(d) *Describe specific damage reported by customers during the 2008 Ice Storm*

Customers reported extensive damage to the FG&E system and, in many instances, to their individual service. Customer damage reports included accounts of downed wires, broken and leaning polls, trees resting on lines, and other damage. Depending on the situation, additional work orders were issued to the dispatch group or customers were informed of their responsibilities for service related damages.

Customers calling in to FG&E's IVR system had an option to identify the following types of damages: (a) Broken Poles; (b) Heard Loud Bang; (c) Tree on the Lines (d) Wires Down; and (e) Other. The IVR system would then generate a "trouble ticket," as discussed further below (*see* Attachment III.A.3(d)), and if the type of damage was provided, it would appear in the "trouble code" section of the trouble ticket. The vast majority of customers called only to report an outage and did not provide additional comments or the known cause or other damage information. The specific breakdown of the IVR trouble tickets is as follows:

- a. Customers reporting "Broken Poles": 86
- b. Customers reporting they "Heard a Loud Bang": 243
- c. Customers reporting "Trees on the Lines": 364
- d. Customers reporting "Wires Down": 1,032
- e. Customers reporting "Other": 0
- f. Customers not reporting cause or damage: 8,038

The total number of trouble tickets for FG&E was 9,763.

(e) *Describe specific damage to company equipment and other property during Winter Storm 2008*

As shown by the following table, the storm caused devastating damage to FG&E's equipment in the Fitchburg service area.³⁵

Fitchburg Service Area (square miles)	170
Feet of Primary Wire Replaced	146,226
Feet of Secondary and Service Wire Replaced	46,503
New Poles Set ³⁶	212
Crossarms Replaced	281
Transformers Replaced	170
Fuse Links Replaced	2,000
Splices Made	6,000

Table 3.

Over 36 miles of new wire was installed in less than two weeks in order for FG&E to fully recover from the storm. And yet, this represents only a small portion of the wire downed and requiring repair, as most of the wire taken down by falling trees during the 2008 Ice Storm was spliced and reinstalled. In total, Unitil estimates that 150 to 200 miles of lines were downed during the storm.

4. Describe Outage Tracking and Field Dispatch Coordination

The IVR system is the primary means by which customer outages are typically reported and tracked. The IVR can identify the customer and his or her location either by using a Caller ID function or by requesting entry of the customer's account number. This information is used to generate a "trouble ticket" (*see* Attachment III.A.3(d)) which

³⁵ While the extent of damage may appear to be less than larger companies, it is important to put the damage in the proper context; this amount of damage was experienced in just four communities. The damage was, however, similar to the reported in neighboring communities including Ashburnham, Massachusetts and New Ipswich, New Hampshire.

³⁶ This does not include poles set by Verizon during the restoration period.

indicates the time of the call, the customer's location, the relevant circuit number, and any comments entered by the customer into the IVR through the options menu. Once trouble tickets are generated in the IVR, they are forwarded to EOC personnel in the relevant operating division where they are used during normal operations to direct crews to customer locations. During widespread outage events, trouble tickets provide valuable information to help assess the extent of an outage and the areas of the system that appear to be hardest hit.³⁷

In addition to notification by customers, outages are tracked by other means. Damage assessors and crew guides call in to the Restoration Coordinator by radio or cell phone to report outage. FG&E's Supervisory Control and Data Acquisition System (SCADA) alerts operating personnel when breakers open or close at substations, which can also assist with locating outages. Additionally, municipal officers call their designated contact at FG&E to report outages in their communities.

Pursuant to the ERP, FG&E's Restoration Coordinator prioritizes and coordinates the dispatching and completion of restoration work. The Restoration Coordinator's objective is to "restore electrical service to critical facilities and to the largest number of customers in the shortest period of time consistent with public safety." Field supervisors working under the Restoration Coordinator oversee the physical restoration of the system. These supervisors assign work to crews based on the restoration priorities discussed below. Field supervisors communicate with FG&E's dispatch center, advising of the current location of work and trucks assigned. During 2008 Winter Storm, the Restoration Coordinator and field supervisors acted in accordance with the duties described for them in the ERP.

³⁷ Additionally, customers with access to the internet can report an outage via a web-based form.

Given the scale of the 2008 Ice Storm, the IVR system played a lesser role in outage tracking than it ordinarily does. Typically, customer outages occur as a result of separate and distinct problems that are easily identifiable and can be organized and prioritized for repair. For example, a fallen tree may result in a downed wire or broken pole, thereby causing an outage to a group of customers. Restoring these customers entails removing the tree and repairing damage to electrical equipment (a process that typically takes only a couple of hours). These problem locations, which are commonly referred to as "troubles" or "trouble locations," can be identified through the IVR system, sorted, and prioritized for repair as described above.

After the 2008 Ice Storm hit, virtually the entire FG&E system was a trouble location. There were no portions of the Unitil system, other than the underground portions, that were not extensively damaged. Every circuit, fuse, main line, sidetap, and lateral were extensively damaged, as were thousands of individual customer service lines. Hundreds of broken poles and crossarms, hundreds of miles of line, and thousands of individual service lines lay in a jumble of broken and fallen trees and limbs on the ground. Unitil conservatively estimates that approximately 150 to 200 miles of its 500 miles of primary circuitry were downed as a result of broken and falling trees. Under these circumstances, the IVR / trouble ticket system was of little value.

Thus, throughout most of the restoration effort, the primary means for FG&E to track outage was through reports from its damage assessors in the field. These personnel advised FG&E of major damage to the system. During the final five or six days of the effort, when most of the major lines had been repaired, FG&E relied increasingly on the IVR system and trouble tickets to locate individual customers without service.

Additionally, as discussed further below, the IVR system was used throughout the restoration process to identify critical / life support customers.

5. Prioritization of Outage Repairs

- (a) *Provide list of priority treatment groups (e.g., fire, medical, police, water, sewer)*

As set forth in the ERP, hazardous downed wires are considered highest priority work, and are responded to prior to restoration work. Once restoration work has commenced, service is restored based on the prioritization categories set forth in the ERP, with "A" being the highest priority:

- A. Transmission lines, transmission substations, 13.8 kV distribution substations;
- B. 13.8 kV circuits and 4 kV substations;
- C. All critical facilities on the feeders before moving to the next area;
- D. Hospitals, central water and sewer pumping facilities, life-support customers;
- E. Fire, Police, Emergency Management Agency Headquarters, nursing homes, elderly residence facilities;
- F. Largest block of customers;
- G. Individual services to identified Life Support Customers; and
- H. Remaining individual services.

FG&E treats all facilities in categories C, D and E as critical. Thus, following restoration of major electric infrastructure, the following priority treatment groups are restored first: hospitals, central water and sewer pumping facilities, life-support customers,³⁸ fire departments, police, Emergency Management Agency Headquarters, nursing homes, and elderly residence facilities. FG&E maintains a list of critical

³⁸ Life support customers appear twice on the prioritization list. "D" refers to life support customers who lack power because of damage to a main line. "G" refers to life support customers who lack power because of damage to their individual service lines.

facilities, which it used to prioritize restoration efforts following the 2008 Winter Storm. A copy of the list is contained at Attachment III.A.1(b)(9).

FG&E followed the prioritization scheme established in the ERP when restoring power following the 2008 Ice Storm. While there were some minor variations from the prioritization scheme, they were initiated in the field in order to create efficiencies. For example, if crew were repairing a circuit and a critical police station was located nearby, and service could be quickly restored to the station, the crew might simply make the necessary repairs then, rather than move on to the next circuit and have to make a separate trip back to the police station at a later time. Additionally, due to the scope and duration of the storm, FG&E augmented its critical facilities list. In addition to the listed facilities, FG&E also placed a priority on providing power to emergency shelters and other emergency-related organizations that did not have a source of backup generation. Later in the process, as it became evident that more hotel rooms were needed to house crews, these also received priority status.

While FG&E adhered to the prioritization set forth in the ERP, due to the massive scope of the damage progress down the priority list was considerably slower than in a typical outage. Instead of prioritizing and dispatching crews to individual trouble locations, as would typically occur, restoration proceeded from the very top of the priority list, with the transmission system, then proceeded to the substations, then individual circuits, and so on, until crews were finally restoring individual services to customers. Crews started at substations and began working downstream, repairing the mainlines of circuits first.³⁹ This required clearing and isolating all the sidetaps, laterals

³⁹ The mainline of a circuit is generally defined as the three-phase "backbone" portion of a circuit emanating from the substation, from which the remainder of the circuitry is fed.

and downstream circuitry until the mainline portions of circuits were energized. Crews then began the process of restoring increasingly smaller portions of circuits, until they were ultimately able to work on individual customer problems. There were instances where it was necessary to rebuild miles of line and run miles of new wire in order to restore only a handful of customers. This became increasingly typical in the final days of the restoration effort, slowing restoration efforts dramatically.

(b) *Describe the procedure for addressing medical needs/critical customers registration and notification*

FG&E's computer system designates its customers who are critical / life support status. Registration of critical status can occur at the time a customer initially signs up for service with FG&E. Existing customers can also notify FG&E CSRs that they have developed a need for electrical medical equipment in their home and require critical status. Further, FG&E's Credit Department can designate customers as critical / life support. Due to Department regulations that limit the ability of utilities to cut off service to critical customers who have fallen into arrears, Credit Department personnel inquire of customer status during the collections process. If a customer is critical, and documents his or her condition with a doctor's note or other records, then the appropriate coding is made in FG&E's computer system. The critical designation is subsequently printed out on all trouble tickets and work orders, informing staff that these customers should receive priority treatment.

In addition, if the company receives reports of medical emergencies during the course of the outage, these will be noted on the trouble tickets that are generated. During the restoration process the company did receive many reports of priority situations from local public officials which were handled in this manner. As main lines were restored

and the company began to address local restoration, these reported issues were prioritized for response.

(c) *Explain how remaining customers were prioritized*

As set forth in the prioritization table in Section 5(a) above, after restoration of service to critical customers (C, D, and E on the priority list), FG&E made repairs that would result in the restoration of service to the largest number of customers in the shortest time (F), then restored service lines to its critical / life support customers (G). Finally, service lines were restored for non-critical individual customers based upon trouble tickets and the crews' inspection for damaged service lines. During the final phase of the restoration effort, crews swept through neighborhoods visually inspecting service lines for damages. FG&E metering personnel assisted with identifying customers who remained without power. These sweeps continued repeatedly until all customers had been brought on-line.

6. Call Center Operations During Storms

(a) *Provide detailed information on calls from customers calling in to report outages, including number of calls received by date, by location and by type of complaint*

During the first 48 hours of the 2008 Ice Storm, Unitil's Call Center in Concord, New Hampshire received over 40,000 calls from customers, either through the IVR system, or by speaking directly with a Unitil CSR. Nearly 165,000 calls were received during the period from December 11 to December 25. On a normal day, the Call Center receives between 800 and 1,000 calls, or an average of 22,000 calls per month. As the following table illustrates, the volume of calls received during the two-day period of the storm was approximately twice the monthly average.

Date	Calls Received by the IVR	One-Hour Periods over 100% Utilization	# Calls Answered by Representatives	Avg. Wait Time	Avg. Call Handle Time
12/11/08	4,092	1	977	05:37	04:59
12/12/08	24,880	13	3,855	07:03	03:32
12/13/08	16,475	4	2,125	03:18	04:44
12/14/08	15,789	4	1,827	03:30	05:18
12/15/08	16,689	10	2,748	03:49	05:15
12/16/08	14,487	11	3,487	05:54	05:00
12/17/08	11,638	13	3,277	12:09	05:23
12/18/08	10,744	9	3,747	13:04	06:20
12/19/08	9,406	5	2,583	05:49	08:06
12/20/08	7,314	1	931	09:07	08:15
12/21/08	6,748	1	1,187	08:40	06:32
12/22/08	6,819	0	2,092	03:27	06:16
12/23/08	3,712	0	1,160	05:05	05:55
12/24/08	1,995	0	852	05:13	05:44
12/25/08	13,348	3	1,479	06:13	03:43
Total	164,136	75	32,327		

Table 4.

Call volume was heavy during the evening hours of December 11, beginning with the first calls around 8:00 p.m. The number of calls answered by the Call Center representatives initially peaked at 300 calls during both the 11.00 p.m. to midnight and midnight to 1:00 a.m. hours. Call volume slowed overnight but the rate increased on the morning of December 12, as 369 calls were received between 6:00 and 7:00 a.m.

Customers that received busy signals at the Call Center called other Unitil telephone numbers, including the corporate offices in Hampton, New Hampshire. Customers also called town EOCs and were connected to Unitil employees embedded at the EOCs.

Although non-CSR employees receiving these calls may not have had access to the same detailed information as the CSRs, they provided a sympathetic ear and a "live person" to listen to customer concerns.

As shown in the above table, there were 75 hours during the two week restoration period when the capacity of the Call Center phone lines could not handle the number of calls due to a confluence of factors. Many customers expressed a desire to speak to a representative and the duration of calls was increasing. Customers waiting to speak to representatives filled up the Call Center telephone lines, and as a result many customers received busy signals. The latest update on the IVR was provided to customers, but because the IVR did not provide customer- or community-specific details, many customers stayed on the line for an opportunity to speak to a representative, or left a message requesting a callback by a CSR or a supervisor. Over the entire storm period, Unitil's Call Center managers and supervisors returned all customer requests for a call back, in many cases using their cell phones to keep the Call Center telephone lines free for in-coming calls. Due to the volume of calls, it was not possible to return every call immediately and although a number of customers may have called more than once, a Unitil manager or supervisor personally returned all known requests for a telephone call during the period of the 2008 Ice Storm.

After the initial calls to report outages, subsequent waves of calls over the next several days addressed a variety of matters, including reports of extraordinary hardship and other circumstances faced by customers, requests for estimated restoration times, information regarding Unitil's restoration priorities, and location of crews in their community. Through the IVR, customers have the option to provide information regarding the cause of the outage, or the type of damage observed. As described in Section III.A.3, *supra*, out of more than 9,763 trouble tickets generated by FG&E customer calls, approximately 1,735 customers opted to enter this additional information.

- (b) *Provide copy of written instructions and/or protocols to call center support personnel (i.e., information on extent of damage, estimation of response time)*

Unitil's CSRs have access from their desktop computers to routine information for each customer, including address, account number, usage, billing, and payment histories. During outages, the CSRs also rely upon information on the extent of the damage incurred in each service area in order to effectively communicate with customers. This intelligence comes from several sources, including outage calls to the Call Center, feedback from damage assessors and crews working in the field, and news reports.

A customer's need for information changes radically during an outage, from initially reporting the outage, to later seeking information regarding when power will be restored. The Call Center management team is responsible for gathering as much information as possible on the storm and communicating that information to the CSRs. This information includes the cause of the outage, efforts to respond to the outage, and estimated restoration times. The most important information relates to estimated restoration times for the system (*i.e.*, full restoration), individual communities, and individual customers. During the 2008 Ice Storm, the Call Center relied on information shared with the public through PSAs and also on conversations with Operations personnel.⁴⁰ Briefings with the Call Center representatives were held each day in an effort to coordinate the type of information being provided to customers by the PSAs, CSRs, IVR messages and over the Company's web-site.

On the morning of December 11, when the weather forecast was still uncertain, all operations personnel were informed that this could be an "all-hands-on-deck" situation, and that the Fitchburg division would be the hardest hit area. This assessment

⁴⁰Copies of the PSAs are provided as Attachment III.A.7(b).

was relayed to the CSRs, who were instructed to expect outage reports to begin around midnight.⁴¹

The first 2008 Ice Storm PSA was issued at 1:15 p.m. This PSA indicated that:

Severe weather conditions may occur later tonight and into tomorrow. These conditions may interrupt electric service in some areas. Most electrical outages are expected to be for relatively short periods of time, only. However, severe weather conditions can create substantial damage to the electrical system, and restoration can take an extended period of time.⁴²

A subsequent communications from the Director of Electric Operations was issued at 4:25 p.m. and forwarded to CSRs indicating that the forecast had not changed significantly, but that road conditions were expected to be slick and that downed poles were a possibility during the evening commute.

On Saturday, December 13, the PSA indicated that 59,000 customers were without power with damage most severe in the Seacoast and Fitchburg areas, focusing initially on sub-transmission facilities that feed large numbers of customers. The PSA indicated further that:

Unitil anticipates that it will take days to restore power to all customers and recommends that customers plan accordingly.

The PSA also referred customers needing shelter to contact local emergency personnel. Consistent with the advisory, on the morning of December 13, CSRs were informed that all Unitil crews were working and that more crews were on the way from Ohio and Pennsylvania and expected to be working the next day. Based upon information available at that time, and Unitil's prior experience in major storms, the CSRs

⁴¹ This information was relayed to the CSRs by forwarding 9:45 a.m. email on December 11 from the Director of Electric Operations.

⁴² Unitil Issues Electric System Advisory to Customers, December 11, 2008.

were instructed that many, if not most customers could be restored by the end of the day on December 14. The CSRs were also informed that other utilities were also reporting large numbers of outages.

At mid-day on December 13, CSRs were informed that they should continue to inform customers that restoring power to all customers would take several more days, likely lasting through the week. The IVR message was updated to inform customers that 550,000 customers remained without power in Massachusetts and New Hampshire and that the Governors of both states had declared states of emergency. Customers were further informed that crews had arrived to help Unitil from outside New England. The message stated that, "[w]e anticipate that it will take days to restore power to all customers so we recommend that all customers plan accordingly."

Shortly after, CSRs were informed that damage in Fitchburg was going to take longer to restore than previously anticipated and would extend into the following week. Restoration efforts were proceeding in Fitchburg but the number of customers restored per "trouble" was declining. CSRs were also provided with a list of shelters to offer to customers. Later that day, on December 13, based upon continuous updates from the field, CSRs were instructed to advise customers that power may not be restored until December 17 or 18.

On Sunday, December 14, CSRs were informed that progress was very slow as some parts of the Fitchburg electric system needed to be completely rebuilt and that they should no longer convey estimated restoration times to FG&E customers due to the severity of the damage. The CSRs were provided with the Massachusetts and New

Hampshire 2-1-1 telephone numbers for customers requiring assistance from health and human services organizations.

On Monday, December 15, the IVR message was updated during the afternoon to indicate that "restoration may not be completed until this coming weekend", *i.e.*, December 21. It was updated again at 6:00 p.m. to convey the fact that crews from as far away as Pennsylvania, Ohio and Tennessee were working around the clock to restore customers in the Fitchburg area, with restoration not expected to be completed until the weekend. The message indicated that:

Outage counts are coming down but the damage is extensive – in some areas virtually every single circuit, fuse, side tap and lateral has been impacted. We are prioritizing our response efforts to achieve maximum customer restorations in the shortest amount of time.

Because of the damage, our customer service staff is still unable to provide estimated restoration times for specific areas. We realize that for many of our customers, that to go without electricity for now 4 days is a unique and yet extremely frustrating event. We appreciate your patience during this very difficult period.

Unitil issued a PSA at 5:00 p.m. on Wednesday, December 17 indicating that the estimated restoration times for Massachusetts customers with "[r]estoration of all *primary circuits*" was expected on Thursday in Fitchburg, on Friday in Townsend and Lunenburg, and on the weekend in Ashby, subject to weather."

The PSA issued at 9:00 p.m. on Friday December 19 reported that 135 crews were working across Unitil's service area and that the total would increase to 184 crews the following day, due to the release by National Grid of 47 crews to assist Unitil. However, it was unclear when power would be restored to individual customers as the communication indicated that "major lines" would be in service in Fitchburg by the end

of the next day, with harder hit areas of Townsend, Lunenburg and Ashby to follow one day later.

Earlier in the day, on December 19, CSRs were provided with more specific talking points. The CSRs were also instructed to clarify that rumors circulating that Unitil was running out of supplies were false and unfounded. On Sunday, December 21, the CSRs were informed that National Grid had arrived to help restore power in the Fitchburg division.

At noon, on Monday, December 22, CSRs were informed that a transmission outage had caused outages to 6,000 customers in Fitchburg and that there would be an outage of between 1-4 hours duration. On December 24, CSRs were instructed to tell customers that significant progress has been made in Ashby and that customers would be restored either that day or the next, December 25. A PSA issued at 8:15 a.m. indicated that:

Restoration is expected to be substantially completed today, with the possible exception of one circuit in southwest Ashby which sustained extreme damage.

(c) *Describe provisions for receiving and responding to the volume of customer calls*

FG&E's customers' primary point of contact with Unitil during the 2008 Ice Storm was through the Call Center in Concord, New Hampshire. In normal circumstances, there are approximately 30 Call Center representatives whose schedules are arranged to ensure that there are approximately 15 CSRs available to handle non-emergency calls that occur between 5:00 a.m. and 11:00 p.m. Unitil recently added nine call center representatives as a result of the acquisition of Northern Utilities. On December 11, Unitil increased the Call Center staffing levels to prepare for "storm mode"

operations. For the duration of the storm and until December 25, the Call Center remained open for 24 hours a day. On the morning of December 12, the Call Center staffing was expanded by directing representatives that are normally dedicated to credit issues to assume CSR duties. These six credit representatives are trained to serve as CSRs and most of them had started out in this role and were familiar with the Call Center protocols.

On December 18, the Call Center also received back-up resources from volunteers that work in Unitil's corporate office in Hampton, New Hampshire. While these personnel are not trained to use Call Center computer screens, they are located adjacent to CSRs and were able to rely and verify certain critical information relating the status of the restoration efforts. The additional staff also satisfied the desire of many customers to speak to a "live person" and to empathize with customers' predicaments.

At the time of the 2008 Ice Storm, Unitil had 72 lines on three 24 channel T-1 circuits, four of which were reserved for system connectivity, leaving 68 available for incoming calls. At any given moment, under normal operating conditions, approximately 10 lines will be in use.⁴³ As shown on the table in Section 6(a), there were 75 hours during which more calls were received than could be handled for the capacity of the Call Center. This is attributable to the overwhelming volume of calls, the number of customers that were waiting to speak to a CSR and the length of calls once a customer was connected to a CSR. On December 17, one of the three T-1 circuits (representing 24 lines) overloaded and went out of service, leaving only 48 lines to handle calls for approximately 24 hours until Siemens, Unitil's phone vendor, reset the trunk card. There

⁴³ Calls received between 11:00 p.m. and 5:00 a.m. are routed to the Fitchburg dispatch center, a 24-hour operation.

were also times when the overwhelming volume of calls from customers led to issues on the Verizon and FairPoint infrastructure external to Unitil's systems.⁴⁴ Unitil does not have a record of how many of these calls failed to get through.⁴⁵

As discussed above, the IVR has the capability to generate a "trouble ticket" without the customer speaking directly to a representative. The IVR can identify the customer and customer's location either by using a Caller ID function or by requesting entry of the customer's account number. The trouble ticket indicates the time of the call, customer location including circuit number, and any comments entered by the customer into the IVR through the options menu regarding the type of trouble being reported (*e.g.*, broken pole, "heard loud bang", trees on the lines, downed wire, no power, *etc.*) The trouble ticket also indicates whether the customer is flagged as a critical customer. Once trouble tickets are generated in the IVR, they are immediately forwarded to DOC personnel in the appropriate operating division where they are used to direct crews to customer locations during normal outage events. During widespread outage events, such as the 2008 Ice Storm, trouble tickets provide valuable information to help assess the extent of an outage and the areas of the system that appear to be hardest hit.

The operation of the IVR can be modified when the Call Center is placed in "storm mode" in order to provide tailored messaging about the outage and to speed up call processing time. This changes the content of messages and the options that customers hear when they call in. This capability was used extensively throughout the restoration period. In addition to information about restoration efforts, the IVR

⁴⁴ This is one possible reason, in addition to the overflow on the IVR, that customers were hearing different busy signals when trying to contact the Call Center.

⁴⁵ PAETEC cannot track these calls because they never reached PAETEC's system.

communicated safety messages and informed customers of the types of issues that would require an electrician.⁴⁶

Customers can also report an outage via an on-line form on Unitil's website if they have access to the internet. As currently designed, this web option is a generic "contact the customer" option and reported outages still need to be entered into the outage reporting system by a CSR.

Unitil has recently added 48 additional telephone lines as a cushion to account for the addition of Northern Utilities. Unitil now has 120 lines, far in excess of the 24 lines that is anticipated to be needed for normal operations. Unitil is also planning to add 24 additional lines this summer. Unitil is also reviewing several call overflow options offered by third party vendors for both the IVR system and the calls to CSRs. Unitil is actively reviewing a proposal from its existing telephone and IVR vendors which would create a duplicate outage responding option that could be activated when call volumes to the Call Center would otherwise result in a busy signal.

7. Describe Communications, Written and Oral, with Municipal Officials and Agencies, Prior to and During the Storm, and Provide Supporting Documentation

(a) *FG&E Planning*

The FG&E ERP provides for initiation and maintenance of communications with municipal officials (including civil defense directors), state legislative representatives, the Department and MEMA. Communications with public officials is necessary to provide

⁴⁶ The IVR has an automatic callback feature that can be used after a main line is restored in order to identify any customers still without power. This feature was not used during Ice Storm 2008 because of the volume of individual service issues that were not resolved by energizing the main lines.

reliable information about an impending storm, the means by which customers can remain safe, the damages incurred to the electric system and the progress made to restore power. Utilities must also coordinate closely throughout a restoration effort with local public safety officials in order to restore power safely and expediently.

Management from each of Unitil's three divisions meets at least once a year with local public safety officials to address a range of issues including emergency planning, communications and restoration priorities as well as tree trimming and other maintenance efforts. The most recent emergency preparedness meeting in the Fitchburg area took place on November 18, 2008. In general, public safety officials have regular contact with Unitil throughout the year regarding utility work on public roads.

(b) *Unitil Activities During Winter Storm 2008*

Unitil/FG&E's efforts to implement the communication provisions of the ERP are discussed in detail in Section III.A.1 above. The Company issued PSAs on a regular basis to provide ongoing information on the storm and restoration efforts to all constituencies. The first PSA was distributed to company employees, media and emergency and elected officials in Massachusetts and New Hampshire on December 11 at 1:15 p.m. This PSA served three purposes: (1) to provide toll-free numbers for Unitil, (2) to advise customers of supplies that would help them withstand a power outage, and (3) to provide an update on anticipated weather conditions. Subsequent PSAs were issued one to five times per day and contained information on the number of customers still without power. Many PSAs also contained some indication of expected restoration times. All PSAs were posted on Unitil's web site in addition to being distributed to the media and public officials. A copy of the PSAs and other public statements issued during

the storm are included in Attachment III.A.7(b). The contact list for PSA distribution was updated and expanded throughout the restoration process.

As called for in the ERP, local public safety officials (*e.g.*, fire and police) were also provided with a private phone number that was dedicated to responding to emergencies and other concerns.⁴⁷ The Company attempted to be accessible to incoming calls and to coordinate with public safety officials throughout the restoration process. Given the overwhelming impact of the storm and the challenges of the restoration efforts, the company did have to improvise in its implementation of the ERP. The adjustments made were described in Section III.A.1(4) and (5) above.

During the course of the restoration effort, Unitil/FG&E personnel received hundreds of calls and messages from public officials and from the media, and made significant efforts to respond to every one as quickly as possible and with the best information available. Unitil representatives attended many, but not all, of Fitchburg EOC briefings and the Mayor of Fitchburg's daily press conference. As the event continued and the demand for information increased, Unitil did eventually embed personnel in the Fitchburg EOC and the Lunenburg EOC, and established dedicated communication channels for public officials in all four towns.

Notwithstanding Unitil's/FG&E's continuing and sustained efforts to meet the public information needs during the restoration process, it became apparent that those efforts were not able to meet those needs in the face of a storm restoration of this magnitude. Unitil has identified a number of challenges:

- Communication efforts were compromised by the difficulty of providing accurate estimated restoration times. Once the initial damage assessment

⁴⁷ Regrettably, in Fitchburg, this phone line was compromised during the restoration phase after it was made available to customers.

had been done, the early focus of the limited resources available to Unitil was on power restoration. However, as the restoration proceeded and repairs proved to be more extensive and time-consuming than originally expected, estimated restoration times were increased. This led to customer confusion, anxiety and a loss of confidence in the information being provided by Unitil.

- Rumor control proved to be a significant challenge for Unitil during the restoration process. Every effort was made to immediately dispel incorrect or misleading information, whether it came to us from customers, public officials or the media, but the problem persisted and compounded the difficulties of communication.
- Delays in being able to assign personnel to serve as contact points for communication with public officials were not helpful. In addition, the rotation of several personnel in the liaison role throughout the restoration period precluded more productive relationships from being formed.
- The ability of the Call Center to meet the communication needs of customers is critical to maintaining an adequate flow of information during an extended restoration period. As the Call Center became unable to fully meet that need, the pressures on local public officials rose significantly.
- As the restoration period lengthened, customers and public officials increasingly sought very specific information about the status of the restoration effort, the location of crews and the length of time it would take to restore specific streets or addresses. This level of specificity was generally not available.

These factors help explain why many of those who commented at the public hearings in Fitchburg and Lunenburg identified communications as a significant issue in Unitil's response to the 2008 Ice Storm. The lessons learned and recommendations to address these communications issues are included in Section III.A.11 of this Report.

8. Describe Communications with Customers During Outages

The details of Unitil's communications with customers through the PSAs, the IVR and by direct contact with a CSR or Call Center supervisor, are set forth in Section 6(b),

supra. In general, for the duration of the storm, customers contacted Unitil to report an outage, and to describe the damage to Unitil's system and to their individual service, such as wires down, broken and leaning poles, burning limbs on the wires and transformers or other equipment down from the poles. Customers with service-related issues reported instances where their lines from the street were either down or hanging low, trees leaning on the service wires and services physically removed from their home. Depending on the situation, additional work orders were issued to the dispatch group or customers were informed of their responsibilities for service related damages.

In addition to specific information regarding the status of the restoration efforts, described in Section 6(b), Unitil's communications by CSRs and other company personnel with customers during the storm included safety-related advice concerning the safe use of generators, such as their placement in relation to the house to avoid fumes, and how to handle wires down on a customer's property. The CSRs also offered customers a list of shelters available in the communities, and the location of FG&E's EOCs where customers could obtain additional updates and information concerning the restoration effort by speaking with an embedded Unitil representative. As the storm lingered, when CSRs could not provide an accurate estimate of the time that service would be restored to a customer location, other information provided to customers included a description of the number of and location of crews in the particular location, and an explanation of Unitil's prioritization of repairs, *i.e.*, working on the parts of the system that would restore the greatest number of customers first.

Unitil's CSRs, supervisors and managers, as well as backup volunteers out of Unitil's corporate offices, worked tirelessly during the 2008 Ice Storm, many working 12

hour shifts from December 12 through December 24 in an effort to ensure that customers received as timely information as possible about the restoration effort, to record customer outage and trouble reports, and, in many cases, to provide a sympathetic ear and offer safety-related and practical advice to assist customers in what was an extremely trying and difficult situation.

9. Provide Vegetation Management Procedures, and Trimming Activities for Transmission and Distribution Lines, by Circuit and Town, Including Maintenance Schedules, for the Last Five Years

(a) *Unitil's Vegetation Management*

Vegetation management for electric utilities includes the trimming of trees near electric lines and the prevention of new growth within utility rights-of-way. It can also refer to efforts of customers and towns to encourage new plantings of trees that are more resistant to impeding electric lines under both normal and storm conditions. Tree trimming improves the reliability of service by decreasing the chance that tree limbs will interfere with electric wires if they become entangled, or cause outages when they break.

Unitil's tree trimming policies are designed to shear branches back to a set distance from wires, with the desired clearance distances depending on the loading of the line as indicated by voltage and capacity, the degree of control over the right-of-way, and the length of the tree trimming cycle. Unitil's transmission lines are subject to the most aggressive vegetation clearing practices (generally, cutting down aging trees entirely) because the impact of a fallen tree could affect thousands of customers. Unitil also has explicit trimming rights within its transmission right-of-way which allows trimming as much as necessary to ensure the integrity of the line, as compared to distribution lines which are usually located in the public right-of-way and where the company's trimming

rights are much more circumscribed due to state or local law or individual property rights. An additional consideration is that most of Unitil's poles are jointly owned with Verizon or FairPoint, and the responsibilities for maintenance and inspection of the pole plant and trimming of lines do not solely fall upon one company.

Unitil's Vegetation Management Policy is included in Attachment III.A.9(a). As described in this attachment, Unitil follows standard utility industry practice in tree trimming, which calls for tree trimming to be performed in cycles over a period of years – meaning every circuit on the system is assessed and trimmed within a certain number of years. The cycle varies between four and ten years depending on the voltage of the line (higher voltages serve more customers) and whether it is a three-phase (more capacity) or single-phase circuit. Each year Unitil prepares a plan for tree trimming and schedules the work to be done through the year. FG&E's Vegetation Management Schedule for the past five years for maintaining its transmission and distribution system is included as Attachment III.A.9(b).

FG&E's expenditures for tree trimming have averaged approximately \$350,000 annually in recent years. The 2009 budget, which was established before the 2008 Ice Storm, is \$390,000, an increase of approximately 10% over 2008.⁴⁸ Trimming costs go up every year, due to both increasing operational costs and the increasing amount of line as the system expands.

Scheduling tree trimming requires advance notification of towns and permission from abutting landowners. Once the annual plan has been developed, Unitil meets with the tree wardens in each town to go through the list of which streets will be trimmed and

⁴⁸ Because work is planned and executed by circuit rather than by town, a breakdown of expenses by town is not available.

the trimming specifications they plan to use. Certain roads may be designated by the cities and towns as "scenic roads" with more stringent tree trimming restrictions that Unitil must comply with.

Permission "doorcards" are distributed to residents in advance of tree crews coming through with three options: trim, do not trim, and remove selectively. In some cases Unitil cannot get needed permissions and is unable to do a complete trim.⁴⁹ If permission is not granted, the crews are restricted in their ability to trim. Restrictive tree trimming can have long-term consequences because it is much less expensive to more completely trim a tree in anticipation of returning on the normal cycle than to only partially trim more frequently.

There are occasions in which Unitil receives specific requests from a customer regarding a problem with a tree or a limb on or near a line. Unitil investigates all calls and trims selectively if the tree or branch poses an immediate threat to electric equipment. If the issue involves telephone or cable company equipment, Unitil will notify the appropriate service provider of the location and the problem.

(b) *Vegetation Management and the 2008 Ice Storm*

While it may be possible to reach generalized conclusions regarding the impact of distribution line tree trimming policies on the damage caused by a storm, it is much more challenging, if not impossible, to perform a true after-the-fact diagnostic that quantifies this impact. This is particularly true for severe ice storms due to the degree of ice loading on trees and wires. Expansion of the trim zone may help improve day-in/day-out reliability, but would not be sufficient to prevent the type of damages where whole trees

⁴⁹ State laws in both Massachusetts and New Hampshire provide property owners with the right to require utilities to seek permission for tree trimming that occurs in front of their property – for example between a sidewalk and the street.

are snapped in two or uprooted as occurred during the 2008 Ice Storm. The only way to avoid damage in these circumstances would be to replicate for the distribution lines the clearing practices applied to the transmission lines, where entire trees are cut and limitations on vegetation growth are more severe. Yet even the more significant transmission line trim zone did not prevent damage to transmission lines from falling trees and limbs from outside of that zone. Moreover, large falling trees and branches will sometimes cause the electric lines to snap, leaving the pole intact, but when they fall against the thicker cable and telephones lines which do not break as readily, more significant damage may occur to the pole.

The impact of tree trimming as a preventative measure during an ice storm depends significantly on the amount of ice that collects on trees because at a certain level of ice buildup, a tree branch or entire tree will fall with or without more aggressive tree trimming practices. The 2008 Ice Storm had extraordinary levels of ice buildup on trees, resulting in the collapse of thousands of trees onto electric facilities. While more aggressive tree-trimming practices may have eliminated some branch-related outages, they would not have prevented much of the damage incurred by trees during and after the 2008 Ice Storm. It all likelihood, it would not have prevented trees from bringing down utility poles.

Ice loadings were estimated to be from 0.5 to 1.5 inches after the storm moved through Unitil's service areas. The impact of ice on wires and trees was described by Dr. Keith C. Heidorn, as follows:

Hanging wire cables collect ice until the cable breaks or the rain stops. Diameters of these ice-coated cylindrical cables may reach five centimeters, adding a weight of 15 to 30 kilograms per meter (10-20 pounds per foot) to the wire. Lines not broken directly under the ice's weight may succumb to the combined forces of ice

and wind, or by trees and branches falling across them. Even days after the storm has abated, lines may break when they react to the sudden change in their load as the ice falls from them. Vibrations, often violent, may also occur as the ice falls, snapping weak points in the line under the added strain.⁵⁰

As noted by David Graves, a spokesman for National Grid, "[t]his was a devastating and unprecedented storm. The ice accumulation on the trees could not have been prevented by trimming. It's impossible to speculate as to what trees might have, could have and didn't come down because they were trimmed."⁵¹ This article cited comments along the same lines by Tom Frantz, Director of the New Hampshire Public Utilities Commission Electric Utilities Division:

Pruning more trees would not have prevented the widespread power outages in this ice storm, said Tom Frantz, director of the electric utility division for the state Public Utilities Commission. That's because most of the trees that took down lines grew outside the trim zone, he said. Only 20 percent to 25 percent of the trees that caused the outages were inside the area where utility companies would normally cut trees or branches. "Unless you moved through the rights-of-way and took out a huge amount of trees," Frantz said, the damage could not have been prevented. "New Hampshire's a heavily forested state." Tree trimming works to improve reliability in normal circumstances, and utility companies and the Public Utilities Commission have taken steps to improve tree maintenance programs, he said.

In the 2008 Ice Storm, trees outside of relatively wide transmission right-of-ways caused damage. Healthy trees that had up to an inch and a half of ice were uprooted and fell on power lines, causing poles to snap. Unitil had to replace nearly 300 poles across

⁵⁰ Ice Storms: Hazardous Beauty, Dr. Keith C. Heirdorn, 1998. According to his bio, Dr. Heidorn, "has over thirty years experience in meteorology, climatology, air quality assessment and education, specializing in the fields of air quality assessments, atmospheric dispersion modeling, micrometeorology, climatology and, most recently as an educator on global change issues." This citation can be found at <http://www.islandnet.com/~see/weather/elements/icestorm.htm>.

⁵¹ "New Hampshire Utilities Blame Weather, Not Tree-Trimming For Outages," Eagle Tribune article authored by Margo Sullivan, December 17, 2008.

its three divisions in order to restore power.⁵² Fortunately, the 2008 Ice Storm had relatively modest winds or the damage would have been much more significant.

10. Discuss Grid Reliability Standards Issues and Infrastructure Management, Including Scheduling of Line Maintenance, and Transmission Maintenance Outage Scheduling

(a) *Grid Reliability Standards Issues*

The North American Electric Reliability Corporation ("NERC") develops and maintains reliability standards which define the reliability requirements for planning and operating the North American bulk power system.⁵³ FG&E is registered with NERC as a Load Serving Entity and Distribution Provider. FG&E is in compliance with all applicable NERC Reliability Standards.

FG&E does not own or operate bulk power facilities, however it is still required to maintain compliance with the applicable NERC Reliability standards, which cover areas such as:

- Cyber Security
- Under-voltage Load Shedding Programs
- Reliability Coordination
- Protection System Testing
- Underfrequency Load Shedding
- Sabotage Reporting
- Disturbance Reporting
- Operations Planning
- Special Protection Systems

(b) *Infrastructure Management*

The FG&E system is presently supplied from the National Grid 115kV transmission system. Four National Grid 115kV transmission lines terminate at the Flag Pond 115kV ring bus from two different sources (two lines from Pratts Junction and two

⁵² This number of poles set in does not include poles replaced by Verizon and FairPoint.

⁵³ The NERC Reliability Standards can be found at <http://www.nerc.com/page.php?id=2/20>.

lines from Bellows Falls). Both pairs of lines are double-circuited on common towers. The only identified transmission equipment that FG&E owns and operates is the 115kV ring bus at Flagg Pond.

FG&E connects to the regional electric grid at only one location, the Flagg Road Substation. Flagg Pond substation is designed with a high degree of redundancy. The 115 kV ring bus provides a substantial improvement in reliability and operating flexibility compared to a straight bus configuration. The substation is equipped with redundant transformers so that the loss of one transformer will not interrupt service to the system. Flagg Pond is also designed with a 69kV ring bus which improves reliability and increases operating flexibility on the 69kV system.

Unitil has considered whether it is possible to establish a second connection to the regional grid, particularly to back-feed the system, but there are no nearby transmission lines of sufficient capacity to make this feasible. However, FG&E has developed plans to construct a second supply point into the center of the FG&E system off of the same 115kV lines that connect Pratts Junction to Flagg Pond. This will provide the opportunity for FG&E to split its system into two distinct systems to address capacity concerns and improve reliability.

FG&E's subtransmission system consists of seven 69kV parallel lines and is designed to withstand the loss of any one element plus the loss of all non-utility owned generation under peak loading conditions.

In order to maintain reliable transmission, subtransmission and substation equipment, FG&E follows a set of operations bulletins which describe inspection, maintenance and testing procedures and guidelines for the equipment. A summary of the

operations bulletins associated with transmission and subtransmission, and substation maintenance are shown in the table below.

<u>Operations Bulletin</u>	<u>Description</u>
OP 2.00	<u>Transmission Inspections</u>
OP 3.00	<u>Substation Inspection Test Maintenance</u>
OP 3.01	<u>Substation Transformers</u>
OP 3.02	<u>Interrupting Devices</u>
OP 3.05	<u>Isolating Devices</u>
OP 3.06	<u>Supervisory Control and Data</u>
OP 3.07	<u>Protective Relays</u>
OP 3.08	<u>Infrared Survey</u>
OP 3.12	<u>Substation Batteries</u>
OP 3.13	<u>Insulation Oil Analysis</u>
OP 3A.14	<u>Substation Monthly V&O Inspection</u>
OP 3A.15	<u>Substation Annual Inspection</u>
OP 5.00	<u>Vegetation Management</u>
OP 8.00	<u>Critical Spares Policy</u>
OP 10.00	<u>Electric Test Equipment</u>

Table 5.

Copies of these operation bulletins are included in Attachment III.A.10(b).

(c) *Scheduling of Line Maintenance and Transmission Maintenance Outage Scheduling*

As stated above, the only transmission equipment that FG&E owns is the 115kV ring bus located at Flagg Pond. FG&E operates its 115kV ring bus in conjunction with ISO Operating Procedure #3 (OP3) for scheduling and coordination of outages on its 115kV facilities (primarily 115kV ring bus). The Rhode Island, Eastern Massachusetts, Vermont Energy Controls ("REMVEC") is the entity that controls the scheduling for switching activities in the Local Control Area.

FG&E operates all of its Local Area Facilities (69kV and below) per a policy which guides all switching activities.⁵⁴ This Policy outlines and standardizes the process of completing electric switching operations and electric safety tagging at all Unitil locations where personnel are engaged in the operation or maintenance of lines and equipment, including the areas of transmission, subtransmission, distribution and substations. This Policy defines the requirements for electric system switching and safety tagging operations. The primary goals of this policy are to protect employees working under all conditions, protect equipment from damage, and direct attention to abnormal or special conditions.

Switching operations required to support maintenance or construction activities is considered to be "planned switching". Switching orders are to be submitted two days in advance to allow the appropriate individuals an adequate amount of time to evaluate the affect this switching will have on the system.

All planned switching is reviewed and approved by at least one representative from Unitil's Engineering Department and one representative from Operations Department. Engineering is responsible for reviewing switching orders for reliability, loading, equipment ratings, protection schemes, and proper equipment identification. Operations is responsible for reviewing switching orders for reliability, proper equipment operating conditions, safety clearance, actual system configuration and proper use of safety tags. Engineering and Operations strive to keep the system in a normal operating configuration whenever there is the threat of adverse weather. Planned switching operations on a given day require approval from REMVEC, the Controlling Authority.

⁵⁴ A copy of this policy, *Electric System Switching and Safety Tagging RB, DS 5.02 (H)* is included in Attachment III.A.10(c).

11. Identify Company Practices That Require Improvement and Propose Modifications

In the aftermath of the 2008 Ice Storm, Unitil's has identified the following general areas for improvement, and provides a set of preliminary recommendations for modifications relevant to those areas. As noted herein, Unitil is also completing a self-assessment which will further detail lessons learned and recommendations, and may include additional recommendations.

1. Storm Readiness

Unitil believes that its capital and maintenance expenditures, including the more specific tree-trimming and pole maintenance/replacement policies, are adequate and that the devastating impact of the storm was not related to any deficiency in equipment or system maintenance. However, the company will review these practices with the Department and local communities to determine if any improvements can be made.

With respect to the ERP, Unitil has identified specific practices that are candidates for modification in order to ensure the company is better able to respond to a storm that causes extensive damages across a large geographic region.

Current recommendations to improve the ERP include the following:

- Review primary and secondary roles and responsibilities to ensure functions are clearly defined and correspond to the impact of the storm;
- Differentiate between centralized support and management services and local or decentralized operations to ensure response activities are performed efficiently, and enable division operating personnel to focus primarily on restoring power and coordination with local safety officials (certain logistical support functions were centralized during the 2008 Ice Storm);

- Consider and formalize appropriate additional contingencies to ensure ERP can be adjusted to accommodate storms of varying impact, and will allow for unexpected deviations from the plan to respond to issues as they arise during a storm event;
- Standardize ERP to apply to all three Unitil divisions, with distinct information, including local contact numbers, maintained in division-specific attachments;
- Incorporate and ensure consistency of Unitil's new Emergency Information Center into the communications section of the ERP;
- Expand ERP to include formalized responsibilities for non-operations employees serving in storm support roles as a second job (non-operations employees served in support roles during the 2008 Ice Storm);
- Revise ERP in response to DPU directives from current proceeding and to incorporate feedback from other participating stakeholders, including the Attorney General and city and town officials;
- Ensure periodic updates to the ERP are based on input from internal resources and external stakeholders, with direction by a member of senior management, and in participation with the three division managers; and
- Contact numbers should be reviewed and updated quarterly under the direction of division managers (contact numbers have been updated since the 2008 Ice Storm).

The process of revising the ERP for all of Unitil is underway.

2. Storm Preparations and Restoration

Practices that can be improved based on the experience gained during the December 2008 ice storm include the approach to retention of outside crews, staffing of logistics support personnel, early and more detailed damage assessment, estimating total crew days likely to be required, preparing crews for the following day's activities, and communications between crews in the field and storm restoration managers.

Current recommendations in this area include the following:

- Evaluate strategy to retain contract crew commitments, taking into account Unitil's particular circumstances and external market considerations;

- Develop an approach for stand-by crew deployment that is efficient and economical;
- Evaluate strategy to facilitate availability of electricians to customers to perform on premises electrical work for equipment not owned or maintained by Unitil;
- Evaluate options for more efficient refueling and stocking of bucket crews with storm restoration material;
- Identify and train additional personnel to perform damage assessment as a second job;
- Consider and formalize, if warranted, criteria for revising crew hour estimates based on extent and nature of damage indicated in initial assessment;
- Improve reliability of communications technology for crews in the field during widespread power outage conditions; and
- Establish a more expedient way for crews to provide feedback on repairs that have been completed.

3. Public Communications

Unitil believes that improvements should be made in the process of communicating with the general public, the elected and other public officials as well as the use of media to do so. The information that is relied upon in these public communications should also be improved. In at least once respect, the establishment of an Emergency Information Center, changes have already been implemented during the preparations for two storms that had a potential impact on Unitil's Fitchburg division.

Current recommendations in this area include the following:

- Clarify communications roles in ERP;
- Evaluate and revise protocol for outreach to public officials and members of the media as the storm approaches and throughout the restoration period (a revised protocol was employed during the January 2009 storm events);

- Revise process to ensure that all public-facing personnel, including public communications staff, the call center, operations personnel, and personnel embedded in town EOCs have a common source of information and communicate consistent messages throughout the restoration period
- Clarify roles and responsibilities of personnel embedded in town EOCs and ensure protocols provide them with the information and tools necessary to perform these functions;
- Employ both traditional media (*e.g.*, newspaper placements) and less traditional forms of communication to reach more customers;
- Provide more details on the extent of the damage and specific information about the process employed by Unitil to restore power; and
- Investigate technology and systems that will provide more accurate information on customers that remain without power and designate appropriate resources to implementing these (this technology review is underway).

4. Customer Communications

The frequency of public communications and quality of information also affected the performance of the call center as the number of customers trying to get through to a CSR placed extraordinary stress on the call-handling capacity of the call center and on the representatives handling the calls. Though increased communications on the status of repair and areas of remaining outage would not have changed the timing of service restoration, Unitil recognizes that more proactive dissemination of such information and increased customer service capacity in storms of this magnitude would provide a valuable customer satisfaction service, and potentially decrease customer frustration during extended outages.

Current recommendations in this area include the following:

- Increase capacity of the call center for incoming and outgoing calls (call center capacity has been increased from 72 lines to 120 lines);

- Explore additional Interactive Voice Response (IVR) capabilities to provide more valuable information through the IVR, and designate appropriate resources;
- Evaluate third-party overflow operations for the call center and the IVR (Unitil has been in contact with third-party providers);
- Make greater use of the IVR outgoing call function to communicate proactively with customers;
- Ensure that call center representatives have access to the most current information on storm restoration progress;
- Expand the number of call center staff by training capable non-call center personnel to perform in this role during major and prolonged outages;
- Modify Unitil's website to make it easier for customers to initiate storm related contacts; and
- Implement a new process to review decisions made with respect to estimated billing after a prolonged outage.

IV. CONCLUSION

The 2008 Ice Storm left an unprecedented wave of destruction across a wide swath of the Northeastern United States. The areas served by Unitil were hard hit but none harder than its Massachusetts customers, who bore the brunt of the storm. The storm left approximately 1.2 million customers without power including approximately 28,000 Unitil customers in Fitchburg, Lunenburg, Townsend and Ashby. In order to restore power to these customers, large portions of the region's electric infrastructure had to be rebuilt in a matter of days, including 36 miles of new wire, over 200 poles, 6000 splices and 2000 fuselinks in the four towns served by FG&E. To put this magnitude of the storm in perspective, FG&E installed almost four years worth of wire in the two week period of the storm restoration.

Unitil restored power to its last customer on December 25, fully two weeks after the storm had hit. This was accomplished through the tireless efforts of Unitil's employees with the assistance of additional crews that had traveled from as far away as Michigan and Tennessee to help restore power. Many of these men and women worked 16-hour shifts for the entire stretch. The crews, in particular, worked under very difficult conditions, including seven consecutive days of sub-freezing and two substantial snowstorms. Municipal officials and employees, including police and fire departments, the National Guard and other first responders also participated in the storm response effort.

The 2008 Ice Storm was a painful event for Unitil and its customers. As detailed in this Report, Unitil has identified a number of areas where it will be implementing changes to its processes, systems and operations to address a storm of this magnitude in the future. Unitil is committed to institute changes that are needed for FG&E to provide exemplary performance in restoring power and communicating with customers in future major storm events.