



Unitil Energy Systems, Inc.  
Major Storm Cost Reserve Fund Report  
2012

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Unitil Service Corp.

February 27, 2013

## **Introduction**

Unitil Energy Systems, Inc. (“UES” or the “Company”) submits this Major Storm Cost Reserve (“MSCR”) Fund Report for the period ended December 31, 2012. This filing complies with the New Hampshire Public Utilities Commission (“Commission”) requirements set forth in the Company’s Rate Plan Settlement Docket No. DE 10-055 and as ordered in the Commission’s Order in DE 11-277 Order No. 25,351 *Order Granting Increase to Storm Recovery Adjustment Factor* (“SRAF”) issued April 24, 2012. The rate levels resulting from the distribution revenue changes specified in Section 2 of DE 10-055 include \$0.4 million annually for the MSCR, which will be used to recover costs associated with responding to and recovering from qualifying major storms.

The MSCR Fund Balance at December 31, 2012 is a deficit of (\$2.9 million), reflecting an increase in the fund’s deficit of (\$2.5 million) from the MSCR Fund opening balance of (\$0.4 million) at January 1, 2012 - See *UES MSCR Fund Balance Rollforward Schedule* on page 3. The increase in the fund’s deficit from 2012 activity primarily relates to storm restoration costs incurred during Hurricane Sandy, in October, of \$2.3 million. The 2012 MSCR storm costs have been reviewed for accuracy, completeness and proper classification by Unitil’s Internal Audit staff.

Excluding the Hurricane Sandy costs of \$2.3 million, which the Company will propose to recover through the Storm Recovery Adjustment Factor in an upcoming filing with the Commission, the MSCR fund balance is a deficit of (\$0.7) million at December 31, 2012. In addition, the Company has incurred significant costs for storm events since December 31, 2012, such as the February blizzard, and the Company projects the MSCR fund deficit will exceed (\$1.2) million at March 31, 2013. To address the projected deficit balance in the MSCR, the Company will propose to increase the annual MSCR funding level from \$0.4 million to \$0.8 million effective with the implementation of the Company’s next step adjustment in May 2013.

## **MSCR ACCRUAL AND RECOVERY OF CERTAIN STORM RESTORATION COSTS**

The Settlement Agreement in DE 10-055 provides, in part, in Section 8, that:

Qualifying major storms shall include severe weather events causing 16 concurrent troubles (interruption events occurring on either primary or secondary lines) and 15 percent of customers interrupted, or 22 concurrent troubles, in either UES' Capital or Seacoast regions, as well as costs associated with planning and preparation activities in advance of severe weather if a qualifying major storm is likely to occur. Planning and preparation activities will include pre-staging of crews, standby arrangements with external contractors, incremental compensation of employees, and other costs that may be incurred to prepare for a qualifying major storm. A qualifying major storm will be considered likely to occur if the Power Disruption Index ("PDI") from the Company's professional weather forecaster reaches a PDI level of 2 or greater with a "high" (greater than 60 percent) level of confidence. (Section 8.1)

The parties recognize that certain weather events may result in extraordinary expenditures to prepare for, or recover from, storms or natural disasters that do not meet the defined criteria for a qualifying major storm. The Company may petition the Commission to recover the extraordinary costs of such events from the MSCR and has the burden to demonstrate the reasonableness of its expenditures. (Section 8.2)

PDI levels are indices developed by Unitil's previous weather forecast provider, WSI Corporation of North Andover, MA. A PDI level is dependent upon various types of weather impacts and is a qualified indicator of both the possibility and severity of a particular weather event having the potential for customer outages. (Settlement Agreement, DE 10-055, Section 8.1, Footnote 5)

The Company now contracts with Schneider Electric (Formerly Telvent DTN) of Burnsville, MN, which developed EII level index. Similar to the PDI index referenced in the Settlement Agreement, an EII level is dependent upon various types of weather impacts and is a qualified indicator of both the possibility and severity of a particular weather event having the potential for customer outages. An EEI level of 3 is equivalent to a PDI level of 2.

**Unitil Energy Systems, Inc.**  
**Major Storm Cost Reserve (MSCR) Fund - Rollforward**  
**As of December 31, 2012**

Section #	Date	Description	Amount
	1/1/2012	Opening Balance	\$ (435,764)
<b>2012 MSCR Activity:</b>			
	1/1 - 12/31/2012	Current Rate Recovery	400,000
1.6	1/26/2012	Winter Storm	(154,618)
2.6	3/1/2012	Winter Storm	(124,615)
3.6	9/18/2012	Wind/T-Storms	(75,428)
4.6	10/29/2012	Hurricane Sandy	(2,269,530)
5.6	12/27/2012	Winter Storm	(246,544)
---	1/1/2012- 12/31/2012	Carrying Charges	(26,947)
	12/31/2012	MSCR Balance	\$ (2,933,446)

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Attachments

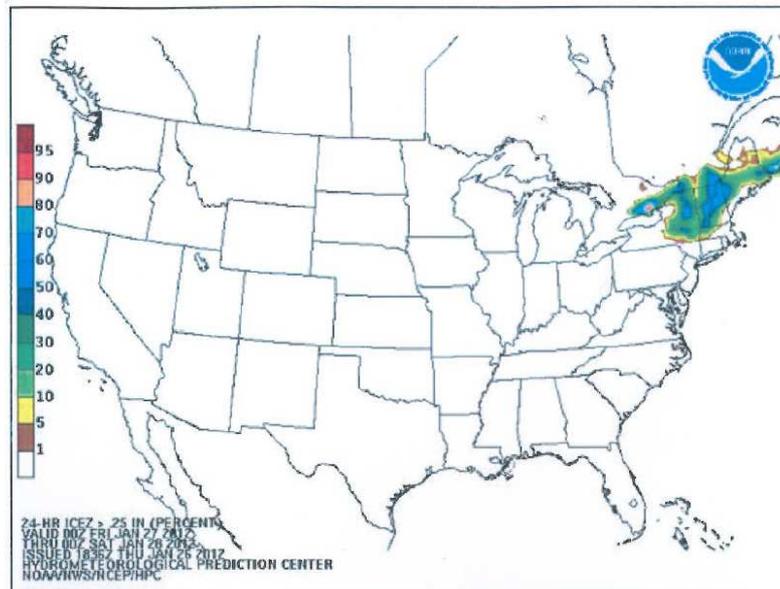
Attachment A - Weather Estimated Impact Indices (EII)

Attachment B - After Action Report – Super Storm Sandy

## 1. Winter Storm (January 26<sup>th</sup>, 2012)

### 1.1. Description of the Storm

On January 26<sup>th</sup>, 2012 a wintery mix of snow, sleet, and freezing rain moved across the region overnight and into the early morning hours of January 27<sup>th</sup>. Winter storm and blizzard watches and warnings were issued by weather forecasters across the region. The primary concern for Unitil was the forecasted ice accretions which ranged between 0.25-0.50 inches and wind gusts up to 35 mph. However, as the storm passed through the region, the temperatures remained favorable resulting in less than forecasted ice accretion.



Ice Accretions Predictability (January 26<sup>th</sup>, 2012)

### 1.2. Summary of the Extent of the Storm Damage

Unitil Energy Systems experienced marginal impact to its service territories as the storm system passed through the region. Throughout the day Unitil Energy Systems experienced 7 outages (6 of those in the Capital region) that affected approximately 2,402 customers. With the available acquired resources each outage was promptly restored with no outage lasting longer than 2 hours.

### 1.3. Preparations

Unitil began to monitor the storms progression prior to the forecasted impact date on a region by region basis. Unitil held its first system-wide preparatory conference call on January 26<sup>th</sup> to initiate logistic activities and align the ICS organization. Based on the forecasted predictions of ice accretions and the likelihood of elevated wind gusts the Company began preparation activities including the release of a Public Service Announcement (PSA) and notifications to customers, regulators, municipals, and emergency management officials. Additionally, for this event UES acquired approximately 19 line and 8 tree crews, specifically for the Capital region which was forecasted to receive the worst of the inclement weather.

1.4. Restoration

As the storm progressed across the region the temperatures gradually increased, limiting the amount of ice that accreted on trees and wires. As a result, the event caused less than expected damage and customer outages across UES service territories. Small outages were reported overnight and throughout the day with 6 out of the 7 reported outages in the Capital region. The Company was able to quickly respond with the available resources. Once the temperatures began rising the following morning of January 27<sup>th</sup>, the additional acquired resources were released.

1.5. Exclusionary Criteria

Based on the forecast, the storm was capable of having a significant impact on UES customers (predicted levels of ice and wind speed) and met the weather exclusionary criteria (weather forecast attached) for storm reserve treatment related to preparatory activities; however it did not qualify under the outage exclusionary criteria.

**Severe Weather Alert Service From Telvent  
For Unitil Services Corp**

Date: January 26, 2012

Time: 1:45 PM EST

Forecaster: J. Meikle

Zones	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	NONE	ICE	ICE	NONE
Event Begin Time		2AM	9PM	
Event End Time		9AM	3AM	
Day 1 EII	1	3	2	1
Event Confidence		MEDIUM	LOW	
Tstrm Wind Gusts				
Ltng Intensity				
Storm Mvmt Dir				
Rain Amount				
Snow Amount				
Snow Character				
Ice Amount		0.25-0.50"	TR-0.10"	
Sustained Wind				
Wind Gust				
Temp. Extremes	40/30	38/29	41/31	37/29
EII	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Day 2 Snow	1	1	1	1
Day 2 Ice	2	4	3	2
Day 2 Wind	1	1	1	1

Day 2 Gust	1	1	1	1
Day 2 Confidence	High	Low	Medium	High
Day 3 Snow	1	1	1	1
Day 3 Ice	1	1	1	1
Day 3 Wind	1	1	1	1
Day 3 Gust	1	1	1	1
Day 3 Confidence	High	High	High	High

1.6. Qualifying Costs Charged to the Storm Reserve

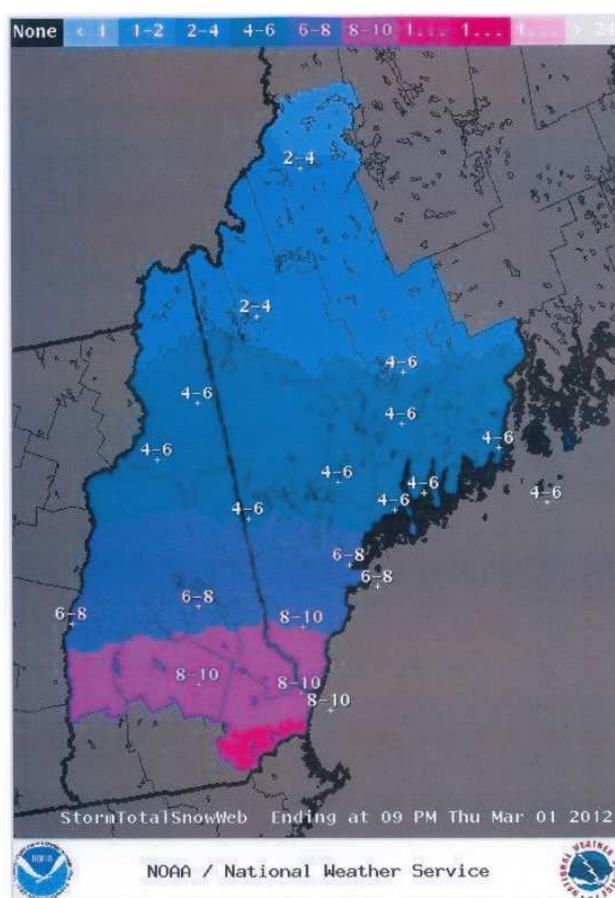
The total amount charged to the storm reserve for this event was:

Payroll	\$	5,271
Materials & Supplies		591
Transportation, USC Time & Expenses		590
Contractor Invoices & Other		149,935
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Total Expenditures	\$	156,387
Utility Plant Additions		(1,769)
<hr/>		
Charged to MSCR	\$	154,618
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## 2. Winter Storm (March 1<sup>st</sup>, 2012)

### 2.1. Description of the Storm

Throughout the evening of Wednesday, February 29<sup>th</sup> and into the morning hours of Thursday, March 1<sup>st</sup> a storm passed over northern New England producing a mix of heavy, wet snow and blustery winds. Approximately seven (7) inches of moderately wet snow fell across the Capital region while the Seacoast region experienced one (1) to two (2) inches of heavier, wet snow. Wind gusts up to 26 mph were felt in the Capital region with higher wind speeds (greater than 32 mph) felt in the Seacoast region. While the Capital region experienced larger amounts of moderately wet snow, the wet consistency snow and higher wind gusts occurred closer to the coast causing numerous interruptions in the Seacoast region.



NOAA Snow Predictions (March 1, 2012)

### 2.2. Summary of the Extent of the Storm Damage

The Capital region experienced little damage and few customer interruptions as a result of the weather however; the Seacoast region experienced 24 scattered outages throughout the day impacting approximately 1,482 customers with a peak of 6 concurrent outages occurring at 9:00 a.m. impacting 320 customers. Nearly all outages were attributed to tree limb contact with most short in duration being restored in under 2 hours.

2.3. Preparations

Unitil began its preparations by holding a system-wide conference call on Wednesday, February 29<sup>th</sup>. The company then issued a Public Service Announcement (PSA) and initiated Company outreach with life support customers, regulators, emergency response, and municipal officials. In addition to other preparatory activities, Unitil acquired approximately 21 line and 15 tree crews, for the NH territory with Capital initially receiving the majority of resources based on the higher forecasted snow amounts. Once the adverse weather moved into the region, it became evident that the Seacoast region was experiencing the majority of outages and resources were shifted to support restoration efforts there.

2.4. Restoration

The Capital region experienced little damage and few customer interruptions as a result of the weather however; the Seacoast region experienced 24 scattered outages throughout the day impacting approximately 1,482 customers with a peak of 6 concurrent outages occurring at 9:00 a.m. impacting 320 customers. With the additional resources shifted to the Seacoast region, the Company was able to swiftly repair and restore outages, most in under 2 hours.

2.5. Exclusionary Criteria

Based on the forecast this event was capable of having a significant number of customer interruptions (wet snow prediction of 7 inches and wind speed greater than 35 mph). The event met the weather exclusionary criteria (weather forecast attached) for storm reserve recovery of preparatory activities however it did not qualify under the outage exclusionary criteria.

**Severe Weather Alert Service From Telvent  
For Unitil Services Corp**

Date: February 29, 2012  
Time: 6:15 PM EST  
Forecaster: Tony Dello

Zones	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	SNOW	SNOW	SNOW	SNOW
Event Begin Time	NOW	NOW	NOW	10PM
Event End Time	ONGOING	ONGOING	ONGOING	ONGOING
Day 1 EII	3	3	3	3
Event Confidence	HIGH	HIGH	HIGH	HIGH
Tstrm Wind Gusts				
Ltng Intensity				
Storm Mvmt Dir				
Rain Amount				
Snow Amount	6-11"	8-12"	8-12"	8-12"
Snow Character	WET	NORMAL	NORMAL	WET
Ice Amount				

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Sustained Wind				
Wind Gust				
Temp. Extremes	34/28	33/27	34/28	33/26
<b>EII</b>	<b>SEACOAST</b>	<b>CAPITAL</b>	<b>FITCHBURG</b>	<b>PORTLAND</b>
Day 2 Snow	4	3	3	4
Day 2 Ice	1	1	1	1
Day 2 Wind	1	1	1	1
Day 2 Gust	1	1	1	1
Day 2 Confidence	High	High	High	High
Day 3 Snow	1	1	1	1
Day 3 Ice	1	1	1	1
Day 3 Wind	1	1	1	1
Day 3 Gust	1	1	1	1
Day 3 Confidence	Medium	Medium	Medium	Medium

2.6. Qualifying Costs Charged to the Storm Reserve

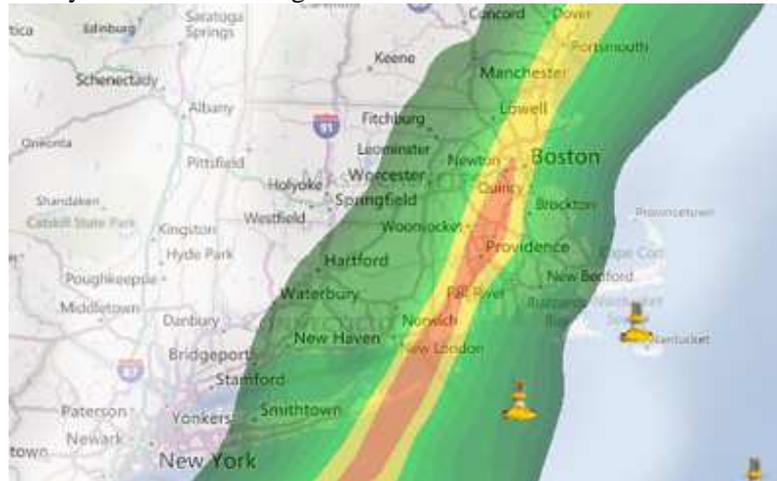
The total amount charged to the storm reserve for this event was:

Payroll	\$	14,400
Materials & Supplies		851
Transportation, USC Time & Expenses		2,641
Contractor Invoices & Other		117,107
Total Expenditures	\$	134,999
Utility Plant Additions		(10,384)
Charged to MSCR	\$	124,615

### 3. Wind/T-Storms (September 18<sup>th</sup>, 2012)

#### 3.1. Description of the Storm

On Tuesday, September 18<sup>th</sup> a band of thunderstorms passed over the region bringing heavy rain and blustery winds. Particularly hard hit was the Seacoast region where strong gusty winds were felt. As the storm moved towards the coast, the intensity decreased and only caused minor interruptions, mostly in the Seacoast region.



Storm Radar (Sept 18<sup>th</sup>, 2012)

#### 3.2. Summary of the Extent of the Storm Damage

The Capital region experienced 4 scattered outages impacting a total of 1,105 customers as a result of the weather however; the Seacoast region experienced 19 scattered outages throughout the early evening and into the morning hours on Wednesday impacting approximately 1,055 customers. The peak for UES occurred at approximately 11:00 p.m. on Wednesday with 11 concurrent outages impacting 900 customers. Nearly all outages were attributed to tree limb contact with most being short duration; restored in under 2 hours.

#### 3.3. Preparations

Unitil began its preparations by holding system-wide conference calls on Tuesday, September 18<sup>th</sup> at 8:30 a.m. and again at 1:30 p.m. to coordinate resources and preparatory activities. Municipal and Elected Officials as well as Regulatory and State Emergency Management Officials were notified via a Pre-Event Stage Report of a possible impact. Unitil acquired approximately 12 line and 16 tree crews, for the NH territory. The EOCs operated in a partially decentralized mode with additional staff in all operating centers.

#### 3.4. Restoration

Scattered outages were repaired with contracted resources throughout the night and early morning hours until full restoration was complete at approximately 6:00 a.m. the following morning.

3.5. Exclusionary Criteria

Based on the forecast this event was capable of creating a significant number of customer interruptions. The event met the weather exclusionary criteria (weather forecast attached) for storm reserve recovery of preparatory activities however it did not qualify under the outage exclusionary criteria.

**Severe Weather Alert Service From Telvent  
For Unitil Services Corp**

Date: September 18, 2012

Time: 1:00 PM EDST

Forecaster: J Meikle

Zones	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	WIND/TSTM	WIND/TSTM	WIND/TSTM	WIND/TSTM
Event Begin Time	4PM	4PM	4PM	4PM
Event End Time	4AM	2AM	2AM	5AM
Day 1 EII	3	3	3	3
Event Confidence	HIGH	HIGH	HIGH	HIGH
Tstrm Wind Gusts	45-60	45-60	45-60	45-60
Ltng Intensity	LOW	LOW	LOW	LOW
Storm Mvmt Dir	NE	NE	NE	NE
Rain Amount	0.75-2.00	1.00-2.00	1.00-2.00	0.75-2.00
Snow Amount				
Snow Character				
Ice Amount				
Sustained Wind	20-30	20-30	20-30	20-30
Wind Gust	35-45	35-45	35-45	35-50

Temp. Extremes	72/54	74/49	76/56	69/53
EII	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Day 2 Snow	1	1	1	1
Day 2 Ice	1	1	1	1
Day 2 Wind	1	1	1	1
Day 2 Gust	3	3	3	3
Day 2 Confidence	Low	Low	Low	Low
Day 3 Snow	1	1	1	1
Day 3 Ice	1	1	1	1
Day 3 Wind	1	1	1	1
Day 3 Gust	1	1	1	1
Day 3 Confidence	High	High	High	High

3.6. Qualifying Costs Charged to the Storm Reserve

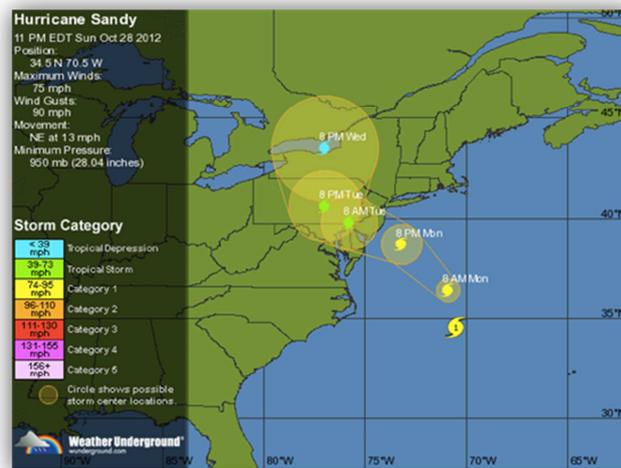
The total amount charged to the storm reserve for this event was:

Payroll	\$	3,475
Materials & Supplies		532
Transportation		455
Contractor Invoices & Other		75,876
Total Expenditures	\$	80,338
Utility Plant Additions		(4,910)
Charged to MSCR	\$	75,428

#### 4. Super Storm Sandy (October 29<sup>th</sup>, 2012)

##### 4.1. Description of the Storm

Hurricane Sandy, the 10<sup>th</sup> hurricane of the 2012 Atlantic Hurricane Season that devastated portions of the Caribbean and Mid-Atlantic before impacting the Northeastern United States, became the second-costliest Atlantic Hurricane, only surpassed by Hurricane Katrina. With winds spanning over 1,000 miles in diameter, Hurricane Sandy impacted New England areas with high gusty winds and heavy rainfall, throughout the afternoon and early evening of Monday, October 29<sup>th</sup>. Unitil has completed an after action report of the event which is attached ([Attachment B](#))



Super Storm Sandy Track (October 29, 2012)

##### 4.2. Summary of the Extent of the Storm Damage

Effects from Hurricane Sandy were felt throughout the morning and afternoon hours on Monday, October 29<sup>th</sup>, when outages began occurring at approximately 10:00 a.m. Unitil experienced peak interruptions at 4:00 p.m. of the same day with 31,000 at peak and 69,000 total customers impacted in the New Hampshire service area (peak represents 42% of Unitil's NH electric customers) the majority of which were caused by broken tree limbs.

##### 4.3. Preparations

Utilizing various media and weather outlets, Unitil began monitoring the storm's development on Monday, October 22<sup>nd</sup>. Once the forecast established a storm path that would impact the New England region, the Company formally began its preparations. A system-wide conference call was held Thursday, October 25<sup>th</sup>, which initiated a series of preparatory activities and activated the Company's Incident Command System (ICS). Preparatory activities prior to Sandy's impact included but were not limited to: notifying Regulators, State Emergency Centers, and Municipal and Elected Officials; mobilizing all Company personnel assigned a Storm Assignment and cancelling vacations; issuing multiple Public Service Announcements (PSAs) that incorporated warning and preparatory information; contacting customers and providing specific storm-related preparatory information; and participating in regional and national mutual assistance conference

calls. In addition, Unitil acquired approximately 52 line crews, 27 tree crews, 28 damage assessors, and 50 wires down personnel for the NH territory.

4.4. Restoration

Unitil's NH Electric Operations were able to restore power to 95% of the affected customers by 10:00 p.m. of the following day, Tuesday, October 30<sup>th</sup>, with complete restoration to all customers by 11:00 p.m. the next day, October 31<sup>st</sup>.

4.5. Exclusionary Criteria

Based on the magnitude of the storm and damage to the system, the exclusionary criteria was met for both preplanning and restoration activities.

4.6. Qualifying Costs Charged to the Storm Reserve

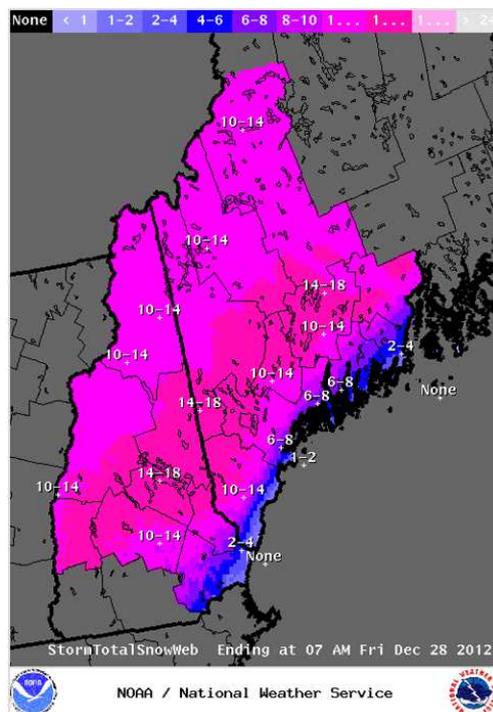
The total amount charged to the storm reserve for this event was:

Payroll	\$	193,630
Materials & Supplies		41,525
Transportation, USC Time & Expenses		83,983
Contractor Invoices & Other		2,299,890
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Total Expenditures	\$	2,619,028
Utility Plant Additions		(349,498)
<hr/>		
Charged to MSCR	\$	2,269,530
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## 5. Winter Storm (December 27<sup>th</sup>, 2012)

### 5.1. Description of the Storm

On the evening of Wednesday December 26<sup>th</sup>, a winter storm was forecasted to move across the New England region and continue through the following 36 hours. Several winter storm watches and advisories were issued by NOAA and Unitil's forecasting service. The concern related to this storm included the size and duration of the event and amount of predicted snowfall. Another risk was the ambiguity of the of transition line between snow and a wintery mix of ice, sleet and rain that referenced possible accumulations of wet snow in excess of 6" with ice accretion over ¼ inch.



Predicted Snow Totals (December 27<sup>th</sup>, 2012)

### 5.2. Summary of the Extent of the Storm Damage

The event resulted in little damage and few interruptions in the Capital region, however the Seacoast region experienced a total of 9 outages throughout the day affecting 10,356 customers with a peak of 5 concurrent outages affecting 7,616 customers occurring at approximately 5:00 a.m. on December 27<sup>th</sup>. The outages were responded to quickly and all customers were promptly restored throughout the morning of Thursday, December 27<sup>th</sup> with fewer and smaller, outages occurring in the afternoon.

### 5.3. Preparations

Once elevated EII levels were identified by the forecaster, Unitil held a system-wide storm call on Wednesday, December 26<sup>th</sup> to coordinate response activities. The Company issued a Public Service Announcement (PSA) regarding the predicted winter weather and initiated

communications with customers, regulators, emergency response and municipal officials. In addition to other preparatory activities, Unitil acquired approximately 24 line crews, 20 tree crews and 12 wires down personnel for the NH service territory. The decision to acquire additional crews was based on the forecast and a desire to mitigate extended outages during the holiday season.

5.4. Restoration

At peak, Seacoast experienced 5 concurrent outages interrupting approximately 7,616 customers that were restored within 1 ½ hours following the outage. Smaller additional outages were experienced throughout the afternoon with all outages repaired by 4:00 p.m. of the same day.

5.5. Exclusionary Criteria

Based on the forecast this event was capable of having a significant impact on UES customers and met the weather exclusionary criteria (weather forecast attached) for storm reserve treatment of preparatory activities however it did not qualify under outage exclusionary criteria.

**Severe Weather Alert Service From Telvent  
For Unitil Services Corp**

Date: December 26, 2012

Time: 1:00 PM EST

Forecaster: J Meikle

Zones	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	SNOW/GUST	SNOW/GUST	SNOW/GUST	SNOW/GUST
Event Begin Time	9PM	9PM	8PM	10PM
Event End Time	12PM THU	12AM FRI	12AM FRI	2PM THU
Day 1 EII	2	3	2	3
Event Confidence	MEDIUM	HIGH	MEDIUM	MEDIUM
Tstrm Wind Gusts				
Ltng Intensity				
Storm Mvmt Dir				
Rain Amount				
Snow Amount	2-6"	6-12"	4-7"	6-12"
Snow Character	WET	WET	WET	WET
Ice Amount	Tr-0.15		0.05-0.20	
Sustained Wind				
Wind Gust	40-50			40-50
Temp. Extremes	37/29	33/27	35/29	35/27
EII	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Day 2 Snow	3	3	1	2
Day 2 Ice	1	1	1	1

Day 2 Wind	1	1	1	1
Day 2 Gust	2	1	1	2
Day 2 Confidence	Medium	Medium	Medium	Medium
Day 3 Snow	1	1	1	1
Day 3 Ice	1	1	1	1
Day 3 Wind	1	1	1	1
Day 3 Gust	1	1	1	1
Day 3 Confidence	High	High	High	High

5.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was:

Payroll	\$	3,860
Materials & Supplies		2,073
Transportation		1,164
Contractor Invoices & Other		252,787
<u>Total Expenditures</u>	<u>\$</u>	<u>259,884</u>
Utility Plant Additions		(13,340)
<u>Charged to MSCR</u>	<u>\$</u>	<u>246,544</u>

Attachment A

**Estimated Impact Indices (EII)**

Forecasted Wind Speed/Wind Gusts \*WITH LEAVES\* (April 1 - October 31)

<b>Level</b>	<b>Wind Speed</b>	<b>Wind Gusts</b>
EII = 2	> 30 mph	> 35 mph
EII = 3	> 45 mph	> 50 mph
EII = 4	> 60 mph	> 65 mph
EII = 5	> 70 mph	> 75 mph

Forecasted Wind Speed/Wind Gusts \*WITHOUT LEAVES\* (November 1 - March 31)

<b>Level</b>	<b>Wind Speed</b>	<b>Wind Gusts</b>
EII = 2	> 40 mph	> 45 mph
EII = 3	> 50 mph	> 55 mph
EII = 4	> 60 mph	> 70 mph
EII = 5	> 70 mph	> 85 mph

Forecasted Ice Accretion (assumes "normal" wind speed)

<b>Level</b>	<b>Ice Accretion</b>
EII = 2	> 1/10 inch
EII = 3	> 3/8 inch
EII = 4	> 1/2 inch
EII = 5	> 1 inch

Forecasted Snow Amounts (assumes dry snow consistency). These amounts are factored with wind speed more so than actual accumulation.

<b>Level</b>	<b>Snow</b>
EII = 1	> 6 inches
EII = 1	> 12 inches
EII = 2	> 18 inches
EII = 3-5	> 24 inches

Forecasted Snow Amounts (assumes wet snow consistency). Season will modify amount within level – A fall storm (with leaves) will have a significantly increased impact.

<b>Level</b>	<b>Snow (Without Leaves)</b>	<b>Level</b>	<b>Snow (With Leaves)</b>
EII = 2	> 6 inches	EII = 2	> 4 inches
EII = 3	> 8 inches	EII = 3	> 6 inches
EII = 4	> 12 inches	EII = 4	> 12 inches
EII = 5	> 24 inches	EII = 5	> 24 inches

Forecast Confidence Levels

<b>Low</b>	<b>Medium</b>	<b>High</b>
< 30% Chance	≥ 30 ≤ 60% Chance	> 60% Chance

Attachment B

**Super Storm Sandy  
After Action Report**  
Unitil Energy Systems



Emergency Management  
Unitil Corporation  
November 30, 2012

November 30<sup>th</sup>, 2012

## Executive Summary

Hurricane Sandy, the 10<sup>th</sup> hurricane of the 2012 Atlantic Hurricane Season that devastated portions of the Caribbean and Mid-Atlantic before impacting the Northeastern United States, became the second-costliest Atlantic Hurricane, only surpassed by Hurricane Katrina. Developing near Jamaica on October 22<sup>nd</sup>, Sandy tracked northeast along the Eastern Coast of the U.S. before turning west making landfall near Atlantic City, New Jersey with winds of approximately 90 mph.

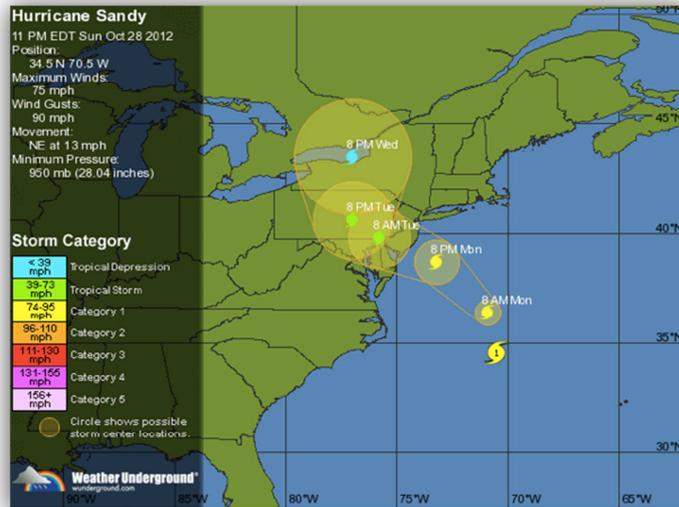


Figure 1 - Super Storm Sandy Track

Hurricane Sandy caused more than \$53 billion dollars in damage and at least 209 deaths in seven countries, including 131 in the United States. Emergency declarations were issued for 14 states in the U.S. with 24 states affected, thousands of homes and businesses destroyed, and over 8.5 million people without electricity. The areas hit hardest by Sandy were New York and New Jersey, which left thousands of residents displaced and over 150,000 still without power nearly two weeks after the storm's passing. With winds spanning over 1,000 miles in diameter, Hurricane Sandy impacted New England areas with high wind gusts and heavy rainfall at times, throughout the afternoon and early evening on Monday, October 29<sup>th</sup>.

## Weather Overview

Hurricane Sandy developed along a tropical wave in the western Caribbean on October 21<sup>st</sup> becoming a depression and then a Tropical Storm within 6 hours. Over the next two days, the eye of the storm began to develop as it moved northward while increasing in strength and was given Hurricane status on October 24<sup>th</sup>, just before making landfall in Jamaica and then Cuba as a Category 2 hurricane. Sandy then tracked north through the Bahamas and parallel to the Southeastern US coast with sustained winds at 105 mph before starting a north, northwest turn on October 29<sup>th</sup>. That evening, Sandy made landfall just five (5) miles south of Atlantic City, NJ, as an extra tropical storm with a nearly 1000 mile tropical storm force wind diameter, before moving into central Pennsylvania and then New York on October 31<sup>st</sup>.

Hurricane Sandy's track was unprecedented for an October storm, which would typically be steered away from the US due to a strengthening jet stream; however, a strong ridge of pressure centered over Greenland blocked the storm's normal path out to sea. Additionally, a strong cold front moving through the eastern U.S. began to merge with Sandy on October 29<sup>th</sup> creating a "Super Storm", which dropped inches to feet of snow across the Appalachian Mountains before diminishing. Major causes of damage from the storm were high winds and storm surge, which coincided with astronomical high tides.

With a wind span diameter over 1,000 miles, Hurricane Sandy's effects were felt across the New England region with rain, heavy at times, strong sustained winds (20-30 mph) and wind gusts up to 55 mph as the storm slowly moved across the Mid-Atlantic. The duration of these weather conditions began during the afternoon of Monday, October 29<sup>th</sup> with peak winds occurring in the evening until the storm diminished overnight into the next morning.

### Preparation Activities

Unitil began monitoring the storm's development on Monday, October 22<sup>nd</sup>, utilizing various media and weather outlets as the storm progressed. Once it became likely that the storm's path could impact the New England region, Unitil's Emergency Management and Compliance Director held an internal storm conference call on Thursday, October 25<sup>th</sup>, which initiated the Company's preparation activities and Incident Command System (ICS). Preparation activities prior to Sandy's impact included, but were not limited to:

- Notifying Regulators, State Emergency Centers, and Municipal and Elected Officials;
- Meeting with the Company's top executives as part of the Strategic Response Committee;
- Mobilizing all Company personnel assigned a Storm Assignment and cancelling vacations;
- Securing additional external resources;
- Issuing multiple Public Service Announcements (PSAs) with information;
- Contacting customers and providing storm-related preparatory information; and
- Participating in regional and national mutual assistance conference calls.

Unitil's Logistics and Planning teams worked through the weekend to ensure resources and accommodations were firm for an early start on Monday morning. Unitil opened its Emergency Operations Centers (EOC's) in Concord, Kensington, and Hampton, NH at 8:00 AM on Monday, October 29<sup>th</sup> in advance of the expected impact later that evening.

### Impact and Restoration

Effects from Hurricane Sandy were felt throughout the morning and afternoon hours on Monday, October 29<sup>th</sup>, with outages beginning to occur at approximately 10:00 AM. Unitil experienced peak interruptions at 4:00 PM of the same day with approximately 36,000 customers (35% of Unitil's Customers) without power. On a cumulative basis, nearly 69,000 Unitil customers were impacted throughout the duration of the event. Of the 36,000 customers impacted, 31,000 were in the New Hampshire service area (42% of NH electric customers). In response to the estimated impact of the storm to the northeast, Unitil mobilized 15 internal crews, 92 contractor line crews, 37 contractor tree crews, 48 damage assessment crews, and 84 wires down personnel. Over the course of restoration efforts, Unitil committed 11 internal line crews, 52 contractor line crews, 27 tree crews, 28 damage assessment crews, and 50 wires down personnel to the NH service territories.

Unitil's NH electric operations were able to restore power to 95% of the affected customers by 10:00 PM of the following day, Tuesday, October 30<sup>th</sup>, with complete restoration made to all customers by 11:00 PM the next day, October 31<sup>st</sup>.

The following graph depicts customer interruptions for the Unitil System and also by region.

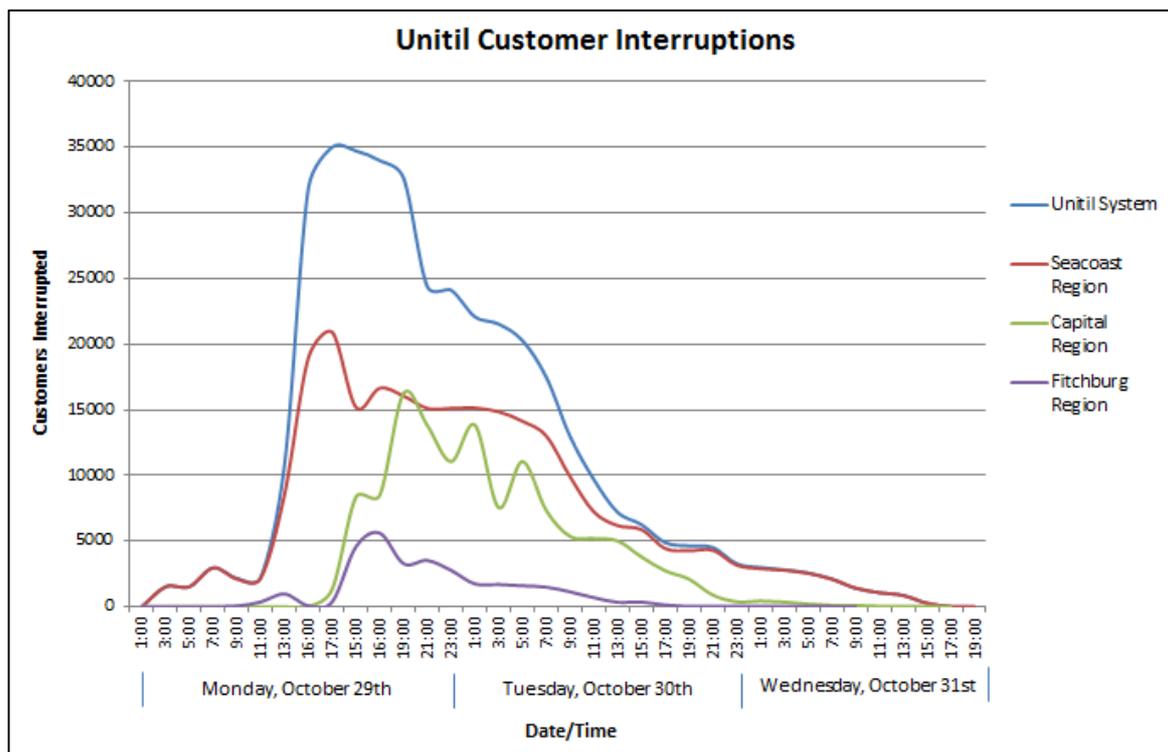


Figure 2 - Unitil System Customer Interruptions

## Findings and Recommendations

Using its ERP as a guideline, Unitil was able to restore all impacted customers in 2.5 days, with the Capital region completed in less than 52 hours and the Seacoast region completed in 60 hours from the time the first storm-related outage occurred. The response to Super Storm Sandy demonstrated the effectiveness and flexibility of its ERP and ability to handle events of differing sizes. Not only did Unitil complete restoration of its own customers by Wednesday, October 31<sup>st</sup>, the Company also provided mutual assistance and additional resources to other utilities in Massachusetts, New Hampshire, Rhode Island and Connecticut. Additionally, this was the first time the Company rendered mutual assistance for both electric and gas utilities simultaneously.

In conducting its storm critique of the Company's response to Super Storm Sandy, section leads in the ICS organization, as well as other key personnel submitted evaluations of their respective groups' performance before, during, and after the event. These evaluations were summarized and provided a basis for conducting the storm critique and identifying critical challenges and improvement opportunities.

The following items have been identified for further enhancements:

- It was observed during the outage experienced by the Customer Call Center that portions of the building were not on uninterruptable power supply (UPS). These areas have been identified and will be placed on UPS.
- Customer call blasts were made during the event to provide customer information however, this process needs further work to target specific customers and ensure on-hold messaging is adequate. This is currently being reviewed by Customer Service and the IT dept.
- Enhancements need to be made to the rapid damage assessment process for swifter ETR development. A MA legislative requirement stating an ETR must be developed within 24 hours of the storms passing has prompted changes in the damage assessment process itself which is used to calculate ETRs.
- Municipal Room documentation needs to be standardized and enhanced to include utilization of WebEOCs and maintaining a list of schools in the service territory for faster and more detailed communications with Municipal Officials.
- Communication channels for selectmen in Unitil's service territories needs to be defined and assigned to a member of the ICS organization. Discussions will occur with various organizations to ensure communication channels for this group of people are adequate.

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### List of Acronyms

CED – Central Electric Dispatch

DOC – Distribution Operating Center

DPU – Department of Public Utilities

EOC – Emergency Operations Center

ERP – Emergency Response Plan

ETR – Estimated Times or Restoration

FTE – Full Time Employee

IAP – Incident Action Plan

IC – Incident Commander

ICS – Incident Command Structure

LSC – Life Support Customer

NEMAG – Northeast Mutual Assistance Group

NIMS – National Incident Management System

OMS – Outage Management System

PSA – Public Service Announcement

SRC – Strategic Response Committee

UPS – Uninterruptable Power

## Incident Overview

On Monday, October 29<sup>th</sup>, the Mid-Atlantic and New England regions were impacted by Hurricane Sandy as it weakened to a Tropical Storm.

Hurricane Sandy's track was unprecedented for an October storm, which would typically be steered away from the US due to a strengthening jet stream; however, a strong ridge of pressure centered over Greenland blocked the storm's normal path out to sea. Additionally, a strong cold front moving through the eastern U.S. began to merge with Sandy on October 29<sup>th</sup> creating a "Super Storm", which dropped inches to feet of snow across the Appalachian Mountains before diminishing.



Figure 3 - Super Storm Sandy Projected Impact

Major causes of damage from the storm were high winds and storm surge, which coincided with astronomical high tides. With a wind span diameter over 1,000 miles, Hurricane Sandy's effects were felt across the New England region with rain, heavy at times, strong sustained winds (20-30 mph) and wind gusts up to 50 mph as the storm slowly moved across the Mid-Atlantic. The duration of these weather conditions began during the afternoon of Monday, October 29<sup>th</sup>, with peak winds occurring in the evening until the storm diminished overnight into the next morning.

The first storm-related outage for Unitil occurred at approximately 10:00 AM on Monday, October 29<sup>th</sup>, with peak interruptions reaching 36,000 customers (35% of Unitil's customers) at 4:00 PM on the same day. Of the 36,000 peak customers impacted, 31,000 were in the New Hampshire service area (42% of NH electric customers) with cumulative customers affected in the NH electric territory reaching over 61,000 customers throughout the event. On a cumulative basis, nearly 69,000 Unitil customers were impacted throughout the duration of the event.

Over the course of restoration efforts, Unitil committed 11 internal line crews, 52 contractor line crews, 28 damage assessment crews, 50 wires down personnel and 27 tree crews to the New Hampshire regions. Unitil NH electric operations was able to restore power to 95% of the affected customers by 10:00 PM of the following day, Tuesday, October 30<sup>th</sup>, with complete restoration made to all customers by 11:00 PM the next day, October 31<sup>st</sup>.

The table on the following page shows customer interruptions throughout the restoration efforts in 4 hour intervals for the NH electric service territories.

Table 1 – NH Electric Customer Interruptions

<b>Date</b>	<b>Time</b>	<b>Peak Customers Interrupted</b>	<b>Cumulative Customers Interrupted</b>
Monday, October 29 <sup>th</sup>	8:00 a.m.	0	0
	12:00 p.m.	2172	4169
	4:00 p.m.	27306	34418
	8:00 p.m.	31437	52831
Tuesday, October 30 <sup>th</sup>	12:00 a.m.	29890	55611
	4:00 a.m.	22428	56604
	8:00 a.m.	20044	57326
	12:00 p.m.	16800	57983
	4:00 p.m.	9332	58604
	8:00 p.m.	4864	60067
Wednesday, October 31 <sup>st</sup>	12:00 a.m.	4620	60095
	4:00 a.m.	3270	61232
	8:00 a.m.	2812	61313
	12:00 p.m.	2115	61473
	4:00 p.m.	1069	61484
	8:00 p.m.	269	61589
Thursday, November 1 <sup>st</sup>	12:00 a.m.	0	61590

## Emergency Preparedness

### ERPs and Response Structure

Unitil utilized the National Incident Management System (NIMS) to manage its emergency response to Super Storm Sandy. NIMS is a comprehensive and unified approach to incident management, applicable at all jurisdictional levels and across multiple functional disciplines. Furthermore it improves the effectiveness of emergency response providers and incident management organizations across a full spectrum of potential incidents and hazard scenarios. NIMS relies on the Incident Command System (ICS) to coordinate and manage an organization's mobilization, response, and demobilization.

Unitil's ERP is used for a broad spectrum of emergencies, from small to complex incidents, both natural and manmade, including acts of catastrophic terrorism and major equipment failures. The Company's planning, as recommended in the ICS protocol, is organized around five (5), major functional areas: command staff, operations, planning, logistics, and administration/finance.

The use of ICS has vastly improved Unitil's coordination and cooperation between public and private entities. To accomplish this use, Unitil shaped its internal response organization around the ICS recommended organization. This organization is responsible for combining facilities, equipment, personnel, procedures, and communications under a unified and scalable response structure, which is designed to specifically manage incidents and their activities.

One of the features of Unitil's Plan is that of scalability, which was demonstrated by this weather event. Many storms begin and end as a regional emergency; however, for those that escalate beyond a region's ability to respond effectively, a system emergency is often declared. Unitil's ERP accommodates single region, multi-region and system-wide events by ensuring the key elements of an ICS organization exist at each level and can be easily replicated elsewhere using common roles and responsibilities.



Figure 4 - Regional EOC Personnel



Figure 5 - System EOC Personnel

Unitil's ICS organization is depicted in the chart below with specific company titles of the personnel fulfilling each role. For the response to Super Storm Sandy, the entire ICS organization was activated including the Strategic, Tactical, and Operational levels.

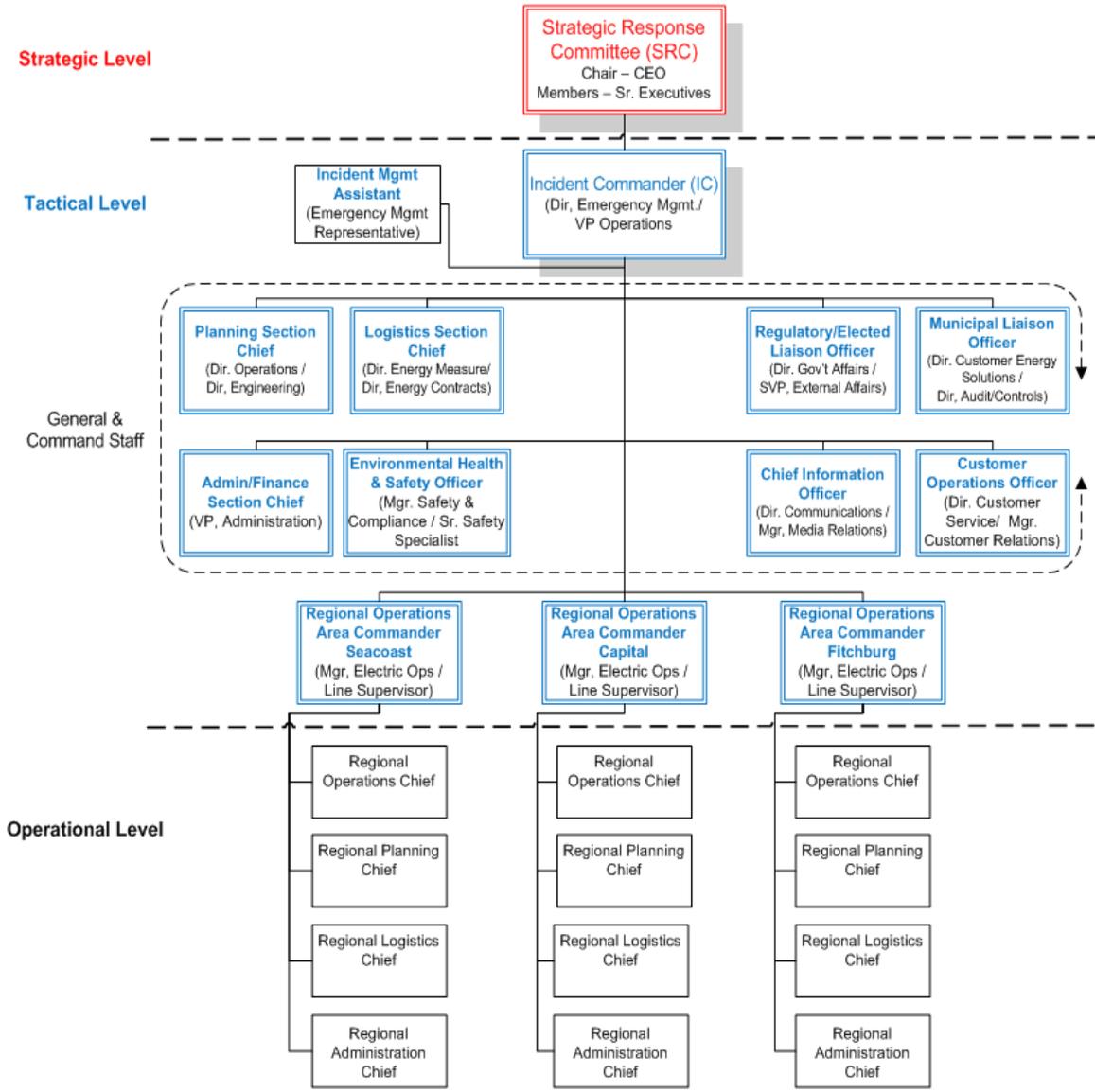


Figure 6 - Unitil's ICS Organization

### Vegetation Management

Unitil's Vegetation management program consists of planned maintenance cycle pruning, as well as other planned reliability driven work, targeted hazard tree removal work and unplanned reactive work. Planned maintenance cycle pruning is done on a circuit basis where circuits to prune are identified based on the time since last pruned, 3 year historic tree-related reliability performance, and actual conditions in the field. Planned reliability driven work is identified based on overall recent historic circuit reliability performance and tree field condition. Hazard tree removal work is identified based on 3 year historic tree failure related reliability performance and/or tree field conditions.

Unitil's program is consistent with industry standards and practices as recent studies suggest for the average distribution trimming cycles for investor owned utilities in New England. Unitil's program is also consistent with other ECNE member companies. Regardless of these practices, exposure to falling trees and limbs outside the trim zone is not eliminated and severe damage can occur during major storms such as Super Storm Sandy.

### Outage Management System

Unitil utilizes an Outage Management System (OMS) as the primary informational tool to monitor and assist in service restoration. Unitil's Centralized Electric Dispatch (CED) department is responsible for operating OMS for routine and small storm event conditions; however, CED is supported by local Distribution Operation Centers (DOC's) when events trigger criteria including a level of outages in which case a region may revert to a decentralized operation.

Decentralization is a term used to describe moving network control, management of OMS, repair and restoration activities from the Centralized Electric Dispatch organization to the local DOC in one or more of Unitil's three (3) regions. When such an occurrence happens, the EOCs will operate under the ICS organization with trained personnel in each region operating OMS throughout the event.

Once the regional EOCs were activated, on Monday, October 29 at 8:00 AM, the regional response organization took control of OMS operations for the expected event. The OMS largely functioned as designed and provided valuable information for managing/tracking and resolving outages throughout restoration efforts. Once restoration efforts were nearly completed, the regional response unit transitioned control of the OMS back to CED for normal operations.

### Emergency Response

Unitil began monitoring the storm's development on Monday, October 22<sup>nd</sup>, utilizing various media and weather outlets as the storm progressed. Once it became likely that the storm's path could impact the New England region, the Emergency Management and Compliance Director held an internal storm conference call on Thursday, October 25<sup>th</sup>, which initiated the Company's preparation activities and Incident Command System (ICS). Preparation activities prior to Sandy's impact included, but were not limited to:

- Notifying Regulators, State Emergency Centers, and Municipal and Elected Officials;
- Meeting with the Company's top executives as part of the Strategic Response Committee
- Mobilizing all Company personnel assigned a Storm Assignment and cancelling vacations;
- Securing additional external resources;
- Issuing multiple Public Service Announcements (PSAs) with information;
- Contacting customers and providing storm-related preparatory information; and
- Participating in regional and national mutual assistance conference calls.

Unitil's Logistics and Planning teams worked through the weekend to ensure resources and accommodations were firm for an early start Monday morning. Unitil opened its Emergency Operations Centers (EOCs) in Concord, Kensington, and Hampton, NH at 8:00 AM on Monday, October 29<sup>th</sup> in advance of the expected impact later that evening.

### Pre-Event Activities (Monday, October 22nd – Sunday, October 28th)

#### Resource Acquisition

The Resource Unit, under the Logistics Section Chief, began making calls to external resources on Wednesday October 24<sup>th</sup> to inquire about availability for the following week. External resources available were acquired beginning Thursday, October 25<sup>th</sup>; however, the demand for resources was significant along the Northeast coast of the US.

In the process of acquiring resources, the Company lost over 40 crews due to the competitive environment (bidding wars) and, as the inland impact became more likely, companies would not release resources that were initially promised. It is worth noting that the existing regulatory environment has forced companies to "Lock In" resources earlier and earlier to ensure that Companies have enough boots on the ground before the impact of the event is clearly understood. This process has also significantly increased the cost to meet customer expectations. The table below depicts the number and type of crews utilized in NH that responded to Sandy, by crew and personnel, which included contractors used from as far as Michigan and Canada. Unitil also had an outstanding resource request through the Northeast Mutual Assistance Group (NEMAG) for an additional 75 crews that was never fulfilled.

Table 2 – NH Crew Supplements

Crew Type	# Crews	# FTEs (personnel)
Internal Line	11	22
External Line	52	110
Tree	27	56
Damage Assessor	28	28
Wires Down	50	50
Support	≈80	≈80

### Mobilization

Unitil's Emergency Management and Compliance department began monitoring the weather system on Monday, October 22<sup>nd</sup> and continued to monitor various weather outlets until it was determined that the system could impact the New England region. Beginning on Wednesday, October 24<sup>th</sup>, daily updates were issued to Regulatory and Municipal officials via Pre-Event Reports.

The Emergency Management and Compliance Director initiated an internal coordination conference call on the afternoon of Thursday, October 25<sup>th</sup>. This call included section leads and chiefs from each function of the ICS organization to commence preparation activities. Under the direction of the Incident Commander (IC), the Logistics Section began to acquire external resources they had contacted for availability the day prior. Preparation activities related to the 3-day checklist found in Unitil's ERP, began with some items expedited because of the upcoming weekend.

At 5:00 PM of the same day (Thursday, October 25<sup>th</sup>) the IC initiated a Strategic Response Committee (SRC) Meeting of Unitil's Senior Executives to brief them on the possible impact and preparation activities being made. It was then decided that all employees would be mobilized in their assigned storm roles and vacations would be cancelled. An email blast notification was sent at 9:00 AM the next day (Friday, October 26<sup>th</sup>) to all storm assigned personnel notifying them of their roles and instructions for response.

A second internal conference call was held on Friday, October 26<sup>th</sup> at 3:00 PM, which was used to finalize preparation activities and confirm the Emergency Operations Centers (EOCs) opening times, which was agreed to be 8:00 AM on Monday, October 29<sup>th</sup>, ahead of the expected weather impact forecasted for later that afternoon.

Unitil held storm conference calls each day throughout the weekend and also participated in Regional Mutual Assistance calls (NEMAG), which were daily throughout the entire event and restoration period. Additionally, for the first time ever, EEI coordinated national conference calls related to resource deployment and re-deployment. At peak there was an outstanding request for some 26,000 line FTE's, which was only partially filled when crews were redeployed from the southern utilities.

### Restoration Priorities

Restoration priority recognizes public safety as a primary concern. Recognizing that expeditious restoration of customers is the mission, circuits with most customers out and requiring minimal effort is the most efficient and practical approach in prioritizing work. The process by which Unitil will approach the restoration of feeders will take into consideration the safety of the public, our employees, and mutual aid supporting the restoration.

Other factors and considerations are taken into account when prioritizing work and may include: Live wires down; Transmission lines; Substations; Life Support Customers (LSC); Critical Infrastructure; Distribution Feeders; Transformers. Unitil's Municipal Room in each region maintains constant communications with local Municipal Officials to prioritize other infrastructure such as schools and community centers, which may not exist on the critical infrastructure list. The Municipal liaison resides

in the Municipal Room, which is staffed 24/7 and conducts twice daily conference calls to ensure restoration priorities are being met.

### Day 1 Response (Monday, October 29th)

All of Unitil's EOCs were activated and fully staffed on Monday, October 29<sup>th</sup>, with the regional EOCs taking control over response activities from the CED center in advance of customer interruptions. A final Pre-Event report was submitted to Regulatory and Municipal officials upon the EOCs opening times, to confirm final preparations were made. Once storm-related outages began to occur at 10:00 AM, Restoration Status Reports would be utilized every four (4) hours until the conclusion of the event to provide outage and crew information.

Two (2) internal storm conference calls were held between the System and Regional EOCs with key personnel from the response organization, to ensure responding crews had arrived at their location and talked through other preparations. The first call was held at 9:00 AM shortly after the EOCs formally opened, with another call at 8:00 PM that night to discuss the system impacts in the regions at that time and make any additional requests to the System EOC.

As the Super Storm's outer bands moved throughout New England, rain and high wind gusts up to 55 mph were felt in the region, which resulted in limb, tree and wire damage. The first storm-related outage for Unitil occurred at approximately 10:00 AM on Monday, October 29<sup>th</sup>, with peak interruptions reaching 36,000 customers (35% of Unitil's customers) at 4:00 PM on the same day. Of the 36,000 customer impacted 31,000 were in the New Hampshire service areas (42% of NH electric customers) with the remaining interruptions in the Massachusetts service territory.

As indicated in the Incident Action Plan (IAP) submitted on Monday, October 29<sup>th</sup>, the main focus for the day was ensuring public safety, which includes responding to wires down reports and locations. Crews responded to outages throughout the day as safe conditions allowed; however, the primary focus was responding to the 96 reported wires down across the Fitchburg service territory.



### Day 2 Response (Tuesday, October 30th)

On Tuesday, October 30<sup>th</sup>, a transition from the public safety (wires down) phase to the restoration phase was made. Damage assessment was conducted and once all reported wires down were addressed, resources were given work packages and focused on restoration to affected areas. Significant restoration progress was made, and by the end of the day, nearly 85% of the peak affected customers had been restored with less than 4,700 of the 36,000 customers still without power.

Two (2) internal storm conference calls were held between the System and Regional EOCs to discuss the restoration progress made for each region; to also discuss demobilization efforts in response to the progress made that day. The first call was held at 9:00 AM, with the second call at 8:00 PM that night, which included preliminary discussions regarding demobilization efforts to begin the following day.

In the New Hampshire regions, where approximately 31,0000 customers were affected at peak, less than 4,700 customers remained without service by the end of the day. These customers were restored throughout the following day, October 31<sup>st</sup>, with all customers restored by 11:00 PM.

### Day 3 Response (Wednesday, October 31st)

With less than 4,700 Unitil customers remaining without service, restoration Day 3 focused on smaller outages and single service issues throughout the morning and afternoon hours. The last internal conference call was held at 9:00 AM to discuss final restoration efforts and completion times, EOC closing statuses, and demobilization efforts. The Capital region completed restoration to all affected customers by 2:00 PM, while the Seacoast region, which experienced more customer interruptions, was completed by the end of the same day. In conjunction with the remaining restoration activities, demobilization efforts were initiated by functions of the ICS organization.

### Demobilization

Demobilization efforts began throughout the day on Wednesday, October 31<sup>st</sup>. These activities included returning control of OMS to CED, releasing crews, compiling documentation related to the event, and returning employees to their normal work assignments. Working closely with the NEMAG, resource releases were structured with most contractor crews being sent to other New England utilities as needed, including 15 line and tree crews sent to other NH utilities. In addition to providing other utilities with contractor crews, Unitil also provided five (5) of its own crews for mutual assistance in the New England region.

Throughout the event Unitil restored over 513 individual outage locations.

The graphs on the following page depict customer impacts experienced throughout Super Storm Sandy for the Company and NH regions.

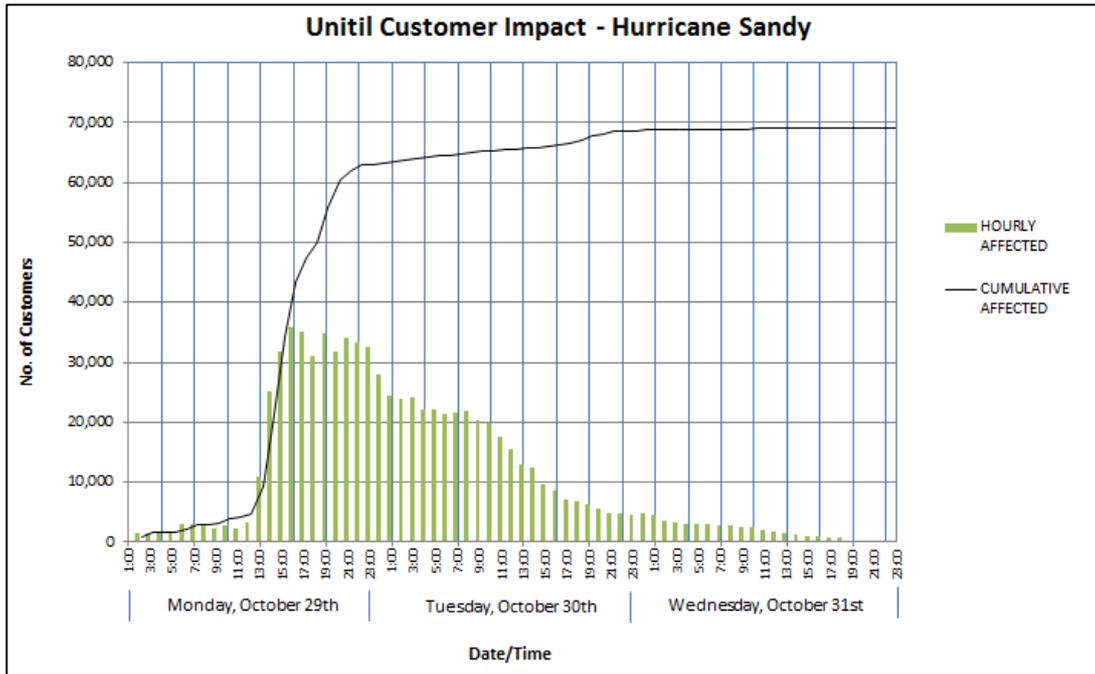


Figure 7 - Unitil System Interruptions (Hourly and Cumulative)

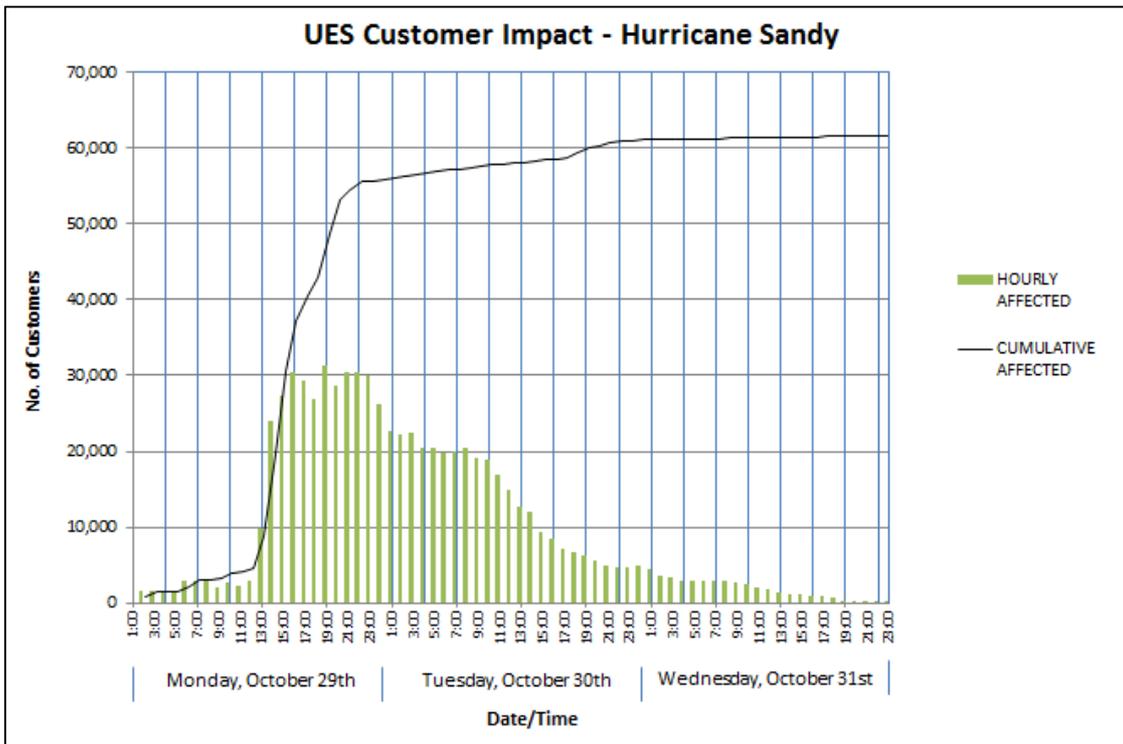


Figure 8 – Unitil Energy Systems Interruptions (Hourly and Cumulative)

## Communications

Communicating with our customers, the general public, news media, employees and local officials is essential during emergency conditions. The Chief Information Officer (CIO) and team, is responsible for ensuring only accurate and timely information is released as widely as possible through various channels. Messages regarding safety and preparation, restoration progress, estimated times of restoration and other storm-related information are carefully crafted by the CIO team to be approved by the Incident Commander (IC) for release.

### Internal Communications

Once internal assigned personnel are notified of their role and mobilization timing, the CIO team initiates daily employee updates to all employees via email. These updates are used to keep company personnel aware of expected weather impact, preparation activities taking place, and restoration progress made throughout the event. Important safety-related and preparedness messaging is given to employees through these daily updates, which also provides follow up and event closure information once restoration is complete.

### Customer Communications

An essential piece of any storm restoration is Customer communications. The Company must be able to provide consistent, timely information prior to, during, and after any storm event where customers are expected to be impacted and to utilize various channels to accomplish this, including social media outlets. The first Public Service Announcement (PSA) was released on Friday, October 26<sup>th</sup> detailing preparations made by the Company and to urge customers to stay informed and prepare for the possibility of power outages. The PSA also included recommendations for “storm kit” materials, helpful resources for preparedness and contact information for the Customer Service Center.

Once the first PSA was issued, the Customer Service Center (CSC) initiated callouts to all customers listed on the Life-Support Customer list to ensure these customers were aware of the forecasted weather and provide preparedness tips. On Saturday, October 27<sup>th</sup> and Sunday, October 28<sup>th</sup>, call blasts were made to all Unitil customers with the same messaging. The second preparatory PSA was sent on Sunday, October 28<sup>th</sup>, which notified customers of the Company mobilization and formal EOC opening times for the following day. A total of 15 PSAs were released throughout the event (3 prior to event and 12 during) and provided information on restoration efforts being made and estimated times of restoration when available.

In addition to taking customer outage calls throughout the event, the Company also utilized its corporate Twitter account to respond to inquiries and provide additional information and resources. This account was monitored 24/7 throughout the event by the CIO team and was also used to share important links to the Company’s online Outage Center and map, which provided real-time outage information. Throughout the event, Customer Service processed almost 10,000 customer calls and more than 2,000 web outage forms in a timely and efficient manner. The table on the following page provides a breakdown of Customer Service’s statistics for Super Storm Sandy.

Table 3 – Customer Service Statistics

Date	PORCHE IVR			* IVR/CSC Service Level (Combined)	SIEMENS Phone System/CSC			Web
	Total # of calls in the IVR	# Selecting Outage Option (update or ticket)	% Reporting Outage	% Answered in 20 Sec	# CSR Calls Received	# CSR Calls Answered	Avg Wait Time	Web Inquiries
29-Oct	15,606	11,413	73%	99%	4,164	4,037	0:06	1215
30-Oct	13,051	8,440	65%	100%	4,180	4,096	0:04	844
31-Oct	2,671	673	25%	98%	1,643	1,602	0:07	69
<b>Total</b>	<b>31,328</b>	<b>20,526</b>	<b>66%</b>	<b>99%</b>	<b>9,987</b>	<b>9,735</b>	<b>0:05</b>	<b>2128</b>

### Elected and Regulatory Officials Communications

The Liaison Unit, under the ICS organization, is responsible for communicating with Elected and Regulatory Officials during emergency events. They work closely with the CIO and team to ensure only consistent messaging is being provided. The Liaison Officer provides pro-active outreach to Elected and Regulatory Officials prior to the event and will provide on-site representatives for emergency centers as requested by Regulatory agencies.

The Liaison Officer provides information via email to Elected and Regulatory Officials prior to, during and at the conclusion of the event and also responds to individual requests for information as they are received.

### Municipal Communications

Communications with Municipal Officials remained constant prior to, during, and at the closing of the storm event via the regional Municipal Rooms located in each EOC. Municipal Officials, including Fire, Police, Public Works, and local Emergency Management Directors, were consistently provided with information on Unitil's preparations and restoration progress through multiple channels. Dedicated phone, email, and fax numbers were monitored 24/7 in the Municipal Rooms to respond to any information or operational requests.

Additionally, Municipal Conference Calls were held daily throughout the event with Municipal Officials and Unitil operational personnel for a more detailed discussion on the events impact and restoration progress. The first Municipal Conference Call was held on Monday, October 29<sup>th</sup> at 11:00 AM to provide the Municipal Officials with response strategies and ensure channels of communications and processes were clearly identified. A second call was also held on the same day at 6:00 PM to discuss preliminary impacts from the storm and discuss restoration strategies for the following day. The next call was held on Tuesday, October 30<sup>th</sup> at 5:00 PM to discuss progress and address any outstanding requests. The final call was held the same day at 10:00 PM. With less than 4,700 customers remaining without power across the New Hampshire regions, Municipal Officials did not request another call. The Concord EOC

and Municipal Room were closed at 2:00 PM the following day, October 31<sup>st</sup> with the Kensington EOC and Municipal Room closing later the same day at 8:00 PM.

## Logistics

Logistics was responsible for (1) acquiring external resources; (2) ensuring sufficient material flows; (3) arranging for the lodging and meals of storm response personnel; and (3) establishing staging areas and sites to support the influx of external resources.

Given the geography impacted by the storm, the IC made a commitment to acquire additional resources prior to the storm's impact. Although the Northeast Mutual Assistance Group (NEMAG) assists in resource allocation, nearly all members were expected to be impacted by the Super Storm, which resulted in an earlier retention of resources and over 26,000 FTE outstanding resource requests across multiple regions. In the process of acquiring resources, the Company lost over 40 crews due to the competitive environment (bidding wars) and as the inland impact became more likely, companies would not release resources that were initially promised. Prior to the storm's impact, Unitil was able to secure a sufficient number of crews to respond in NH but needed to extend its reach further west than for previous events.

Crews secured for NH service territories by the Logistics Unit included 52 line crews, 27 tree crews, 28 damage assessors and 50 wire down personnel in addition to 11 internal line crews and over 80 support personnel.

## Resource Management

Once the number of crews was confirmed, the Logistics unit worked tirelessly to ensure lodging and meal accommodations were coordinated and secured prior to their arrival. Over 670 hotel rooms were booked for resources working in the New Hampshire territories, which also provided over 1,000 meals each day of restoration. As crews were assigned to each region from the System EOC, Regional Logistics personnel assigned crew lodging and meals while Operations personnel ensured work locations and packages were distributed.

## Materials & Supplies

The Procurement unit ensured that storm kits were prepared with materials and supplies for crews and mobilized these kits to the EOCs prior to the expected impact. Material vendors were put on standby and any deficit in supplies at the EOCs was addressed prior to the EOC opening. With only isolated damage being made to the system, materials and supplies available for the storm were adequate.

## Safety and Environmental

No safety incidents or injuries were reported throughout this event for Unitil or any of its retained resources. A minor incident regarding a cracked windshield occurred; however, it was not serious and was replaced. Upon the crews' arrival, a Safety Representative was on-site to preform safety briefings at designated areas and ensured that all crews were briefed prior to beginning any work. Additional Safety

and Environmental contractors were put on standby for services; however, given the short restoration period and limited safety and environmental impact, these resources were not needed.

### Critical Challenges

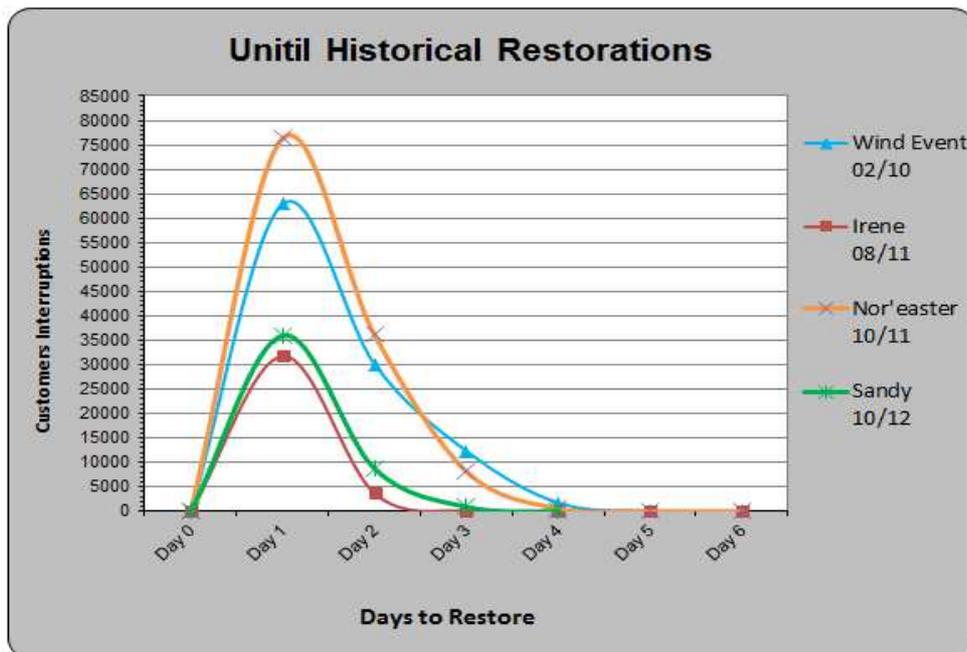
The primary challenge for this event was the ability to acquire quality resources. The event was well forecasted with high winds and significant amounts of wet snow impacting mid-Atlantic utilities. The competition for resources was considerable and some of the harder hit utilities had to wait for redeployment of resources to meet their needs. As a result, Unitil will revise its present methodology for resources acquisition.

### Historical Event Comparison

Table 4 – Unitil Historical Comparison

Unitil Historical Storm Comparisons				
Feb 2010 Wind Event vs. Tropical Storm Irene vs. 2011 October Nor'easter vs. Super Storm Sandy 2012				
	Wind Event February 2010	Tropical Storm Irene August 2011	Nor'easter October 2011	Super Storm Sandy October 2012
	Unitil System	Unitil System	Unitil System	Unitil System
Customers Out -Total	63,123	35,114	76,324	35,989
Crews Worked	254	256	331	273
Wire Reattached or Replaced (ft.)-Total	103,900	2,684	6,860	21,819
Transformers Replaced Total	67	15	11	23
Poles Set-Total	126	2	19	18
Cross-arms Replaced	325	11	75	26
Restoration Days	4	1.5	4	2.5

Figure 9 – Unitil Historical Restorations



## After Action Review and Recommendations

Unitil continuously strives to identify better, and to improve methods, systems, and processes to manage and respond to severe events. Following every major restoration event, a storm critique meeting is held with key personnel from the response structure to identify any areas of improvement, lessons learned, or best practices. The critique meeting for Super Storm Sandy was held on Tuesday, November 6<sup>th</sup> at 3:00 PM with Section Leads and Chiefs gathering evaluations from each team member who participated during restoration efforts. These evaluations were collected and summarized into overall improvement opportunities for follow up. Items that were identified during the response to Super Storm Sandy can be found in Attachment 1.

## Conclusions

Despite setbacks (unfulfilled crew requests), Unitil was able to restore power to all of the nearly 36,000 affected customers in 2.5 days. More rewarding was the ability to provide other utilities with valuable resources to aid restoration in other areas more heavily damaged by Super Storm Sandy.

## Acknowledgements

Emergency Management respectfully thanks all employees, external resources, Municipal, Regulatory and Elected officials for their combined efforts and dedication to that ensure safety and customers remained a top priority throughout the event.

## Attachment 1 – After Action Items/Areas for Improvement

Improvement Area	Resolution/Action Item	Function/Owner	Estimated Completion
Areas of the Customer Service Center are not currently on the Uninterruptible Protection System (UPS)	Areas to be identified and added to the UPS	IT Unit	April 2013
Customer call blast and on hold messaging processes need refinement	Process of initiating customer call blast to all customers and coordinating on-hold messaging to be reviewed and enhanced	Customer Service & IT Unit	December 2012
Rapid Damage Assessment process to be reviewed and enhanced for more timely ETRs	Enhanced/new process to account for rapid damage assessment deployment and relay of information for ETR development	Planning Unit	February 2013
Municipal Room documentation enhancements and information sharing	Further refinement in the Municipal Rooms process on gathering information and relaying information back to municipals including the addition of lists of school to aid impacted areas	Municipal Unit	February 2013
Special communication channels for selectmen in service territories should be made with a process for tailored information	Assign ownership for this group to a unit in the ICS organization and ensure process is in place and documented for communications	Liaison & Municipal Units (w/ Emergency Management oversight)	January 2013

## Attachment 2 – OMS Outage and Customer Interruption Information (NH)

SUPER STORM SANDY					
Date/Time	Hourly		Cumulative		Total Customers
	Affected	% Interrupted (Peak)	Affected	% Interrupted (Peak)	
10/29/2012 8:00:00	2959	3.25%	2959	3.25%	75195
10/29/2012 9:00:00	2959	3.25%	2959	3.25%	75195
10/29/2012 10:00:00	2106	2.31%	3520	3.87%	75195
10/29/2012 11:00:00	2677	2.94%	4091	4.49%	75195
10/29/2012 12:00:00	2172	2.38%	4169	4.58%	75195
10/29/2012 13:00:00	2871	3.15%	4868	5.35%	75195
10/29/2012 14:00:00	9901	11.65%	12510	14.52%	75195
10/29/2012 15:00:00	23935	28.39%	26660	31.38%	75195
10/29/2012 16:00:00	27306	34.89%	34418	42.78%	75195
10/29/2012 17:00:00	30442	39.43%	40105	50.25%	75195
10/29/2012 18:00:00	29402	37.27%	41183	51.66%	75195
10/29/2012 19:00:00	26914	35.62%	44810	57.56%	75195
10/29/2012 20:00:00	31437	44.07%	52831	70.24%	75195
10/29/2012 21:00:00	28577	39.44%	53628	71.56%	75195
10/29/2012 22:00:00	30467	41.57%	55518	73.70%	75195
10/29/2012 23:00:00	30473	41.60%	55572	73.79%	75195
10/30/2012 0:00:00	29890	40.95%	55611	73.83%	75195
10/30/2012 1:00:00	26168	35.23%	56031	74.54%	75195
10/30/2012 2:00:00	22654	29.31%	56241	74.90%	75195
10/30/2012 3:00:00	22169	28.49%	56306	75.00%	75195
10/30/2012 4:00:00	22428	28.93%	56604	75.51%	75195
10/30/2012 5:00:00	20448	25.59%	56963	76.11%	75195
10/30/2012 6:00:00	20497	25.66%	57083	76.26%	75195
10/30/2012 7:00:00	19893	24.78%	57115	76.30%	75195
10/30/2012 8:00:00	20044	25.06%	57326	76.64%	75195
10/30/2012 9:00:00	20395	25.44%	57677	77.03%	75195
10/30/2012 10:00:00	19141	23.96%	57805	77.18%	75195
10/30/2012 11:00:00	18904	23.66%	57817	77.20%	75195
10/30/2012 12:00:00	16800	20.68%	57983	77.47%	75195
10/30/2012 13:00:00	14975	18.27%	58047	77.54%	75195
10/30/2012 14:00:00	12646	15.49%	58142	77.67%	75195
10/30/2012 15:00:00	12048	14.62%	58412	77.99%	75195
10/30/2012 16:00:00	9332	11.48%	58604	78.27%	75195
10/30/2012 17:00:00	8394	10.33%	58637	78.31%	75195
10/30/2012 18:00:00	7063	8.28%	59006	78.75%	75195
10/30/2012 19:00:00	6677	7.66%	59985	79.83%	75195
10/30/2012 20:00:00	6241	7.07%	60067	79.92%	75195

November 30<sup>th</sup>, 2012

10/30/2012 21:00:00	5625	6.37%	60747	80.66%	75195
10/30/2012 22:00:00	4864	5.59%	60935	80.96%	75195
10/30/2012 23:00:00	4790	5.48%	60955	80.99%	75195
10/31/2012 0:00:00	4620	5.28%	60955	80.99%	75195
10/31/2012 1:00:00	4866	5.53%	61231	81.30%	75195
10/31/2012 2:00:00	4502	5.06%	61231	81.30%	75195
10/31/2012 3:00:00	3505	3.91%	61232	81.30%	75195
10/31/2012 4:00:00	3270	3.65%	61232	81.30%	75195
10/31/2012 5:00:00	3001	3.35%	61233	81.30%	75195
10/31/2012 6:00:00	2986	3.33%	61233	81.30%	75195
10/31/2012 7:00:00	2910	3.23%	61252	81.33%	75195
10/31/2012 8:00:00	2812	3.11%	61313	81.39%	75195
10/31/2012 9:00:00	2808	3.10%	61392	81.48%	75195
10/31/2012 10:00:00	2578	2.85%	61426	81.52%	75195
10/31/2012 11:00:00	2475	2.73%	61469	81.57%	75195
10/31/2012 12:00:00	2115	2.33%	61473	81.57%	75195
10/31/2012 13:00:00	1837	2.02%	61475	81.58%	75195
10/31/2012 14:00:00	1415	1.55%	61477	81.58%	75195
10/31/2012 15:00:00	1201	1.32%	61482	81.58%	75195
10/31/2012 16:00:00	1069	1.17%	61484	81.59%	75195
10/31/2012 17:00:00	899	0.99%	61547	81.65%	75195
10/31/2012 18:00:00	863	0.95%	61575	81.69%	75195
10/31/2012 19:00:00	652	0.72%	61581	81.69%	75195
10/31/2012 20:00:00	269	0.30%	61589	81.70%	75195
10/31/2012 21:00:00	35	0.04%	61589	81.70%	75195
10/31/2012 22:00:00	15	0.02%	61590	81.70%	75195
10/31/2012 23:00:00	7	0.01%	61590	81.70%	75195
11/1/2012 23:00:00	0	0.00%	61590	81.70%	75195

Attachment 3 – NH Peak Outages by Town

