# REPORT OF THE NORTH CAROLINA UTILITIES COMMISSION AND THE PUBLIC STAFF

# TO THE

# NORTH CAROLINA NATURAL DISASTER PREPAREDNESS TASK FORCE

# RESPONSE OF ELECTRIC UTILITIES TO THE DECEMBER 2002 ICE STORM

# SEPTEMBER 2003

State of North Carolina
Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325



August 29, 2003

Secretary Bryan E. Beatty, Chairman
North Carolina Natural Disaster Preparedness
Task Force
4701 Mail Service Center
Raleigh, North Carolina 27699-4701

Dear Secretary Beatty:

The Utilities Commission and the Public Staff have completed and present for your consideration the results of our investigation into the response of North Carolina's electric utility providers to the ice storm of December 2002. Both as Secretary of Crime Control and Public Safety and as Chairman of the Governor's Task Force, your interest in these issues is significant and we are pleased to assist with the examination that you and others in the public arena require.

On December 4 and 5, 2002, a major ice storm blanketed 40 North Carolina counties with up to one inch of ice, causing an unprecedented power outage to approximately two million electric utility customers. Governor Easley subsequently formed the North Carolina Natural Disaster Preparedness Task Force and charged it with reviewing the storm response and recovery efforts of state agencies and private companies. In conjunction with the work of the Task Force, the Utilities Commission and the Public Staff have undertaken an independent review to assess how well utility providers responded to the Ice Storm, from the pre-planning stage through restoration of service to customers.

As part of the independent review, the Utilities Commission held six public meetings in the most heavily affected areas of the state to allow public comment regarding the utility outages related to the ice storm. Summaries of the comments are included as an appendix to this report. In addition, utility providers were sent extensive data requests concerning their forecasting, response planning, damage assessment, mobilization, repair activity, and customer service before and during the Ice Storm, as well as their general operation and maintenance practices and overall

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emergency preparedness. These data requests were followed up by numerous telephone interviews and further data requests over a period of several months.

The primary purpose of this report is to present the results of our independent review. Because the Utilities Commission has limited jurisdiction over electric cooperatives and municipal utilities, this report concentrates on the efforts of the state's three major public utility electric companies: Duke Power, Progress Energy Carolinas, and Dominion North Carolina Power. The focus of the report is on utility-related issues. The Commission and the Public Staff welcome the comments of other members of the Task Force who bring different perspectives to certain of these issues. Please feel free to call on us for any additional explanation or assistance, as we remain committed to working with you for the duration of the Task Force's tenure.

Respectfully submitted,

Jo Anne Sanford

Jo Anne Sanford, Chair
North Carolina Utilities Commission

Robert P. Gruber

Robert Gruber, Executive Director
Public Staff

cc: Senator David W. Hoyle
Senator R.C. Soles, Jr.
Representative Harold J. Brubaker
Representative Drew P. Saunders
Members of the North Carolina Utilities Commission

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# I. Introduction

On December 4 and 5, 2002, a major ice storm (the "December 2002 Ice Storm" or the "Ice Storm") blanketed 40 North Carolina counties with up to one inch of ice, causing an unprecedented power outage to approximately two million electric utility customers. Governor Easley subsequently formed the North Carolina Natural Disaster Preparedness Task Force (the "Task Force") and charged it with reviewing storm response and recovery efforts of state agencies and private companies. In conjunction with the work of the Task Force, the Utilities Commission and the Public Staff have undertaken an independent review to assess how well utility providers responded to the Ice Storm, from the pre-planning stage through restoration of service to customers.

As part of the independent review, the Utilities Commission held six public meetings in the most heavily affected areas of the state to allow public comment regarding the utility outages related to the Ice Storm (the "Public Meetings"). A summary of the comments presented at the Public Meetings is attached as the Appendix to this report. In addition, the utility providers were sent extensive data requests concerning their forecasting, response planning, damage assessment, mobilization, repair activity, and customer service before and during the Ice Storm, as well as their general operation and maintenance practices and overall emergency preparedness.

The primary purpose of this report is to present the results of that independent review. Because the Utilities Commission has limited jurisdiction over electric cooperatives and municipal utilities, this report concentrates on the efforts of the state's three major public utility electric companies – Duke Power ("Duke"), Progress Energy Carolinas ("Progress Energy"), and Dominion North Carolina Power ("Dominion")

(collectively, the “Utilities”). The focus of the report is on utility-related issues. The Commission and the Public Staff welcome the comments of other members of the Task Force who bring different perspectives to certain of these issues.

## II. Key Findings

The independent review by the Utilities Commission and the Public Staff resulted in the following key findings:

1. The severity of the Ice Storm, as measured by the number of customer outages, was unprecedented on a statewide basis, unprecedented for Duke as a system, and almost unprecedented for Progress Energy.

2. The great majority of outages during the Ice Storm were caused by tree trunks or limbs falling onto distribution lines. Because the storm occurred early in the season, when there was still foliage on many hardwood trees, the number of trees and limbs that fell due to ice buildup was greater than it would have been if the storm had occurred later in the winter.

3. The costs of power restoration were substantial for Duke and Progress Energy and will be recovered by the Utilities through current rates rather than through increased rates.

4. Some government officials in Durham and Durham County were concerned that they did not receive sufficient information from Duke during the Ice Storm and the subsequent power restoration process. Since the storm, the Utilities have made extensive efforts to improve their communications with government officials during outage periods.

5. The Utilities' efforts to deal with the high volume of telephone calls they received were adequate; improvements were identified and have been made. Duke initially experienced difficulties with its automated outage reporting system, but the difficulties were quickly corrected.

6. As a result of the Ice Storm, Duke and Progress Energy identified a need for improved communications with their Spanish-speaking customers, and both utilities have made very commendable efforts to communicate more effectively in Spanish.

7. The Utilities' Internet sites were useful to some customers in the restoration process.

8. Power was restored at a faster rate following this storm than it was after severe ice storms in prior years.

9. The Utilities have appropriate procedures in place for making advance plans for severe weather events and obtaining restoration assistance from other utilities. Their plans were disrupted to some extent in this case because the storm unexpectedly increased in intensity and breadth as it moved through the state.

10. Assertions have been made that improvements in the design and maintenance of the Utilities' electric distribution systems would make them less vulnerable to major storms. While there may be isolated areas or pockets that need improvement, the investigation did not indicate that significant outages during the Ice Storm were attributable to the design or age of the distribution systems or to pre-existing conditions on the systems.

11. Adequate right-of-way maintenance and tree trimming are essential in order to minimize the number and severity of outages during major storms. Clearly there is a direct correlation between the proximity of trees to utility lines and the integrity

of the lines. Several municipalities have adopted ordinances limiting tree trimming by utilities. Such ordinances are designed to enhance the environment and aesthetics of a city, but if improperly formulated, implemented or enforced, they can compromise utility infrastructure and reliability when storms occur. Therefore, a proper balance must be struck between aesthetic benefits to the community and the risk of substantial societal costs associated with the types of major storms to which North Carolina is vulnerable. All municipalities and all utilities should carefully examine their tree-trimming ordinances and their interpretation as well as enforcement of those ordinances to determine whether improvements can be made to minimize the risk of damage to utility distribution systems during storms.

12. Increasing the use of alternate feeds, as proposed by some customers, would not be of significant benefit in reducing outages during storms of the magnitude of the Ice Storm. Similarly, greater use of distributed generation would be of limited benefit in reducing weather-related outages.

13. Assertions have been made that Duke assigned fewer restoration workers to the Durham area than to other parts of its service territory that incurred similar damage from the Ice Storm. The investigation indicates that the ice buildup in Durham peaked later than in other areas and was greater than Duke anticipated; the storm was more severe and widespread than predicted. This was reflected in the number of damage evaluation and restoration personnel there on the first day of the storm. However, by the second day of the storm, the number of personnel in Durham was comparable to that in other affected areas in its service territory.

14. This investigation found no discrimination among geographical areas by any of the Utilities in their storm restoration efforts. There were fewer restoration

workers per outage in Durham than in other parts of Duke's system during the first day of storm restoration due to several factors, including the fact that the Ice Storm began in Duke's Southern Region and the first available off-system resources were deployed there.

15. The Utilities' restoration priorities were to address safety-related situations, emergency services, and critical infrastructure needs and then to restore service to the largest number of customers in the shortest period of time.

16. During the Ice Storm there were widespread rumors that Duke's crews were working considerably fewer hours per day than Progress Energy's crews; however, the Public Staff's investigation indicates that these rumors had little or no basis in fact. Duke and Progress Energy worked their crews approximately the same number of hours per day, and these working hours were appropriate in light of the emergency conditions, the need for rapid power restoration, and the anticipated duration of the recovery effort.

17. There is no reason to believe that the restoration of service to customers was delayed because of employee layoffs by the Utilities, or closure of some local offices, during the period prior to the Ice Storm.

18. Predicting restoration times for customers is a very difficult and unreliable process, and customers tend to be very frustrated when they find themselves still without power at the predicted restoration time. Consequently, the Utilities Commission and the Public Staff do not recommend increasing the use of power restoration estimates, or distributing maps showing estimated restoration times, as some customers have proposed.

19. At the time their power lines were damaged by the storm, or at the time their power was restored, a small percentage of customers suffered property damage because of open neutral conditions. The Utilities should use due diligence to correct any open neutral conditions which exist prior to power restoration in a given area.

20. The Utilities' line workers and field personnel deserve special recognition for their extraordinary work during the restoration effort.

## III. Severity of the Ice Storm

The Ice Storm began on December 4, 2002, and continued into the afternoon of December 5. Two days prior to the storm, initial weather forecasts called for ¼ inch ice accumulations over a large part of North Carolina. The areas of expected impact grew larger as the storm approached. Weather forecasts changed to predict ¼ to ⅜ inch ice accumulations throughout much of the state with possible accumulations of up to ½ inch in central North Carolina.

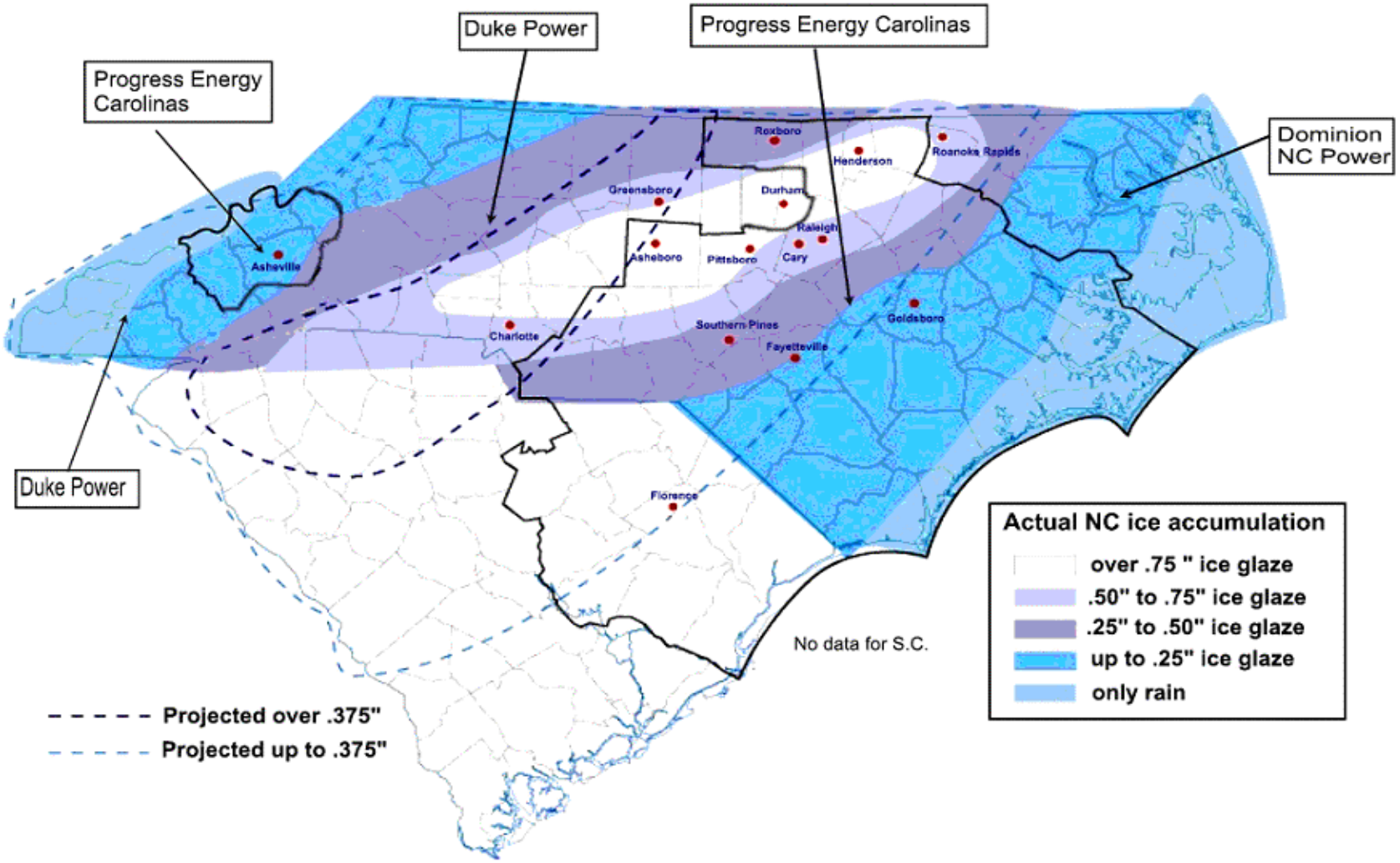
A mixture of snow and sleet changing to freezing rain was initially expected to arrive late in the evening on December 4; however, these conditions developed in many areas before sundown, much earlier than anticipated. By the end of the storm on the afternoon of December 5, accumulations were more than double the expected buildup in most of central North Carolina. Only the extreme eastern and western portions of the state were spared the ¼ to 1 inch of ice that covered almost all of the state.

Much of the state's heaviest ice accumulation fell within Duke's service territory, impacting the vast majority of Duke's customers. Progress Energy's service territory was also hit hard, although the heaviest ice accumulations were not as widespread as in Duke's service territory. The impacted areas within the territories of Duke and

Progress Energy included the most populous areas of the state. Dominion's service territory (the northeastern region of North Carolina) is less populated and experienced less ice accumulation than other regions of the state.

Figure 1 shows expected ice accumulation versus actual ice accumulation across North Carolina, as well as the Utilities' service territories. The original weather forecast is indicated by dotted lines; the area of heavier predicted accumulation is within the darker dotted line. Actual ice accumulations are indicated by color, with white representing the areas that experienced the greatest accumulation. Progress Energy had up to ¾ inch of ice accumulation in large portions of its service area, and up to 1 inch in the northern parts, whereas Duke experienced from ¾ to 1 inch of ice buildup in large portions of its impacted area. Dominion experienced up to ½ inch of ice accumulation in the Roanoke Rapids area.

**Figure 1: December 2002 Ice Storm Accumulations/Utilities' Service Territories**



# IV. Impact of the Ice Storm

Utility damage reports indicate that the vast majority of damage resulted from falling limbs and trees coming into contact with electrical lines, tearing down lines and damaging poles, transformers, and other equipment, rather than from failure of the lines themselves as a result of ice buildup. As is usually the case in ice events, evergreens created the most problems. Many evergreens from untrimmed areas outside the right-of-way fell and impacted the lines.[1] Throughout the state, hardwoods, which rarely experience ice damage, suffered significant limb breakage because the Ice Storm came in late fall when foliage was still on the trees. It has been suggested that the drought conditions of recent years contributed to pre-Ice Storm leaf retention and weakened branches.[2] Several Duke employees who are certified arborists spoke at the Public Meetings. One such employee spoke at the Durham Public Meeting, stating that he and some of his colleagues were extremely surprised at the structural failure of white oaks, and they are of the opinion that the leaves had not dropped as a result of the drought, thereby adding a great deal of surface and increasing the ice loading of the trees.[3]

[1] Utility right-of-way easements for transmission lines generally contain provisions allowing the utility to remove or trim "danger trees," trees outside the right-of-way that could fall into the line. Right-of-way easements for distribution lines generally do not contain such provisions.

[2] Response of January 15, 2003 by Duke Power to Public Staff – NCUC data request, Question No. 28.

[3] Transcript of Regional Public Meeting Regarding Utility Outages, Durham, North Carolina, December 19, 2002, Phil Ray, Page 53.

The following table shows the impact of the Ice Storm on the Utilities' system-wide facilities.

**Table 1: Ice Storm Impact on Facilities**

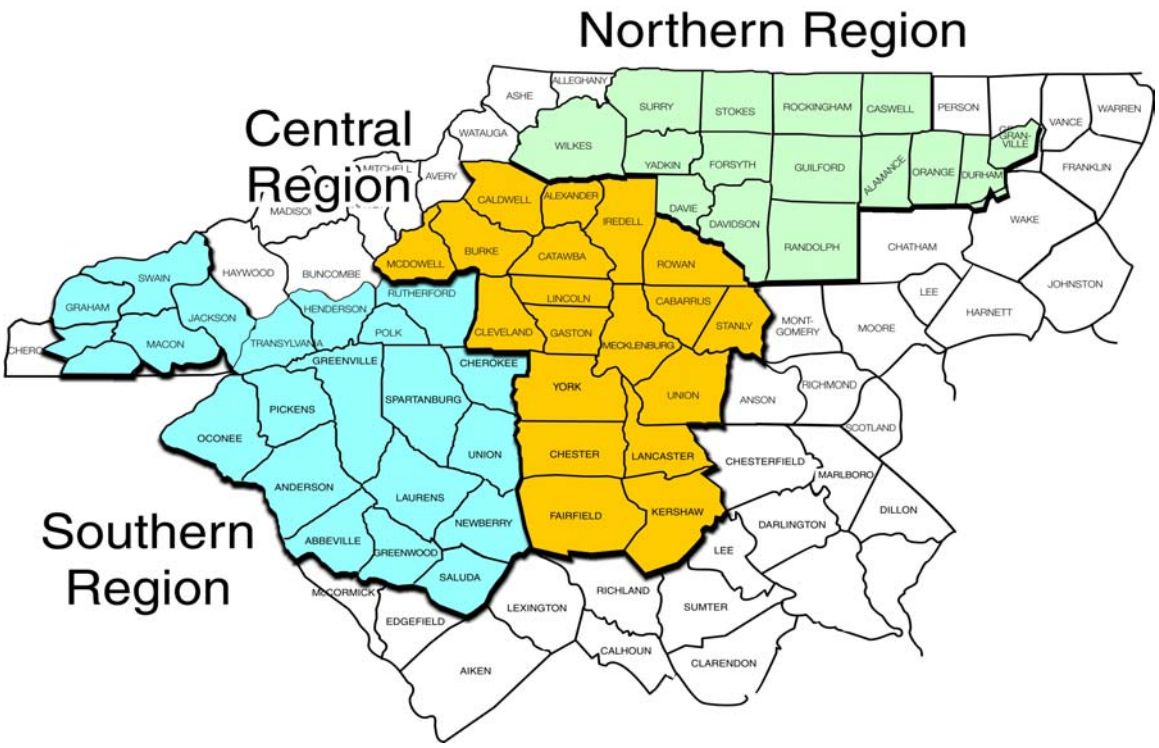
| Facilities | Duke | Progress Energy | Dominion |
|---|---|---|---|
| Poles damaged | 3,200 | 1,322 | 10 |
| Total poles | 1,480,355 | 1,073,441 | 122,093 |
| Transformers replaced | 2,300 | 2,196 | 7 |
| Total transformers | 575,586 | 425,661 | 40,956 |
| Cross-arms damaged | 4,420 | 1,090 | 77 |
| Insulators damaged | 37,000 | 3,760 | N/A |
| Fuses replaced | 87,630 | 28,268 | 150 |

**Impact on Duke**

The Ice Storm began in the Southern Region of Duke's service territory, moved through the Central Region, and finally impacted the Northern Region. These regions are depicted on Figure 2.

The peak of the storm outages for the Southern and Central Regions occurred at 8 p.m. on December 5. The Southern Region (including the cities of Anderson, Greenville, and Spartanburg in South Carolina) had just over 300,000 customers without power, while the Central Region (including the cities of Charlotte, Gastonia, and Salisbury in North Carolina) had 643,000 customers without power. Some thirteen hours later, at 9 a.m. on December 6, the Northern Region (including the cities of Greensboro, Winston-Salem, Durham, Burlington, and Chapel Hill in North Carolina) hit peak outage levels of 425,000 customers out of service.

**Figure 2: Duke's Service Territory by Region**

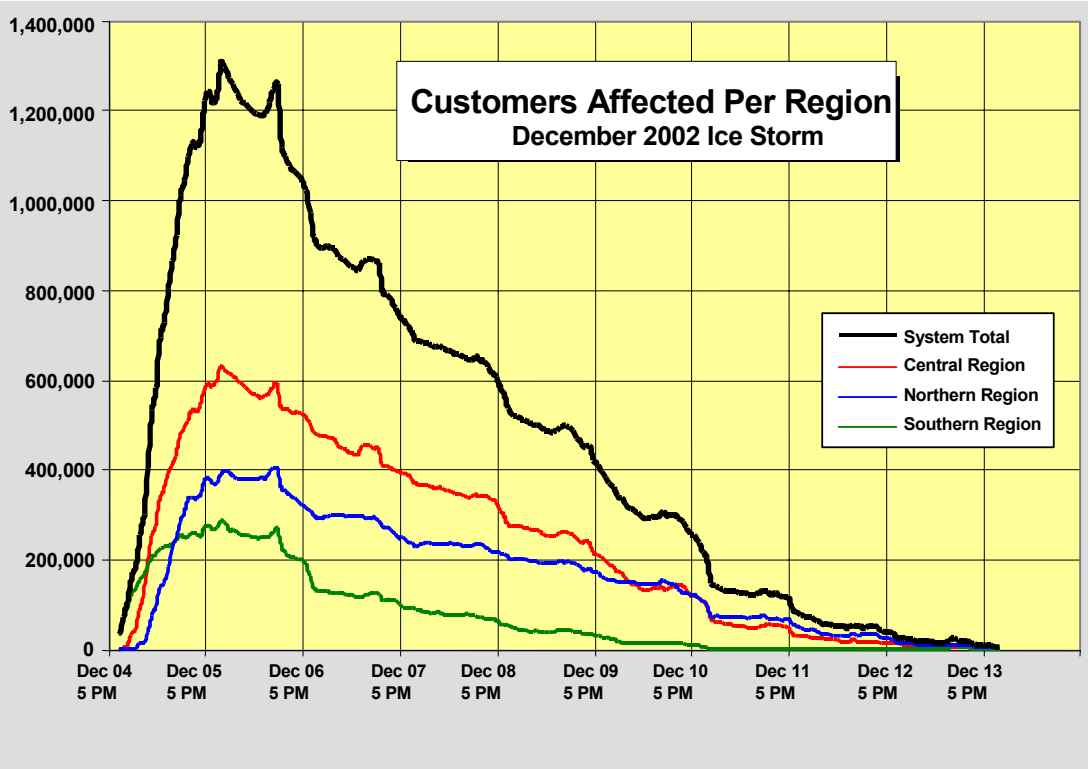



Provided by Duke

The peak number of Duke's North Carolina customers without service at one time as a result of the storm was 1,042,034 out of a total of 1,675,361 (62.2%). Figure

3 shows the fluctuations in the number of affected customers (including South Carolina as well as North Carolina customers) over time in each of Duke's three regions.

**Figure 3: Duke's Customers Affected Per Region**




Provided by Duke

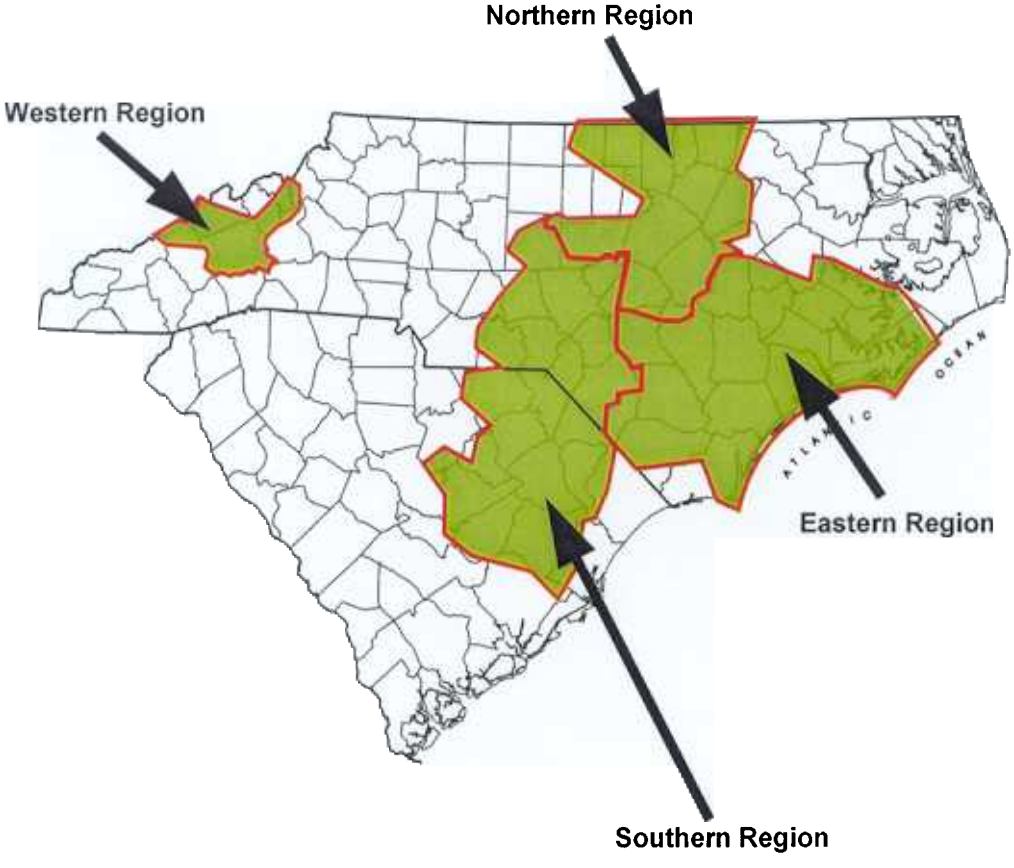
## Impact on Progress Energy

While the Ice Storm affected all of Duke's service territory, only certain portions of Progress Energy's territory were severely impacted. Figure 4 shows the four regions that comprise Progress Energy's service area.

As the storm moved across the Carolinas from west to east, its primary impact on Progress Energy was in the company's Northern Region (including the cities of Raleigh, Cary, and Henderson), where approximately 392,000 customers were without power at the peak of the storm. The North Carolina portion of Progress Energy's Southern

Region (including the cities of Rockingham, Sanford, and Southern Pines) was also substantially affected, with approximately 64,100 customers out of service.

**Figure 4: Progress Energy's Service Territory by Region**

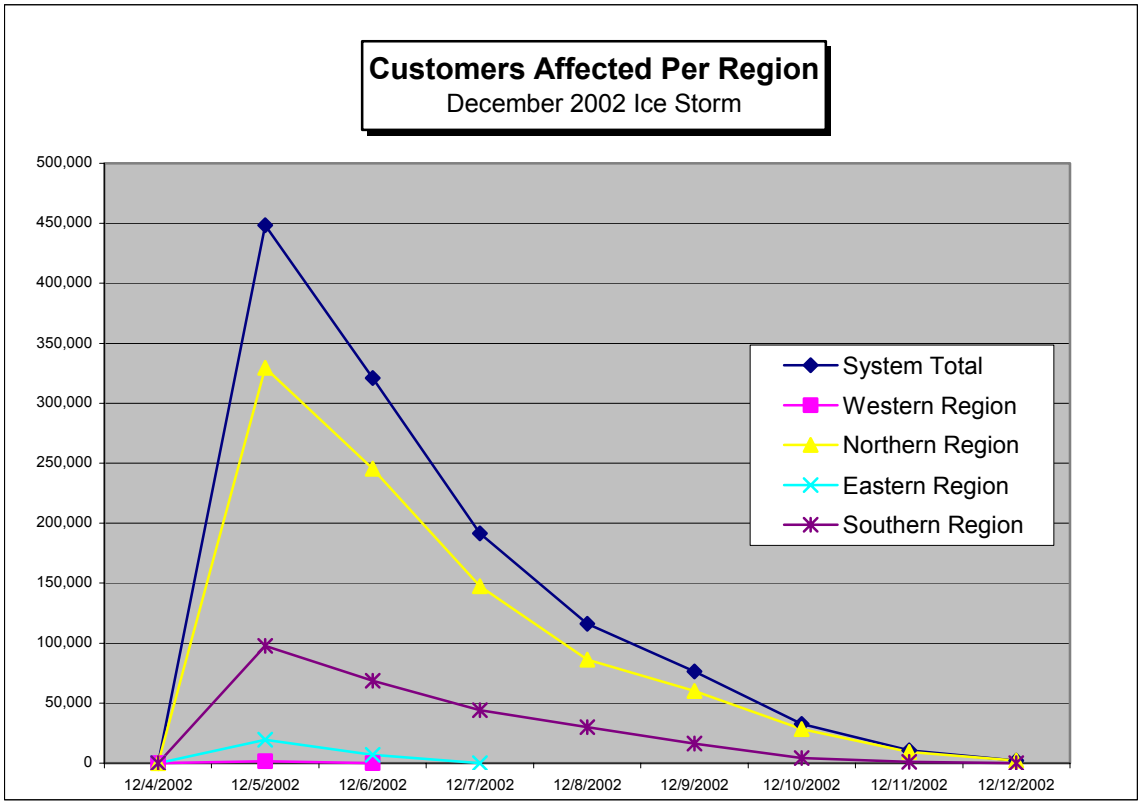



Provided by Progress Energy

Progress Energy's Eastern Region (extending from Fayetteville to Morehead City), its Western Region (the Asheville area), and the South Carolina portion of its Southern Region were only lightly impacted by the storm.

The peak number of Progress Energy's North Carolina customers without service at one time as a result of the storm was 460,400 out of a total of 1,136,000 (40.52%). Figure 5 shows the number of customers out of service at 5 p.m. each day of the restoration period. (Since the peak number of 460,400 customers without service did not occur at 5 p.m., it is not reflected on the graph.)

**Figure 5: Progress Energy's Customers Affected Per Region**




Based upon information provided by Progress Energy

## Impact on Dominion

Dominion experienced significantly less overall damage to its electric system than did Duke and Progress Energy. Dominion had 91,000 customers out of power system-wide (North Carolina and Virginia), including 22,010 in North Carolina. Only two of Dominion's five North Carolina service areas experienced significant power outages: Ahoskie with 1,590 outages and Roanoke Rapids, the worst hit area, with 19,800 outages. The peak number of Dominion's North Carolina customers without service at one time as a result of the storm was 22,010 out of a total of 112,523 (19.56%).

**Impact on Cooperatives and ElectriCities**

North Carolina Electric Membership Corporation consists of 27 member cooperatives (the "Cooperatives") serving 860,000 customers. The Cooperatives serve 45% of the state's land mass and own and operate 90,000 miles of electric distribution lines. On December 5, the Cooperatives experienced a total of 185,000 customer outages across the state. The areas of greatest impact were Davidson, Randolph, Union, and Wake counties.

ElectriCities is an organization representing 72 cities across North Carolina that operate municipal electric systems serving 500,000 customers. ElectriCities member systems suffered 177,833 outages across North Carolina as a result of the December 2002 Ice Storm, with 44,376 of these outages occurring in the eastern part of the state.

# V. Restoration of Service: Field Operations

The Utilities' common goal was to restore electric service to as many customers as quickly and safely as possible. Crews began restoration work immediately, although working conditions were especially dangerous as limbs, trees, and power lines continued to fall. Because of the widespread damage caused by fallen trees, transportation of outside crews, when available, was difficult. Working with state, county, and municipal public work forces, repair crews had to clear fallen trees from the roadways before they could begin repairing lines. The extremely cold weather for several days following the storm also impeded the work of tree and repair crews. Even though the Utilities were restoring power to customers on December 4 and 5, the total number of customers without power continued to climb for several hours as additional

customers or previously restored customers lost power. The restoration efforts of each utility are discussed below.

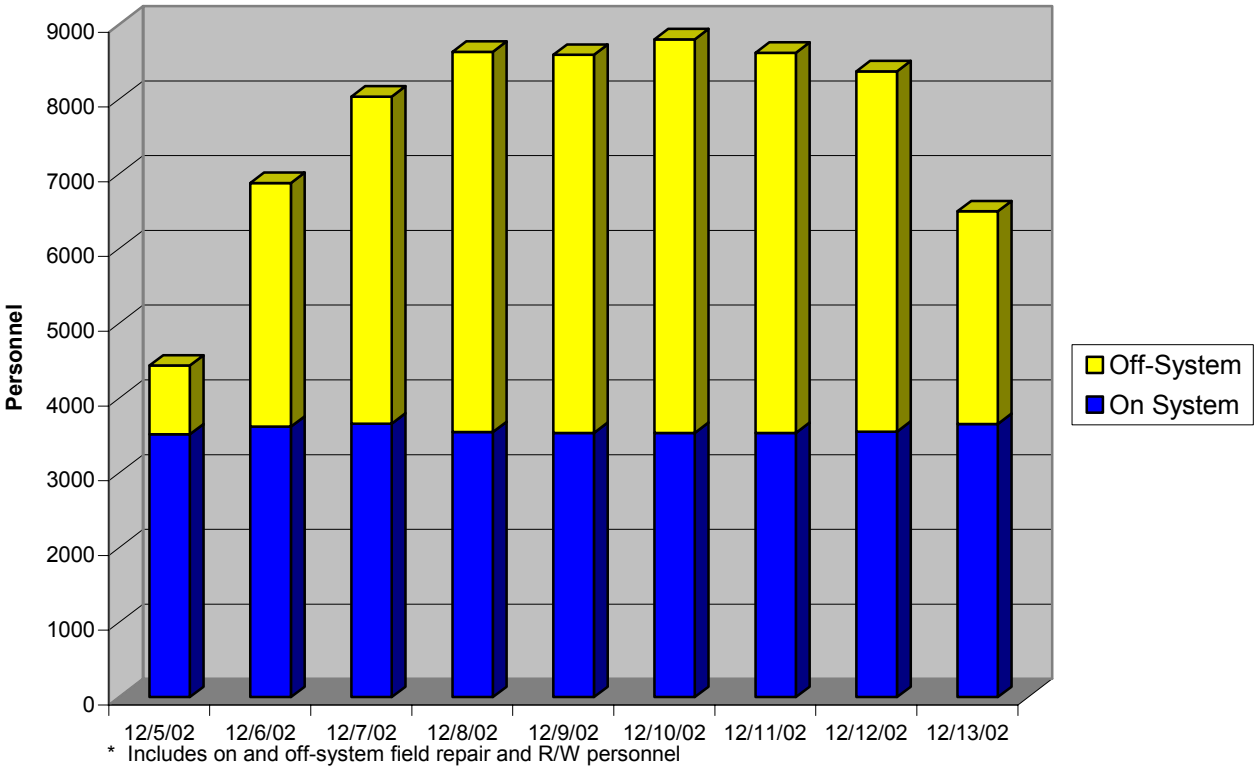
**Duke**

At noon on December 4, Duke activated its Emergency Operations organization and opened its Emergency Operations Facility. Duke had already made arrangements with other utilities and contractors for storm restoration work, but continued these discussions to determine if additional crews could be released and, if so, when they could arrive. On December 5, Duke continued to analyze the storm's impact, to assess damage identified in the field, and to obtain crew resources from other utilities.

Off-system crews arriving from Southern Company reached Duke's Northern Region the evening of December 5 and were available to begin restoration work the following morning. Crews from northern utilities could not be released to assist Duke until the storm had cleared their service areas.

To restore power to its customers, Duke utilized more than 11,000 personnel. These included company employees normally assigned to restoration efforts, other company employees who were reassigned from normal duties to restoration efforts, employees of contractors, and off-system resources from 18 states. Figure 6 shows the number of personnel working to restore power on Duke's system on each day from December 5 through 13.

**Figure 6: Duke's Service Territory Field Personnel***




Provided by Duke

Staging areas were set up in Spartanburg, South Carolina (for the Southern Region), Charlotte, North Carolina (for the Central Region), and Greensboro, North Carolina (for the Northern Region) to assemble and deploy tree crews and line maintenance crews. Duke staffed its operating centers and call center 24 hours a day and performed many support activities at night. Because damage occurred to its entire service territory, Duke was initially unable to move company repair crews from one area to another to provide restoration assistance.

During the restoration period, Duke implemented procedures which had been developed and enhanced following previous storms, including busing crews from work staging centers to hotels, delivering lunch meals to crews at jobsites, refueling trucks at

the staging or operations centers overnight, preparing work packages during the night, and in many cases, feeding crews at the staging centers early in the mornings and late in the evenings.

The Public Staff conducted a field visit to Duke's Triangle Operations Center located on Hillsborough Road in Durham. This center was responsible for outage tracking, crew assignment, staging, logistics, and materials warehousing and distribution. Duke's communications system allowed it to be in constant contact with crews in the field as well as other operations areas and to dispatch crews rapidly to hot spots as they were identified. Duke employed runners to deliver materials to specific work areas instead of requiring field crews to come to the warehouse. The Public Staff also visited Duke's Durham County Stadium staging center. This staging center served as the central location for crew gathering and dispatch. A materials area located outside served both as a supply area for new materials and as a collection area for damaged and salvaged materials brought in by the line crews. Duke had brought in several hundred tons of gravel to improve the maneuverability of heavy line trucks in the muddy parking lot.

Utilizing its detailed emergency preparedness plan, Duke restored power to all main feeders and public health and safety facilities by December 9. By noon December 11, 90% of Duke's customers with storm-related power outages were restored, and by early December 14, all customers were restored, except for locations where damage to customer equipment required repair by the customer before Duke could restore service.

Between December 5 and 13, Duke safely restored power to more than 150,000 customers per day on average, setting a new company record for repair. During this

time, Duke had to repair or replace large numbers of poles, transformers, cross-arms, insulators and fuses, as shown in Table 1 in Section IV of this report.

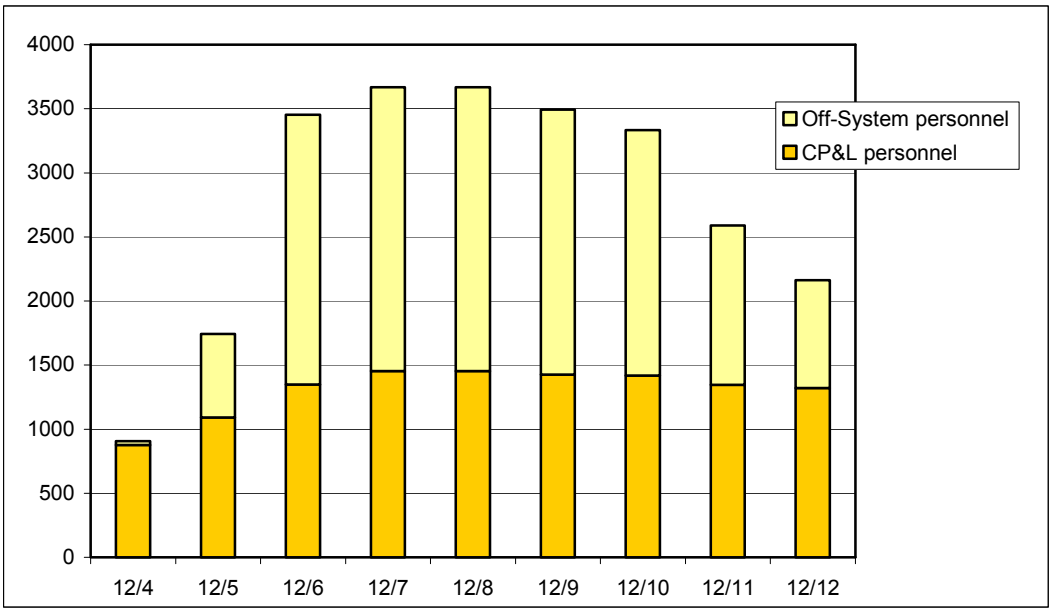
Although no serious accidents or injuries occurred during the restoration work, Duke had one traffic-related fatality involving an off-system worker.

**Progress Energy**

On December 4, in preparation for the storm, Progress Energy moved 350 of its own employees and contract personnel to the central part of the state, essentially doubling its usual number of repair personnel in the area. By 4 a.m. on December 5, Progress Energy began importing crews from outside its system, and later that morning it sought additional crews.

Tree crews and line crews were staged at four sites in Progress Energy's hardest-hit regions: Raleigh, Henderson, Asheboro, and Zebulon. By the end of the day on December 5, 1,700 personnel were in the field; by the next day that number had doubled. By December 7, the number of tree and line personnel in the field had reached more than 3,600. This work force came from 19 states and included both utility and contract crews. It also included crews from Progress Energy's Florida affiliate (formerly Florida Power), which were mobilized on December 5. In addition, 900 employees at call centers (including corporate volunteers) and 500 employees in other support roles (including crew guides and other logistics support) brought the total work force to more than 5,000 people on December 7. Figure 7 shows the number of field personnel participating in Progress Energy's power restoration efforts each day from December 4 through 12.

**Figure 7: Progress Energy's Service Territory Field Personnel**




Provided by Progress Energy

Even as the total number of outages diminished by December 9, Progress Energy still had more than 3,400 personnel in the field. The majority of the crews were kept on the job until over 90% of the affected customers had service restored. By December 11, the work force was reduced somewhat as several utilities recalled their crews, and Progress Energy released a number of tree crews whose work was mostly completed at that point. On December 12, one week following the Ice Storm, nearly 2,500 people continued to work on service restoration. As late as December 13, some off-system personnel were still helping with cleanup activities, even though service had been restored to all customers by that time.

During the restoration period, Progress Energy implemented procedures learned from previous outages to maximize the crews' time on the job, including busing crews from work staging centers to hotels, feeding crews at the staging centers early in the mornings and late in the evenings, delivering lunch meals to crews at jobsites, refueling

line trucks and equipment at night at the staging centers, and preparing work packages and materials overnight so that crews would be ready to move out immediately after breakfast. Because they can work more efficiently during daylight hours, the majority of the restoration tree and line crews were utilized during the day, leaving the staging centers very early in the morning. Progress Energy kept some crews on the job around the clock to handle emergency repairs, such as live wires or restoration of service to critical customers such as hospitals, water and sewer treatment plants, and other health and public safety facilities. No serious accidents or injuries occurred during the restoration work.

The Public Staff conducted field visits to Progress Energy's staging center located at the State Fairgrounds in Raleigh. The fairgrounds was not in use during the restoration period, and there was ample parking for the numerous trucks utilized by tree and line crews. The Jim Graham Building provided sheltered space for Progress Energy's staging center operations and its communications office, materials storage and distribution center, crew rooms for work assignment and safety briefings, restroom facilities, and a dining area for up to 1,700 workers. Progress Energy had on site a food preparation tractor-trailer rig complete with a frozen food storage area for thousands of meals. The company also had on site a fleet of commercial charter buses that were used to shuttle non-local workers back and forth to their hotels. This allowed the crew trucks to remain at the staging center overnight for refueling and restocking with materials for the next day. When work crews arrived at the staging center each morning and received breakfast, they were able to depart for their assigned work areas without significant delay. Some crews returned to the staging center as late as 10:30 p.m. These crews were fed in a matter of minutes and transported back to their lodging.

Service was restored to tens of thousands of Progress Energy's customers by the end of the day on December 5. By the end of the day on December 6, the second day of restoration work, nearly 50% of all affected customers had service restored. As the outage continued, however, the repair of more severely damaged facilities and restoration of service to customers in rural areas slowed because of the difficulty of accessing the outage sites and the quantity of work required to restore service. By December 10, more than 96% of Progress Energy's customers who lost power during the storm had service restored. By December 11, service was restored to 99% of the customers, and the remaining customers capable of receiving service were restored by the end of the day on December 12.

**Dominion**

The precipitation in Dominion's Virginia service area was mainly in the form of snow and sleet and thus did not create major power outages. As a result, the majority of Dominion's Virginia restoration crews were available to assist Dominion with its North Carolina restoration efforts. Although it had originally requested assistance from Allegheny Power, Dominion determined on December 5 that it would not need the outside assistance, and the Allegheny Power crews were diverted directly to Progress Energy to assist in its restoration efforts.

On December 5, three 50-person field teams and many of the local line contractors were sent from Virginia to Roanoke Rapids to help with Dominion's efforts to restore service to its 22,010 North Carolina customers who had lost power as a result of the Ice Storm. On December 6, Dominion had 62 tree clearing workers, 260 line workers, 85 support personnel, and 275 call center personnel working on its restoration efforts. By midnight December 6, all but 1,000 Dominion customers had been restored.

At this time, additional crews were released to redeploy and provide assistance to other utilities. By 2 a.m. December 8, all of Dominion's customers were restored to service, and the remaining crews were immediately offered to other utilities. By December 8, Dominion released 240 tree contractors and 100 line contractors, which are normally committed to serve Dominion, for redeployment elsewhere in North Carolina. Dominion had no serious accidents or injuries during the restoration process.

**North Carolina Electric Membership Corporation**

The state's electric membership cooperatives used 3,300 line workers and other specialists to restore power to their customers. By 9 p.m. on December 5, service had been restored to nearly 56,000 customers, leaving 129,032 without power. By 9 p.m. on December 6, 67,000 customers remained without service. Restoration progress remained steady and by 9 p.m. on December 7, 39,000 customers remained without power. On December 8, only 13,000 customers were still without power. At 9 p.m. on December 9, there were 12,000 customers out of service, and by December 10, there were 7,035. As of noon December 11, only 200 scattered customers remained without power. The Cooperatives reported no serious accidents or injuries during the restoration process.

**ElectriCities**

ElectriCities oversees an emergency assistance program which attempts to match cities that are not affected by a storm with those that need help to restore service following storm related outages. Twenty-seven member cities of ElectriCities were able to restore power without assistance following the Ice Storm. Seventeen cities provided assistance to other municipalities requiring aid. In addition, some cities received assistance from cities in Georgia and Virginia.

The customers experiencing outages in the eastern part of North Carolina were fully restored by December 7. All of ElectriCities' customers were restored by December 10. There were no serious accidents or injuries reported during the restoration process.

**Cleanup**

Cleanup work involves activities that are designed to restore electric distribution lines to normal operating conditions but may have been omitted during earlier restoration efforts in order to restore service to customers as quickly as possible. Overhead cleanup work includes (1) replacing damaged power poles; (2) restoring power lines that are sagging beyond their normal ground clearance limits as a result of the impact of ice, trees, or limbs; (3) replacing damaged guy wires; and (4) replacing damaged or destroyed street lights. An example of underground cleanup is the replacement of damaged underground electric cable that may have been bypassed during earlier restoration efforts.

Following the December 2002 Ice Storm, the Utilities engaged in the process of surveying long-term damage to their respective distribution systems. The Utilities' tree crews completed the process of removing hanging or broken tree limbs, leaning trees, and danger trees in their rights of way ("ROWs") that posed a threat to their distribution systems.

Progress Energy temporarily increased staffing to deal with cleanup needs. The cleanup was completed February 28, 2003. Duke identified 895 distribution circuits that were the most heavily damaged. A field survey was conducted on each circuit, and tree crews eliminated the potential outage sources on the circuits. This task was completed on March 7, 2003. Dominion completed its cleanup on March 6, 2003.

The Utilities Commission and the Public Staff conclude that the Utilities completed the survey and cleanup of their distribution systems in an orderly and efficient manner. Potential problems were eliminated, and with the combination of nature's tree pruning and the companies' tree maintenance, the systems should be better prepared to withstand future storms.

# VI. Restoration of Service: Public Information

Communications with interested parties – customers, government officials, and the news media – are of vital importance to an electric utility when a major storm results in widespread power outages. This section of the report reviews the Utilities' efforts to keep the public informed as to the status of the restoration process.

**Communications with Government Officials**

On December 4, Duke, Progress Energy, and Dominion contacted state and local government officials, as well as local and county emergency operations offices. Regular updates were provided to the Utilities Commission, the Public Staff, the Governor's Office, state emergency planners, the media, local and state emergency operations centers, and elected officials throughout the nine-day restoration effort.

Many governmental participants at the Public Meetings stated that they appreciated the information they had received from the Utilities during the Ice Storm about the status of electric service in their areas and the progress of the restoration effort. In particular, school officials almost uniformly indicated that they had been kept very well informed.

However, there were also a number of government officials, especially from the city of Durham and Durham County, who expressed concern that Duke's

communications with them had been inadequate. These officials stated that they had not received enough information, especially during the first two days of the storm; that the telephone lines designed for direct calls from local government and emergency officials did not work; and that the company had not cooperated sufficiently with local emergency planning exercises. These communications problems, which Duke did not dispute, appeared to be largely attributable to shortcomings in the working relationship between Duke's regional management and local officials other than those associated with the public schools. In reviewing their performance after the storm and making reports on "lessons learned" to the Governor's Task Force, the Utilities devoted considerable attention to communications with government officials. They stated that in future storms they planned to designate specific employees to serve as liaisons with particular counties and emergency operations centers. Duke reported that it was developing a new outage database, which would enable it to determine the number of outages and the number of customer calls received by county, city and ZIP code. In addition, Duke plans to communicate with key emergency personnel, before winter and summer storm seasons, and it also intends to work with county officials to identify critical facilities that are remote from substations or main feeder lines and thus are especially vulnerable to lengthy outages. The Utilities Commission and the Public Staff recommend that Duke take whatever steps are necessary to ensure that elected officials in all areas of its service territory have direct access to information regarding storm preparedness and restoration.

**Media Communications**

The Utilities issued regular media releases that included outage statistics and service restoration estimates, as well as safety tips and telephone numbers to call to report an outage.

Duke used PR Newswire for news release distribution. Duke issued 39 news releases and dozens of media updates during the restoration period, in addition to conducting numerous on-air interviews. Duke sent additional personnel to the areas most heavily affected by the Ice Storm to communicate with the public and issued specialized bulletins for the Triangle area.[4] These efforts continued until all customers were back on line.

Progress Energy issued news releases at least daily, participated in the Division of Emergency Management's daily media briefings, and conducted hundreds of media interviews. Progress Energy engaged in extensive outreach through radio spots and newspapers throughout the restoration process.[5] In the aftermath of the Ice Storm, Progress Energy has taken several steps to enhance its media communications in adverse weather periods. These enhancements include positioning Progress Energy media spokespersons in affected areas, proactively generating news updates on the restoration process, and adding local radio outlets and towers to its restoration priority lists.

Dominion issued two to three regular news releases per day in addition to answering media inquiries.

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[4] Response of January 15, 2003 by Duke Power to Public Staff – NCUC data request, Question No. 40.

[5] Response of January 15, 2003 by Progress Energy Carolinas to Public Staff – NCUC data request, Question No. 40.

While the investor-owned utilities were generally able to communicate with the public successfully through the media, ElectriCities encountered some difficulties. ElectriCities has advised the Public Staff that the major local television affiliates in the Triangle area failed to report its news releases and updates, leaving thousands of municipal power customers with little or no information on the status of their electric service.

**Customer Call Centers**

The total number of phone calls collectively received by the Utilities during and following the Ice Storm was unprecedented and presented significant challenges to the companies.

Duke has a plan for activating auxiliary telephone support in its Customer Contact Center during major outages. This plan includes contact with designated individuals in various internal departments who are responsible for activating an auxiliary work force "call tree." In anticipation of the December 2002 Ice Storm, Duke identified the need for an auxiliary work force in its Customer Contact Center on December 3, the day before the storm hit. Contacts for each department identified volunteers to support storm restoration by responding to customer calls. Auxiliary employees were prescheduled to report to work at 6 a.m. on December 5. As a result, Duke increased staffing at its call center from 220 to 600 telephone agents. The need for auxiliary personnel was evaluated on a daily basis until December 15.

Duke's outage reporting system is known as PowerOn. Customers dial a unique toll-free number that allows them to report their outage automatically through a Voice Response Unit ("VRU"). Customers who call the PowerOn number are given the opportunity to report a power outage through the automated system. Customers who

for whatever reason cannot report their outage in the automated system are directed to a live operator. PowerOn is served by 332 incoming lines at Duke's Customer Contact Center. There are approximately 1,400 additional lines available through a contracted third-party overflow provider, for a total of 1,732 lines.

Several days before the Ice Storm moved through Duke's service territory, Duke began promoting its PowerOn number for reporting outages. On December 3, Duke added messages to PowerOn for its general customer base. When the Ice Storm began, the maximum number of callers who could be accommodated in the queue waiting to talk to a live operator was 255. During the early hours of the Ice Storm, from approximately 9 p.m. on December 4 until 2:30 a.m. on December 5, the number of callers in the queue exceeded 255. At this point the PowerOn software inappropriately directed customers in the queue back into the VRU, so that they never got through to report their power loss. As soon as this problem was identified and confirmed, the Maximum Queue Size parameter within the Duke telephone switch was increased from 255 to 2048, resolving the transfer issue.

A few hours later, between 6 a.m. and 11 a.m. on December 5, a significant number of callers received busy signals when dialing Duke's toll-free number, because the number of callers exceeded the 1,732 lines available. After the morning of December 5, the volume of calls declined, and thereafter the number of busy signals was minimal.

In addition to using PowerOn, Duke's customers were also able to automatically report outages through one of 45 local telephone numbers. Because these 45 local numbers come to Duke through numerous local carriers, Duke was unable to provide data for customers using these numbers. However, Duke believes that many

customers using these local numbers received busy signals, especially during the first day of the event, and that these busy signals were due in part to infrastructure limitations among the local telephone carriers. Duke's Customer Service Center received approximately 1.6 million calls during the Ice Storm and restoration period, whereas Duke's normal daily call volume is approximately 26,454 calls.

The Commission and Public Staff commend Duke for quickly resolving the problem of an inadequate maximum limit on the queue of callers waiting to speak to a live operator. However, it is regrettable that Duke did not have sufficient lines in the PowerOn system to accommodate all callers on the morning of December 5. The Commission and Public Staff recommend that in planning for future storms, the Utilities should make every effort to ensure that the number of telephone lines available to customers – as well as internal system parameters such as maximum queue size – is sufficient to meet the demands imposed by a major storm. The number of customers is steadily increasing, and the Utilities cannot appropriately assume that the December 2002 Ice Storm is the worst storm they will ever face; thus, even a telephone system adequate to meet the requirements of the December 2002 storm may not be sufficient for future planning purposes.

On December 5, Progress Energy initially had 343 employees staffing its customer service telephones. Once the true impact of the storm was known, the company increased its call center personnel to a peak of 535 employees on December 9.[6]

[6] The 900 call center employees referred to in Section V of this report include employees who did not staff the customer service telephones, as well as employees who did staff the telephones but were not working on December 9.

Progress Energy answered approximately 650,000 outage calls between December 4 and 11. Almost half of the total call volume, 318,000 calls, was taken within the first full day of the storm event, in contrast to Progress Energy's normal daily call volume of approximately 15,000 calls. To answer call volumes of this magnitude, Progress Energy relied heavily on automation, particularly during the early stages of the storm. Customers utilizing Progress Energy's toll-free, automated Outage Line did not encounter difficulties in reporting outages. However, some customers used Progress Energy's toll-free customer service number to report an outage, instead of the advertised outage-reporting number. To deal with these calls, Progress Energy placed a recorded message on the customer service line, directing customers with power outages to hang up and call the outage-reporting number. Nevertheless, some customers who called the customer service line received busy signals in the first days of the Ice Storm, because the number of callers exceeded the number of lines available for this number.

Following the Ice Storm, Progress Energy identified the need to enhance its VRU. In future outages, the VRU will provide the following information to customers: (1) areas most impacted; (2) a schedule for providing restoration estimates, even while damage assessment is under way; (3) number of customer outages and number of repair crews working in the field; (4) areas for which no restoration estimates are available; (5) an option for customers with meter damage requiring an inspection before system connection can occur; and (6) a full Spanish outage-reporting menu. In addition to these VRU enhancements, all of which have now been implemented, Progress Energy plans to distribute glow-in-the-dark magnets with outage-reporting numbers.

Dominion's call centers began planning for the Ice Storm on December 2. At meetings on that day, Dominion made contingency plans for going into "storm mode" by operating on a round-the-clock basis with 13-hour work shifts. On December 3, emergency shifts were activated. From December 4 through 7, Dominion answered 55,792 calls from its North Carolina and Virginia customers with customer service agents and automated outage reporting technology. Dominion's peak 8-hour shift was from 8 a.m. to 4 p.m. on December 5, when it fielded 11,630 calls. In response to the number of outages experienced, Dominion increased its call center personnel from 260 to 275 on December 6. Since approximately 25% of Dominion's outages were in North Carolina, Dominion estimates that it answered approximately 2,908 calls from its North Carolina customers during the peak 8-hour period. Dominion's normal daily call volume is 16,891, of which approximately 1,689 calls are from its North Carolina customers.

**Communications with Spanish-Speaking Customers**

In addition to the tremendous volume of calls being taken, the Utilities also faced the need for effective communication with the Hispanic population. According to the Governor's Office of Hispanic/Latino Affairs, North Carolina has the fastest growing Hispanic population in the country. Between 1990 and 2000, the number of Hispanics in the state grew by almost 400%, from 76,745 to over 379,000. Spanish is the first language of approximately 90% of North Carolina's Hispanics, and the only language of about 60% of North Carolina Hispanic workers. 49.9% of North Carolina Hispanics speak English less than "very well" (as defined by the United States Census). North Carolina ranks number one in the United States in percentage increase of immigrants from 1995 to 1999, at 73%.

Since 1999, Duke has provided its Spanish-speaking customers with the option of talking to a Spanish-speaking customer representative to receive business and service-related information. In addition, Duke utilizes a translator service for customers speaking languages other than English and Spanish and for Spanish-speaking customers when a bilingual Duke customer representative is not available. On December 9, Duke enhanced service to its Spanish-speaking customers by:

- Adding messages to PowerOn for Spanish-speaking customers;
- Establishing a unique toll-free number for Spanish-speaking customers, thus providing these customers an additional channel to access Spanish-speaking specialists and enabling them to hear the same storm informational messages that English-speaking customers heard;
- Promoting the new toll-free number on radio stations targeted to Spanish-speaking customers;
- Using Duke employee volunteers who speak Spanish to staff the line after regular Spanish-speaking specialists completed their 12-hour shifts; and
- Utilizing two Spanish-speaking Duke employees to provide translations, information, and interviews to major Latino news outlets.

During the storm event, the toll-free number established for Spanish-speaking customers received 1,377 calls. Duke is not aware of any delay in restoration of service resulting from language problems.

In February 2003, Duke requested PR Newswire to translate its storm restoration news releases into Spanish and distribute them to Spanish-language media outlets. These releases were also available on www.dukepower.com, Duke's customer web site. Duke plans to continue this process in future storm responses.

In order to improve communications with its Spanish-speaking customers, Duke is designing and building a fully automated Spanish Outage Reporting application, enabling Spanish-speaking customers to report their outages through a toll-free number similar to PowerOn. Duke is in the analysis phase of this project, currently working to gain a better understanding of the needs and expectations of this customer segment. Duke indicated that while it expects the Spanish outage reporting functionality to mirror the English offerings Duke has today, feedback received from the Spanish-speaking community suggests that the presentation for Spanish-speaking callers may need to differ from the presentation for English-speaking callers. For example, Spanish-speaking customers have indicated that they want more information about electric service in general and electric safety during power outages. Duke indicated that it is considering incorporating a callback function into its Spanish Outage Reporting application. This project is expected to be complete in the fourth quarter of 2003.

Progress Energy had Spanish-speaking customer service associates available 24 hours a day throughout the restoration period, and Spanish-speaking customers were directed to these associates. No complaints were received from Spanish-speaking customers about availability of assistance, and the company is not aware of any delay in service restoration due to language problems. However, after the Ice Storm, in order to improve its communications with Spanish speakers in future storms, Progress Energy made enhancements to its automated outage reporting system (effective January 27, 2003) enabling Spanish-speaking customers to have the exact outage reporting functionality that is provided to English-speaking callers, with the exception of the option to receive a callback. The Spanish callback functionality was implemented on June 9, 2003. The system calls back all customers who did not opt out

of receiving a callback when reporting their power outage. The system reads the customer a message in English, and customers who want to hear the message in Spanish press 2 for the Spanish recording. If the system reaches an answering machine, the message is read in English. By October 2003, Progress Energy plans to implement a second phase for the Spanish callback functionality, enabling customers to receive a callback confirmation message in the same language in which the outage was reported, even if the confirmation call is answered by an answering machine. In addition, Progress Energy has identified nearly 50 Spanish-language media outlets in its service area. Since January 2003, news releases have been translated into Spanish and distributed directly to these media outlets. Progress Energy will continue this practice in future outages.

Dominion has a third party Translation Line that allows all customer agents to communicate with Spanish-speaking customers 24 hours a day, seven days a week, 365 days a year. Dominion believes that language barriers did not delay service restoration.

It appears that the Utilities have worked very effectively to deal with the problems arising from the rapid influx of Hispanic immigrants into the state and the need to communicate with customers in more than one language. Few problems arose as a result of inadequate communications with Spanish-speaking customers, and since the Ice Storm the Utilities have taken further steps to improve their communications in the Spanish language. The Utilities' efforts in this area are worthy of commendation.