Before the
U.S. DEPARTMENT OF ENERGY
Washington, DC 20585

In the Matter of	)	
	)	
Implementing the National	)	NBP RFI: Communications Requirements
Broadband Plan by Studying the	)	
Communications Requirements of	)	
Electric Utilities to Inform	)	
Federal Smart Grid Policy	)	

RESPONSE OF
SOUTHERN COMPANY SERVICES, INC.

Southern Company Services, Inc. ("Southern Company"), on behalf of itself and its operating affiliates, hereby submits its response to the Department of Energy's ("DOE's") Request for Information ("RFI"), released May 5, 2010, about current and projected communications requirements of electric utilities in "sustaining and modernizing the [electric] grid, as well as the types of networks and communications services that may be used."[1] Southern Company was an active participant in proceedings before the Federal Communications Commission ("FCC") leading to the FCC's release of the National Broadband Plan ("NBP") and appreciates the opportunity to provide DOE with information responsive to the specific questions raised in the RFI.[2]

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[1] 75 Fed.Reg. 26206, 26207 (published May 11, 2010).

[2] Southern Company addressed many of the same, or similar, issues in its Comments to the FCC with respect to NBP Public Notice #2 in GN Docket Nos. 09-47, 09-51, and 09-137, filed October 2, 2009. Southern Company hereby incorporates these Comments by reference, and appends as Attachment A hereto a copy of these Comments.

Southern Company Services, Inc. is a wholly-owned subsidiary service company of Southern Company, a super-regional energy company in the Southeast United States. Southern Company also owns four electric utility subsidiaries – Alabama Power Company, Georgia Power Company, Gulf Power Company, and Mississippi Power Company – which provide retail and wholesale electric service throughout a 120,000 square mile service territory in Georgia, most of Alabama, and parts of Florida and Mississippi. Members of the Southern Company family use a variety of communications technologies to support the safe and efficient delivery of energy services to their customers. Moreover, and as explained herein, Southern anticipates that it will continue to incorporate new communications technologies as Southern's electric operations evolve to meet customer demand for highly reliable and robust electric service.

Southern Company appreciates the opportunity to provide comments to DOE on its current and projected communications requirements, particularly with respect to Smart Grid applications. At the outset, it should be noted that the views expressed herein are necessarily based upon current visions of the applications and services that might be encompassed within the term, "Smart Grid." Just as the public Internet now encompasses myriad technologies, applications, and services that could hardly be imagined at the introduction of the internet protocol, it is almost impossible to predict how Smart Grid applications and services will evolve over time due to changes in technology, consumer demand, and the power industry itself. Moreover, the architecture and needs of each utility's grid are unique, with the likelihood that Smart Grid deployments will vary widely among utilities. Southern Company therefore strongly agrees with DOE's observation in the RFI that "just as there is no 'one-size-fits all' utility solution, illustrated by investor-owned, municipally-owned, and rural electric cooperates – [it] also cannot expect any 'one-size-fits-all' communications solution to accommodate all reasonable Smart Grid implementations and applications."[3]

To facilitate DOE's consideration of Southern Company's views on the issues, Southern Company hereby provides its responses to each of the nine questions listed in DOE's RFI.

Question One:

> ***What are the current and future communications needs of utilities, including for the deployment of new Smart Grid applications, and how are these needs being met?***

Southern Company has a wide variety of communications needs with widely varying requirements. To meet these needs, Southern Company currently uses a variety of solutions including public carrier solutions (for needs that do not have stringent reliability and availability requirements) and its own wireless network (for needs with more stringent reliability and availability requirements).

To address the Supervisory Control and Data Acquisition (SCADA) and Automated Metering Infrastructure (AMI) needs today, Southern Company has deployed narrow band communications infrastructures which include: Multiple Address Systems (MAS), Utilinet radios and PCS, all in the 900 MHz band. These RF networks link Transmission, Distribution and AMI devices. Commercial wireless service provides back haul from AMI collector sites, but not without outages.[4]

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3 RFI, at 26207.

4 Southern Company is willing to provide further information to DOE, upon request and on a confidential basis, on its outage experiences.

SouthernLINC Wireless, a wholly-owned subsidiary of Southern Company, has also been utilized for Distribution Automation and other mission critical applications.

Southern Company utilizes SouthernLINC for push-to-talk (PTT) mobile dispatch radio communications, Automated Resource Management (ARMS) and other mobile dispatch data applications.

Public carriers are used for non-critical voice communications and to support the communications requirements of a wide variety of other business applications such as email, calendaring, teleworking, teleconferencing, and various line of business applications (more detail is included in the use cases in response to question 4). To support these needs, Southern Company has contractual and strategic partnerships with various public carriers providing coverage in our service territory.

Data communications and security requirements will continue to grow exponentially in the future. Southern Company recognizes that it would not be prudent to build a separate communications infrastructure for each new application. To meet the rapidly growing communications demands for operating the electric system, Southern Company desires to deploy a single broadband infrastructure constructed to meet utility reliability specifications. This system will be used in conjunction with public carrier solutions to apply the right solution to the right business problem taking cost, reliability, availability and security into account.

Question Two:

> ***What are the basic requirements, such as security, bandwidth, reliability, coverage, latency, and backup, for SmartGrid communications and electric utility communications systems in general—today and tomorrow? How do these requirements impact the utilities' communication needs?***

Security

There are inherent risks (interruption of control, malicious control actions, widespread extended outages, destruction of assets, etc.) associated with technologies that control an electric utility's business. Before putting into effect any new technology, an associated security strategy must be developed. A complicating security issue is the growing use of public wireless services. Older grid control systems were physically isolated from the Internet and other public networks. However, newer systems may require interconnectivity via the Internet to work properly, which inherently presents cyber vulnerabilities. Southern Company must be poised to address new risks as these technologies are introduced to the enterprise.

- **Firewalls –** These should be part of the strategy to secure and isolate a network while still permitting authorized data communications to pass through. Firewalls with VPN capabilities also allow secure, encrypted communication from a remote location through the Internet.

- **Encryption -** Sensitive data at rest should be encrypted. Sensitive data sent across a wireless network should also be encrypted. The security strategy will determine the extent to which encryption is used.

- **Strong Authentication -** Especially for situations where security breaches could have large-scale ramifications (compromised customer data, loss of control, malicious control actions, etc.) strong authentication should be the outer layer of defense for a complete security strategy. Standard identity management services, biometrics, public key infrastructure (PKI) or automated authentication capabilities should be employed where appropriate.

Bandwidth

To address the communication needs for distribution and transmission, Southern Company has, to date, deployed over 6,000 Remote Terminal Units (RTUs) on distribution and transmission devices and in substations, representing over 500,000 points. Southern Company has a company-owned wireless “narrowband” (12.5 or 25 KHz per channel) communications infrastructure to link these devices.

Broadband is now needed to link these various remote devices with other information tools such as advanced applications. This will expand the point count to well over 750,000. Southern Company must expand its capability to acquire and act on analytical information, such as predicting and analyzing incipient faults, ensuring power quality, meeting specialized customer requirements and dealing with the pressing concerns of national security.

With broadband capabilities, Southern Company will be able to monitor distribution line flows, know in advance when lines are about to overload, “see” and predict faults about to occur on the line from incipient equipment failure and immediately pinpoint the source of outages. The capability will also be provided to quickly analyze power flows for rerouting power feeders using automated switching in the event of outages to restore power as rapidly as possible.

Southern Company utilizes Narrowband PCS frequencies (in the 901/940 MHz bands and with channel bandwidths of 50 to 100 KHz) for Automated Metering Infrastructure (“AMI”) deployment. Southern uses commercial carriers for backhaul of this AMI data to the collector points.

Reliability

As DOE is well aware, delivery of electricity is an essential public service, and a disruption of that service, if not restored promptly, could threaten the public safety and the nation’s economic security. Our nation’s economic prosperity and quality of life have long depended on the essential services that utilities provide; therefore, it is necessary to ensure that electric utilities are able to conduct their operations safely, reliably and efficiently.

Southern Company operates in areas of the country where hurricanes, tornados and severe thunderstorms are prevalent and frequently disrupt commercial power systems and communications systems. As a result, the communication infrastructures used today to manage electric power service are themselves vital components of the nation’s critical infrastructure. These communications systems must be reliable, including of sufficient structural integrity and with on-site emergency power systems capable of extended operations without the availability of commercial electric power. Southern Company and other utilities typically design key communications systems (*e.g.*, systems used for distribution control, transmission energy management, or generation control) to a reliability standard of 99.999 percent. Reliability also encompasses the instantaneous availability of communications to handle large amounts of traffic, such as those that arise during or following major emergencies when major repairs to utility infrastructure must be carried out as quickly as possible and with the least potential for damage or danger to the public and utility crews.

Reliability of communications is the primary issue for utility communications: if the grid control systems do not work, it is irrelevant what they could potentially do or how secure they are. Grid control systems have to work in all conditions. In fact, the more severe the situation (*e.g*., hurricanes, ice storms, or sabotage), the more important it is that these systems perform as designed. Some of the design elements to ensure high reliability of the Smart Grid include self-healing architectures, interactive configurations, and integration with distributed generation control. Ideally, grid control systems will be proactive and not just reactive (*i.e*., they are designed to avoid problems before they can occur).

By their very nature, electric utilities operate in "noisy" and hostile environments for communications provided through RF radio or copper-based wireline systems. Many components of a normally functioning electric power system generate electromagnetic energy that can interfere with wireless communications devices. Utilities work hard to control the harmful effects of these interference sources, but they exist and in many environments (*e.g*., inside generating stations or electric substations), above-average RF signals levels are required for effective communications over the surrounding noise floor. Given the fact that many "smart grid" applications will require use of wireless devices on or directly adjacent to electric plant to monitor and control critical components, these devices will have to be designed and operated on wireless networks that can overcome the inherent noise generated by the electric plant itself.

Local exchange telephone companies have been reluctant to bring copper-based communications circuits into electric substations or other areas where high voltages are present due to the presence of ground potential rise (GPR), and will typically require installation of special equipment at extra cost to protect circuits brought into these environments.[5] In the case of stray voltages sent to ground during a fault condition, the electric current will follow the path of least resistance through the soil, which would include highly conductive materials such as underground pipes or communications cables in the immediate vicinity of the fault. GPR could thus pose a threat to communications equipment located even at some distance from the fault and/or to persons working on that equipment. For this reason, many utilities prefer to install microwave communications systems or private fiber optic communications systems into areas where GPR could be an issue.

As noted above, SouthernLINC Wireless, a wholly-owned subsidiary of Southern Company, has designed and built its system to meet the rigorous standards of utility communications. All sites must have batteries with an absolute minimum capacity of eight hours, and every site critical to electric operations must have a generator with on-site fuel capable of powering the site for several days. SouthernLINC Wireless has a proven high rate of survivability even during the most extreme circumstances such as:

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5 For example, General Subscriber Service Tariff of BellSouth Telecommunications, Inc. (Georgia), Section A2.3.14 ("Company Facilities at Hazardous or Inaccessible Locations,") gives the carrier the right to require a customer to provide high voltage isolation equipment at any location deemed to be a "hazardous electrical environment (e.g., an electric power substation or generating plant or a high voltage transmission tower, switching or distribution location)." (Tariff available at http://cpr.bellsouth.com/pdf/ga/a002.pdf, last visited July 8, 2010).

Hurricane Katrina, ice storms and other disasters when the need for communications is most critical.[6]

Coverage

Southern Company's approach to the Smart Grid project is futuristic and not limited to commercially available "off the shelf" solutions. The vision is to combine several applications on one broadband infrastructure. Coverage for Smart Grid applications must extend to every point of a utility's system where it is required, which might not correspond to population centers or major transportation corridors. For AMI, this means that coverage must extend to every meter location, and for command and control applications, coverage must extend to every location where the utility has infrastructure, including substations and transmission and distribution lines that are located in isolated areas away from population centers.

There are challenges in securing broadband for this approach to Smart Grid. Public carrier broadband is available in the cities but is far more limited in the rural areas. Signals in the higher frequency bands, such as WiMAX, offer poor building-penetration and limited propagation. For WiMAX to be successful, it must deliver significantly better performance than current alternatives such as 3G. Licensed spectrum, although designed with higher power levels and better propagation characteristics, is expensive and often cost prohibitive for regulated utilities. The bottom line is that Southern Company has over 120,000 square miles of coverage territory and needs an infrastructure capable of

[6] Appended hereto as Attachment B is a letter, dated February 5, 2010, in which Southern Company described for the FCC staff how SouthernLINC Wireless was able to withstand the effects of Hurricane Katrina and maintain service for utility crews, public safety agencies, and others during and immediately after the hurricane.

broadband data rates and adequate propagation characteristics to cover the territory with a minimum number of sites.

Latency

The Supervisory Control and Data Acquisition (SCADA) equipment industry is moving toward Internet Protocol (IP) enabled networks. There are several reasons: the need for network manageability, the movement of manufacturers to IP based products, and the movement away from serial connections.

In more predictable privately owned and managed networks, latency is less of an issue. However, the use of public networks potentially introduces much greater latency and traffic prioritization issues outside of the utilities' control. Latency must be extremely low to optimize polling performance and prevent communication "front-ends" from timing out. Low latency is especially vital for command and control applications such as load management, protective relaying, and SCADA. Southern Company's operating companies generally require latency levels of less than 100 milliseconds for command and control applications, with any increase in latency above 250 milliseconds to be unacceptable.

Latency is less of an issue for AMI that is of a one-way nature (*i.e.*, transmission of metering data to a collection point and backhaul to the utility). Latency increases in importance as a utility, such as Southern Company, deploys two-way AMI communications, such as those needed to enable demand-response, time-of-use pricing, and other innovations, due to the need to have near real-time two-way communications between the utility and potentially hundreds of thousands of customers.

Backup

With smart grid power redundancy, if one component of the electric system fails, electricity can be redirected to prevent service disruption. A similar situation exists in communications systems and networks with route diversity. The solution is to build a redundant data path into the network topology and to specify radios and switches that allow "hot swapping" so that malfunctioning equipment can be replaced without disrupting network operations. Southern Company has this capability today on many of its communications systems. By designing and maintaining its own communications networks, Southern Company has assurance that paths are truly redundant and/or diverse, and that malfunctioning equipment can be replaced according to its own operational priorities and requirements.

Question Three:

> ***What are other additional considerations (e.g. terrain, foliage, customer density and size of service territory)?***

As mentioned above, Southern Company has over 120,000 square miles of electric service territory that necessitates an infrastructure with broadband data rates and adequate propagation characteristics to cover the territory with as few sites as possible. Southern Company's operating territory includes extreme variations in climate and topography, ranging from lowlands along the Atlantic and Gulf Coasts, to the mountainous areas of north Georgia and Alabama. Southern Company also serves some of the largest urban areas in the country, with high rise buildings that create "urban canyons," to some of the most rural areas in the country.

Range and coverage are among the most critical design challenges to serving Southern Company's diverse operating territory. The negative side of using narrowband channels is lower data capacity; the advantage is that these narrowband channels are predominately in lower frequency bands which propagate much farther than the higher frequencies typically used for broadband. Applications requiring higher data rates need broader spectrum to work. But, broader spectrum often means higher frequencies which are easily absorbed by foliage or blocked by terrain. It is essential that transmit power levels and platform specifications for broadband meet the needs and challenges that utilities are facing.

Question Four:

> ***What are the use cases for various smart grid applications and other communications needs?***

These current applications will be more pervasive with the advent of Smart Grid:

Distribution Automation

- Substations
    - Control
    - Monitoring
- Distribution Line Monitoring
- Pole-mounted Recloser (Line switch)
- Gang-Operated Sectionalizing Switch
- Switched Capacitor Bank for single-phase or three-phase operation
- Automatic Transfer Switch using pad-mounted switchgear
- Automatic Transfer Switching Scheme for the pole-mounted solution
- Network Underground Distribution Automation
- Automation of the pole-mounted Regulator (Voltage regulator)

Transmission Automation

- Transmission Line Switches
- Substations

- Control
- Monitoring

Two-Way Communications

- Push-to-talk (PTT) voice communications via SouthernLINC
- 450 MHz radio
- Mobile dispatch data
- Emergency communications

Automated Metering Infrastructure (AMI)

- 2,400,000 meters currently deployed by Southern Company
- 4,400,000 meters planned by end of 2012
- Communications back haul to and from collector sites
    - 262 currently installed
    - 380-400 by end of 2012
- Outage management

Field Force Automation

- Automated Dispatch
- Mobile access to mapping information
- Mobile access to documentation

Video Surveillance

- Security
- Monitoring of operations

Predictive analytics

- Real-time analysis of Distribution and Transmission data to predict and proactively correct problems and minimize customer disruption.
- Data Historian in Generating Plants, Transmission & Distribution: Analysis of information from sensors, plant statistics, T&D line devices, substation information to predict and correct equipment failure.
- Improved load forecasting:
- Leveraging AMI metered load data, Generation could more accurately predict instantaneous, hourly (intra-day), and daily (intra-week) load forecasts for six different load regions.
- Leveraging AMI infrastructure to attach weather stations could provide more accurate regional weather forecasts.

- Combining both improved weather and load information would significantly enhance the load forecast mathematical models and systems. This improved information supports:
    - optimal fleet efficiency (economic dispatch) and regulatory reserves;
    - optimal trading and lower energy costs;
    - enhanced predictions on when transmission deficits could occur on the integrated transmission system; and
    - better forecasts for the energy auction which requires Southern Company to offer all available capacity not used to meet native load forecast, reliability requirements, and sales to third parties.
- Support for short and long-term load forecasting for:
    - Variable energy resources such as wind and solar generation;
    - Expansion of load sources such as electric vehicles, demand side management programs, and distributed generation sources.

Customer facing applications

- Call Management Systems
- Voice Response Units
- Online Customer Care Applications (electronic bill payment, service outage reporting, budget billing, etc.)
- Energy Audit Tools
- Energy Management Portals
- Outage Notifications/Alerts (could include email, phone and/or text messages)
- Bill Analysis and Explanation
- Rate Comparisons
- Energy Efficiency and Demand Side Programs

Power Generation and Southern Power Applications

- Mobile inventory for warehouses
- Mobile work order approval
- Mobile operator rounds at plants
- Tool tracking for Foreign Material Exclusion Areas
- Dosimeter Badge Training
- Plant system preventative maintenance - integrating plant data historian (operational information) with enterprise work management system to support condition-based maintenance (preventative maintenance) versus time base maintenance which results in more efficiency and lower costs.
- Plant system monitoring and diagnostics - integrating Plant Data Historian (operational information) with graphic systems being used by Generation and Southern Power Monitoring and Diagnostics (M&D) Center to trend plant operational characteristics and proactively alarm and monitor conditions that warrant intervention or action be taken.

- Communication requirements for energy scheduling with plants or companies outside of Southern Company to support wholesale energy contract requirements.
- Communication from biomass plant truck weight scales and fuel procurement and accounting system to track fuel inventory and payments.

Back Office Applications

- Inventory Management utilizing RFID tags
- Automated Warehouse Management
- Telematics for Fleet Management

Other general use Business Applications

- Voice calling
- Mobile e-mail
- Mobile calendaring
- Mobile document viewing
- Tele-working
- Teleconferencing
- Video Teleconferencing

Question Five:

What are the technology options for smart grid and other utility communications?

The following table identifies a number of the wireless technologies that are or could be employed today or in the near-term for Smart Grid applications. As can be noted, none of these technologies is a perfect solution for every aspect of what are now considered the likely components of the Smart Grid. It should also be noted that new technologies will probably have to be developed or perfected for a number of the Smart Grid applications that are currently being discussed.

Current Wireless Technologies and Potential Uses/Limitations

Wireless Technology	Possible Applications	Benefits	Limitations
Multiple Address System Radio	• Distribution Automation • Transmission Automation	• Point-to-Multipoint • SCADA and DA applications in service today • Flexible, reliable	• Limited bandwidth • Lack of available frequencies
Spread Spectrum Radio	• Distribution Automation • Metering	• Point-to-Multipoint • Unlicensed 902-928MHz • Last-mile connections	• Low power • Line of sight required
WiMAX	• Fault Anticipator	• Fixed operations to IEEE 802.16d • 75mbs over 10-30 miles • Different vendors work together • Only point-to-point is available today	• Low power levels • Poor Propagation • Licensed frequencies are auctioned

Wireless Technology	Possible Applications	Benefits	Limitations
3G Cellular	• AMI Backhaul • Video Surveillance • General Use Business Applications	• Cost effective • Quick implementation • Data rate up to 1 Mb/s	• Not suitable for critical applications • Limited coverage areas
4G Cellular (LTE)	• Mobile access to mapping information • Mobile access to other Apps	• Data rate 100 Mb/s • Standard of the future	• Under development • Limited coverage area • Many unknowns
SouthernLINC	• Automated Dispatch • Distribution Automation • PTT • Blackberry • Phones	• Highly reliable design • Good coverage in Southern Company's footprint • Cost effective	• Limited to 19.2 Kb/s • Mature technology
2G Cellular (TDMA)	• Non-critical Applications • Mobile Phones	• Unique time slots for each user • Widely available	• Future 3G systems will use CDMA or EVDO • Network capacity limits number of active devices

Wireless Technology	Possible Applications	Benefits	Limitations
Satellite	• Storm Restoration • Emergency Phones for Operations Centers	• Immune to natural disasters • Extensive coverage for non-Low Earth Orbiting (non-LEO) systems • Quick implementation	• Traditionally higher cost • Severe weather can affect some bands • Latency

Question Six:

> ***What are the recommendations for meeting current and future utility requirements, based on each use case, the technology options that are available, and other considerations?***

Please refer to the answers to Question Four for current requirements and Question One for the technologies currently in service to meet those needs. In the table on the following pages, Southern Company identifies a number of future applications that could be of benefit to utility operations if the technologies to support these applications can be provisioned on a cost-effective basis. Because these are future applications, Southern Company has not yet determined which communications solutions it would use to meet these future needs. However, the following table identifies the criteria Southern Company would use to make those decisions.

		Most Significant Communications Requirements					
Future Use	**Description**	**Bandwidth**	**Latency**	**Reliability**	**Security**	**Coverage**	**Other Considerations**
Power Flow/ Short Circuit/ Coordination Analysis	Supports the switching management application in providing feedback on the probable state of the electrical distribution system at the completion of each step based upon projected load and other switching approved for the same period.	Low	Low	Low	High	High	Does not require high bandwidth. If inoperable, critical functions can be performed on the grid. Requires extensive coverage in remote locations. Communications Infrastructure TBD
Fault Location	Will utilize data from the digital relays presently deployed in line reclosers and substation breakers. To provide additional input, the Fault Location application will utilize the data from a basic fault detection application (and possibly fault current magnitude) that executes in most of the pole mounted Remote Terminal Units.	High	Low	High	High	High	If inoperable, critical functions can be performed on the grid, but it is important. Public Spectrum could be used such as DSL, but DSL is not optimum. SouthernLINC could work with the data buffered for slower speeds.

		Most Significant Communications Requirements					
Future Use	**Description**	**Bandwidth**	**Latency**	**Reliability**	**Security**	**Coverage**	**Other Considerations**
Optimal Volt / Var / Loss Management	The Optimal Voltage / Var / Loss Management application will utilize the analysis engine to predict a topology, voltage level, etc. to reduce the distribution losses by a quantifiable amount and, if enabled, direct DSCADA actions to the controllable devices to meet the predicted state.	Low	Low	Low	High	High	Does not require high bandwidth. If inoperable, critical functions can be performed on the grid. Requires extensive coverage in remote locations. Communications Infrastructure TBD
Contingency Analysis	Application that runs in the background, analyzing various single contingencies (single piece of equipment failure) based upon the present state, predicted operating conditions, considering switching that is scheduled, and loading based upon temperature forecasts to determine if the contingencies can be eliminated or that a loss of customer service for a substantial period of time will result.	Low	Low	Low	High	High	Does not require high bandwidth. If inoperable, critical functions can be performed on the grid. Requires extensive coverage in remote locations. Communications Infrastructure TBD

		Most Significant Communications Requirements					
Future Use	**Description**	**Bandwidth**	**Latency**	**Reliability**	**Security**	**Coverage**	**Other Considerations**
Outage Management	Receives and analyzes trouble calls and makes predicted outages based upon algorithms, rule sets, and DSCADA. Maintains historical outage information and calculates outage indices.	High	Low	High	High	High	Three data sources will feed this system. SCADA, AMI and customer phone calls. Critical application which will require a private network
Vehicle Location System	The ability to query the Automated Resource Management System. (ARMS) This will increase the efficiency and effectiveness of available personnel in restoring service.	High	Low	High	High	High	This application includes mobile dispatch which is critical. Due to the coverage requirements, a public carrier might be used along with SouthernLINC
Dynamic de-rating of equipment due to harmonics		Low	Low	Low	High	Low	Internal application which rides the DA network

In addition to the current utility communications applications identified above in response to Question Four, the future use cases outlined in the table above represent a subset of the applications and predictive analytics that are likely to be developed and implemented with Smart Grid. In any event, reliable communications between end-point devices and an integrated management system will be critical.

Question Seven:

> ***To what extent can existing commercial networks satisfy the utilities' communications needs?***

Energy providers such as Southern Company are among the millions of users of commercial wireless services. Southern Company uses traditional commercial cellular networks for both voice and data where reliability, latency and availability are less critical. Applications appropriate to commercial networks include email, cellular phone services and certain data applications. Commercial networks are used when outages can be tolerated and when the application is not used for control of the power system or in scenarios that do not require real-time access. Commercial networks can also be utilized for a variety business and operational needs, provided backup applications, business processes, or alternate communications methods are in place to meet these needs should the commercial network be unavailable. Southern Company uses commercial networks for backhaul of data in situations where the data can be stored at collector sites and then forwarded to host sites if a commercial network outage occurs. Adequate RF coverage must be considered when using commercial networks along with network capacity and the potential for congestion.

In contrast to other commercial networks, SouthernLINC Wireless designed its service area to generally correspond with Southern Company's electric service territory, and it designed and built its system to meet Southern Company's rigorous utility standards. SouthernLINC Wireless has a proven high rate of survivability even during the most strenuous circumstances such as hurricanes, ice storms and other disasters when communication needs are most critical. Because of the way the SouthernLINC Wireless network was designed "from the ground up" to meet utility standards, and because SouthernLINC Wireless is owned and controlled by the utility, Southern Company can rely on SouthernLINC Wireless for dispatch voice (PTT) service and wireless data.

Part of the inherent strength of SouthernLINC Wireless is that it is owned and controlled by the utility itself, and is therefore focused on resolving any issues that could affect utility operations. Although SouthernLINC Wireless has been established as a commercial carrier, its primary mission is to support the electric operating companies. That kind of dedicated support cannot be replicated just through the language of a service agreement with a third-party carrier." Certain mission critical data communications services (*e.g.*, distribution automation, etc.) are also provided via the SouthernLINC Wireless network.

A number of commercial carriers have made the claim that rate-regulated utilities prefer to install private communications networks because the cost of the private networks can be included in the utility's rate base.[7] This simplistic argument overlooks

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[7] Southern Company notes, for example, that the National Broadband Plan included a recommendation, based on comments from a commercial wireless carrier, that public utility commissions should "ensure that utilities' incentives do not lead them to make suboptimal communications and technology decisions." (NBP Recommendation 12.2) While acknowledging that the "structural problem" of incentivizing utilities to sell "less or cleaner power" was beyond the scope of the NBP, the FCC nevertheless took the opportunity to express its opinion on how state regulators should review utility investments. Contrary to

two very critical points. First, and foremost, the selection of any communications system or service necessary to support utility operations is primarily based on the utility's operational needs and requirements. As with anything, total cost of ownership is a factor in the decision, but Southern Company does not base its communications purchasing decisions on whether the cost can be included in the company's rate base. Second, capital expenditures are subject to review by the state public utilities commissions, and are subject to denial in the event the regulators believe the investment was not a prudent use of ratepayers' money.

Currently, for example, because of growing demand for electricity and new environmental laws, many utilities have been compelled to budget for extremely large capital investments in new generation facilities, environmental retrofits, and other enhancements to the electric system itself. It is naïve at best, or misleading at worst, for commercial carriers to suggest that a utility would have an incentive to take on the additional responsibility of installing and operating a private communications system just so the utility can include these costs in an already strained and heavily-scrutinized capital budget.

Question Eight:

> ***What, if any, improvements to the commercial networks can be made to satisfy the utilities communications needs?***

Commercial networks must improve the reliability and survivability of their networks, particularly in times of emergencies when the utilities' communications needs

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the FCC's implication, ratemaking issues create no incentives for a utility to make "suboptimal communications and technology decisions."

are the most critical. On site back up power (batteries and generators), redundant electronics, adequate capacity and ubiquitous coverage (not just large population centers) are absolute necessities. All sites must have batteries with an absolute minimum capacity of eight hours and a generator with on-site fuel capable of powering the site for several days. Utilities require communications wherever and whenever it is needed regardless of the situation. For commercial carriers to provide connectivity for the more demanding utility applications, latency must be significantly reduced, network connectivity must be available at all times, network congestion must be eliminated and the network must be accessible regardless of location.

In the most critical applications, some type of priority must be given to utility traffic with negligible latency and zero probability of blocking in order to provide real-time or near real-time communications. Any regulations promoting the concept of "net neutrality" must not inhibit such prioritization of traffic or they will effectively remove commercial wireless systems from consideration. The operation of a utility's electric system is dependent on a highly reliable, 100% available communications network. Dropped signals, lost or late data, long upload/download times, cell site outages, network congestion and/or inability to access the network (no service) are more than inconvenient, they are potentially disruptive and can impede a utility's ability to address electric grid conditions.

Whereas most carriers insist on a *force majeure* clause to excuse their non-performance as a result of storms or other unforeseen contingencies, an electric utility must be able to rely on its communications network during and immediately following such contingencies. After-the-fact rebates or credits for prolonged outages pursuant to a service level agreement ("SLA") will not compensate the utility – or its electric customers – for the utility's inability to communicate and/or control its grid. Commercial networks must also adopt cybersecurity standards and requirements consistent with those established by various agencies such as FERC, NERC and NIST that are, or will be applicable to other infrastructure owners and service providers.

Interdependence between commercial power systems and commercial telecommunications networks has been a concern in relation to National Security and Emergency Preparedness (NS/EP), and Southern recommends caution in any recommendation or suggestion that utilities should rely on commercial communications networks. The National Security Telecommunications Advisory Committee (NSTAC) within the National Communications System (NCS), U.S. Department of Homeland Security, states the following;

> The inherent interconnection and resulting interdependencies between domestic communications networks and various other infrastructure sectors pose significant threats not only to our national security, but also to the availability of NS/EP communications services and the operational capabilities of other infrastructures reliant upon communications services.[8]

In a January 2006 Report, NSTAC's Telecommunications and Electric Power Interdependency Task Force (TEPITF) observed that electric power service providers largely rely on private, internal communications systems for "mission-critical functions, such as process control systems, supervisory control and data acquisition (SCADA) systems, generation facilities, transmission grids, and the distribution network, including emergency response communications."[9] TEPITF further noted that many private

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[8] NSTAC, "Addressing Critical Infrastructure Interdependencies and Independence," http://www.ncs.gov/nstac/nstac_t5.html (last visited June 24, 2010).

[9] NSTAC Report to the President on Telecommunications and Electric Power Interdependencies: People and Processes: Current State of Telecommunications and Electric Power Interdependencies, January 31,

communications systems operated by electric utilities are protected with back-up power: “These backup capabilities, which are not economical or feasible for commercial networks, are required by utilities to ensure reliable communications in emergencies.”[10] Thus, even if commercial communications networks *could* supply all of the utility sector’s communications needs, complete interdependence between these critical infrastructures might not be in the national interest. The implications for such interdependencies were further explored in a February 17, 2009, report by the Communications Dependency on Electric Power Working Group of the NCS Committee of Principals, which found that because of these interdependencies, long-term outages of electric power could have devastating consequences to millions of people.[11]

Finally, Southern Company would need assurance that its investment in communications equipment or end-user devices would not be stranded if the carrier seeks to changes its technology platform. Unlike the residential market, where handsets are almost a disposable commodity, it would create significant hardship and expense for a utility and its ratepayers if a carrier expected a utility to change out potentially hundreds of thousands or millions of devices at such point as the carrier converts to a new technology platform.

Question Nine

> ***As the Smart Grid grows and expands, how do the electric utilities foresee their communication requirements as growing and adapting along with the expansion of Smart Grid applications?***

2006, at 3-1 and 3.2. The Report is reprinted in the following compilation of NSTAC reports: http://www.ncs.gov/nstac/reports/2006/NSTAC_XXIX_Reports_082206.pdf

[10] *Id.*

[11] Communications Dependency on Electric Power Working Group Report, "Long-Term Outage Study" National Communications System Committee of Principals, February 17, 2009.

Southern Company foresees that growth of Smart Grid applications and services will drive the move to broadband. With the advent of many devices on the grid, more points will be controlled and monitored, resulting in the need for higher bandwidth. Also, as millions of addresses are utilized and the conversion from serial to IP communications occurs, conversion to Internet Protocol version 6 (IPv6) will be essential. Another essential component will be an integrated management system for control and monitoring.

The Smart Grid will drive a significant increase in the number of remote sites, devices, and data points which will inherently require more communications capacity. Moreover, the computing infrastructure which analyzes and stores the information collected from the remote sites will expand as well.

As noted above, spectrum for broadband is generally in higher frequency bands where it is much more costly to deploy throughout a service territory as large as Southern Company's. In recent years, the FCC has focused on auctioning more spectrum for commercial services and in allocating new spectrum for public safety networks. By contrast, utilities have been losing access to spectrum through reallocations and other proceedings that, by design or effect, have inhibited utilities' ability to employ private networks. Southern Company is therefore supportive of the recommendation in the FCC's National Broadband Plan that utilities be given access to the proposed 700 MHz public safety broadband network on a shared basis with public safety agencies.[12] The FCC even pointed to SouthernLINC Wireless as an example of how a communications

[12] FCC, *The National Broadband Plan: Connecting America*, available at http:// www.broadband.gov (last visited June 9, 2010), at Recommendation 12.4.

network, "built to very high reliability standards," can be used to provide service to a large number of public safety agencies and other public agencies.[13] Southern Company respectfully urges DOE support the FCC's recommendation that Congress amend the Communications Act of 1934 to permit utilities to have access to this 700 MHz spectrum on a *meaningful* basis sufficient to justify the investment utilities would need to make in this wireless infrastructure for the benefit of public safety and public service. This would mean, for example, that the rules for shared systems would be flexible enough allow the parties to mutually agree on how channel capacity will be managed, and without an automatic right for public safety users to preempt all use by a utility (unless, of course, that was expressly accepted by the utility as part of the agreement).

CONCLUSION

Access to reliable and secure communications links will be fundamental to the ability of electric utilities to fulfill the promise of the Smart Grid. Historically, utilities have provisioned private networks for mission-critical applications due to the utilities' unique operational requirements, their need to maintain high reliability and availability of communications service to key utility components, and their desire to minimize interdependencies between the commercial power and commercial telecommunications networks in the interest of national security and emergency preparedness. At the same time, utilities such as Southern Company can and do use many commercial telecommunications services where issues of reliability, security, latency, or coverage might not be as critical to the safe and efficient maintenance of electric service. Southern Company anticipates that the myriad applications that will comprise what we now call

[13] *Id.*

Smart Grid will rely on a careful mix of privately-owned and operated systems for command and control operations and use of commercial services when adequately justified on engineering, reliability, and cost issues.

Southern Company appreciates DOE's interest in these important issues, and welcomes the opportunity to answer any questions that DOE may have related to Southern Company's use of communications in support of its generation, transmission and distribution of electric power to the American public.

Respectfully submitted,

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Dated: July 12, 2010

ATTACHMENT A

Southern's October 2, 2009, Comments to the FCC on the Smart Grid Issues in the National Broadband Plan

GN Docket Nos. 09-47, 09-51, and 09-137

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137
	)	

To: The Commission

SOUTHERN COMPANY SERVICES, INC:
COMMENTS – NBP PUBLIC NOTICE #2

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Dated: October 2, 2009

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137

To: The Commission

SOUTHERN COMPANY SERVICES, INC:
COMMENTS – NBP PUBLIC NOTICE #2

Southern Company Services, Inc. ("Southern"), on behalf of itself and its operating affiliates, hereby submits its comments in response to the Federal Communications Commission's Public Notice on the implementation of Smart Grid Technology.[1]

Southern applauds the Commission for recognizing the vital role of utility communications in meeting the important national interest in the secure, reliable, and efficient delivery of energy services to the American public and is pleased to provide the following

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[1] / Comment Sought on the Implementation of Smart Grid Technology, NBP Public Notice #2, GN Docket Nos. 09-47, 09-51, 09-137, Public Notice, DA 09-2017 (rel. Sept. 4, 2009) ("Public Notice").

comments. Southern previously filed comments and reply comments in response to the Commission's *Notice of Inquiry* on the development of a national broadband plan[2] and respectfully refers the Commission to these filings as well, which are incorporated herein by reference.

I. INTRODUCTION

Southern Company Services, Inc. is a wholly-owned subsidiary service company of Southern Company, a super-regional energy company in the Southeast United States. Southern Company also owns four electric utility subsidiaries – Alabama Power Company, Georgia Power Company, Gulf Power Company, and Mississippi Power Company – which provide retail and wholesale electric service throughout a 120,000 square mile service territory in Georgia, most of Alabama, and parts of Florida and Mississippi. Members of the Southern Company family use a variety of communications technologies, including FCC licensed radio spectrum, to support the safe and efficient delivery of energy services to their customers.

II. GENERAL COMMENTS

The Commission's Public Notice requests very specific and detailed information regarding utility implementation of Smart Grid technology. Although it has done its best to respond to the Commission's request as completely and comprehensively as possible in the time allotted, Southern would like to clarify for the Commission that Smart Grid is still a very new and evolving concept and as yet there are no clear answers to many of the Commission's questions. While the promises and potential of Smart Grid have prompted numerous manufacturers, vendors, and service providers to file comments, make presentations, and launch

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[2] / *A National Broadband Plan for Our Future*, GN Docket No. 09-51, Notice of Inquiry, FCC 09-31 (rel. April 8, 2009) ("*Broadband NOI*"). Southern filed comments in GN Docket No. 09-51 on June 8, 2009, and filed reply comments in that docket on July 21, 2009.

public marketing campaigns regarding their visions for Smart Grid, at this point these are all still just *visions*.

The reality is that utilities across the nation are still working on their Smart Grid plans, which is an extraordinarily complex process with significant ramifications. The architecture and needs of each utility's grid are, by necessity, unique – there is no "one-size-fits-all" solution. In addition to the mind-boggling variety of possible technologies and solutions, utilities must also consider factors such as (i) compatibility with existing systems; (ii) ability to expand or adapt the system to accommodate future needs; and (iii) compliance with any mandatory standards that may be adopted. If a utility should guess wrong with any of these factors (and at this point it is still very much a guess), it risks having an enormous stranded investment. It is therefore even more essential that all options be kept open at this time with respect to Smart Grid and that any potential technologies, opportunities, or solutions not be foreclosed prematurely.

For example, and as discussed below in these comments, utilities already face significant spectrum constraints even as their need for spectrum is rapidly increasing. Additional spectrum is therefore needed to expand or augment the capabilities of existing systems and facilitate the implementation of Smart Grid and other critical utility communications needs. However, any new spectrum made available to utilities should be in addition to – not a replacement for – existing spectrum currently used by utilities, and the use of this new spectrum should be optional, not mandatory.

Finally, while Smart Grid would certainly benefit from ubiquitous broadband deployment, it is not dependent on it. As stated above, there is no "one-size-fits-all" solution to Smart Grid, and utilities must be afforded the freedom and flexibility to select the technologies and platforms – be they broadband, narrowband, or some combination of the two – that are best suited for their particular grid architectures, operating environments, and Smart Grid deployments. Any action that has the legal or practical effect of mandating rather than facilitating the use of broadband for Smart Grid would severely restrict this vital flexibility, thus substantially raising the costs of further modernizing the nation's electric infrastructure and significantly delaying Smart Grid deployment. Therefore, while Southern urges the Commission to make every effort to promote broadband as a viable option for Smart Grid implementation, the Commission must also take care not to make one dependent on the other.

III. RESPONSES TO THE COMMISSION'S REQUEST FOR COMMENTS ON THE IMPLEMENTATION OF SMART GRID TECHNOLOGY

1. Suitable Technologies

- **What are the specific network requirements for each application in the grid (*e.g.*, latency, bandwidth, reliability, coverage, others)? If these differ by application, how do they differ?**

Each of the network requirements mentioned by the Commission in the Public Notice – latency, bandwidth, reliability, and coverage – are essential requirements for the communications services and applications utilities depend on for the safe, reliable, and efficient operation of the electric grid.

Low latency levels are especially vital for critical command and control applications such as load management, protective relaying, and supervisory control and data acquisition (SCADA) systems.[3] Southern's operating affiliates generally require latency levels of less than 100

[3] / As described by the National Telecommunications and Information Administration (NTIA): "SCADA systems are generally computer-controlled radio communications links that allow a user to control and monitor power generation, storage and distribution systems without having to deploy staff where the equipment is located … As modern utility systems have increased in complexity, SCADA systems have become critical components of their command and control infrastructure. These systems help to automate tasks like opening and closing circuit breakers, monitoring system reliability, and monitoring alarms for overload conditions." Marshall W. Ross and Jeng F. Mao, *Current and Future Spectrum Use by the Energy, Water,*

milliseconds for these command and control applications, with any increase in latency to 250 milliseconds or greater considered unacceptable. With respect to advanced metering infrastructure (AMI), latency is less of an issue for basic applications such as one-way transmission of metering data to a data collection point and the backhaul of that data to the utility. However, low latency becomes a much more important requirement as more advanced *two-way* AMI communications applications are deployed – such as those that enable consumers to take advantage of demand-response, time-of-use pricing, and other innovations – due to the need for real-time, instantaneous two-way communication between the utility and potentially hundreds of thousands of consumers.

Bandwidth is generally less of an issue today for command and control applications, except to the extent the amount of bandwidth available affects other network requirements such as latency or reliability. Bandwidth is much more important, however, for data collection applications, especially when it is necessary to transmit large amounts of data aggregated from various points on the grid, including substations, capacitor banks, transformers, or hundreds of thousands of customer premises meters.

Perhaps the most important network requirements for utility communications applications are reliability and coverage. In order to maintain the levels of service, safety, and reliability needed by the public – and increasingly mandated by federal and state regulators – utility

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and Railroad Industries, U.S. Department of Commerce, National Telecommunications and Information Administration, Jan. 2002, at 3-10.

Southern's SCADA system enables its operating companies to monitor transmission and distribution operations in real time; quickly identify potential or actual problems (such as outages); adjust voltages and deenergize lines to efficiently manage load levels, prevent or contain outages, and ensure the safety of the public (*e.g.*, from downed lines, etc.); and collect and transmit voluminous amounts of data between remote facilities and headquarters, thus increasing the efficiency of field inspection and maintenance operations and ensuring the integrity of the power grid.

communications systems (including those that support Smart Grid applications) must work twenty-four hours a day, seven days a week, 365 days a year at a standard of reliability of 99.999 percent to meet America's "everyday" needs, and especially during service outages, natural or man-made disasters, or other emergency situations.[4] Electric utilities are now subject to mandatory reliability standards adopted and enforced by the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC) pursuant to the Energy Policy Act of 2005. These standards require electric utilities to have reliable communications for operational control and management of the electric grid, including wireless communications systems that enable monitoring, control, protective relaying, and other essential functions throughout the entire grid. Not coincidentally, these same communications applications are also key elements of the Smart Grid.

Reliability also requires that utility communications systems be *instantaneously available* at any time to handle large amounts of traffic, such as during or following major emergencies when major repair or restoration of critical utility service and infrastructure must be carried out as quickly as possible while any damages or danger to the public from power surges, downed power lines, etc., are minimized. This instantaneous availability is thus especially critical for Smart Grid command and control applications.

Finally, the coverage of any Smart Grid application must extend to every point of the utility's system where it is required. For AMI applications, this means that coverage must

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[4] / The Commission recognized back in 1985 that utilities' communications needs "tend to demand a reliability factor of 99.995 percent" – a factor that has increased with the introduction of new mandatory reliability standards at both the federal and state levels, as well as the increasing automation of grid operations and the deployment of Smart Grid applications. *See Amendment of Part 94 of the Commission's Rules to Authorize Private Carrier Systems in the Private Operational Fixed Microwave Service*, PR Docket No. 83-426, First Report and Order, 57 Rad. Reg. 2d (P&F) 1486, ¶ 53 (1985).

extend to every customer meter, including those in rural and remote areas. For command and control applications, coverage must extend to every place where the utility has infrastructure, including to substations and transmission or distribution lines that are located in or traverse isolated, hard-to-reach areas.

- **Are current commercial communications networks adequate for deploying Smart Grid applications? If not, what are specific examples of the ways in which current networks are inadequate? How could current networks be improved to make them adequate, and at what cost? If this adequacy varies by application, why does it vary and in what way?**

A Smart Grid "system" actually consists of a mix of different components, functions, and applications. For certain non-critical functions and applications, commercial networks are adequate. For example, AMI backhaul (*i.e.*, transporting meter data back to the utility) is an application that is less dependent on reliability and network availability, and Southern currently utilizes a virtual private network over a commercial cellular network as a cost-effective means of fulfilling this communications need. In conjunction with this commercial backhaul service, Southern utilizes a private last-mile link between the customer premises meter and the point where the data is collected for backhaul because: (1) there is no commercial network coverage (or insufficient coverage) where many meters are located; and (2) capacity on the commercial network is not always available due to issues such as network congestion, and Southern's equipment can store the meter data while waiting for capacity on the commercial network to become available.

However, as discussed in more detail below, reliability and coverage are frequently a problem for commercial networks, thus making them generally unsuitable for other Smart Grid applications, and especially unsuitable for critical command and control communications. Moreover, Southern believes that the costs of improving the reliability and coverage of commercial networks to the levels required for critical utility communications would be too high to justify the necessary level of investment by commercial carriers.[5]

- **How reliable are commercial wireless networks for carrying Smart Grid data (both in last-mile and backhaul applications)? Are commercial wireless networks suitable for critical electricity equipment control communications? How reliably can commercial wireless networks transmit Smart Grid data during and after emergency events? What could be done to make commercial wireless networks more reliable for Smart Grid applications during such events?**

In Southern's experience, reliability is a major limiting factor in using commercial wireless networks. First, when utility communications are carried over a commercial wireless network, they are subject to the same quality of service levels – and issues – as any other communications traffic being carried over the commercial carrier's network.[6] These issues include network congestion and cellsite outages that can degrade the quality of the communications service or even make service entirely unavailable. These problems create an inconvenience for most consumers through dropped calls, long call set-up times, poor sound quality, or long upload/download times for data applications. For utility communications, however, such problems are more than inconvenient – they are potentially disruptive: dropped signals can result in lost data, and command and control signals that are dropped or subject to increased latency can effectively cripple a utility's ability to address grid conditions that require

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[5] / The high level of investment necessary by commercial carriers would also effectively divert these carriers' resources from their core commercial communications operations to the detriment of broadband consumers. These are the same reasons why public safety agencies generally do not rely on commercial carriers for their critical communications services.

[6] / In general, utility communications do not receive any priority over any other traffic on a commercial wireless network, nor do commercial service providers have any incentive to give any priority to utility communications over the communications of their more lucrative commercial service customers. Moreover, to the extent the Commission should decide to impose "net neutrality" mandates on wireless networks, commercial service providers may be prohibited from giving any priority to utility communications.

a response measured in milliseconds. Moreover, for utility personnel working on or near energized lines and often times in high noise environments (due to large electrical equipment), voice quality is critical.

These problems with network congestion, latency, and overall quality of service are likely to get worse before they get better due to the rapidly increasing demands being placed on commercial wireless networks by "smart phones" and other data-hungry devices, which are already causing network problems in many cities as a result of their success. Overall, while commercial service providers have made significant improvements in the levels of quality and reliability of their networks, they still fall well short of the levels of quality and reliability necessary for critical utility operations.

Commercial networks are also not generally designed or built to provide the levels of reliability, survivability, availability, and coverage that are necessary to meet critical utility communications needs, particularly during times of emergency.[7] For example, when Hurricane Katrina slammed into the Gulf Coast region in 2005, the communications systems operated by Southern Company subsidiaries Mississippi Power and SouthernLINC Wireless were for a time the sole source of wireless communications in Gulfport, Mississippi and along much of the Mississippi coast. When the Commission's Independent Katrina Panel presented its report and recommendations to the Commission, the Panel made the following observations regarding utility communications networks:

> Electric utility networks (including utility-owned commercial wireless networks) appeared to have a high rate of survivability following Katrina. These

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[7] / Although Southern's affiliated operating utilities rely on a commercial provider – SouthernLINC Wireless – for land mobile service, SouthernLINC Wireless is a wholly-owned subsidiary of Southern Company and has designed and built its system to meet the rigorous standards of a utility or public safety system.

> communications systems did not have a significant rate of failure because: (1) the systems were designed to remain intact to aid restoration of electric service following a significant storm event; (2) they were built with significant onsite back-up power supplies (batteries and generators); (3) last mile connections to tower sites and the backbone transport are typically owned by the utility and have redundant paths (both T1 and microwave); and (4) the staff responsible for the communications network have a focus on continuing maintenance of network elements (for example, exercising standby generators on a routine basis).[8]

Although the Panel made several recommendations for improving the survivability and reliability of commercial wireless services during and after emergency events such as Hurricane Katrina, these recommendations have yet to be implemented.[9] Commercial wireless networks therefore remain largely dependent on the restoration of electric utility service, and the restoration of electric utility service is dependent on functioning utility communications systems. The reliability and survivability of commercial networks – especially during times of emergency when commercial networks are likely to be overloaded and/or suffering from inoperable infrastructure – therefore make commercial wireless networks unsuitable for critical utility command and control applications.

Finally, for reasons of operational reliability and system security, it is essential for utilities to maintain direct control over their communications systems. As previously discussed in these comments, utilities are subject to mandatory reliability and security requirements established and enforced by FERC and NERC and cannot afford to hand over liability for their communications reliability to third parties. Moreover, the use of any third party communications

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8 / Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks: Report and Recommendations to the Federal Communications Commission, June 12, 2006 at 12-13.

9 / In fact, when the FCC attempted to act on the Katrina Panel's recommendations by requiring commercial wireless carriers to adopt measures intended to improve their networks' reliability during storms and other disasters, the commercial carriers fought vigorously against these measures.

network or service effectively introduces additional "points of entry" into a utility's communications system that could be exploited by a cyberattack against the utility's system or infrastructure.

2. Availability of Communications Networks

- **What percentage of electric substations, other key control infrastructure, and potential Smart Grid communications nodes have no access to suitable communications networks? What constitutes suitable communications networks for different types of control infrastructure?**

For command and control purposes, Southern continues to find ways to communicate with key components of its existing infrastructure. However, the communications networks currently available to Southern are almost entirely narrowband, and none of its substations or other key infrastructure elements have access to broadband communications that would allow for the transmission of the amounts of data necessary for more sophisticated applications (*e.g.*, video surveillance, more detailed real-time data on loads and line conditions, etc.). In many cases, Southern's private communications network covers territory where there is no commercial signal to be found.

3. Spectrum

- **How widely used is <u>licensed</u> spectrum for Smart Grid applications (utility-owned, leased, or vendor-operated)? For which applications is this spectrum used?**

Licensed spectrum is widely used in Southern's communications systems for most communications and Smart Grid applications, although nearly all of this spectrum (with the exception of point-to-point microwave backhaul) is still narrowband. In particular, Southern uses licensed spectrum (or, in some cases, fiber) for most of its backhaul and command and control applications. Southern also relies extensively on licensed spectrum for its AMI applications. This licensed spectrum includes frequencies in the 450 MHz and 900 MHz bands, as well as 800 MHz SMR frequencies used by Southern's commercial carrier affiliate, SouthernLINC Wireless (a wholly-owned subsidiary of Southern Company).

- **How widely used is unlicensed spectrum? For which applications is this spectrum used?**

Southern does use some unlicensed spectrum for last-mile solutions in certain circumstances, particularly for some point-to-point microwave links. As an example, in some cases Southern will establish a last-mile link using unlicensed spectrum to allow a capacitor bank to communicate through an MAS remote to an MAS master station that might otherwise be blocked by terrain or foliage. However, Southern tries to minimize its use of unlicensed spectrum due to interference concerns.

- **Have wireless Smart Grid applications using unlicensed spectrum encountered interference problems? If so, what are the nature, frequency, and potential impact of these problems, and how have they been resolved?**

Not only has Southern experienced interference problems in unlicensed spectrum bands, but Southern has also experienced interference to its *licensed* spectrum caused by unlicensed operations. For example, in one recent case involving interference to its licensed operations, Southern ultimately traced the source of interference to a malfunctioning baby monitor. When these interference problems arise, they knock out Southern's communications link, which could potentially affect the safety and reliability of portions of the electric grid until the interference issue can be resolved. For this reason, Southern strongly cautions the Commission that many new and proposed "unlicensed" technologies that have been discussed in this docket have not yet been proven under real-world operating conditions, and the deployment of such technologies could compromise the viability of existing services, including critical utility communications and applications.

- **What techniques have been successfully used to overcome interference problems, particularly in unlicensed bands?**

Southern has utilized a variety of filtering and engineering solutions in response to interference problems, but this is really only effective when there is sufficient information available regarding the source and nature of the interference. In most cases, someone must actually go out to the field and track down the source of interference, which can often take days. Meanwhile, until the source of interference is found, the affected communications link is effectively rendered inoperable.

- **Are current spectrum bands currently used by power utilities enough to meet the needs of Smart Grid communications?**

As Southern explained in its earlier filings in the Commission's *Broadband NOI* docket, the spectrum bands currently relied on for critical utility operations are increasingly congested and scarce, and narrow bandwidths and the technical and operational rules for some of these bands render them inadequate for current and future utility sector needs.[10] Not only are utilities effectively relegated to a total of about 30 MHz for their internal communications systems, but this same 30 MHz is also utilized by hundreds of thousands of small, medium, and large business enterprises from all sectors of the economy. As a result, very little of this spectrum remains available for licensing by utilities. For example, within Southern Company's service territory, no more suitable spectrum remains available for licensing in Georgia, and the amount of available licensed spectrum in Alabama is nearing exhaustion.

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[10] / Reply Comments of Southern Communications Services, Inc. in GN Docket No. 09-51 at 13 – 14; *See also* Reply Comments of Entergy Services, Inc. in GN Docket No. 09-51 (filed July 21, 2009) at 8, *and* Reply Comments of PacifiCorp and MidAmerican Energy Company in GN Docket No. 09-51 (filed July 21, 2009) at 6-7.

Moreover, this 30 MHz of spectrum is scattered across several bands – including 6.95 MHz in the VHF band, 11.85 MHz in the UHF band, 6 MHz in the 800 MHz band, and 5 MHz in the 900 MHz band – none of which provide adequate bandwidth or channel sizes for the broadband applications that utilities require to support their critical operations. In particular, most state-of-the-art broadband technology requires channels that are at least 5 MHz wide, whereas the typical land mobile voice channel is only 25 or 12.5 kHz wide – and these voice channels are being narrowed even further.

- **Is additional spectrum required for Smart Grid applications? If so, why are current wireless solutions inadequate?**

As discussed above, the amount of spectrum available to utilities today is already insufficient to meet their current communications needs, therefore additional spectrum is required. In addition to the bandwidth limitations discussed above, utilities have few, if any, practical options for obtaining needed additional spectrum.[11]

Another driver for additional spectrum and bandwidth is the fact that the amount of data that utilities would like to handle is orders of magnitude larger than what is handled today. Examples of some of the data-driven applications that will further improve the reliability and efficiency of the electric grid include:

- Real time event information (beyond command and control);
- Data on power quality (such as waveform data, etc.);
- Setting relays remotely;
- Setting regulators to make the grid more efficient;

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[11] / Reply Comments of Southern Communications Services, Inc. at 16 – 17.

- Addition of fault locators to do more intelligent switching (*i.e.*, if the system senses reverse current or no current, it would switch the power flow automatically);
- Mapping for remote locations and for pinpointing outages or other problems;
- Transmission of schematics, blueprints, and other data to crews in the field; and
- Video surveillance of substations and other critical points in order to prevent copper theft and acts of vandalism or sabotage, and to provide overall security throughout the grid.

Field engineering provides another example of the way in which the capability to handle greater amounts of data would benefit the safety, reliability, and efficiency of the electric grid. Today, field engineers take handwritten notes of changes to the power grid when they make repairs or alterations, and this data is manually entered into the utility's mapping system when the crew returns to the office. It is very important that any repairs or temporary fixes be placed in the mapping system as soon as possible so that others working on the grid have full insight into the state of the grid and can note any temporary fixes that will need to be corrected later. Ideally, the crew would be able to remotely enter this data right into the system from the field so that it would be immediately available to other crews working on the grid. While in theory commercial networks could carry this data, a substantial amount of field work occurs in remote areas where commercial carriers do not provide coverage. In addition, commercial networks are not an ideal solution when there is a disaster (and public networks are down) and crews are out making repairs.

- **<u>Coverage</u>: What current and future nodes of the Smart Grid are not and will not be in the coverage area of commercial mobile operators or of existing utility-run private networks?**

Significant portions of the electric infrastructure operated by Southern's electric utility affiliates are located in rural and remote areas where commercial mobile operators have yet to deploy 3G service – or, in some cases, have yet to deploy any service at all. These areas are not located near large population centers or major highways and are thus a very low priority for commercial mobile operators. Any deployment of advanced mobile wireless services (or any service) to these areas by commercial mobile operators will therefore likely take years, if it occurs at all.

By contrast, Southern communicates with most key components of its existing infrastructure and continues to find ways to communicate with other devices in its network, including in areas where there is no commercial signal to be found. Southern is also continuing to expand its coverage for distribution automation systems and AMI and to improve its existing coverage for these systems by adding capacity and filling in coverage "holes." However, as discussed above in these comments, these communications networks are almost entirely narrowband, and none of its substations or other key infrastructure elements have access to broadband communications that would allow for the transmission of the amounts of data necessary for more sophisticated and/or data-intensive applications.

- **<u>Throughput</u>: What is the expected throughput required by different communications nodes of the Smart Grid, today and in the future, and why will/won't commercial mobile networks and/or private utility owned networks on existing spectrum be able to support such throughputs?**

It is difficult to estimate the throughput that will be required for the various types of nodes that could form part of the Smart Grid as it evolves over time. As noted above, the devices and applications that could comprise the Smart Grid range from one-way metering devices that need to transmit short data bursts only periodically, to sophisticated command and control applications that could require the real-time collection and analysis of significant operational data and the remote control of critical system components, all with a high degree of confidence and reliability. Smart Grid can also encompass video monitoring or surveillance and the real-time delivery of system engineering information to and from field personnel to facilitate system repairs and enhance plant and worker safety.

Existing private radio networks operated by utilities are constrained by the extremely small amounts of bandwidth available for their operation; for example,12.5 kHz per channel for Multiple Address Systems currently used for utility SCADA. Utilities are restricted today in what they can do by the limited throughput of the wireless systems that can be licensed on existing private spectrum allocations. As noted above, commercial carriers have access to much larger amounts of spectrum, but they do not provide that bandwidth in all locations where the Smart Grid must be deployed, they are unlikely to extend that bandwidth just to encompass the locations needed by utilities, and they cannot guarantee the immediate availability and consistent reliability of their networks, particularly during storms and other times when the utilities have the greatest need to monitor and control their systems. Thus, the throughput potentially available from commercial networks is unlikely to meet utilities' Smart Grid requirements.

Southern urges the Commission to ensure that sufficient private spectrum is allocated for Smart Grid applications to supplement the limited spectrum currently used by utilities so that the Smart Grid will never be constrained in functionality by limitations on data throughput.

- **<u>Latency</u>: What are the maximum latency limits for communications to/from different nodes of the Smart Grid for different applications, why will/won't commercial mobile networks be able to support such requirements, and how could private utility networks address the same challenge differently?**

Please see Southern's response to Section III, Question 1.

- **<u>Security</u>: What are the major security challenges, and the relative merits and deficiencies of private utility networks versus alternative solutions provided by commercial network providers, such as VPNs? Do the security requirements and the relative merits of commercial versus private networks depend on the specific Smart Grid application? If so, how?**

Southern's primary security concern is the issues that arise from the introduction of third parties, such as commercial network providers, into the communications system it relies on for its utility operations. From a cybersecurity standpoint, the use of commercially-provided services, such as VPNs, effectively opens up new penetration points over which the utility has little or no control, particularly with respect to the switches, software, and servers used to provide the commercial service.

- **<u>Coordination</u>: Are there benefits or technical requirements to coordinate potential allocation of spectrum to the Smart Grid communications with other countries? What are they?**

The coordination of spectrum allocations for Smart Grid communications with other countries would serve to foster Smart Grid innovation and deployment and would significantly lower the potential costs of implementation. Manufacturers and developers would be better able to focus their efforts and resources while having a much larger potential market over which their costs could be spread. Coordination with Canada – such as UTC has proposed with respect to the 1800-1830 MHz band – would also facilitate interoperability, improve the overall reliability and efficiency of the North American power grid, and serve the vast needs of growing systems and increasing wireless data loads.

As Southern explained in the *Broadband NOI* proceeding, the Commission could coordinate with the National Telecommunications and Information Administration (NTIA), the Department of Energy, FERC, and other energy regulators at all levels of government to develop a spectrum-sharing arrangement between the federal government and utilities and critical infrastructure industries in the 1800-1830 MHz band – an arrangement that would have several advantages. For example, a spectrum-sharing arrangement would provide the government with certainty that this spectrum will be used to advance important national policy goals concerning energy efficiency, reliability, and security. In addition, a spectrum-sharing arrangement between federal government users and utility/CII users would serve important national security interests by keeping sensitive information about the nation's critical infrastructure out of the public domain.

If the 1800-1830 MHz band should be opened for use by utilities, however, it is essential that utility use of this spectrum band be optional, not mandatory. Utilities across the country have already made substantial capital investments in communications systems in other frequency bands in the expectation that these systems could be integrated into or work in conjunction with a Smart Grid system. If utilities should be compelled to move their operations into a different band, their existing communications systems would have to be substantially overhauled or effectively abandoned – either way, the cost to utilities and to electric ratepayers would be enormous, and the time and effort required to migrate all of their operations to a new band would delay Smart Grid deployment for years. In addition, licenses to access the 1800-1830 MHz band should be assigned in a manner that does not impose a cost burden, such as a requirement to participate in auctions or pay high user fees, that would act as a deterrent to utility use of this band.

- **If spectrum were to be allocated for Smart Grid applications, how would this impact current, announced and planned Smart Grid deployments? How many solutions would use allocated spectrum vs. current solutions? Which Smart Grid applications would likely be most impacted?**

Because Smart Grid is still such a new and evolving concept with many unanswered questions, Southern believes that is impossible to make any such predictions at this time.

IV. CONCLUSION

Communication has become an integral part of our society and our economy, and the actions and decisions of the Commission – whether in developing the national broadband plan, shaping spectrum policy, or encouraging innovation – will have significant ramifications for a broad array of important national interests and public policy priorities, including energy independence and efficiency and the safety and reliability of our nation's critical infrastructure. The Commission should therefore be commended for recognizing, through this Public Notice, the vital role of utility communications in meeting the important national interests in the secure, reliable, and efficient delivery of energy services to the American public.

Southern again urges the Commission to maintain and protect the limited amount of spectrum currently available to utilities and to make additional dedicated spectrum available for the essential communications systems necessary to support utility operations, including Smart Grid implementation, now and in the future. Southern also urges the Commission to ensure that all options are kept open with respect to Smart Grid and that any potential technologies, opportunities, or solutions not be foreclosed prematurely. In this way, the Commission can ensure that its policies and decisions advance the broader national public policy efforts envisioned by Congress and the Administration, as exemplified in Section 6001 of the Recovery Act.[12] Southern is pleased to provide these comments and looks forward to working with the Commission toward meeting these public policy goals.

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[12] / American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009) ("Recovery Act"), § 6001(k)(2)(D).

WHEREFORE, THE PREMISES CONSIDERED, Southern Company Services, Inc. respectfully requests the Commission to take action in this docket consistent with the views expressed herein.

Respectfully submitted,

SOUTHERN COMPANY SERVICES, INC.

__/s/ Jeffrey L. Sheldon____________

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Dated: October 2, 2009

ATTACHMENT B

February 5, 2010 Letter from Southern Company to FCC Regarding the Survival of Utility-Owned Networks Following Hurricane Katrina

GN Docket Nos. 09-47, 09-51, and 09-137

McDermott
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Munich New York Orange County Rome San Diego Silicon Valley Washington, D.C.

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February 5, 2010

VIA ELECTRONIC FILING

Mr. Nick Sinai
Energy and Environment Director
National Broadband Plan
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Ex Parte

Re: A National Broadband Plan for Our Future: Implementation of Smart Grid Technology; GN Docket Nos. 09-47, 09-51, 09-137

Dear Mr. Sinai:

As discussed in a previous *ex parte* notice,[1] representatives of Southern Company ("Southern") recently met with you and your colleagues to discuss the Commission's development of a National Broadband Plan, and specifically in relation to Smart Grid technologies.

During this meeting, Commission staff requested additional information regarding the survival and recovery of utility-owned and operated communications networks (including the wireless network of Southern's wholly-owned subsidiary, SouthernLINC Wireless) and commercial communications networks during and immediately after Hurricane Katrina in 2005. Southern is pleased to provide the Commission with the following information.

1. Interdependencies Between Commercial Telecommunications Networks and Commercial Power Systems Should Be Minimized

As a general matter, Southern respectfully refers Commission staff to the June 12, 2006, Final Report of the Commission's Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks ("Katrina Panel Final Report"),[2] which specifically addresses the performance of various communications networks – including commercial and utility networks – during and immediately after Hurricane Katrina.

[1] / Southern Company Notice of *Ex Parte* Presentation, filed January 15, 2010, GN Docket Nos. 09-47, 09-51, 09-137.

[2] / The Katrina Panel Final Report is publicly available through the Commission's website at http://www.fcc.gov/pshs/docs/advisory/hkip/karrp.pdf

Although the Katrina Panel Final Report made several recommendations for improving the survivability and reliability of commercial wireless services during and after emergency events such as Hurricane Katrina, these recommendations have yet to be implemented and recent efforts by the Commission to respond to these recommendations, such as mandatory installation of backup electric power, have been vigorously opposed by commercial carriers. Commercial communications networks therefore remain largely dependent on the restoration of commercial electric utility service, and the restoration of electric utility service is dependent on deployment of private utility communications systems that are not dependent on commercial telecommunications networks. Utility ownership and control over the communications systems they use to support utility operations are key to maintaining the levels of service, safety, and reliability needed by the public and required by federal and state regulators, especially during emergency situations such as hurricanes and other natural or man-made disasters.

Experience has shown that interdependence between commercial telecommunications services and commercial electric power should be kept to a minimum. In fact, the National Security Telecommunications Advisory Committee (NSTAC), within the National Communications System, U.S. Department of Homeland Security, states the following:

> The inherent interconnections and resulting interdependencies between domestic communications networks and various other infrastructure sectors pose significant threats not only to our national security, but also to the availability of NS/EP [National Security/Emergency Preparedness] communications services and the operational capabilities of other infrastructures reliant upon communications services.[3]

These concerns about interdependence of commercial telecommunications and commercial electric power were highlighted in the January 2006 Report of NSTAC's Telecommunications and Electric Power Interdependency Task Force (TEPITF), which observed that electric power service providers largely rely on private, internal communications systems for "mission-critical functions, such as process control systems, supervisory control and data acquisition (SCADA) systems, generation facilities, transmission grids, and the distribution network, including emergency response communications."[4] The TEPITF further noted that many communications systems operated by electric utilities are protected from power outages through long-term backup power generation facilities, designed to provide power for up to two weeks without refueling.

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3 / NSTAC, "Addressing Critical Infrastructure Interdependencies and Independence," http://www.ncs.gov/nstac/nstac_t5.html (last visited Feb. 4, 2010).

4 / NSTAC TELECOMMUNICATIONS AND ELECTRIC POWER INTERDEPENDENCY TASK FORCE (TEPITF), *People and Processes: Current State of Telecommunications and Electric Power Interdependencies*, January 31, 2006 at 3-1.

"These backup capabilities, which are not economical or feasible for commercial networks, are required by utilities to ensure reliable communications in emergencies."[5]

2. Following Hurricane Katrina, SouthernLINC Wireless Was Able to Restore Service More Quickly Than Commercial Wireless Carriers

SouthernLINC Wireless operates a wireless iDEN network in the Southeast United States, with a service area that includes the Gulf Coast regions of Mississippi and Alabama. Although SouthernLINC Wireless is a provider of commercial wireless services, its primary purpose is to maintain reliable mobile communications services for its electric operating company affiliates in direct support of their electric utility operations. Accordingly, SouthernLINC Wireless' system was designed and constructed from the outset to rigorous utility-grade standards in order to meet the demanding operational requirements of electric utility communications systems.

Hurricane Katrina made landfall on the morning of August 29, 2005, inflicting significant damage throughout the Gulf Coast regions of Louisiana, Mississippi, and Alabama. Within three days (*i.e.*, by September 1, 2005), SouthernLINC Wireless had 98 percent of its cell sites operational, with communications restored at the remaining sites through the placement of portable cell site equipment.[6] USA Today reported on October 10, 2005, that "for the first 72 hours, [SouthernLINC Wireless] radios were virtually the only way to communicate on Mississippi's Gulf Coast."[7] SouthernLINC Wireless even succeeded in increasing its capacity in the affected areas through the addition of over 100 base radios to its network.[8]

By comparison, RCR Wireless News reported the following on September 5, 2005, nearly one week after Hurricane Katrina struck:[9]

- "Cingular Wireless LLC said it has set up free emergency calls at its open company-owned retail stores in Alabama, Mississippi and Louisiana. The carrier also said it plans to deploy mobile calling vans in the area, providing free phone

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5 / *Id*. at 3-2.

6 / *See* Dan Meyer, *Carriers Make Slow Progress to Repair Networks*, RCR Wireless News, Sept. 5, 2005; *See also* SPECIAL REPORT OF THE COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS, HURRICANE KATRINA: A NATION STILL UNPREPARED, S. REPT. 109-322 at 289 (2006) (hereinafter "Senate Special Committee Report").

7 / Dennis Cauchon, *The Little Company that Could*, USA Today, Oct. 10, 2005.

8 / Remarks of Robert G. Dawson, CEO of SouthernLINC Wireless, before the FCC Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, January 30, 2006 (hereinafter "Dawson Testimony to the FCC Katrina Panel").

9 / Dan Meyer, *Carriers Make Slow Progress to Repair Networks*, RCR Wireless News, Sept. 5, 2005.

calls … Cingular added that it has more than 500 generators ready to be dispatched as soon as conditions allow …"

- "Sprint Nextel Corp. said it was sending hundreds of engineers and technicians, as well as nearly two dozen vehicles into the area, but it cannot reach many sites until it is deemed safe … The carrier added that many wireless sites that relied on battery backup have failed and will have to wait until it is safe for generators and personnel to recharge the batteries to turn the sites back on."

- "T-Mobile USA Inc. said more than 80 percent of its coverage was operational in the Mobile, Ala., area and more than 40 percent was operational in the Hattiesburg, Miss., and surrounding Gulf Coast region."

On September 12, 2005, two weeks after Hurricane Katrina struck, RCR Wireless News reported the following:[10]

- "Cingular reported that 75 percent of overall service had been restored in the areas hit by the hurricane as of September 8, with full restoration in many places, including Mobile, Ala.; Jackson and Meridian, Miss.; and Hammond and Houma, La. The carrier added that service has been substantially restored in Hattiesburg, Biloxi and Gulfport, Miss."

- "Verizon Wireless reported similar progress in restoring service in Alabama and the Florida Panhandle, with pockets of limited coverage remaining in Mississippi."

- "Sprint Nextel Corp. said wireless service had been restored in Alabama, more than 80 percent of Mississippi and more than 60 percent in Louisiana."

- "Alltel Corp. said that 90 percent of its wireless network in Mississippi was online as of September 8 …"

- "Nextel Partners Inc. said it had restored more than 85 percent of its wireless services in the area impacted by the hurricane as of September 6."

It was also reported in the Katrina Panel Final Report that the restoration of commercial communications services in the Gulf Coast region was further hampered by the extensive damage and destruction suffered by wireline backhaul facilities, including transport lines, central offices, and switches.[11] SouthernLINC Wireless discovered that it had to work around problems

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[10] / Dan Meyer, *Hurricane's Financial, Physical Impact on Carriers in Limbo*, RCR Wireless News, Sept. 12, 2005.

[11] / *See, e.g.*, Katrina Panel Final Report at 8 – 9 and 14 – 15.

in other carriers' networks. For example, SouthernLINC Wireless became aware that its mobile service customers who had been assigned a 228 area code were unable to receive any calls that were initiated on other carriers' networks; they could only receive calls from other SouthernLINC Wireless customers. To solve this problem, SouthernLINC Wireless issued these customers a second toll-free telephone number, and proactively contacted them to let them know they could receive calls on this additional number.[12]

3. SouthernLINC Wireless' Ability to Restore Service So Promptly Greatly Contributed to Public Safety and Restoration of Public Services

The restoration time for commercial wireless networks in the Gulf Coast region may also be compared to the time needed to restore critical electric utility service in the region. For example, Mississippi Power, an affiliate (and customer) of SouthernLINC Wireless, serves the Mississippi Gulf Coast area. When Hurricane Katrina struck, it inflicted serious damage on Mississippi Power's infrastructure and knocked out electric power to all 195,000 of its customers. More than 600,000 of Alabama Power's customers also lost power. Nevertheless, power was restored to every customer in the service area who could take it by September 10, 2005 – just 12 days after the hurricane hit.[13]

In 2006, the Senate Committee on Homeland Security and Government Affairs issued an extensive report on Hurricane Katrina and the lessons to be learned. As part of its discussion of communications issues arising from Hurricane Katrina, the Report stated:

> Mississippi Power relied on its only viable form of communication – its internal system Southern Linc Wireless. This system was designed with considerable redundancy and proved reliable despite suffering catastrophic damage. Within three days, the system was functioning at nearly 100 percent.[14]

It is clear that Southern's ability to communicate allowed for the efficient establishment of support operations needed for the prompt restoration of electric service. For example, through the use of communications service provided by SouthernLINC Wireless, Mississippi Power was able to establish staging areas and to procure food, shelter, fuel and security, for 1,250 employees of Mississippi Power and another 11,000 workers from 23 states and Canada in a coordinated effort to restore power. The continued availability of communications throughout

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[12] / Dennis Cauchon, *The Little Company that Could*, USA Today, Oct. 10, 2005; *See also* Dawson Testimony to the FCC Katrina Panel.

[13] / Dennis Cauchon, *The Little Company that Could*, USA Today, Oct. 10, 2005; Testimony of David Ratcliffe, President and CEO, Southern Company, before the Senate Committee on Homeland Security and Government Affairs, Nov. 16, 2005.

[14] / Senate Special Committee Report at 289.

this period allowed Mississippi Power to coordinate the tremendous logistics involved in supporting these crews in six tent cities, including the serving of 30,000 meals per day.[15]

Restoration of commercial electric power at the earliest possible time unquestionably promoted the earlier restoration of other essential services, such as hospitals and other medical facilities, the preservation of food supplies, and the operation of public telecommunications networks. There is a direct causal connection between the maintenance of Southern's privately-owned communications network and the restoration of essential public services that save lives and help maintain social order.

In addition, SouthernLINC Wireless was often the only means of communications for thousands of rescue workers. Within days of the storm, SouthernLINC Wireless activated nearly 2,500 new phones for use by the Mississippi National Guard, the U.S. Coast Guard, the Mississippi Emergency Management Agency and other government agencies and public service entities.[16] Moreover, continued operation of the SouthernLINC Wireless system allowed Southern's employees, rescue personnel working in the damaged areas, and SouthernLINC Wireless customers to contact loved ones to exchange information on their personal situations.[17] This, in turn, helped these individuals to refocus on the tasks at hand despite the personal trauma they may have experienced in their own homes and families.

4. SouthernLINC Wireless's Network Was Designed to Utility Standards, Not the Standards of a Commercial Wireless Network

SouthernLINC Wireless cell sites were built with redundant electronic components, and towers were built to withstand winds of 100 miles per hour – even if covered with a half-inch of ice. Generators were installed at almost every tower site to maintain power until commercial electric power service could be restored.[18]

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[15] / Dennis Cauchon, *The Little Company that Could*, USA Today, Oct. 10, 2005; Dawson Testimony to the FCC Katrina Panel.

[16] / Dawson Testimony to the FCC Katrina Panel. The FCC's Katrina Panel also received testimony from Edmund M. Sexton, Sr., the Sheriff of Tuscaloosa, Alabama, and then-President of the National Sheriff's Association, who described losing communications with a Sheriff in Louisiana "due to limited and overwhelmed cellular service." Sheriff Sexton stated that he then had a conversation with a Sheriff in Mississippi who was utilizing SouthernLINC Wireless' system and was thus able to communicate to Sheriff Sexton the immediate need for additional law enforcement personnel.

[17] / *Id.*

[18] / *Id.*

Mobile Radio Technology reported in a February 1, 2007, article on why the SouthernLINC Wireless system performed more reliably:

> SouthernLINC is in the unique position of being owned by Southern Co., the parent company of five electric utilities in the Southeast, all of which also are SouthernLINC customers. As a result, SouthernLINC developed its system with utility-grade standards in mind. It maintains its own backhaul transport, in addition to using microwave links and leased T-1 lines, and has hardened every site within 100 miles of the coast with large reinforced concrete shelters and backup generators that include 50-gallon propane tanks.[19]

The Katrina Panel Final Report noted the following about utilities' private communications networks:

> Electric utility networks (including utility-owned commercial wireless networks) appeared to have a high rate of survivability following Katrina. These communications systems did not have a significant rate of failure because: (1) the systems were designed to remain intact to aid restoration of electric service following a significant storm event; (2) they were built with significant onsite back-up power supplies; (3) last mile connections to tower sites and the backbone transport are typically owned by the utility and have redundant paths (both T1 and fixed microwave); and (4) the staff responsible for the communications network have a focus on continuing maintenance of network elements (for example, exercising standby generators on a routine basis).[20]

A separate industry study confirmed that utility-owned and operated networks performed well during and following Hurricanes Katrina and Rita:

> Most utilities, regardless of service territory size or proximity to the centers of the storms, reported that their communications systems stood up well to the hurricanes. This stands in stark contrast to the public switched network in the region and wireless carriers, who suffered extensive loss of service and slow recovery time. CII systems...are designed to meet the specialized needs of a single entity or group of companies. Such construction would be cost-prohibitive for a commercial system...Thus...there will be a continued need for CII entities to

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[19] / Lynette Luna, *School of Hard Knocks*, Mobile Radio Technology, Feb. 1, 2007.

[20] / Katrina Panel Final Report at 12 – 13.

> maintain their own private communications networks for mission-critical functions, including backbone networks.[21]

Because SouthernLINC Wireless' network is designed to utility-grade standards, over 25% of SouthernLINC Wireless' customers (by mobile units served) are public sector entities such as governmental agencies, public safety agencies, or other utilities not affiliated with Southern Company.[22]

We trust the foregoing is responsive to your inquiry. If we can provide any further information, please let us know.

Pursuant to the Commission's Rules, a copy of this letter is being filed electronically in the dockets referenced above.

Very truly yours,

__/s/ Jeffrey L. Sheldon_____

Jeffrey L. Sheldon

Counsel to Southern Company

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[21] / "Hurricanes of 2005: Performance of Gulf Coast Critical Infrastructure Communications Networks," United Telecom Council (UTC), November 2005.

[22] / Customer data is current as of December 2009.