Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Inquiry Regarding Carrier Current Systems,	)	ET Docket No. 03-104
Including Broadband over Power Line Systems	)	
	)	

COMMENTS OF PROGRESS ENERGY, INC.

Introduction

Progress Energy, Inc. ("Progress Energy"), on behalf of its subsidiaries Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc. and Florida Power Corporation d/b/a Progress Energy Florida, Inc. submits its comments in response to the Federal Communications Commission's ("FCC") Notice of Inquiry ("NOI") regarding Carrier Current Systems, including Broadband over Power Line Systems, released April 28, 2003 in the above-referenced docket.[1]

Progress Energy Carolinas ("PEC") and Progress Energy Florida ("PEF") are engaged in the generation, transmission, distribution and sale of electric power in the states of North Carolina, South Carolina and Florida. PEC and PEF provide bundled retail electric service to more than 2.8 million customers in those jurisdictions and thus are particularly interested in using Broadband over Power Line ("BPL") technology for internal benefits, such as automated meter reading, outage detection and system monitoring, as well as for the potential external benefit of providing broadband services to consumers, especially to rural areas. During the past several months, PEC has participated in a field trial of the BPL wireless technology developed by Amperion, Inc. ("Amperion"). This field trial involved testing Amperion Connect™ products serving homes and businesses in Raleigh, North Carolina. Customers easily gain broadband

[1] Broadband over Power Line Systems, 68 Fed. Reg. 28182 (FCC May 23, 2003).

access using PowerWiFi™, which is a blend of Powerline and 802.11 wireless technology. Based on this field trial, Progress Energy offers comments to specific questions as follows:

Access BPL Systems

1. What spectrum and bandwidth would Access BPL use? We have granted experimental licenses to some parties under 47 C.F.R. § 5 to evaluate Access BPL equipment that operates from 1.7 to 80 MHz. Would Access BPL devices operate in other portions of the spectrum and at what bandwidth?

Comment: The members of the United Powerline Council ("UPLC"), including Progress Energy, are currently working within the 1.7MHz to 40MHz spectrum for Access BPL. The bandwidth for Access BPL, using Amperion technology within the recommended spectrum, would vary due to power line conditions. At this time, we feel Access BPL will work efficiently in the 1.7MHz to 40MHz spectrum and do not see a move to other portions of the spectrum. However, if other parts of the spectrum do become available and manufacturers decide to produce equipment on those portions, Progress Energy would gladly participate in any testing with the FCC and manufacturers for compliance within the new band(s). We cannot at this time determine what bandwidth would be selected for the new portion.

2. What data transmission speeds can Access BPL systems achieve? What speeds can be typically sustained under normal user environment conditions? What speeds are envisioned with deployed access shared among several users? Are the speeds symmetric in both the transmit and receive directions?

Comment: Each instantiation of the Amperion BPL medium-voltage system consists of an injector which is linked upstream to the Internet. This injector is then linked through the medium-voltage line to several downstream repeater/extractors, terminating into an extractor

located at each downstream end point. Each instantiation would then serve several users in proximity to that instantiation.

Each instantiation of the Amperion BPL system can currently support data transmission speeds of up to 20Mbps through the BPL medium-voltage components. However, the WiFi ingress and egress mechanism used by the Amperion BPL System currently consists of IEEE 802.11b standard-based components which limit the overall data transmission speed of each independent instantiation to 11Mbps. As the Amperion BPL system migrates away from IEEE 802.11b to the IEEE 802.11a/g standards, the overall system speed of each instantiation will be increased to the limits of the BPL medium-voltage components.

Tests conducted by Amperion have shown the capabilities of their BPL medium-voltage components can reach Amperion's projected 18Mbps capabilities and occasionally reach 20Mbps. However, the actual speed delivered through each individual instantiation of their system is dependent on the quality and characteristics of the medium-voltage line being used and typically varies from the 10Mbps to 18Mbps range.

As the Amperion BPL system evolves, the injector to Internet link speed will be up to 54Mbps using IEEE 802.11a/g components. User access speed to the extractors will be up to 54Mbps – again using IEEE 802.11a/g components. The shared bandwidth used by the several users accessing a single BPL instantiation will then be limited only by the capabilities of the BPL medium-voltage components, the quality of the medium-voltage line itself, and the speed of the Internet link serving that instantiation.

We currently envision the Internet link speed for each BPL medium-voltage instantiation to be in the range of 6Mbps to 18Mbps which would then be shared by the several users connected through that instantiation.

The Amperion BPL system can be configured to provide a Quality of Service (QOS) that can control transmit and receive speeds with any split required. The system can be set up as symmetric or asymmetric.

3. What are the modulation techniques? What techniques are used for ensuring the security of data? What schemes are used for contention resolution between Access and various In-House BPL devices, if more than one device needs to take control of the electric wire at the same time to communicate?

Comment: The primary modulation technique used on the medium-voltage lines is Orthogonal Frequency Division Multiplexing. Amperion is using this modulation technique for testing on medium-voltage lines within Progress Energy's distribution system. Amperion uses an 802.11b WiFi technique as the solution from the medium-voltage grid to the home. This is soon to be enhanced to the 802.11a/g WiFi standard and techniques. The data is secured using a proprietary key designed by Amperion.

4. What is the status of development and anticipated timeline for market deployment of Access BPL equipment?

Comment: Some companies are already deploying Access BPL equipment as a commercial venture. The industry in general is in its infancy (first generation hardware/software). Progress Energy has been testing technical feasibility since March of this year. We are currently collecting all of our test data and field experiences for an internal report. In general, we believe that Amperion's implementation of BPL performs as expected and may represent a significant opportunity for Progress Energy to deploy a network that can benefit distribution operations as well as provide a new source of revenue.

It is our hope that the results will be positive and that we will extend our testing into a

trial market in North Carolina for several months to more accurately assess customer acceptance and commercial viability.

In-House BPL Systems

5. Would products developed according to one standard work with products developed according to another standard, without the need for additional equipment, such as converters and adaptors?

Comment: There are no published standards that we are aware of at this time. We would strongly encourage the creation of an In-House BPL standard, similar to what has been done with WiFi. This would encourage several manufacturers to enter the market and lower costs of deployment, which benefits all parties.

Interference From BPL Emissions

6. How does the close proximity of Access BPL equipment to cable television and telecommunications equipment from third party service providers co-located on the same utility pole affect the operation of these services? On the other hand, what is the effect of this close proximity to Access BPL operations?

Comment: There have been no known incidents of interference with cable television or telecommunications equipment in close proximity to Access BPL. Similarly, Access BPL has not experienced interference from these co-located systems on utility poles. Currently, the systems are being tested for FCC compliance by third parties.

7. Are there test results from field trials of Access BPL that may assist in the analysis of harmful interference? Inasmuch as In-House BPL equipment is already on the market, are there any reports that may assist in the further analysis of harmful interference?

Comment: Progress Energy has worked closely with Amperion for the Part 15 Class B compliance of its (Amperion) equipment. Amperion has performed detailed radiated emissions measurement tests in the field at Progress Energy and at two other deployment sites with different utilities. This testing was conducted with the assistance of an independent FCC registered, NVLAP[2] approved test organization and was performed by NARTE[3] certified engineers. Amperion has submitted its test results to Progress Energy and the FCC's Office of Engineering & Technology. These results show that Amperion equipment, which can be deployed on both underground and overhead wires, is compliant with FCC Part 15 Class B limits. Currently, Progress Energy is continuing testing of the system with third parties, including the FCC Office of Engineering & Technology, to analyze the emission results and ensure that we are in full compliance with FCC rules.

8. Given their different operating environment, is it necessary to tailor the rules to differentiate equipment used specifically in Access BPL and In-House BPL applications, or should one set of general limits be applied to both? What should such limits be and what is the technical basis for them?

Comments: Access BPL is deployed in open areas and underground while In-House BPL is deployed in confined spaces. Because they are two different systems and two applications, it may be sensible to apply different levels of radio emission limits.

10. Would the new high speed Access and In-House BPL equipment pose a higher risk of interference to licensed radio services than the traditional carrier current systems?

Comments: There have been no reported instances of interference during the extensive field trials performed thus far at Progress Energy and at utilities we have communicated with.

[2] National Voluntary Laboratory Accreditation Program
[3] National Association of Radio and Telecommunications Engineers

Our trial has been conducted strictly in accordance with existing Part 15 limits and measurement procedures. Should such a situation ever arise, it can be addressed by the equipment's ability to shift frequencies in order to avoid interference.

11. Will the power line carrier systems currently deployed by the utility companies to control and monitor the electrical system be replaced in the future with the new high speed BPL equipment?

Comments: The current BPL systems run only on medium-voltage, and only a few of the existing utility power line carrier systems can operate on high-voltage lines. After BPL has proven to be as stable and reliable as the existing, slower systems, utilities will begin to switch. Control and monitoring of the electric grid is of vital national interest and cannot be subject to jamming, hacking, etc.

There are utility functions on the medium-voltage system using the older power line carrier systems that most likely would be replaced. These would include automatic meter reading, volt/VAR/amp monitoring, and remote switching systems.

12. How would the utility companies deploy these new control systems and how would these new systems coexist with the older control systems?

Comments: We have tested one narrowband carrier current system, TWACS from Distribution Control Systems, Inc., alongside the Amperion system in a residential neighborhood, with absolutely no interference detected by either system. Since the frequencies of older systems that we are aware of are all in the Hz or kHz range, we would not expect BPL systems in the mHz range to negatively affect them, or vice versa.

13. Should power line carrier systems using BPL technology be subject to the coordination process in the current database maintained by the UTC ("United Telecom

Council")?

Comments: Yes. Only one of these can operate on a medium-voltage circuit at a time. It would be important to assure that the circuit frequencies are allocated and that no interference between adjacent systems occurs.

14. Are any changes needed in the regulations governing power line carrier systems? Should power line carrier systems using BPL technology be subject to the general requirements for Access BPL systems, since the same system may now be carrying broadband signals as well as monitoring and control signals? How could, or should, these functions be separated?

Comments: It is critical that the monitoring and control functions be protected from the general users of Access BPL. This could be accomplished by using static addresses, Media Access Control ("MAC") layer filtering, or perhaps a Virtual Private Network ("VPN"). Each LAN connected device has a unique MAC address that can be used to filter data from/to specific devices/users to provide separation and isolation. VPN provides a secure isolated data "tunnel" which could be used to separate and protect monitoring and control data from Access BPL data.

Summary

Most of a utility's distribution lines are not automated today due to the high cost associated with both communications and control equipment. Widespread deployment of BPL could help drive these prices down, thereby significantly improving power quality and reliability.

Progress Energy fully supports the Federal Communications Commission's efforts to explore how it can promote the development of BPL while continuing to protect other licensed users of the radio bands in which BPL systems typically operate. Progress Energy recognizes that there are key regulatory issues to be addressed, including vendor compliance with the FCC's radio frequency emissions standards. However, these issues can be resolved to the benefit of all

involved.

BPL technology, while still very much in its infancy, has the potential to expand the control of various distribution system equipment, such as capacitor controllers, switches, reclosers, and other line regulation equipment. Our preliminary tests have shown that with appropriate IP interfaces, this equipment can easily integrate with Access BPL.

In addition to the potential for BPL to make extensive use of utility infrastructure, including poles and rights-of-way, Access BPL systems also have the potential to allow electric utilities to implement widespread remote meter reading and automated outage detection and other advanced metering services.

Remote meter reading offers several benefits to both the utility and its customers. The utility avoids having to physically send employees out to customers' premises to read meters. Customers prefer this because utility personnel are not entering upon their property. Utilities benefit by avoiding exposure of their employees to injury and other liability that may arise when entering upon third parties' property. Utilities are also able to more quickly and easily re-check a meter reading when a customer calls to inquire about a bill. Finally, utilities avoid the vehicle, labor and liability expenses associated with maintaining vehicles and personnel to read meters.

Regarding automated outage detection, today utilities generally have in place monitoring equipment that determines when a feeder line is out of service; however, the cost of placing such equipment on smaller lines is prohibitive. Therefore, utilities must rely upon customers calling in to determine when an individual premise is without service. Access BPL holds promise as a cost-effective technology to perform this service, which would be particularly helpful during large outages caused by storms. After a main feeder line is placed back into service, the utility, with this technology, will be able to remotely determine which smaller lines also suffered

damage and to repair them without having to wait for customers to report outages and then attempt to determine from this piecemeal data what additional lines are out.

Finally, Access BPL provides the potential for a utility to offer its customers real time metering, consumption, and pricing data so that customers can adjust their consumption based upon the current price/cost of electricity.

Respectfully submitted,

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