

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

<b>In the Matter of</b>	)	
	)	
<b>Carrier Current Systems, including Broadband over Power Line Systems</b>	)	<b>ET Docket No. 03-104</b>
	)	
<b>Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems</b>	)	<b>ET Docket No. 04-37</b>
	)	

**To: The Commission**

**REPLY COMMENTS OF DUKE ENERGY CORPORATION**

By: Shirley S. Fujimoto  
Jeffrey L. Sheldon  
Erika E. Olsen  
McDERMOTT WILL & EMERY LLP  
600 Thirteenth Street, N.W.  
Washington, D.C. 20005-3096  
202.756.8000 (T)  
202.756.8087 (F)

Its Attorneys

Dated: June 22, 2004

## TABLE OF CONTENTS

	Page
I. THE COMMISSION MUST FIND AN APPROPRIATE BALANCE AMONG COMPETING INTERESTS TO FOSTER THE GROWTH OF THIS NASCENT PLATFORM .....	2
II. COMMENTERS CONCUR THAT PLC AND IN-HOUSE BPL SHOULD NOT BE INCLUDED IN THE DEFINITION OF ACCESS BPL.....	5
III. MANY COMMENTERS AGREE THAT HARMFUL INTERFERENCE CONCERNS CAN BE OVERCOME OR EFFECTIVELY ADDRESSED .....	7
A. Commenters Support a Limited Central Database to Screen Harmful Interference Complaints.....	7
1. Homeland Security Concerns Justify Limiting Data Available on Access BPL Infrastructure .....	8
2. Competitive Concerns Support Limiting the Information Available on Access BPL Infrastructure .....	10
3. A Limited Database will Reduce Illegitimate Interference Complaints .....	10
4. NTIA’s Notification Recommendations are Burdensome and Unnecessary.....	11
B. Duke Continues to Believe that Potential Harmful Interference to Licensed Services Can Be Mitigated and Resolved.....	13
1. Utilities’ Experience Indicates that Properly Installed BPL Systems Do Not Pose an Interference Threat .....	13
2. The FCC Should Provide Some Guidance with Respect to Assessing Harmful Interference .....	14
C. The FCC Should Not Dictate Mitigation Techniques or Require Specific Equipment Features; Shut Down Should be a Last Resort .....	15
D. The FCC Should Not Dictate A Range of Frequencies, Require Frequency Exclusion Capability, or Mandate Coordination Areas .....	18
IV. THE FCC’S SUGGESTED MEASUREMENT AND EQUIPMENT AUTHORIZATION PROCEDURES FOR ACCESS BPL SYSTEMS APPEAR ADEQUATE.....	20
V. A SEPARATE RULE PART FOR BPL OPERATIONS IS UNNECESSARY .....	22
VI. PROVISION OF ACCESS BPL WILL NOT IMPEDE ELECTRIC RESTORATION.....	23
VII. CONCLUSION.....	24

## EXECUTIVE SUMMARY

Duke agrees with the Commission's conclusion in the NPRM that Access BPL has the potential to play an important role in providing high-speed Internet and broadband services to unserved and underserved areas of the country, providing utilities with an opportunity to improve the safety and efficiency of the electric power distribution system and furthering homeland security by helping to manage this vital element of the Nation's critical infrastructure. Overly prescriptive regulations, however, would severely damage the business case for BPL and could condemn the technology before it can achieve these benefits. The FCC must, therefore, proceed in a balanced manner to develop regulations that will promote regulatory certainty and spur investment in this promising broadband infrastructure while protecting the interest of licensed operations.

Duke is also pleased that many commenters agreed with several key points made in Duke's initial comments in this proceeding. Like Duke, a number of commenters, including NTIA, concluded that the Commission should modify its proposed definition for Access BPL to clarify the scope of the rules and to explicitly exclude Power Line Carrier ("PLC") and In-House BPL. Duke and NTIA suggested that a separate definition for In-House BPL should also be adopted, but Duke reiterates that it should be keyed to the utility's interconnection point to the customer premises.

Many commenters concurred with Duke that a limited national database could be established that is designed to facilitate communications between Access BPL providers and licensed users to enable prompt resolution of harmful interference. The inclusion of detailed technical information, however, is unnecessary and could endanger BPL and utility infrastructure. Moreover, the data suggested for inclusion would not be useful to licensees

seeking to identify an interference source, would constitute an unnecessary economic and administrative burden, and would compromise the competitive position of BPL operators.

Many commenters, including NTIA, agreed with Duke's view that harmful interference can be effectively mitigated through proper engineering and collaborative efforts. Duke concurs with this assessment and further agrees with those commenters who suggested that the FCC should provide some guidance with respect to assessing what constitutes harmful interference in order to eliminate frivolous or illegitimate claims. NTIA and others also agreed with Duke's position that shut down of BPL operations is a last resort and should be used only when other mitigation techniques are ineffective.

While Duke believes that a number of NTIA's recommendation with respect to mitigation techniques provide a useful roadmap to aid in interference resolution, Duke does not believe that these techniques should be mandated by rule. Duke believes that many of NTIA's recommendations are overly conservative and that a number of NTIA's specific suggestions, particularly those related to notching and geographic restrictions, are unnecessary and overly burdensome. Duke is pleased to see that NTIA has reversed its position on taking measurements at line height and that NTIA is now recommending measurements at one meter above ground.

Duke strongly opposes the suggestion that BPL operators be required to certify BPL system compliance. Certification is the responsibility of the manufacturer of Part 15 equipment. It is inappropriate and unprecedented to require the BPL operator to shoulder the burden of certifying BPL equipment. *In situ* testing by the manufacturer at three representative BPL installations is sufficient to ensure system compliance.

Finally, Duke disagrees with NTIA's suggestion that BPL rules be partitioned out into a separate rule section. BPL should not be treated any differently from any other unintentional radiator, and a separate section is inappropriate and unnecessary.

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

<b>In the Matter of</b>	)	
	)	
<b>Carrier Current Systems, including Broadband over Power Line Systems</b>	)	<b>ET Docket No. 03-104</b>
	)	
<b>Amendment of Part 15 regarding new Requirements and measurement guidelines for Access Broadband over Power Line Systems</b>	)	<b>ET Docket No. 04-37</b>
	)	

**To: The Commission**

**REPLY COMMENTS OF DUKE ENERGY CORPORATION**

Pursuant to Section 1.415 of the FCC's Rules,<sup>1</sup> Duke Energy Corporation ("Duke"), by and through its attorneys, hereby submits its Reply Comments in the above-captioned proceeding in response to the Federal Communications Commission's ("FCC's" or "Commission's") Notice of Proposed Rulemaking ("NPRM") in ET Docket Nos. 03-104 and 04-37.<sup>2</sup>

Duke is pleased to note that many commenters agreed with several key points made in Duke's initial comments in this proceeding. Specifically, a number of commenters concluded that: (1) the Commission should modify its proposed definition for Access BPL to clarify the

---

<sup>1</sup> 47 C.F.R. § 1.415.

<sup>2</sup> *In re Carrier Current Systems, including Broadband over Power Line Systems; Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems*, ET Dockets No. 03-104, 04-37, FCC 04-29, (rel. Feb. 23, 2004); 69 Fed. Reg. 12612 (Mar. 17, 2004) ("BPL NPRM"); Public Notice, DA 04-760 (Mar. 23, 2004) (asking parties to submit responses only in new newly established docket, ET Docket No. 04-37). By Order released May 27, 2004, the Reply Comment date was extended to June 22, 2004. Order Granting Extension of Time, DA 04-1552 (rel. May 27, 2004).

scope of the rules and to explicitly exclude Power Line Carrier (“PLC”) and In-House BPL; (2) a limited national database could be established that is designed to facilitate communications between Access BPL providers and licensed users to enable prompt resolution of harmful interference; and (3) harmful interference can be effectively mitigated through proper engineering and collaborative efforts. In addition, Duke is also pleased to have the opportunity to respond to several issues raised by the National Telecommunications and Information Administration’s (“NTIA’s”) Phase 1 technical report on Access BPL’s interference potential with respect to government operations between 1.7 MHz and 80 MHz and NTIA’s Comments and Technical Appendix, filed in this docket on June 4, 2004. As discussed herein, while Duke believes that a number of NTIA’s recommendations with respect to mitigation techniques provide a useful roadmap to aid in interference resolution, Duke does not believe that these techniques should be mandated by rule. Duke also believes that many of NTIA’s recommendations are overly conservative, and that a number of NTIA’s specific suggestions, particularly those related to notching and geographic restrictions, measurement procedures, and certification by BPL operators, are unnecessary and overly burdensome.

**I. THE COMMISSION MUST FIND AN APPROPRIATE BALANCE AMONG COMPETING INTERESTS TO FOSTER THE GROWTH OF THIS NASCENT PLATFORM**

Duke agrees with Chairman Powell that broadband over power line technology “has the potential to speed access to every home already on the power grid using existing lines.”<sup>3</sup>

Access BPL could also “improve the provision and management of electric power systems,

---

<sup>3</sup> Remarks of Michael K. Powell, Kansas Rural Broadband and Telemedicine Summit, Lawrence, Kansas (Feb. 20, 2004), *available at* [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-244205A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-244205A1.pdf) (last visited May 25, 2004).

enhance homeland security, and protect vital elements of our Nation's critical infrastructure."<sup>4</sup> Duke also concurs with NTIA's comments that in addition to its tremendous potential to deliver broadband Internet access to consumers, BPL deployment will benefit consumers of electric services as it "should yield additional motivation and resources for maintaining the electric power distribution system, predicting and preventing faults, and achieving more rapid repairs in an affordable manner" as well as inducing "substantial reliability improvements" in the Nation's electric infrastructure.<sup>5</sup> NTIA also suggests that BPL will aid in reducing or remedying existing power line noise, and speeding electric service restoration efforts.<sup>6</sup> NTIA notes that current electric restoration protocol requires utilities to maintain substantial crews and equipment to enable rapid deployment and repair, to monitor and forecast adverse weather and other hazards, and to pool resources with other companies in the event of widespread failures. Identification of service failures also must rely heavily on customer outage reports and complaints to diagnose the extent and location of a problem. BPL has the potential to speed detection and diagnosis of electrical system failures, which will enable more efficient personnel and equipment deployment and yield more rapid system restoration.<sup>7</sup>

Duke is troubled that the fear of potential interference and other concerns have prompted a number of commenters to propose a level of public disclosure, coordination, certification, equipment capabilities, mitigation methods, prescriptive regulations and compliance that Duke believes would collectively exceed requirements imposed on many other communications

---

<sup>4</sup> *Id.*

<sup>5</sup> Comments of the National Telecommunications and Information Administration at v, 4 (filed June 4, 2004). Comments for all parties referenced herein are those filed in ET Docket No. 04-37 unless otherwise indicated.

<sup>6</sup> Comments of NTIA at 4-6.

<sup>7</sup> Comments of NTIA at 6.

providers, whether operating on licensed or unlicensed spectrum. If imposed upon the nascent BPL industry, these requirements would condemn the technology and its potential value to the public before it even has the opportunity to be developed, evaluated, or deployed.

In order for BPL's potential to be realized, it must make business sense for equipment vendors and electric utilities to invest the time, money, and resources necessary to launch Access BPL as a viable broadband competitor and internal utility resource. Access BPL is a prime example of what has been described as a "nascent platform," and its viability is extremely sensitive to the regulatory signals the FCC sends.<sup>8</sup> Companies take significant risks when investing in communications networks, particularly those that employ emerging technologies.<sup>9</sup> Overly prescriptive regulations, such as those recommended by some commenters, would severely damage the business case for BPL and could condemn the technology before it can even get started.<sup>10</sup>

Duke understands that the Commission must be cognizant of its responsibility to protect licensed incumbent operations from harmful interference. As a licensee itself, Duke relies on its private wireless systems and the protection that licensing affords in order to support Duke's day-to-day operations and to assist in managing its electric infrastructure in times of crisis. Duke is proceeding in a measured manner with its pilot programs for BPL, including university-assisted measurements and technical support, and it continues to believe that a properly engineered BPL

---

<sup>8</sup> Remarks of FCC Commissioner Kathleen Q. Abernathy, Federal Communications Bar Association, New York Chapter, New York, NY (July 11, 2002), *available at* [www.fcc.gov/Speeches/Abernathy/2002/spkqa217.txt](http://www.fcc.gov/Speeches/Abernathy/2002/spkqa217.txt) (last visited Mar 23, 2004).

<sup>9</sup> *See*, Remarks of Commissioner Kathleen Q. Abernathy, NARUC Annual Meeting Panel on Broadband over Powerline Systems, Atlanta, Georgia (Nov. 19, 2003), *available at* [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-241485A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-241485A1.doc) (last visited May 25, 2004) ("Abernathy NARUC Remarks").

<sup>10</sup> *Id.*

system will not cause harmful interference to licensed operations. Moreover, as NTIA noted, the “potential benefits of BPL...warrant acceptance of a small and manageable degree of interference risk.”<sup>11</sup>

Provisioning broadband infrastructure is a business venture. For electric utilities considering this venture, Access BPL appears to be a practical, cost-efficient method with significant advantages, not the least of which is the ubiquitous nature of the transmission medium -- power lines. However, if providing broadband access via Access BPL becomes unprofitable due to market forces, over-regulation or other circumstances, companies will delay or abort entry plans, seek alternate technologies, or simply exit the market - regardless of the benefit to the end consumer. Commissioner Abernathy has argued that when faced with a nascent technology or platform, the FCC is best served by taking a hands-off approach or applying a light touch until the contours and capabilities of the new service or application are better understood.<sup>12</sup> Duke urges the Commission to heed this advice in crafting appropriate technical criteria for Access BPL operations in order to maintain an environment conducive to investment in new infrastructure. The market should dictate Access BPL’s success or failure – not the Commission.

## **II. COMMENTERS CONCUR THAT PLC AND IN-HOUSE BPL SHOULD NOT BE INCLUDED IN THE DEFINITION OF ACCESS BPL**

Of those commenters addressing the Commission’s proposed definition of Access BPL, virtually all of them agreed with Duke that the Commission’s definition of Access BPL is overly broad and, if adopted without revision, would arguably encompass existing Power Line Carrier

---

<sup>11</sup> Comments of NTIA at iv.

<sup>12</sup> *See, e.g.*, Abernathy NARUC Remarks.

(“PLC”) and In-House BPL systems.<sup>13</sup> Like Duke, the United Power Line Council (“the UPLC”) and Progress Energy suggested definitions that specifically exclude PLC as defined in Section 15.113 of the FCC’s rules.<sup>14</sup> The UPLC and Southern<sup>15</sup> also argued that Access BPL should only include those carrier current systems transmitting at high frequencies (above 1.7 MHz), while Progress Energy suggested that this threshold be 1.0 MHz.<sup>16</sup>

Southern also recommended that In-House BPL as well as PLC be specifically excluded from the Access BPL definition, and sought clarification that the equipment installed to facilitate Access BPL be installed, owned, and/or maintained by the utility.<sup>17</sup> NTIA concurred that the FCC should consider defining “In-House BPL” in order to “properly frame the applicable rules and measurement guidelines” for Access BPL.<sup>18</sup> Apart from Duke, NTIA is the only other commenter to suggest a specific definition for In-House BPL. NTIA’s suggested definition, however, would *exclude* power lines owned, operated or controlled by the utility from being considered In-House BPL. This recommendation, however, would not address the concerns Duke expressed in its initial comments with respect to electrical power lines owned, operated or controlled by a utility that are wholly within utility-owned buildings or other properties. Carrier current systems on the electrical power lines within utility-owned office buildings, operations centers, and other similar facilities clearly should not be considered Access BPL. Accordingly,

---

<sup>13</sup> Comments of the United Power Line Council at 4 (“the UPLC”); Comments of Progress Energy at 2; Comments of Ameren at 3; Comments Southern LINC, Southern Telecom, Inc., and Southern Company Services, Inc. at 14 (collectively “Southern”).

<sup>14</sup> Comments of the UPLC at 4, Comments of Progress Energy at 2.

<sup>15</sup> Comments of the UPLC at 4; Comments of Southern at 14.

<sup>16</sup> Comments of Progress Energy at 2.

<sup>17</sup> Comments of Southern at 14.

<sup>18</sup> Comments of NTIA at 3.

Duke reiterates that In-House BPL should be defined by reference to the utility's interconnection point with the customer premises.<sup>19</sup>

Duke does not believe that the FCC intended, or that it would be appropriate, for the definition of Access BPL to encompass PLC or In-House BPL systems, and accordingly supports a revision of the proposed definition to clearly state this fact. Regardless of whether the threshold is 1.0 or 1.7 MHz, Duke concurs with those commenters that seek the specific exclusion of PLC and In-House BPL from the Access BPL definition, and further supports the clarification sought by Southern with respect to the installation, ownership and/or operation of Access BPL equipment.<sup>20</sup> The changes suggested by Duke are prudent and not contradicted by other commenters and would provide needed regulatory certainty to PLC and In-House BPL providers.

### **III. MANY COMMENTERS AGREE THAT HARMFUL INTERFERENCE CONCERNS CAN BE OVERCOME OR EFFECTIVELY ADDRESSED**

#### **A. Commenters Support a Limited Central Database to Screen Harmful Interference Complaints**

In its initial comments, Duke supported the FCC's recommendation to establish an Access BPL database to facilitate communication between Access BPL providers and licensees and to screen interference complaints. However, Duke also suggested that the amount of data the FCC proposed to include in the database and to disclose to the public was far in excess of what was reasonably needed to achieve this end. A number of other commenters agreed with Duke's position and presented compelling reasons to reduce the level of specificity for information within the database and/or to restrict its accessibility. The reasons include, among

---

<sup>19</sup> See Comments of Duke Energy Corporation at 4-5.

<sup>20</sup> Comments of Southern at 14.

others: (1) homeland security issues; (2) competitive concerns; and (3) the need to restrict illegitimate interference complaints. In sum, many commenters agreed that making information concerning BPL equipment locations public is not necessary to achieve the Commission's purpose.<sup>21</sup> Duke agrees and urges the Commission to limit database information and access to the minimum amount necessary to address mitigation of actual cases of interference.

### **1. Homeland Security Concerns Justify Limiting Data Available on Access BPL Infrastructure**

As Duke explained in its Comments, disclosure of the locations and operating characteristics of Access BPL deployments through database inquiries raises significant security issues with respect to a utility's electric infrastructure.<sup>22</sup> Cinergy concurred in this assessment, arguing that a "map of BPL equipment locations would, in essence, be a map of a utility's electric infrastructure" and protection of such systems is "an important facet of homeland security efforts."<sup>23</sup> Moreover, not only would this data pinpoint the specific physical locations of a utility's distribution network, but it could also jeopardize the control and monitoring functions that Access BPL systems would provide to the utility itself. The UPLC echoed Duke's concern in this regard, stating that public disclosure of information must be limited to the extent necessary to effectively resolve interference informally *without* "providing sensitive information that could compromise critical infrastructure or competitive interests of BPL providers."<sup>24</sup> In particular, the UPLC noted that utilities are "especially concerned about the disclosure of

---

<sup>21</sup> Comments of Cinergy Corp. at 3 ("Cinergy"); Comments of PPL Telecom, Inc. at 7; Comments of Main.net at 7-8; Comments of Current Technologies at 3; Comments of Southern at 10.

<sup>22</sup> Comments of Duke Energy Corp. at 9-11.

<sup>23</sup> Comments of Cinergy at 3.

<sup>24</sup> Comments of the UPLC at 10.

information that could be considered “protected critical infrastructure information” under the Homeland Security Act of 2002.”<sup>25</sup> Duke concurs with this assessment and urges the FCC: (1) to recognize the legitimate Homeland Security Act interests of utilities; (2) to limit the scope of the data to be collected; and (3) to limit access to such data to the minimum amount necessary to address any immediate and legitimate interference issues that may arise from BPL operations.

These serious concerns over information disclosure have implications far beyond the Access BPL issue and illustrate the inappropriate nature of several of the disclosure requests made by commenters. Small Business in Telecommunications, for example, suggested the inclusion of mapping software to pinpoint the geographic location Access BPL operations down to the precise power line upon which Access BPL signals are traveling.<sup>26</sup> Other commenters suggested the inclusion of extensive data relating to BPL operations, such as the “power spectral density mask” for each BPL device.<sup>27</sup> These suggestions are far beyond what is necessary to manage interference concerns and should be rejected. The database should aid in identifying who is providing BPL in a particular region or zip code and how to contact that entity. Additional database filters may be prudent to eliminate queries related to frequencies that an Access BPL operator does not use, but the database in no way should facilitate the disclosure of sensitive information on utility infrastructure.

---

<sup>25</sup> Comments of the UPLC at 11.

<sup>26</sup> Comments of Small Business in Telecommunications at 8 (“SBT”).

<sup>27</sup> Comments of the Consumer Electronics Association at 7 (“CEA”).

## **2. Competitive Concerns Support Limiting the Information Available on Access BPL Infrastructure**

A number of commenters, including other broadband providers, recognized that public disclosure of Access BPL infrastructure information raises substantial competitive issues.<sup>28</sup> No other broadband provider or Part 15 unlicensed operator is required to disclose the location and extent of its facilities in a public manner. As AT&T argued, unfettered access to such a database is inappropriate “as it would allow the entrenched broadband providers to determine when and where introduction of competitive BPL services was planned.”<sup>29</sup> In order to establish viability as an emerging broadband platform in competition with entrenched cable modem and DSL providers, it is vital that sensitive, competitively valuable information, including the location of facilities and business plans for future service offerings, remain confidential. Moreover, as detailed above, this information is not necessary for interference resolution.

## **3. A Limited Database will Reduce Illegitimate Interference Complaints**

Apart from competitive concerns related to the disclosure of locations and service deployment plans, the Commission’s database proposal would create needless administrative burdens on the Commission as well as on the BPL industry. Moreover, a number of commenters expressed concern that the inclusion of *proposed* BPL systems would also invite pre-construction protests from parties who may wish to prevent the deployment of Access BPL systems in their neighborhoods for illegitimate reasons.<sup>30</sup> Ameren, for example, noted that “requiring Access BPL providers to file information about proposed installations and changes to existing systems

---

<sup>28</sup> See, e.g., Comments of Cinergy at 3.

<sup>29</sup> Comments of AT&T Corp. at 7.

<sup>30</sup> Comments of Power Line Carrier Association at 4 (“PLCA”).

implies some form of right to protest such changes and installations,”<sup>31</sup> and Cinergy suggested that a publicly accessible database “could invite meritless interference complaints.”<sup>32</sup>

Duke agrees that the potential for impeding deployment and meritless interference complaints exists and that proposed systems should not be included in a database of this nature. This requirement would be overly burdensome, and would require BPL operators to expend significant resources addressing “potential” problems that do not exist or may never materialize. Duke believes that limiting the amount of data accessible and the entities entitled to access in accordance with Duke’s initial comments would materially reduce the risk that the database would be used to further meritless complaints or illegitimate attempts to delay Access BPL deployment while preserving the value of the database for the legitimate efforts of licensees and BPL operators for interference management.

#### **4. NTIA’s Notification Recommendations are Burdensome and Unnecessary**

NTIA has suggested that the FCC should require BPL operators to populate and update a publicly accessible database to “facilitate radio operator diagnosis of suspected interference from BPL systems.” NTIA suggested that the database should contain information on planned BPL deployments at least 30 days in advance of implementation, and among other things, include data such as the geographic area of BPL deployments plotted according to a radius around a set of coordinates, modulation details, method of power control, and the maximum number of BPL devices to be deployed in a particular area.<sup>33</sup> NTIA has also asserted, however, that licensed operators should not bear any responsibility in diagnosing BPL interference. Thus, NTIA would

---

<sup>31</sup> Comments of Ameren Energy Communications, Inc. at 10 (“Ameren”).

<sup>32</sup> Comments of Cinergy at 4.

<sup>33</sup> Comments of NTIA at 11-12.

apparently impose a double burden on the BPL operator to disclose extensive operational and proprietary data to enable diagnosis by others, but still place the onus on the BPL operator to diagnose the interference.

Further, NTIA has suggested that it would likely be necessary to compare the disclosed operational parameters with the actual measured results of a spectrum analyzer to diagnose whether BPL is the source of received interference.<sup>34</sup> This docket has suggested that interference, when experienced, would most likely occur in those bands utilized by unsophisticated licensees who may not have access to, or may not know how to use, a spectrum analyzer. The disclosed data, therefore, would likely be useless to most licensees seeking an interference source, but could be a potential boon to competitors or others seeking proprietary data on BPL operators, BPL systems, or the electric grid itself. Duke, therefore, disagrees with NTIA's excessive and burdensome "notification" suggestions, and reiterates its recommendation that disclosures and database access be limited to the minimum necessary to place a licensee in touch with the appropriate BPL operator to cooperatively diagnose and remedy harmful interference issues.

Finally, NTIA has recommended that BPL operators be required to staff a 24 hour, 7 day a week hotline for interference diagnosis and resolution, *possibly during the initial call to the hotline*.<sup>35</sup> While most utilities already staff 24/7 hotlines to take reports related to electric service outages, it is unreasonable and burdensome to require BPL operators to staff a hotline and maintain field personnel to address interference concerns instantaneously during non-business hours on a non-emergency basis. Call-center employees are not engineers, and while they can be trained to gather the appropriate information from a caller, they cannot make an engineering

---

<sup>34</sup> Comments of NTIA at viii.

<sup>35</sup> Comments of NTIA at 13.

assessment with respect to an interference complaint. While Duke is confident that interference complaints can be resolved in a timely manner, the burden suggested here is inappropriate and practically infeasible.

**B. Duke Continues to Believe that Potential Harmful Interference to Licensed Services Can Be Mitigated and Resolved**

**1. Utilities' Experience Indicates that Properly Installed BPL Systems Do Not Pose an Interference Threat**

Duke is in the process of installing and testing its pilot Access BPL system, and is eagerly anticipating its own evaluation of the operational issues associated with this innovative technology. Duke is also encouraged by the reports of other utilities involved in Access BPL pilot systems, who have not experienced significant interference issues with these projects. Specifically, Hawaiian Electric asserts that “in two years of limited BPL trials, HECO has not received one substantiated interference complaint within the direct vicinity of our BPL equipment.”<sup>36</sup> Similarly, PPL Telecom reported that since initiating its BPL operations in February 2002, it has only experienced three informal interference complaints, and that all three “were addressed in a timely manner by relocating the BPL frequencies of nearby equipment to spectrum not allocated to the authorized users.”<sup>37</sup> Main.net has also related a positive experience with the roll out of Manassas, Virginia’s city-wide BPL system, where, in cooperation with the local Amateur Radio Club, the parties determined that no harmful interference was caused by the BPL system.<sup>38</sup> As NTIA suggested and as these utilities’ pilot programs have demonstrated, BPL operators have natural economic motives and other incentives to “voluntarily implement

---

<sup>36</sup> Comments of Hawaiian Electric Company, Inc. at 3 (“HECO”).

<sup>37</sup> Comments of PPL Telecom at 6.

<sup>38</sup> Comments of Main.net at 7.

equipment, organizational elements, and installation and operating practices that prevent interference and facilitate interference mitigation.”<sup>39</sup> Duke concurs with this assessment.

Several parties’ comments also rebutted the claim that BPL systems act as giant antennas and rejected the argument that multiple BPL sites within a given area would result in “cumulative” interference that must be separately addressed. Current Technologies, for example, explained that only two devices at most -- on different frequencies -- can operate on a given BPL segment or cell, each of which covers several hundred meters and that emissions drop off rapidly with distance. As a result, emissions cannot accumulate in a victim receiver, and the "cumulative" emissions from BPL devices are no greater than those from commonplace unintentional radiators.<sup>40</sup> PowerWAN and Hawaiian Electric concurred that power lines are very inefficient as antennas and that they tend to act much like point source radiators.<sup>41</sup>

## **2. The FCC Should Provide Some Guidance with Respect to Assessing Harmful Interference**

A number of parties have also expressed concern with the talismanic manner in which many Access BPL opponents are clinging to the “non-interference” provision of Part 15. Duke shares the concerns of Progress Energy and others that some Access BPL opponents view any interference as intolerable, rather than recognizing that the FCC’s established “harmful interference” definition is the appropriate threshold governing Part 15 operations. Ambient echoed these concerns and requested that the FCC “set the boundaries for what is considered harmful interference so that there is a realistic opportunity for early deployment of BPL technologies and the achievement of the many public benefits which such deployment will make

---

<sup>39</sup> Comments of NTIA at 8.

<sup>40</sup> Comments of Current Technologies at 17.

<sup>41</sup> Comments of Main.net at 6-7.

possible.”<sup>42</sup> Duke agrees with Progress Energy’s and Ambient’s further suggestion that it may be appropriate to provide some guidance and reinforcement with respect to assessing when harmful interference has occurred in the BPL context.

**C. The FCC Should Not Dictate Mitigation Techniques or Require Specific Equipment Features; Shut Down Should be a Last Resort**

Interference that rises to the level of being harmful should clearly be addressed and remedied in a timely fashion. As a Commission licensee itself, Duke would expect no less if it were receiving harmful interference to its operations. Interference scenarios, however, are often unique depending on the equipment, terrain, operating conditions, location of equipment, and/or a host of other variables. In this regard, Duke strongly agrees with those commenters who have suggested that it is inappropriate for the Commission to mandate the inclusion of specific features for Access BPL equipment or to dictate mitigation techniques that must be employed.<sup>43</sup>

In its Phase 1 report, NTIA has suggested a number of mitigation techniques, including among other things, power reduction, frequency avoidance, using balanced differential BPL signal injection, using blocking filters, and shut-down capabilities. These useful suggestions illustrate an expansive range of options that are available to a BPL operator to respond to an incident of harmful interference. However, not every response is necessary or appropriate for a particular type of interference incident. *Mandating* that all or even some of these capabilities be available on every piece of BPL equipment or that these techniques be employed for each interference incident could result in wasted resources. Moreover, as noted above and as acknowledged by NTIA, BPL operators already have business incentives to “voluntarily

---

<sup>42</sup> Comments of Ambient Corp. at 5.

<sup>43</sup> Comments of Southern at 18; Comments of AT&T at 2, 5-6.

implement equipment, organizational elements, and installation and operating practices that prevent interference and facilitate interference mitigation.”<sup>44</sup> Mandating specific features for *all* BPL equipment, regardless of its function and location, is therefore inappropriate and unnecessary.

For example, it would not be cost-effective or necessary to require underground BPL devices to incorporate a host of mitigation capabilities, as interference concerns are greatly reduced due to the shielding that would naturally or inherently occur. The BPL injection device or repeaters would typically be enclosed within a grounded metal padmounted transformer or switching cabinet that provides a shield to electromagnetic radiation. The BPL injection device or repeater is connected to the medium voltage underground cable, which is effectively a coaxial cable with a grounded outer sheath that provides shielding. Finally, the electrical cables, both medium voltage and service voltage, are further shielded by virtue of their underground placement.

Requiring notching, equipment replacement or shut down as a first line of response may also be inappropriate where less drastic or less expensive techniques would achieve the same result. As AT&T concluded, the adoption of specific mitigation techniques and procedures has not been shown to be necessary, and mandating the design, development, and implementation of any such non-warranted requirements would unduly delay prompt deployment of BPL.<sup>45</sup> Duke concurs with this assessment, and supports the use of the mitigation techniques suggested by NTIA, so long as specific mitigation techniques are not mandated by rule. Flexibility is essential in order to quickly and efficiently find the correct response to a particular interference problem.

---

<sup>44</sup> Comments of NTIA at 8.

<sup>45</sup> Comments of AT&T Corp. at 5.

Duke also concurs with Consolidated Edison’s recommendation that the FCC should refine its proposal “to clearly indicate that the adjustment of operation is a permissible method to avoid or mitigate harmful interference and that cessation of operations is a last resort only if remediation of interference by adjustment of operations is unsuccessful.”<sup>46</sup> Moreover, this clarification is “particularly important, as Access BPL facilities will be providing vital electric utility PLC system services in addition to commercial and home services.”<sup>47</sup> Duke also concurs with the UPLC’s suggestion that the FCC should clarify that BPL operators are permitted to correct harmful interference by notching, shifting frequencies, or employing other mitigation techniques first, rather than requiring them to automatically shut down immediately.<sup>48</sup> NTIA also concurs with this assessment, clearly indicating that shut down should be the last resort if other mitigation techniques are ineffective.<sup>49</sup>

Conversely, the American Petroleum Institute (“API”) recommended that shut down should be the first response to an interference complaint, and urged the Commission “to specify in its rules that BPL providers must implement the shut-down feature upon receiving a report of interference from a valid FCC licensee. In other words, the BPL provider should not be able to first investigate and confirm the interference originates from BPL sources before implementing shut-down capabilities, as such a potentially lengthy delay in shut-down could exacerbate the negative consequences of the interference.”<sup>50</sup> This suggestion is clearly an extreme response that is wholly unwarranted. Besides the fact that this harsh response has not been imposed on any

---

<sup>46</sup> Comments of Consolidated Edison Company of New York, Inc. at 4 (“ConEd”)(emphasis in original).

<sup>47</sup> Comments of ConEd at 4.

<sup>48</sup> Comments of the UPLC at 10.

<sup>49</sup> Comments of NTIA at viii.

<sup>50</sup> Comments of the American Petroleum Institute at 8 (“API”).

other Part 15 unintentional radiator, a rule mandating shut down upon merely a *complaint* of harmful interference invites abuse. Moreover, the immediate shut down of an Access BPL device in this manner could endanger vital monitoring, maintenance and other critical infrastructure functions that the BPL system may be supporting for the utility or for a number of utilities in coordinating grid operations.

**D. The FCC Should Not Dictate A Range of Frequencies, Require Frequency Exclusion Capability, or Mandate Coordination Areas**

NTIA's Phase 1 Report on Access BPL and its potential impact with respect to government frequencies suggests that 41 government frequencies should be designated for "special protection." While some may conclude that this necessarily entails notching or prohibiting BPL transmissions on these frequencies, Duke notes that notching has *not* specifically been requested by NTIA for these frequencies. In fact, other protection may be appropriate depending on the precise nature of the government frequency in question, and then only if Access BPL is shown to cause harmful interference to these operations.

Duke also notes that the 41 frequencies identified by NTIA include frequencies that are "protected" under Parts 15, 18, 80 and 87, as well as those protected under various ITU appendices. Under Section 15.205, however, unintentional radiators are *already* permitted to operate on many of the listed frequencies. Accordingly, the Commission has already made a judgment with respect to the interference potential of unlicensed operations operating in conformance with the emissions limits of Part 15, and has sanctioned their operation despite the "protected" status of these frequencies under other sections of the Commission's rules or ITU provisions. A blanket prohibition preventing Access BPL from operating on these frequencies would unnecessarily single out Access BPL for more stringent operational restrictions than other unintentional radiators, which has not been shown to be necessary. Moreover, Section 15.205

only protects certain bands from fundamental emissions from intentional radiators and does not provide special protections from unintentional radiators such as BPL. Accordingly, Duke opposes the wholesale notching of the government frequencies identified by NTIA and suggests that more targeted interference prevention measures may be appropriate after further evaluation of the nature of the particular government operations on these frequencies.

NTIA also recommended that the FCC consider mandating geographic “coordination areas,” as well as designation of “excluded bands” and small geographic “exclusion zones.”<sup>51</sup> An area designated a “coordination area” would require a BPL operator to “pre-coordinate” frequencies prior to deployment, and “excluded bands” and “exclusion zones” would operate as a blanket prohibition on BPL operations in certain geographic areas. NTIA suggests that: (1) National Radio Quiet Zones may be areas requiring pre-coordination; (2) the 74.8-75.2 MHz band used for aircraft marker beacons be an excluded band; and (3) exclusion zones be defined around Coast Guard stations in the 2173-2190.5 kHz band. NTIA is continuing to study these issues, and does not specify any others areas, bands or zones that may qualify.<sup>52</sup> Without further details it is virtually impossible to evaluate whether or not these recommendations are reasonable or even feasible. The potential for a “snowball effect,” however, is clear and the cumulative effect of “coordination zones,” “excluded bands,” and “exclusion zones” could destroy the usefulness of a BPL system by creating large gaps in coverage such that it no longer makes economic or operational sense to deploy. Moreover, by this suggestion, NTIA is essentially seeking to impose obligations associated with licensed services on an unlicensed Part 15 technology – without the attending benefits licensed services enjoy. Duke believes this is inappropriate and unnecessary.

---

<sup>51</sup> Comments of NTIA at 7.

<sup>52</sup> Comments of NTIA at 8.

#### **IV. THE FCC'S SUGGESTED MEASUREMENT AND EQUIPMENT AUTHORIZATION PROCEDURES FOR ACCESS BPL SYSTEMS APPEAR ADEQUATE**

Duke believes that the measurement guidelines suggested by the FCC in its NPRM are reasonable and sufficient to provide an accurate assessment of BPL emissions. While NTIA has offered a number of elaborate procedures ostensibly to increase the likelihood of Part 15 emissions compliance, many of its recommendations are overly burdensome and unnecessary based on the data being reported from current BPL deployments. Moreover, NTIA's own testing procedures are not well documented in the Phase 1 report, and Duke has been unable to discern a manner in which the procedures and results could be duplicated to independently verify NTIA's conclusions.

In particular, Duke believes it sufficient to test emissions at three overhead and three underground representative installations to demonstrate a system's compliance with Part 15 limits as proposed in the NPRM. NTIA's Phase 1 Report however, has suggested that measurements should be taken with the BPL device located at the center of lines at least 600 meters in length that are devoid of discontinuities and has also suggested using standard test facilities and/or measuring at a variety of representative lines that account for impedance variations and other variables. These recommendations are burdensome and unnecessary to ensure Part 15 compliance. Moreover, even locating a 600 meter line with these characteristics may be impractical, if not impossible, for some utilities. Duke concurs, however, with the NTIA's comments in which it suggested that measurements may be taken at one meter height and 10 meters distance to simplify measurement procedures.

Similarly, Duke disagrees with NTIA's recommendation that Access BPL be measured sequentially across the entire band over which the BPL device may operate. This is clearly

excessive where a BPL operator may be utilizing a significant number of channels to operate, and does not provide a sufficient benefit in terms of increased compliance or decreased interference to counter the excessive burden such testing would impose upon the BPL operator. Duke believes that testing emissions of three or four frequencies should be sufficient to ensure compliance.

Duke also opposes NTIA's initial recommendation that measurements be taken at the height of the power line, as this poses significant safety risks for personnel required to access this space without a proportionate benefit in terms of increased accuracy of measurement. If it is not absolutely necessary to require personnel to work in proximity to the electrified portion of the utility's infrastructure and alternatives are available (such as on the ground measurements), then it should not be required. NTIA appears to have recognized this problem in its most recent Comments, and has revised its recommendation to permit measurement one meter above ground level and to utilize a correction factor for calculations. This is a more reasonable position, and Duke supports this revised recommendation. Duke reserves judgment, however, on whether a "correction factor" is warranted for ground-level measurements.

NTIA has also gone well beyond the Commission's recommendations with respect to equipment authorization and has suggested that *the BPL operator* be required to *certify* BPL system compliance. This function has always been, and should remain, the responsibility of the equipment vendor. If each BPL operator is required to certify its system, the additional requirements beyond equipment verification will constitute a substantial additional burden and cost upon the BPL operator. Furthermore, there is no other Part 15 service wherein the *user* is required to demonstrate equipment compliance in this manner. As NTIA itself has noted, BPL operators have strong economic incentive to prevent interference in the first instance, and to

build reliable networks that will not require ongoing interference mitigation activities or equipment shut down. In this regard, BPL operators have every incentive to work with BPL equipment manufacturers to ensure that equipment installed on utility infrastructure meets Part 15 requirements. Duke, therefore, believes that the FCC's suggestion that manufacturers conduct *in situ* testing of equipment for certification purposes is sufficient to ensure compliance.

Finally, Duke supports the innovative and efficient measurement suggestions by Southern LINC, Southern Telecom, Inc. and Southern Company Services, Inc. in their comments. For example, with respect to the methodology for testing emissions from underground transformers, they suggested a method that would use only half the measurements suggested in the Commission's proposed guidelines, enabling the BPL operator to identify the radial with the highest emission level and with approximately twice the accuracy.<sup>53</sup> Duke applauds this suggestion and supports it, as it is clearly a result of experience in the field.

## **V. A SEPARATE RULE PART FOR BPL OPERATIONS IS UNNECESSARY**

NTIA has suggested that the FCC should establish a separate rule part to address BPL operations.<sup>54</sup> Duke strongly disagrees with this suggestion. BPL is currently operating within the confines of Part 15 effectively and efficiently. This suggestion also assumes that the FCC will adopt many if not all of heavy-handed regulations proposed by NTIA, which Duke and others have demonstrated to be unnecessary. This recommendation is also in direct conflict with other statements by NTIA that clearly indicate that BPL operators have the incentive and capability to operate under existing rules without causing harmful interference, that BPL does not pose a systematic interference risk, and that only "refinements, clarifications and adaptations

---

<sup>53</sup> Comments of Southern at 21-22.

<sup>54</sup> Comments of NTIA at 24-25.

of Part 15 compliance measurement provisions are needed.”<sup>55</sup> BPL should not be treated any differently from other Part 15 unintentional radiators in this regard.

## **VI. PROVISION OF ACCESS BPL WILL NOT IMPEDE ELECTRIC RESTORATION**

Finally, Duke wishes to address the suggestion by DERA that the inclusion of Access BPL equipment to utility infrastructure will delay restoration of electric services and that “any complication which slows restoration brings continued human suffering, extended disruption of commerce, delayed community recovery and increased cost of property damage.” DERA suggests that, “[r]esources being finite, the utility company will have to choose between a faster electricity-only restoration or a slower electricity plus BPL restoration.”<sup>56</sup>

Duke disagrees with DERA’s assertions with respect to speed of restoration for two primary reasons. In the first instance, Duke takes its responsibilities to its electric customers extremely seriously, and it fully understands electricity’s role as a foundation of this Country’s modern society and economy. Duke would not permit any interference with the swift and efficient restoration of this service. Second, Duke believes that Access BPL will also provide an added monitoring tool to more quickly identify the location and extent of an outage, allowing a utility to more quickly and effectively deploy crews to specific areas in its network. That is, Access BPL will provide an additional and perhaps more economic and effective remote monitoring tool than has been available to utilities up until now. The use of this new tool will enable faster identification of network issues and faster restoration to affected customers. As

---

<sup>55</sup> Comments of NTIA at 15.

<sup>56</sup> Comments of Disaster Emergency Response Association, Inc. at 3 (“DERA”).

noted above, NTIA concurs with the assessment that BPL will aid in more efficient and faster electric restoration rather than hindering it as DERA suggests.

## **VII. CONCLUSION**

For the foregoing reasons, Duke Energy Corporation respectfully requests the Commission consider these Reply Comments and proceed in a manner consistent with the views expressed herein.

Respectfully submitted:

**DUKE ENERGY CORPORATION**

By:           /s/ Shirley S. Fujimoto          

Shirley S. Fujimoto  
Jeffrey L. Sheldon  
Erika E. Olsen  
McDERMOTT WILL & EMERY LLP  
600 13th Street, N.W.  
Washington, D.C. 20005-3096  
202.756.8000 (T)  
202.756.8087 (F)

Its Attorneys

Dated: June 22, 2004