Before the Commission
Federal Communications Communications Commission
Washington, DC 20554

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

Ashley Lane II WA1ICN
135 Old Farms Rd.
West Simsbury, CT 06092

August 20, 2003

Reply Comments of the IEEE Power Systems Relaying Committee, August 18, 2003
Reply Comments to Ameren Energy Communications, Inc., Ashley Lane II , July 23, 2003
Ameren Energy Communications, Inc., July 7, 2003
AMRAD, July 7, 2003

As both licensed radio amateur and short wave broadcast listener for 35 years, I believe BPL will have a detrimental impact on both these services. More than ever, the amateur service is necessary to provide an experience group of operators and technical talent in times of emergency. The shortwave broadcast service is on the verge of a technical breakthrough in digital communcations under the Digital Radio Mondial (DRM) standard. The shortwave service also provides a true balanced and fair source of information that is so vital in these turbulent times. As a communication engineer with 25 years experience, I am troubled by the apparent lack of technical soundness of filings by BPL supporters, including this one by the IEEE Power Systems Relaying Committee.

The IEEE Power Systems Relaying Committee make the assertion that there were no reports of interference to the amateur radio service at any of the 9 BPL trial locations. This conclusion was apparently reached after studying over 2000 comments filed by radio amateurs, the filings of the ARRL, BPL vendors and BPL trials. It states; "Field measurements by AMRAD and Ameren indicate that there was no detectable interference. There were no comments to the contrary." In fact, in my own reply comments to Ameren, I detailed several instances where Ameren made unsupported statements without reference to any hard field data, including their statements about their own field measurements. In fact, AMRAD reported signficant radiation on the 5, 9 and 11 Mhz shortwave(these are also aeronautical allocations) bands. This contradicts what IEEE Power Systems Relaying Committee have stated concerning the observed interference to licensed services from BPL during the trial.

The IEEE Power Systems Relaying Committee criticize radio amateur filers for basing their comments on the"potential for interference". They speculate that the use of field test results by the ARRL to demonstrate actual interference is not relevant to systems here in this country. In fact, Mr. Ed Hare of the ARRL has made subsequent measurements at several BPL test sites in the Northeast. These results will undoubtedly be detailed in further comments to the commission. Preliminary results can be seen on the following reference in the form of a video: http://216.167.96.120/BPL_Trial-web.mpg

In his own words Hare reported ," The interference found ranged from moderate to extremely strong," Hare said. The video shows the S meter of an HF transceiver holding steady in excess of S9 as the speaker emits a crackling din, which one observer described as sounding like a Geiger counter. Only the very strongest amateur signals broke through on 20 and 15 meters. Hare noted that the field strengths of the various

systems all were within FCC Part 15 limits for power line carrier (PLC) devices." Note: A signal level of S9 roughly corresponds to 54 decibels, or 6 dB per S unit, above the receiver noise floor in a typical 2.3 Khz bandpass. This is a very strong signal level and would very likely cause harmful interference. A more detailed report, by Mr. Joel Gilly who accompanied Mr. Hare during the Eammaus, PA investigation, is attached as an addendum to this reply comment.

The IEEE Power Systems Relaying Committee state that there are no Part 15 rule changes required. This is based strictly on a survey of comments submitted and not on any sound technical reasons. In fact, Mr Hare of ARRL stated that "field strengths of the various systems were all within Part 15 limits", yet the results he obtained showed servere interference in almost every instance. Ameren had stated some emissions exceeded the Part 15 limits but did not supply any data. Moreover, this is evidence that current Part 15 limits for power line communications should be reduced in the frequency range of 2-60 Mhz as they would apply to access BPL.

Respectfully Submitted
Ashley Lane II WA1ICN
August 20, 2003

Addendum to Reply Comments, Ashley Lane II, August 20, 2003

Report by Joel Gilly on BPL trial interference investigation

----- Original Message -----
From: joel gilly
Sent: Thursday, July 31, 2003 11:41 AM
Subject: BPL in Emmaus, PA and My Meeting with Ed Hare.
Gentlemen,
As I had mentioned previously, Ed Hare W1RFI and ARRL Lab Manager, was stopping over in the Lehigh Valley, PA on Wednesday as part of a three state sweep to monitor and collect data about BPL. I had the pleasure of meeting and spending time with Mr. Hare on Wednesday morning and had the opportunity to witness the effects BPL has on the Amateur HF bands.
On Tuesday night, my cell phone rang and when I answered, it was Mr. Hare. He was in the Valley, in Dorneyville, and wanted to touch base with me before our meeting the following morning. I was in West Chester at the time visiting my son, but Mr. Hare had mentioned that he had already swung through Emmaus that evening to make a preliminary assessment of the area.
On Wednesday morning, I met Mr. Hare at the Comfort Suites in Dorneyville. After the introductions, during which he presented me a copy of the "ARRL RFI Book", we discussed a rough agenda, then loaded into his well-used Subaru wagon replete with measuring equipment and a Buddi-pole portable compact dipole strapped to the roof rack, and headed off towards Emmaus.
The area in Emmaus that is being used by PPL for the BPL test is in the area of Pine St. just behind Emmaus High School and the East Penn School District Administrative building. We drove around to find a spot were we could setup to do some measurements. Mr. Hare had selected a spot the previous evening that he thought might be a good area to listen to and measure BPL's radio signature. We parked outside a residence and he began setting up his equipment.
Mr. Hare is using a very simple set-up in order to make an estimate of the field strength of signals that he is interested in. Strapped to the back seat of the Subaru was a wooden palette that contained a deep cycle battery, an inverter, a step RF attenuator, an ICOM PCR-1000 receiver, and his laptop

computer running custom data acquisition and processing software that Mr. Hare authored. As mentioned before, he used a Buddi-Pole compact loaded dipole mounted in a tripod strapped to the roof rack as the antenna. The measurement process involves using the sound card in the laptop PC as an audio voltmeter. It is first desirable to calibrate the system by first measuring the noise generated by the soundcard and the receiver without the antenna attached. The antenna is attached, and the attenuator is adjusted until the desired signal is audible just above the noise floor. The software is then used to sample the audio an that is processed to determine the RMS value based on the 9 kHz bandwidth that the FCC specifies for emissions from Part 15 devices in the HF band. A calculation is then performed against this value taking into account the parameters of the receiver system (radio, feed line, and antenna) to determine the dbuV/M fields strength of the signal. It is a simple and elegant system that Mr. Hare feels will produce the consistent and high quality data that will be needed to address the Amateur Radio communities about BPL to the FCC.

The real eye-opening part of the day was to listen to BPL in action on the HF bands. Mr. Hare disconnected the PCR-1000 and replaced it with a Kenwood TS-440 and we listened to several amateur bands. The type of BPL used in the Emmaus area (there are several "flavors" which Mr. Hare showed later) creates an impulse type noise on the bands. It sounds very much like a Geiger counter. The noise generated is very broad banded and can be heard continuously up-and-down the bands. It seemed to be strongest on 21 MHz and faded below 5 MHz and a little above 24 MHz, but this may have been due to our receive antenna not being optimized for those frequencies. BPL created a consistent S5 to S7 noise level on the bands. We listened for a while to 14.060 Mhz to hear what it would sound like on a popular frequency. Some faint CW stations in the background could be heard, but the opinion was that they would be "un-copyable" under the circumstances. We then got back in the car and began driving around the area listening to the radio and the noise. As we got farther away from the test area, the noise faded dramatically. A few blocks from our initial location, the noise level had dropped dramatically to S1 to S2, the typical "quiet band" conditions.

We then drove to an area that had BPL, but had it's electrical service delivered through underground feeds. In this case, we pulled up outside a residence that was owned by an engineer Mr. Hare had contacted about BPL and who had an Amateur Radio operator living near him. In this case, the noise generated was somewhat reduced, but still around the S5 level outside the residence. It was clear from this example, that if you were a ham living next door to this person, your operating conditions would be greatly compromised.

Later, we drove around again to attempt to find a "hot spot". In the areas that had BPL, it was interesting to note the changing profile of the noise as we roved around the area. Every time we passed a utility pole, the noise level peaked dramatically. We arrived at one area that exhibited a significant increase over neighboring areas. This area happened to be a pole that contained a BPL injection point. The noise present at this location was unprecedented. On the Kenwood, I noted a consistent S9 to S9+10 noise level. I tuned up to around 14.200 and found a 5 call area station in QSO with CY9A. The five was copyable, but CY9A was much weaker, and the noise would have rendered a QSO with the station unmanageable. Mr. Hare then disconnected the TS-440 and made some field strength measurements. His measurements revealed field strengths well in excess of FCC limits.

We then packed up and stopped for lunch. During lunch, we discussed the ARRL ARIA project and BPL. Mr. Hare explained that while the aim of the

ARIA project is much broader than BPL, it will be instrumental in gathering evidence to support the ARRL's position on BPL. He also touched on some ancillary issue regarding BPL. On of the interesting points regarded the limits on conducted signals versus radiated signals from BPL. He explained that some BPL systems are looking to use very high power levels and that these levels could exceed the design limits of other devices plugged into electrical outlets. Another point was that the FCC mandated field strength levels were specified under certain conditions. The vagaries of the various BPL schemes and implementations can provide "wiggle room" for BPL implementers pass the FCC requirements while still creating systems that will adversely affect amateur communications. As Mr. Hare pointed out, an overhead electrical line is just a large radiator of an arbitrary size. The radiation pattern developed by such a line could take the main lobe outside of the test measurement area, but still present a significant problem for amateur radio signals. Therefore, an integral part of the project is to gain "real world" experience about the affects of BPL on amateur communications. Still another question is how BPL will affect other users of the HF radio spectrum. Right now, the Amateur Radio community is the only organized response to BPL. Mr. Hare hopes that when the data he and others are gathering is made public, other organizations will come on-board and voice their concerns about BPL.

After lunch, we went out to the parking lot of the hotel and talked some more. Mr. Hare showed me a video tape he had made of his visit to Briar Cliff Manor, NY (near White Plains), another BPL test site. In that video, he is shown driving around with the TS-440 tuned to the 20m amateur frequencies. As he drives around the area, he tunes around the band. It can be heard clearly that on frequency after frequency, block after block, the band is filled with extremely loud "birdies". It almost made the Emmaus experience seem bearable. The frightening thing about what I saw was that the situation will only get worse. The interference that I heard in Emmaus is directly related to the amount of internet activity. As more and more users come on-line, the crackling of the "Geiger counter" will get more and more persistent. We saw BPL in the day at low usage levels. I can only imagine what it might be like at peak usage hours.

All-in-all, it was on of the most enlightening experiences I have ever had. I am extremely thankful to M. Hare for inviting me along. I hope that in the near future, I can organize my material for the purposes of making a presentation to the DLARC and possibly the LARC.

If you have any comments or questions, please do not hesitate to contact me.

Thank you for your time.

Regards,

Joel M. Gilly
AKrion, LLC.
(610) 530-3213