



## Greetings, Earthlings<sup>1</sup>

Greenbrier County has only two local radio stations, and the nearby mountains tend to interfere with reception. But over Christmas, Richmond's girlfriend, Mary, bought him a \$100 tuner and a \$10 monthly subscription to a service called XM Radio, allowing his Jeep Cherokee to draw 120 channels of crisp digital audio from two geostationary satellites hovering above the Earth. ... ¶ Satellite radio ... is an audiophile's nirvana.

Does BPL mean that any farmer can, say, purchase a \$100 tuner and a \$10 monthly subscription to an internet service giving him broadband access from his wall socket just as he did with XM radio? Not necessarily, because whereas once the satellite is up there, any pickup truck with the tuner and service can receive it, BPL won't be available unless somebody actually installs devices from some central location all along the power lines to his home, which may be just as expensive as some other methods. Sure, maybe BPL can help us reach our broadband goals, but so may other means, just as well or just as poorly.

But I don't think you are quite *that* optimistic about BPL but merely want to see if you can allow it a fair shake in the marketplace, and this is not the focus of my reply comments either. Instead, I want to look at "our national goals of a more robust electrical utility infrastructure" (FEMA), "BPL proponents also state that Access BPL technology will offer benefits to improve the provision of electric power service and advance homeland security" (FCC 04-29, ¶ 13); "Access BPL may allow electric utilities to improve the safety and efficiency of the electric power distribution system and also further our national homeland security by protecting this vital element of the U.S. critical infrastructure" (FCC 04-29, ¶ 30); "we believe that Access BPL has the potential to offer a number of significant benefits, such as ... 4) advancing homeland security" (FCC 04-29, ¶ 48); BPL technology could also improve the provision and management of electric power systems, homeland security, and protect vital elements of our Nation's critical infrastructure" (CHAIRMAN MICHAEL K. POWELL).

As best I can figure, FEMA's reported "national goal of a more robust electrical utility infrastructure" comes from Presidential Decision Directive-63 (PDD-63) of May 22, 1998:

No later than the year 2000, the U.S. shall have achieved an initial operating capability and not later than five years from the day the president signed Presidential Decision Directive 63 the U.S. shall have achieved and shall maintain the ability to protect our nation's critical infrastructures ...; the private sector to ensure the orderly functioning of the economy and the delivery of essential telecommunications, energy, financial and transportation services. ...

*New Federal Guidelines*<sup>2</sup>

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<sup>1</sup> "Greetings, Earthlings," by Brad Stone, **Technology**, *Newsweek*, Jan. 26, 2004, p. 55.

...  
Frequent assessments shall be made of our critical infrastructures' existing reliability, vulnerability, and threat environment because, as technology and the nature of the threats to our critical infrastructures will continue to change rapidly, so must our protective measures and responses be robustly adaptive. ...

Close cooperation and coordination with state and local governments and first responders is essential for a robust and flexible infrastructure protection program. All critical infrastructure protection plans and actions shall take into consideration the needs, activities and responsibilities of state and local governments and first responders.

As "All critical infrastructure protection plans and actions shall take into consideration the needs, activities and responsibilities of state and local governments and first responders," Access-BPL-as-an-electric-grid-protector would necessarily be required to do the same. Okay, let's look at some of those "first responders" the BPL companies should "take into consideration."

PUBLIC LAW 103-408 [Senate Joint Resolution 90]; October 22, 1994

#### ACHIEVEMENTS OF RADIO AMATEURS

Whereas Congress has expressed its determination in section 1 of the Communications Act of 1934 (47 U.S.C. 151) to promote safety of life and property through the use of radio communications;

Whereas Congress, in section 7 of the Communications Act of 1934 (47 U.S.C. 157) established a policy to encourage the provision of new technologies and services;

Whereas Congress, in section 3 of the Communications Act of 1934, defined radio stations to include amateur stations operated by persons interested in radio technique without pecuniary interest;

Whereas the Federal Communications Commission has created an effective regulatory framework through which the amateur radio service has been able to achieve the goals of the service;

Whereas these regulations<sup>3</sup>, set forth in part 97 of title 47 of the Code of Federal

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<sup>2</sup> WHITE PAPER: The Clinton Administration's Policy on Critical Infrastructure Protection: Presidential Decision Directive-63, May 22, 1998, as quoted in Anthony H. Cordesman, Cyber-threats, Information Warfare, and Critical Infrastructure Protection: Defending the U.S. Homeland Published in cooperation with the Center for Strategic and International Studies. Washington, D.C. (Westport: Praeger Pub., 2002) pp. 60-61.

<sup>3</sup>97.1. Basis and purpose. The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

- Regulations clarify and extend the purposes of the amateur radio service as a--
- (1) voluntary noncommercial communication service, particularly with respect to providing emergency communications;
  - (2) contributing service to the advancement of the telecommunications infrastructure;
  - (3) service which encourages improvement of an individual's technical and operating skills;
  - (4) service providing a national reservoir of trained operators, technicians and electronics experts; and
  - (5) service enhancing international good will;

Whereas Congress finds that members of the amateur radio service community has provided invaluable emergency communications services following such disasters as Hurricane Hugo, Andrew, and Iniki, the Mt. St. Helens eruption, the Loma Prieta earthquake, tornadoes, floods, wild fires, and industrial accidents in great number and variety across the Nation; and

Whereas Congress finds that the amateur radio service, has make a contribution to our Nation's communications by its crafting, in 1961, of the first Earth satellite licensed by the Federal Communications Commission, by its proof-of-concept for search and rescue satellites, by its continued exploration of the low Earth orbit in particular pointing the way to commercial use thereof in the 1990's by its pioneering of communications using reflections from meteor trails, a technique now used for certain government and commercial communications, and by its leading role in development of low-cost, practical data transmission by radio which increasingly is being put to extensive use in, for instance, the land mobile service;

Now, therefore be it Resolved by the Senate and House of Representatives of the United Sates of America in Congress assembled,

#### SECTION 1 FINDINGS AND DECLARATIONS OF CONGRESS.

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- (a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.
  - (b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
  - (c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.
  - (d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.
  - (e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

Congress finds and declares that--

- (1) radio amateurs are hereby commended for their contributions to technical progress in electronics, and for their emergency radio communications in times of disaster;
- (2) the Federal Communications Commission is urged to continue and enhance the development of the amateur radio service as a public benefit by adopting rules and regulations which encourage the use of new technologies within the amateur radio service; and
- (3) reasonable accommodation should be made for the effective operation of amateur radio from residences, private vehicles and public areas, and that regulation at all levels of government should facilitate and encourage amateur radio operation as a public benefit.

Approved October 22, 1994

One of the "first responders" as recognized by Congress is the humble amateur operator. It seems to me from PDD-63 & S.J. Res. 90, that if BPL companies are promoting themselves as important to maintaining homeland security with regards to our power grid infrastructure, then they must engage in "Close cooperation and coordination with" radio amateurs and others, "tak[ing] into consideration their needs, activities and responsibilities."

Okay, let's look at who in their comments represents the "needs, activities and responsibilities" of radio amateurs. That would be, among others, the national organization of radio amateurs, the A.R.R.L. Who are they? In the words of its founder:

#### **The Reason Why<sup>4</sup>**

I see those old times grappling with problems of ... rival amateur leagues. I see sinister commercial and government interests at work seeking to exterminate amateur radio. ... ¶ I ask how it all came about; that the ARRL should have succeeded and all its opponents failed. The answer is clear. It is because with our opponents there was always some kind of selfish motive to be served for someone, whereas in our ARRL we insisted from the beginning that no selfish motive for anybody or anything should ever prevail. Everything that ARRL undertakes must be 100% for the general good. That policy bred loyalty and confidence. With those two things an organization can prosper forever.

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<sup>4</sup> "The Reason Why," by Percy Maxim, President A.R.R.L., *QST*, September 1927

## Nine Decades<sup>5</sup>

This year we celebrate the 90th anniversary of the founding of the ARRL. Few other membership associations have survived for so long with their founders' vision still intact. That the ARRL has done so is testimony to the quality of that original vision as well as to the dedication of subsequent generations of members.

Now, the BPL companies must engage in "Close cooperation and coordination with" radio amateurs and others, "tak[ing] into consideration their needs, activities and responsibilities." But from what we've seen they have been ignoring the laws of physics, treating their injected signals as point sources and not as sent over the air by the power lines acting as the antennas they are. How can they take into consideration the radio operator's/listener's needs when they so disregard the laws of physics? Nor have they really considered the amateur's activity of monitoring weak distant signals with sensitive receivers and high gain antennas. Nor have they treated the amateur's national organization as responsible, but some had accused it of inflating interference worries out of a selfish motive to get donations. From what I have seen, BPL companies have by and large treated amateur and other radio interests as competition, not someone they are required to cooperate with. I believe that when the ARRL submits its studies and requirements, the BPL companies who want to bolster national security with their systems, and a fair and sensitive FCC, should respect their figures and requirements.

Now, I am going to be pessimistic here. I am going to figure that the amateurs' requirements of a quiet operating environment cannot be met with any reasonable level of injection that BPL companies want to use and employ on a grand scale, and furthermore that the FCC is somehow predisposed to allow BPL to continue anyway. But I am an amateur operator, have been for forty years. When our neighborhood got together with the local police and organized a Neighborhood Watch, our coordinator took an inventoried list of what resources various neighbors had to contribute. I listed my amateur radio station, that I have the ability to get communications out when other avenues are down. I don't have a big power source, but I have small battery operated equipment that does the job nicely with hams on the other end using sensitive receivers and high gain antennas, in the absence of strong interference. I would not want BPL to disrupt this capability. As "All critical infrastructure protection plans and actions shall take into consideration the needs, activities and responsibilities of state and local governments and first responders," BPL actions should consider my situation also, "as well as the FCC's regulations implementing BPL, be[ing] sensitive to this issue" (FEMA).

Your sensitivity seems to have been expressed in mandating a cooperation by the BPL companies in having them list their operating frequencies and type of modulation in a public record, include a capability of frequency agility to suppress or reduce offending carriers, and if all else fails to stop interference, to terminate operation. At least that is some kind of cooperation, though I don't see how their signals will stay on the listed frequencies when they are being sent through a medium with notoriously nonlinear junctions liable to produce harmonics and signal mixing. I have advocated an identifying

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<sup>5</sup> "It Seems to us," *QST*, January, 2004, p. 9.

signal, like Morse code imposed on each carrier sub-band , say, once an hour. But even with that, are we talking about the "*close cooperation and coordination*" mandated by PDD-63? Let's look at an example of close cooperation and coordination in another arena, say, between a pathologist and a surgeon.

I turned my back to the window and picked up the next specimen. We have a high-speed technique in the lab: the pathologists stand before waist-high benches and examine the biopsies. A microphone hangs from the ceiling before each of us, and it's controlled by a foot pedal. This leaves your hands free; whenever you have something to say, you step on the pedal, and speak into the mike, recording your comments on tape. The secretaries type it up later for the charts.<sup>6</sup>

I've been trying to stop smoking for the past week, and this specimen helped me: it was a white lump imbedded in a slice of lung. The pink tag attached gave the name of the patient; he was down in the OR now with his chest cut open. The surgeons were waiting for the path dx<sup>7</sup> before proceeding further with the operation. If this was a benign tumor, they'd simply remove one lobe of his lung. If it was malignant, they'd take the whole lung and all his lymph nodes.

I stepped on the floor pedal.

"Patient AO—four-five-two-three-three-six. Joseph Magnuson. The specimen is a section of right lung, upper lobe, measuring"—I took my foot off the pedal and measured it—"five centimeters by seven point five centimeters. The lung tissue is pale pink in color and crepitant.<sup>8</sup> The pleural surface is smooth and glistening, with no evidence of fibrous material or adhesions. There is some hemorrhage. Within the parenchyma is an irregular mass, white in color, measuring"—

I measured the lump—"approximately two centimeters in diameter. On cut surface, it appears whitish and hard. There is no apparent fibrous capsule, and there is some distortion of surrounding tissue structure. Gross impression . . . cancer of the lung, suggestive of malignancy, question mark metastatic. Period, signed, John Berry."

I cut a slice of the white lump and quick-froze it. There was only one way to be certain if the mass was benign or malignant, and that was to check it under the microscope. Quick-freezing the tissue allowed a thin section to be rapidly prepared. Normally, to make a microscope slide, you

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<sup>6</sup> The files containing the history of treatment of patients in the hospital. Called a "chart" because the bulk of the file consists of daily charts of temperature, blood pressure, pulse and respiration, the so-called "vital signs."

<sup>7</sup> Diagnosis.

<sup>8</sup> Crepitant means it is crackly and filled with air. This is normal.

had to dunk your stuff into six or seven baths; it took at least six hours, sometimes days. The surgeons couldn't wait.

When the tissue was frozen hard, I cranked out a section with the microtome, stained the slice, and took it to the microscope. I didn't even need to go to high dry: under the low-power objective, I could see the lacy network of lung tissue formed into delicate alveolar sacs for exchange of gas between blood and air. The white mass was something else again.

I stepped on the floor button.

"Micro examination, frozen section. The whitish mass appears composed of undifferentiated parenchyma cells which have invaded the normal surrounding tissue. The cells show many irregular, hyperchromatic nuclei and large numbers of mitoses. There are some multinucleate giant cells. There is no clearly defined capsule. Impression is primary malignant cancer of the lung. Note marked degree of anthracosis in surrounding tissue."

Anthracosis is accumulation of carbon particles in the lung. Once you gulp carbon down, either as cigarette smoke or city dirt, your body never gets rid of it. It just stays in your lungs.

The telephone rang. I knew it would be Scanlon down in the OR, wetting his pants because we hadn't gotten back to him in thirty seconds flat. Scanlon is like all surgeons. If he's not cutting, he's not happy. He hates to stand around and look at the big hole he's chopped in the guy while he waits for the path report. He never stops to think that after he takes a biopsy and drops it into a steel dish, an orderly has to bring it all the way from the surgical wing to the path labs before we can look at it. Scanlon also doesn't figure that there are eleven other operating rooms in the hospital, all going like hell between seven and eleven in the morning. We have four residents and pathologists at work during those hours, but biopsies get backed up. There's nothing we can do about it—unless they want to risk a misdiagnosis by us.

And they don't. They just want to bitch, like Conway. It gives them something to do. All surgeons have persecution complexes anyway. Ask the psychiatrists.

As I went to the phone, I stripped off one rubber glove. My hand was sweaty; I wiped it on the seat of my pants, then picked up the receiver. We are careful about the phone, but just to be safe it gets swabbed with alcohol and Formalin at the end of each day.

"Berry speaking."

"Berry, what's going on up there?"

After Conway, I felt like taking him on, but I didn't. I just said, "You've got a malignancy."

"I thought so," Scanlon said as if the whole path work-up had been a waste of time.

"Yeah," I said and hung up.

I wanted a cigarette badly. I'd only had one at breakfast, and I usually have two.<sup>9</sup>

Okay, let's look at the similarities between a pathologist and surgeon working closely together and the "close cooperation and coordination" between BPL companies and hams. First, the pathologist dictated for the patient's chart to be typed up and filed later. Similarly the BPL companies are to make their operating frequencies and modulation types available in a "publicly accessible database for Access BPL info" (FCC 04-29, ¶ 43). It takes a little bit of time to get the particulars into the system whenever changes are made, but it needs to be there. That's an excellent first step.

Secondly, the pathologist had a process for identifying what was happening in his sample by viewing it under a microscope. The amateur or other shortwave user will similarly need to be able to identify sources of interference. "Normally, to make a microscope slide, you had to dunk your stuff into six or seven baths; it took at least six hours, sometimes days. The surgeons couldn't wait." Similarly, to track down a source of interference takes hours, sometimes days. A first responder in an emergency cannot wait that long. The pathologist streamlined this identification process by quick-freezing the slide. We also should have a streamlined process for identifying interference. I suggest one consisting of sending a Morse code identification with the data, I suggest once an hour for each frequency band. My suggestion is to let the BPL companies put a unique seven digit identifying number along with the their initials or those of the power company, for every operating band, to be changed daily at midnight. It would establish credibility for the complaints.

Thirdly, when an amateur or a surgeon is wetting his pants to get back to taking care of business with the mess in front of him, he should be able to pick up a telephone, a landline, and get what is needed done, so he can go back to operating. My suggestion is that a ham, or other shortwave listener/operator, should be able to call a well publicized local BPL hotline and just enter the identification number to have their BPL operation cease from that device on that band, at least until midnight when the i.d. numbers change. It should have a fail-safe mechanism, that unless a called-in number is identified, and if valid, acted upon in ten minutes, the offending device(s) is altogether shut down. It should also have a deadman's switch, so that if the phone line goes down, the BPL doesn't become an uncontrolled interfering monster. The way it works is the BPL company itself operates, in a continuous loop, a device that calls its own hotline with a dummy number changed daily, and unless it is received by the hotline and resets the switch within ten minutes, the whole system is shut off.

You "seek comment on the appropriate period of time that we should allow for BPL systems to come into compliance with ... new requirements" (FCC 04-29, ¶ 42). Well, let's look at a timeline relative to FEMA's comment. Congress recognized radio amateurs as first responders and worthy of being cooperated with in Senate Joint Resolution 90 in 1994. Then three and a half years later on May 22, 1998, President Clinton in Presidential Decision Directive-63 (PDD-63) recognized the need for close cooperation and coordination with first responders (which would include hams). Their timeline was: "not later than five

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<sup>9</sup> Michael Crichton, A Case of Need (New York: Dutton, 1993) pp. 14-16.

years from the day the president signed Presidential Decision Directive 63 the U.S. shall have achieved and shall maintain the ability to protect our nation's critical infrastructures ...; the private sector to ensure the orderly functioning of the economy and the delivery of essential telecommunications, energy, financial and transportation services. ..." That would make it May 22, 2003, by which time we should have achieved such cooperation.

What happened then? Well, I see that on April 23, 2003, your NOI 03-104 was posted, and the end of April beginning of May, you started receiving replies. I'd say virtually all your 5200+ replies came in after that May 22 deadline, and they reflected not a spirit of cooperation between Access BPL companies and hams, but gross differences and outright hostilities. We hams did, however, receive cooperation from HomePlug who notched out amateur frequencies. What new rules you make for BPL companies to facilitate the close cooperation and coordination— —frequency agility, power reduction, and/or cessation of operation— —should take effect right when the rule itself is made, in order to live up to the sensitivity to the interference issue FEMA credits you with and the national goals of homeland security both you and the BPL companies espouse. I mean, you wouldn't want to take it upon yourself to reset the dates of these goals, would you?

Respectfully Submitted,  
Earl S. Gosnell III