Canadian Electricity Association
Association canadienne de l'électricité
www.canelect.ca

November 28, 2005

Mr. Robert W. McCaughern
Director General
Spectrum Engineering Branch
Industry Canada
300 Slater Street
Ottawa, Ontario K1A 0C8

Dear Mr. McCaughern:

SUBJECT: CEA Reply to the Industry Canada Consultation Paper on Broadband over Power Line (BPL) Communication Systems

1. The Canadian Electricity Association (CEA) is pleased to provide this submission on the Industry Canada (IC) Consultation Paper on Broadband over Power Line (BPL) Communication Systems. The CEA does support the deployment of BPL communication systems in Canada, when issues identified in this submission are resolved and where appropriate. The CEA submission is from the perspective of the utility electrical infrastructure.

2. In summary, the CEA submits that:

- There should be no CRTC regulation of BPL systems that are used for internal utility communications;
- Regulatory uncertainly limits and delays the deployment of BPL in Canada;

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- A power utility should not be compelled to allow access to its facilities, including BPL equipment, particularly if the BPL system is used for internal power utility applications, such as for distribution automation;
- Industry Canada should develop standards for Access BPL equipment and certify Access BPL equipment;
- Industry Canada should confirm that in the event of an electrical power outage, a reliability, security or emergency service event involving the distribution power utility system, these public safety needs (i.e. power needs) must take precedence over restoring commercial BPL communication services; and,
- Data coordination by Industry Canada is essential and IC should develop and maintain a database of BPL installations across Canada.

The Canadian Electricity Association

3. Founded in 1891, the Canadian Electricity Association (CEA) represents Canada's electricity industry in North America and its commitment to safe, reliable, competitively priced, and sustainable electricity for their customers. At the heart of the CEA is a core of corporate utility member companies across Canada. In addition, major electrical manufacturers and corporate consulting companies and several hundred other companies and individuals are members of the CEA.

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CEA General Comments

4. As stated in the CEA Reply Submission on the Federal Telecommunications Policy Review on September 15, 2005, many of the CEA's members are licensees of radio spectrum for use in their electricity operations. Canadian electric utilities use many different types of telecommunication systems such microwave radio, mobile radio systems, and in the future, possibly BPL communication systems, for protection and control of electrical utility critical infrastructure. These telecommunication systems also support operations and maintenance functions and as such are critical to the safe and reliable operation of their respective utilities. For example, many of the CEA's members control their electricity distribution and transmission systems wirelessly. These controls are necessary to maintain the stability of the electrical grids. Utilities also use these communication systems for the wireless transmission of data and control instructions to and from power facilities using a Supervisory Control and Data Acquisition (SCADA) network. The spectrum management for these systems is assigned and regulated by Industry Canada's Spectrum Engineering Branch and this is working well for Canadian power utilities.

5. In the IC Consultation Paper SMSE-005-05, it states that "*BPL operators may ultimately be subject to... the oversight of the Canadian Radio-television and Telecommunications Commission (CRTC)*." The regulatory framework, including the Act and Regulations which governs BPL installations and operators, is at present largely undefined. The consequent uncertainty does not support Industry Canada's stated

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intent "*to facilitate the deployment of BPL*." It would be good to settle the question of CRTC involvement. These policy and governance issues are currently under review by the federal Telecommunications Policy Review Panel (TPRP). Therefore, the CEA recommends retaining the current spectrum regulatory structure under Industry Canada rather than the CRTC.

6. Additionally, if the utility used BPL for internal uses, the utility would not want to be forced to make the wires available to others for commercial purposes.

7. Another challenge facing electric utilities who are considering the deployment of BPL communication systems is the coordination with multiple regulators responsible for different aspects of the electric utility business such as standards, rates and line routing. There will be a need for coordination of multiple regulators and streamlining the regulatory oversight over distribution wires which may be used for BPL communications systems internally and for competitive third-party BPL telecommunication services (e.g., provincial electric distribution utility safety system and work safety regulations).

8. The following Sections include the more specific CEA comments on the deployment and regulation of BPL by each Section of the IC Consultation Paper:

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CEA Comments on Section 2 on Background

9. In ***Section 2 on Background***, the first sentence should be clarified that "*in the past, power utilities have made limited use of alternating current (AC) power line*" rather than the existing statement which portrays it as a common practice. The more common "historical" practice would be the power line communication (PLC) systems which operated on 135 kHz for internal communications by power utilities as mentioned in Footnote 1.

10. Utilities have deployed power line communications (PLC) systems for internal use and may look to deploy BPL for the same type of use. The only regulatory change required should be related to interference issues (see Section 6) for these instances where BPL is deployed for internal use.

11. In the fourth paragraph of Section 2, it is not intuitively obvious how BPL will narrow the gap in the "digital divide". First, one must have a "pipe" of sufficient bandwidth to "feed" the rural community if a commercial undertaking wants to take advantage of the BPL bandwidth. In many, if not most rural communities, this big "pipe" does not exist. Secondly, as BPL is currently only a last mile technology, it would not be of use to those located on farms, ranches, villages, native lands, etc as the BPL range is not sufficient. If anything, the technology will only provide an additional delivery mechanism for competitive services in cities. How competitive this BPL service can be, will depend on costs and the local ISP markets. The Industry Canada SMSE-005-05

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Consultation Paper does not address the rural challenges for deployment and the issue that BPL, as a "last mile solution", is mainly an urban and suburban broadband communication service product due to its attenuation. In most commercial BPL business cases, one would want as many customers attached to each transformer as possible. Rural distribution systems typically have few customers (or a single customer) on each transformer.

12. In the fifth paragraph of Section 2, the IC Consultation Paper raised the point of potential CRTC regulatory oversight jurisdiction over BPL operators. Regulatory precedents related to electric utilities' private communication systems would dictate that the CRTC would not have jurisdiction over a utility's private BPL communications system. For example, if BPL is used for internal utility purposes within the same guidelines as applied to fibre optic and microwave systems, then precedence would indicate that the CRTC would not have jurisdiction. Likewise, if BPL is used for commercial purposes such as providing broadband communications services to the public through a BPL operator deemed a non-dominant carrier, then the utility infrastructure, including the BPL equipment, should not fall under CTRC jurisdiction. Additionally, if the utility used BPL for internal uses only, the utility would not want to be forced to make the wires or their BPL equipment available to others for commercial purposes.

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CEA Comments on Section 3 on General Description of BPL Systems

13. In ***Section 3 of the General Description of BPL Systems***, consideration should be given to all communication systems capable of data transmission including digital microwave radio systems. BPL is a "last mile solution" due to its signal attenuation and that is why fibre optic or telephone lines are used, rather than the reason given in the paper regarding avoiding high-voltage transmission power lines. It is recommended that the second sentence in Section 3 be revised as follows:

> "*BPL systems are comprised of different components which function together to deliver broadband services to customers. Briefly, data is carried* ***to injection point (i.e. at substations)*** *by fibre optic,* ***microwave radio system****, or telephone* ***lease*** *lines.* ~~*to avoid high voltage (HV - greater than 69 kV) transmission power lines.*~~"

14. As well, the IC paper seems to be focused on BPL's potential to deliver high-speed Internet connectivity to the public. However, since the industry consensus is now forming around the opinion that high-speed Internet connectivity may play a secondary use for BPL, this consultation paper needs to reflect this. The discussion of BPL's potential applications should be expanded to include a definition of and distinction between:

- Internal applications used by the power utility to control, maintain and administer its distribution power network such as Supervisory Control and Data Acquisition

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(SCADA), remote outage detection and diagnostics, automatic meter reading (AMR), demand-side management (DSM), etc.; and,

- External services (commercial retail applications) offered to the public such as high-speed Internet.

Although this issue is addressed to a lesser extent in Section 4.1 on page 6, the above clarification should be included in Section 3 on General Description of BPL Systems.

15. In preparing for a small trial BPL deployment, it was noted that there would be changes to the electrical circuitry when a utility does switching for load management or to restore power to customers after an outage. Once the BPL communications system is fully deployed on a distribution system, circuitry changes are generally not an issue. The BPL system can recognize alternative communication routes to a customer as long as there is electrical connectivity to that customer. However, until the BPL system is fully deployed, some electrical circuitry changes may leave existing external BPL customers without service.

CEA Comments on Section 3.2.1 on Access Broadband over Power Line (BPL)

16. In the second paragraph of Section 3.2.1, editorial changes are recommended to help clarify the description related "*Extractors provide the interface…*" so that it would provide a technical correction as follows: "……..*extractors are required to retransmit the signal*". It is also recommended that this paragraph be correct and that these details be moved to *Sections 3.2.3 on End-to-End Access BPL* and *3.2.4 on Hybrid Access BPL*.

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17. In the fifth paragraph of Section 3.2.1 on the proposed definition of "*Access BPL*", we note that the intent is to be consistent with the US Federal Communications Commission (FCC) definitions. While BPL may be "*an unintentional radiator*", that is not its purpose. So including that phrase does not help a reader understand "*Access BPL*". As well, the proposed definition could be taken to mean that the communication is unidirectional. It is recommended that this definition be revised to remove the term "*unintentional radiator*" and to add the following to the sentence: "*A "**bidirectional**" carrier current system……..*".

18. With regards to specifically naming a frequency range "between 1.705 MHz and 80 MHz" in the definition of "Access BPL", it was felt that this would be too restrictive. There are BPL technologies available which use much higher frequencies such as in the GHz range. The higher frequency "Access BPL" may be advantageous because it would operate in the less crowded frequency ranges and would be able to provide higher communication speeds.

19. The proposed two classes of Access BPL systems in Section 3.2.3 on End-to-End Access BPL and in Section 3.2.4 on Hybrid Access BPL are adequate. However, it is recommended that in the last sentence of the first paragraph under Section 3.2.3, the reference to "LV transformer" be changed to "distribution transformer" so that it agrees with the labeling in "Figure 1: Overview of End-to-End Access BPL System".

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Distribution transformers are viewed as part of the medium voltage (MV) power lines rather than the low-voltage power lines.

CEA Comments on Section 3.3 on In-House BPL

20. It is recommended to use the term "***In-Building BPL***" or "***On-Site BPL***" since either of these terms are more comprehensive and appropriate than the proposed term "*In-House BPL*" because it would cover both residential and commercial buildings such as hotels, hospitals, apartment buildings, and industrial buildings. "*In-House BPL*" taken in the physical sense, would not generally be understood to include an industrial complex.

Comments on Section 5 on Current Status of BPL

21. It is recommended that the last sentence be revised in ***Section 5.1 on International Activities*** to highlight the recent international trials and partnerships on BPL in China, Switzerland and Australia, which may reflect a greater willingness for international trials.

22. In the second paragraph of ***Section 5.2 on United States Activities***, related to technical and operational requirements for Access BPL, there is no discussion about electrical distribution technical and operational requirements.

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23. It is recommended that IC work with CEA and its members to ensure the inclusion of information regarding the electrical distribution system requirements.

CEA Comments on Section 6.1 on Equipment Standard and Approval Process

24. The proposed approach under ***Section 6.1 on developing a new Interference Causing Equipment Standard (ICES)*** and implementing a certification process for Access BPL equipment is conceptually acceptable. However, it is important that the BPL equipment approval process not be unduly slow. Before the IC certification approach can be implemented, the following should be established:

a) Specifics of the IC Access BPL Interference Causing Equipment Standard (ICES);

b) Standard testing procedures so that manufacturers, utilities and Industry Canada have a common understanding of how to conduct tests and interpret results;

c) Responsibility for testing and submitting the test report (manufacturer, utility, third-party); and,

d) Performance targets for the Department's review of Access BPL equipment which has been submitted for certification.

CEA Comments on Section 6.2 on Prospective Technical Requirements

25. Under ***Section 6.2 (a) on Emission Limits***, the emission value should be relaxed where there are no interference issues, so fewer repeaters can be utilized. A database of all authorized users, which was mentioned in Section 4.2, should be

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available on the Industry Canada website so a well defined design can be proposed to not only avoid any possible interference but also relax to the emission limits prescribed by U.S. Federal Communications Commission (FCC) Amendment of Part 15.

26. Apart from the above condition, the CEA supports the harmonization of emission limits with those in the U.S., especially in terms of facilitating BPL equipment availability. It is important for IC to monitor the FCC proceedings for further changes in case the FCC emissions requirements become unnecessarily stringent. IC may have the ability to provide helpful input on these FCC proceedings.

27. The proposed BPL technical requirements for equipment should also be evaluated for compliance to CSA, IEEE, and IEC standards on power quality and electromagnetic compatibility (EMC).

28. Under ***Section 6.2 (b) on Interference Mitigation Requirements for Access BPL Systems***, the proposed adaptive interference mitigation techniques should be incorporated in Access BPL equipment. In particular, notch filtering and remote power reduction should be employed. Furthermore, remote filter modification might well be mandated as well. No other additional or alternative interference mitigation techniques are suggested at this time.

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CEA Comments on Section 6.3 on Operational Requirements

29. Under ***Section 6.3 (a) on Prohibited Frequency Bands***, although it is appropriate to restrict Access BPL's use in specific frequencies which are employed for aeronautical services, public safety and national defense, it is recommended that the prohibited frequency bands should not be applied generally across the board but rather to be applied selectively in geographical areas. No additional approaches for protecting essential safety-related radiocommunication services are required.

30. The electric utility communication systems ensure the safe, reliable provision of electricity, and compromising such systems could adversely affect public safety over large areas. Therefore, Access BPL might well be restricted from using the 7 MHz "electric utility telecontrol band", at least in specific regions where licensed systems are employed, should testing reveal that such utility systems could be adversely affected. As well, adjoining electric utilities may need to coordinate their frequencies so as not to impact each other.

31. Under Section 6.3 (b) on Geographical Frequency Restrictions and Coordination Requirements, Access BPL systems should be allowed to operate in any geographic location providing that Access BPL provider coordinates with any authorized users which may be affected by the Access BPL system. Notwithstanding the fact that certain businesses and organizations may have valid reasons for seeking exclusion zones, there are no specific locations known to date where Access BPL systems should be

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prohibited outright. Avoiding specific frequencies should address concerns over potential interference at the majority of locations. Coordination between BPL operators and authorized radio frequency users is best facilitated by:

1) Proscribing well-defined technical requirements for BPL and radio systems; and,
2) Establishing a clear process for conflict resolution, including stages for bilateral discussion and cooperation, with mediation if conflict cannot be resolved by the interested parties themselves. The needs of public safety service organizations should have paramount importance.

32. If the term "*specific authorized users*" refers to licensed spectrum users, then it is recommended that IC facilitate coordination between users as it does in the mobile radio and microwave bands. IC can help identify the sources of interference.

33. Under ***Section 6.3 (c) on Interference Resolution***, the CEA support the IC proposal for BPL operators to address potential interference complaints. It is recommended that a written report with supporting facts by the complainant be submitted to BPL service providers for further analysis and resolution.

34. In terms of establishing a publicly accessible database that would assist in the timely resolution of interference complaints, the following information should be included in the database:

- Name and contact information of company/power utility using BPL;

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- Name and contact information of complainant;
- Contact information, including after hours emergency contact in case of interference with mission-critical users such as public safety organizations or aeronautical navigation licensees;
- Type of BPL equipment deployed;
- Territory where the BPL equipment/systems are deployed;
- Frequency range(s) used; and,
- Status of complaint (under discussion vs. in mediation vs. resolved).

35. Any new installation should be entered into the database at least 30 days prior to construction of an Access BPL line. Interested groups or persons can register to have automatic notifications of any installations in their area. Also the BPL provider should mail out notifications 30 days prior to the installation to any persons or companies in the area of the BPL installation. If these stakeholders have any concerns with the frequencies the BPL equipment/system may use, they can voice their concerns with the BPL provider so the issues can be resolved.

36. In terms of how the information can be assessed and who should have access to the database, it is recommended that the database be made publicly available by the Internet for consultation and BPL operators should be able to register their use of BPL via the Internet as well. The database should also be readily available through a call-

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centre, since BPL may be used heavily in rural areas, where Internet access is still very uncommon.

37. Industry Canada should develop, maintain and manage the database since it will be a key tool in ensuring compliance with the regulations established to govern BPL deployment in a manner that minimizes frequency interference with other users of the 2 - 80 MHz frequency range.

38. There should be consideration regarding when and where a publicly accessible database may not be desirable due to security issues and the nature of the electric utility business.

Conclusion

39. Although CEA and its members are supportive of the deployment of new communication technologies such as BPL, the following issues need to be addressed before greater deployment of BPL communication systems in Canada by electric utilities occurs:

- Clarification of federal regulatory requirements and oversight for BPL communications for internal utility applications as well as for external (commercial retail applications) offered to the public such as high-speed Internet;
- Finalization of Amendments to the Telecommunications Act and Regulations under the present federal Telecommunications Policy Review (FTPR) process which would

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maintain the current Spectrum regulatory structure under Industry Canada's Spectrum Engineering Branch rather than under the CRTC;

- Development of BPL equipment/system products which are interoperable, reliable, cost-effective, safe, and harmonized with applicable North American and international standards; and which can be certified for compliance to the ICES standards issued by Industry Canada; and,
- Development and maintenance of a BPL installation database by Industry Canada.

40. If you have further questions, please do not hesitate to contact Helen Sam, CEA at 514-939-2709 or via email at: sam@canelect.ca.

Yours sincerely,

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