



David M. Aaron

May 23, 2013

BY EMAIL

BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Attention: Erica Hamilton, Commission Secretary

Dear Sirs / Mesdames:

**Re: FortisBC Inc. Application for a Certificate of Public Convenience and Necessity for the Advanced Metering Infrastructure Project
~ Project No.3698682**

The following submissions on behalf of the CSTS are filed in accordance with the Commission's Order G-80-13 dated May 15, 2013.

On April 19, 2013, IARC published a monograph that explains why the W.H.O. classified mobile phone and other sources of radiofrequency radiation as "possibly carcinogenic" for humans.

A. Application

The relevance of the IARC study is not limited to mobile phone radiation. The IARC study is pertinent to question of whether cancer is caused by RF radiation in general. That would include the emissions from the proposed Fortis AMI meters. As set out in the monograph at page 33:

Although the preparation of this *Monograph* had been scheduled so as to include the results of the large international case-control study INTERPHONE on mobile-phone use (conducted in 2000–2004; published in 2010), it should be emphasized that the evaluations in this volume address the general question of whether RF radiation causes cancer in humans or in experimental animals: it does not specifically or exclusively consider mobile

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phones, but rather the type of radiation emitted by mobile phones and various other sources. Furthermore, this *Monograph* is focused on the potential for an increased risk of cancer among those exposed to RF radiation, but does not provide a quantitative assessment of any cancer risk, nor does it discuss or evaluate any other potential health effects of RF radiation.

The application of the IARC study to smart meters is affirmed at page 409 of the monograph:

The Working Group agreed to consider three categories of human exposure to RF radiation: (a) environmental sources such as mobile-phone base stations, broadcast antennae, smart meters, and medical applications; (b) occupational sources such as high-frequency dielectric and induction heaters, and high-power pulsed radars; and (c) the use of personal devices such as mobile phones, cordless phones, Bluetooth devices, and amateur radios.

[Emphasis added]

B. Glioma

With respect to the risk of glioma in mobile phone users, the monograph states at page 412:

The Working Group concluded that these findings could not be dismissed as reflecting bias alone, and that a causal interpretation was possible.

C. Acoustic neuroma

With regard to acoustic neuroma the following statement is made on the same page:

The Working Group considered the same methodological concerns as for glioma, but concluded that bias was not sufficient to explain the positive findings, particularly those of the study from Sweden.

D. Conclusions on cancer

In the Evaluation section on page 421, while stating that there is limited evidence for human carcinogenicity, the monograph states:

Positive associations have been observed between exposure to radiofrequency radiation from wireless phones and glioma and acoustic neuroma.

The conclusion is set out at page 421 as follows:

Radiofrequency electromagnetic fields are possibly carcinogenic to humans (Group 2B).

E. Vulnerability of children

The monograph at page 34 indicates that children are particularly vulnerable:

In children using mobile phones, the average deposition of RF energy may be two times higher in the brain and up to ten times higher in the bone marrow of the skull than in adult users.

F. Chronic exposure compensates for low power density

At page 386, the IARC Working Group concluded:

Exposure of *E. coli* and rat thymocytes to RF radiation at power densities 0.01–1 mW/cm² resulted in significant changes in chromatin conformational state, if exposure was performed at resonance frequencies for 5–10 minutes (Belyaev *et al.*, 1992a, b; Belyaev & Kravchenko, 1994). Decreases in these effects caused by lowering the power density by an order of magnitude could be compensated for by a several-fold increase in the duration of exposure. At exposures longer than 1 hour, the same effect could be observed even at the lowest power density.

[Emphasis added]

We submit that the above-referenced passage from the monograph supports our concern with respect to duration of exposure. In particular, this excerpt indicates that the mitigating effect of low power density is of no consolation where the

duration of exposure is high. On this point, we emphasize that Safety Code 6 does not regulate duration of exposure and, as such, does not concern itself with the very mischief at hand.

G. Cell damage

At pages 310 – 311, the monograph refers to data which suggest that RF exposure affects the ability of cells to repair themselves. We particularly note the statement at page 311 that “the effect of RF radiation was produced via a non-thermal pathway”.

[Emphasis added]

H. Non-thermal effects

On non-thermal effects, the monograph states at page 365:

Studies on mobile-phone use by volunteers have investigated the effects of RF radiation from mobile phones at levels generally assumed to be too low to induce significant heating. In principle, such “athermal” effects on the cardiovascular centres of the brainstem, which regulate the heart and circulation via outflow in the sympathetic and parasympathetic systems, are possible.

The monograph further states at page 409:

Tissue heating is the most firmly established mechanism for effects of RF radiation in biological systems. Although it has been argued that RF radiation cannot induce physiological effects at exposure intensities that do not cause a detectable increase in tissue temperature, except for reactions mediated by free radical pairs, it is likely that not all mechanisms of interaction between weak RF fields, with the various signal modulations used in wireless communications, and biological structures have yet been discovered or fully characterized.

Further at page 409, the monograph recognizes that ICNIRP guidelines are thermally based:

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the Institute of Electrical and Electronics Engineers (IEEE) have developed guidelines for maximum human exposures to RF fields. These guidelines are designed to protect against adverse effects due to whole-body or partial body heating as a result of energy absorption above 100 kHz.

I. Mechanism behind carcinogenesis

At page 384, the Working Group concluded that there was “moderate evidence” that RF radiation alters ODC activity, which is described at page 383 in the following terms:

Ornithine decarboxylase (ODC) is the first and rate-limiting enzyme in the polyamine biosynthesis pathway. Because polyamines are involved in the control of cell replication and differentiation, a change in cellular ODC activity is relevant to carcinogenesis. Tumour promoters such as TPA induce ODC activity, and a high level of ODC activity has been found in several premalignant conditions.

[Emphasis added]

J. Modulation

At page 385, the Working Group concluded:

There is evidence that modulation of the carrier waves of RF radiation can cause changes in biological processes that do not occur when the waves are not modulated. Examples of biological reactions to modulated RF radiation were clearly shown by Bawin *et al.* (1975), replicated by Blackman *et al.* (1979). For more examples and details, see the reviews by Blackman (2009) and Juutilainen *et al.* (2011).

[Emphasis added]

On this point, we note again that Safety Code 6 does not address “modulation of the carrier waves” as a factor that may increase bio-effects. Not only does Safety Code 6 overlook the factor of modulation, but the Exponent Report is also devoid of any consideration of this factor.

K. Power density windows

Safety Code 6 is based on the assumption that more is worse; that bio-effects decrease with a decrease in power density. This assumption is inconsistent with the notion of power density windows, as referenced at page 386 of the monograph:

Effects of RF radiation are dependent on the frequency of the carrier wave. Differences in the response of human cells to GSM-type RF radiation were observed at frequency channels of 905 and 915 MHz. The effects of resonance-type microwave radiation were observed within multiple frequency windows at intensity values well below those at which any thermal effects had been observed.

[Emphasis added]

Not only does Safety Code 6 overlook the factor of power density windows, but the Exponent Report is also devoid of any consideration of this factor.

L. Weight

No evidence exists with respect to the deliberations or reasoning of Health Canada, IEEE and ICNIRP in dismissing the body of scientific evidence that affirms the existence of adverse effects at non-thermal exposure levels. In that regard, the findings of those bodies are incapable of scrutiny.

In contrast, the IARC monograph carries weight in that it sets out a detailed, transparent analysis in support of its conclusion of risk - a conclusion which is consistent with the evidence provided by CSTS witnesses in these proceedings.

M. Class 2B classification

FortisBC's argues that coffee is among the various substances listed by IARC as a class 2B possible human carcinogen however it is silent about the fact that DDT and lead are also included in the classification. FortisBC compares coffee to RF emissions in an attempt to characterize the latter as benign, which it is not. If RF

emissions were benign, they would be under IARC classification 4.

In further reply to the point on coffee, we say that there is no evidence before the Commission as to the health risk of coffee consumption and, as a result, the comparison is a hollow one.

Furthermore, we question: what civil liberties implications would result from a regulatory decision that forces all persons, including babies, to consume coffee? What if the suspected carcinogen was to be imposed on a continuous basis: all day, all night, every day, for an indefinite period of time? Even where the scientifically discernible risk of adverse effects is only a possibility, surely people -in their own homes- have the right to choose.

All of which is respectfully submitted.

Yours truly,



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cc: parties & clients