BRITISH COLUMBIA UTILITIES COMMISSION

IN THE MATTER OF the Utilities Commission Act, R.S.B.C. 1996, Chapter 473
and
FortisBC Inc. Application for a Certificate of Public Convenience and Necessity
for the Advanced Metering Infrastructure Project

FINAL SUBMISSIONS OF CITIZENS FOR SAFE TECHNOLOGY SOCIETY

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1. IARC

A. A factor in cancer

Dr. Bailey admits[1] that RF emissions, such as those from the proposed AMI meters, are a factor in cancer.

This is reflective of the fact that, in 2011, the World Health Organization's International Agency for Research on Cancer (IARC) determined that radiofrequencies used in cell phone communication are a Type 2B (possible) human carcinogen.

B. Same frequencies

These are the same frequencies that are at issue in the present case, as they are the same frequencies that were at issue in the *Chateauguay v. Rogers* case, as per McNamee's testimony at page 76:

> Q. You refer in your testimony to the World Health Organization, that they published a communication in 2011, on May 2011, regarding the Class 2B cancerogen [sic]. Do I understand that the radiofrequency that they are talking about in that document are the exact same frequencies that are used for base stations that we're dealing with?
>
> A. Yes.

The Exponent authors testified[2] that the Interphone study would have dealt with exposure to cell phones (in the nature of GSM phones) that have the same modulation characteristics as AMI meters. In the Interphone study, there was a significant correlation between RF exposure and brain cancer in the group of heaviest usage time. At Hearing Transcript 4, page 664, lines 11 - 14, Dr. Bailey stated:

> And all Dr. Shkolnikov was saying is that the most prevalent type of mobile phone in Europe, for example, is the GSM, which incorporates these modulation characteristics like the Itron meter.

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[1] Hearing Transcript 5, page 906 (from line 25) to 908 line 18

[2] Hearing Transcript 4, pages 654 - 657

C. The explanation

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. CSTS has applied for leave to introduce this document into evidence.

The new monograph states that children are particularly vulnerable as “the average exposure from use of the same mobile phone is higher by a factor of 2 in a child’s brain and higher by a factor of 10 in the bone marrow of the skull.”

The basis for IARC designation of RF as a Class 2B carcinogen is summed up in two sentences of the monograph:

> • "Positive associations have been observed between exposure to radiofrequency radiation from wireless phones and glioma and acoustic neuroma" (p.421).
>
> • “Radiofrequency electromagnetic fields are possibly carcinogenic to humans (Group 2B).” (p. 421)

D. Corroboration

Those associations with brain tumours and tumours of the acoustic nerve were also observed by the Interphone study group and Hardell’s team in Sweden.

In cross-examination, Dr. Carpenter gave his opinion about the Hardel studies:

> MR. MACINTOSH: Q: ...And that’s where I read him as dealing with -- as dealing with Hardell. And is that what you were referencing when you said that it’s inappropriate and questionably ethical how he’s done that?
>
> DR. CARPENTER: A: Yes, that certainly is. I think the statement that is most telling is -- it’s in the last few words on the previous page: “However, limitations in the analysis have been raised…” and that’s a dismissive statement which is not justified. The limits that have been raised have been raised by individuals that deny that there can be non-thermal effects. The Hardell papers in addition to theInterphone are the basis for the IARC identification of radio frequency radiation as being possibly carcinogenic to humans. And the RF panel gave equal weight to Hardell as it did to Interphone in making that judgment.
>
> So this dismissiveness of the Hardell study, who are in my judgment some of the best done studies on the issue, they certainly were better done than the Interphone study, which was full of all kinds of problems, but in fact the Hardell studies and the

> Interphone studies lead to the same conclusion. That being that of long latency, extensive use of cell phone increases risk of glioma on the side of the head the cell phone is regularly used.

2. IARC Distinguished from weight of evidence approach

The approach taken by IARC is different from the approach taken by Health Canada and ICNIRP.

First, IARC has published a detailed monograph setting out the reasons for its classification of RF as a class 2B possible human carcinogen. In contrast, Health Canada and ICNIRP do not publish any description or explanation as to how they interpreted the scientific data.

A further difference between IARC and Health Canada / ICNIRP is described in the testimony of James MacNamee in his evidence in the *Chateauguay v. Rogers* case at page 13:

> This classification is meant to reflect there is some evidence, from human studies and from animal studies, that could be used to formulate a decision of carcinogenicity. But it's also an acknowledgement that there's a much greater... or there's a large number of other evidence that doesn't support that. So, essentially, Class 2B is a category for additional study. It means there is evidence, it doesn't necessarily mean the evidence is strong or causal.

3. "This could be a risk"

McNamee further testified, at page 14:

> This didn't change our position of the literature. This is just another formalized approach to classify agents as to their likelihood of carcinogenicity. <u>This group takes more of a strength of evidence, is there evidence that this could be a risk as opposed to a weight of evidence approach.</u>
>
> <u>[Emphasis added]</u>

In these proceedings, the Commission's approach to the evaluation of health and safety risks should occur along the lines of the approach taken by IARC (i.e. "is there evidence that this could be a risk"?) rather than along the lines of the approach taken by Health Canada and ICNIRP.

4. Why Canada does not regulate in light of evidence that "this could be a risk"

Canada's failure to regulate in light of evidence that there "could be a risk" is addressed in part by Dr. Sears' comments at pages 20 and 9 of her report:

In contrast with some jurisdictions like Russia, where the goal is to avoid all biological effects with the attitude that perturbation of the organism with anthropogenic radiation should simply be avoided,[26] in Canada and like-minded jurisdictions such as the US not only must a biological effect be proven to exist, it must also be proven to be substantially detrimental. This was captured by the 1999 Royal Society Report[3] quote noted in others' submissions:

> "Biological effects can occur at non-thermal exposure levels. However, since there is insufficient evidence to conclude that such biological effects are associated with adverse health effects, the potential significance of biological effects observed at non-thermal exposure levels requires clarification before non-thermal effects are considered for inclusion in Safety Code 6." (p. 4)[82]

The position that effects must be proven to a very high standard before action is taken is characterized as devices being "innocent until proven guilty" and is counter to the Precautionary Principle to which Health Canada claims to ascribe.[83] [page 20]

...

"No consistent evidence" versus "no evidence of harm" versus "evidence of no harm": Given all the potential biases and limitations of individual research studies, it would be astounding to have totally consistent research results regarding effects of low levels of radiofrequency radiation. It is invisible, and difficult to detect, characterize and compare exposures at different frequencies. Radiation may be continuous or pulsed; constant or modulated; near field or far field. Scientists are only starting to discover and validate objective measures of effects of non-thermal doses. We are hopefully beginning to listen to and act upon findings clearly showing potential harm, and there are many such studies. The Bioinitiative2012 report[7] is the latest in dozens of research compilations and appeals from scientists and physicians to act on risks posed by rapid escalation of radiofrequency radiation.

There is an unfortunate history of Canada taking many decades to act upon important public health hazards. Sixty years passed between Europe and Canada acting on lead in paint, to the detriment of generations of children. Tobacco is an ongoing issue, we are very slow to act on mercury, and we are impeding global actions on climate change. [page 9]

The "innocent until proven guilty" approach to health protection was demonstrated by James MacNamee in his evidence in the *Chateauguay v. Rogers* case at page 42:

> We will provide protection against any established health effect, whether it is thermal or non-thermal. So, to say it is only a thermal guideline is technically incorrect.

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[3] Exhibit C9-17

> Where it is somewhat correct is that in the frequency range used by wireless devices, the effect we're trying to protect against is a thermal effect because that is the effect which has been established, the only effect which has been established.
>
> [emphasis added]

The "innocent until proven guilty" approach to health protection was also demonstrated by Dr. Bailey in cross examination[4]:

> MR. ANDREWS: Q: Of your report. And the statement is that this category that is possible carcinogen is used when studies report an association but when chance, bias, or confounding cannot be ruled out with confidence.
>
> DR. BAILEY: A: That's correct.
>
> MR. ANDREWS: Q: So, the Health Canada threshold for taking action is -- they use the phrase "scientifically established" quite frequently. And is that a fair sort of high-level summary?
>
> DR. BAILEY: A: That descriptor is used frequently.
>
> MR. ANDREWS: Q: And so, my question is why is it not sufficient to take action when an agent, like in this case RF, meets the category of possible carcinogen? That is, studies report an association but chance, bias, or confounding cannot be ruled out with confidence. Why is that not enough to take action? Why does Health Canada, or in your view, ought Health Canada, not take action on the basis of this possible carcinogen category, and instead await scientifically established evidence?
>
> DR. BAILEY: A: I think it's clear from the IR documents, and our discussion of the IARC report, that all that the panel identified was limited evidence. That is, in the IRAC classification scheme, essentially all it takes to be entered into the 2B category is reports of statistical association of an exposure with cancer. And that alone, a correlation, as it were, is sufficient to make that exposure placed into the 2B category. And as we discussed, the chance, bias, and confounding could explain partially or all of that association between radio frequency fields and in this case primarily brain cancer. So that is not sufficient to justify a established causal relationship.
> MR. ANDREWS: Q: My question isn't not whether it's sufficient to establish a causal -- or scientifically establish a causal relationship, but why is it insufficient to take action to -- in the form of promulgating a guideline or a standard?

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[4] Hearing Transcript 5, page 552 (from line 21) to 555 line 7

DR. BAILEY: A: Because we don't want to be setting standards that in fact result in no protection of the public health. And if you haven't determined that there is a causal relationship, then an action taken to address that exposure may have no public health benefit at all.

MR. ANDREWS: Q: Why not err on the side of caution? I don't mean that as a rhetorical question.

DR. BAILEY: A: I understand, sir. I think scientific agencies, particularly dealing with health, are extraordinarily cautious, and exercise prudency in their assessments. And have at various times set into place in their deliberations ways that would err on the side of caution. And the fact that we have safety factors in these guidelines and Safety Code 6 and the FCC guideline and the ICNIRP guideline, is part of that precautionary basis. The other thing that is done is where there is a possibility raised about a potential association with something like cancer, then the precautionary approach would be to be very vigilant in monitoring the research and communicating that, the results of that research, to the public, and also in terms of making recommendations for scientific research.

5. Opt-Out rights must flow from evidence that "this could be a risk"

If there is evidence that AMI meters "could be a risk", it would be unconscionable to impose those meters on customers at their residential dwellings against their will. At the very least, those wishing to avoid the risk ought to be free to opt-out. That right to opt-out should not be contingent on the establishment of "a reliable scientific basis". Those wishing to take precautions in their own homes should not have to wait out the process of scientific certainty.

As long as the scientific community is divided and, in light of the IARC classification and other indications that there exists a reasonable basis for concern, those wishing to take protective measures and avoid exposure should be free to do so. It would take a dictatorial regime to deny individuals that freedom of choice in their own homes.

Health Canada's approach to health assessment is no basis to deny individuals freedom of choice in the context of the current uncertainties. As stated by Dr. Sears at page 8 of her report:

> Health Canada's assessment paradigm, that biologically perturbing exposures are permissible unless harm is also conclusively proven, represents a double-hurdle for protective measures.

6. The right to opt-out is triggered by the fact that there are bio-effects, whether or not those bio-effects have been established as being adverse

At page 21 of her report, Dr. Sears articulates the critically important relationship between the precautionary principle and the matter of individual choice.

> Yesterday (Jan. 23rd, 2013), the European Environment Agency published "Late Lessons From Early Warnings, Volume II," including a section on hazards of electromagnetic radiation.[84] Volumes I and II describe harms of delayed actions on known toxicants, the benefits of precaution, and the history of vested interests delaying important actions.
>
> Society evolves, from enthusiastically embracing technological breakthroughs, to cautious concern, to recognition of harm, to restrictions of technology and more prudent uses. For example, X-ray machines ("fluoroscopes") were once used to fit shoes, but are now restricted to medical diagnostic imaging and cancer treatment, with considerable efforts to further limit exposures. Regulations and technologies need to be adjusted prudently, to limit exposures to the most important applications, where alternatives are not feasible. Indeed, considerable scientific evidence currently exists to justify curtailing and modifying our increasing reliance upon wireless communications, at every opportunity. Certainly exposure should be, to the greatest extent possible, an individual choice.
>
> [emphasis added]

In cross-examination[5], Dr. Sears illustrated the point that a precautionary approach should be triggered from the finding of bio-effects, whether or not those bio-effects have been established as being adverse:

> DR. SEARS: A: It's very interesting the way the public debate unfolds in a lot of issues. In B.C. there are -- you've got a lot of public debate regarding pesticides, for instance. Now, where I live in Ontario, we've finished that debate and we've had Canada's best law against pesticides. And the notion is not to get rid of everything that will control a pest, which is what a pesticide is. But to be as prudent as possible, using potentially toxic chemicals.
>
> So, by extrapolation, you know, we haven't shut down agriculture, anything like that. But we're just trying to be prudent. And in the case of radio frequencies, it's established that there are effects. The question is, how adverse those effects are, and I would say that messing with the biology of a developing fetus as one cell turns into two, and as they develop into a living child, and a being, that this is a bit of a silly discussion, whether a real biological effect may or may not be adverse. I think that the focus should be more on there being an effect and trying to minimize the effect and trying to use our technology,

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[5] Hearing Transcript 9. Page 1844 (from line 6) to 1845 line 5

our chemicals, our radio frequencies as prudently as we possibly can. Even in the absence of an established causal mechanism for harm, there is a reasonable basis for concern so as to justify a precautionary approach - and respect for the individual choice to opt-out to that effect.

7. An unjust imposition

In terms of public convenience and necessity, we submit that it is simply not necessary to impose the AMI program on customers in the absence of an opt-out choice - particularly where health issues are a reasonable concern. An environmental agent that has been classified by the World Health Organization as a possible human carcinogen simply cannot be foised -by mandatory imposition- on residential customers. The removal of free choice on health issues should not be allowed to occur as a consequence of FortisBC's monopoly.

While FortisBC has floated the idea of a customer-funded opt-out program, we take the position that charging a fee for opt-out could amount to an imposition for those who cannot afford it.

8. Rights flowing from bio-effects

There is consensus in the scientific community that RF emissions, such as those from the proposed AMI meter, have bio-effects. The outstanding debate is only about whether those bio-effects are adverse or not.

The CSTS submits that existence of bio-effects, in itself, gives rise to an opt-out right, regardless of whether the harmful nature of those effects have been "established". An individual has a right to be free from physical intrusion in his or own home and a right to insist that a utility refrain from touching his/her body; raising heart rate; affecting his brain chemistry; exposing him/her to an environmental agent that caused weight gain in rats; etc. It is one thing for individuals to be subject to environmental influences, but it is another thing to situate those influences on their bedroom walls, in the home, within which privacy and autonomy are fundamental to the fabric of our democratic society.

9. An overview of some bio-effects

Safety Code 6 sets exposure limits to ensure that warming of tissues is "restricted". It does not, however, set exposure limits to ensure that warming of tissues does not occur.[6]

Low-level RF radiation, at the frequency emitted by the proposed AMI meters, can cause small changes in body temperature. This is acknowledged in the Exponent Report, page 11, under the caveat that "small changes in whole body temperature are actually not an adverse effect if they represent a change similar to daily changes to which our bodies routinely adapt."

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[6] Hearing Transcript 4, page 588 (lines 9 - 20) and page 590 (lines 5 - 22)

Whether adverse or not, the low-level RF radiation in question causes small increases in body temperature and/or body heating. This was affirmed by Dr. Bailey on cross examination.[7] Dr. Shkolnikov subsequently qualified that, although he would agree that the emissions at issue cause body heating, whether that heating would result in a rise in body temperature would depend on the cooling ability of the body.[8]

Brain chemistry effects were also acknowledged by Dr. Bailey in cross-examination[9]:

> MR. AARON: Q: Does the ExPonent report contain any Material that contradicts that assertion, that biological effects with health implications have been ascribed to low-level radio frequency radiation? Or, rather, is there anything that contradicts the observation of leakage of the blood/brain barrier as a result of exposure to RF? Anything in the ExPonent report that contradicts that?
>
> DR. BAILEY: A: Our report did not focus on this particular topic, but we included references to reviews of health agencies that have included this topic, and that there is no conclusion that in fact exposure to radio frequency fields produces a confirmed effect on the leakage of the blood/brain barrier.

When asked to particularize his references, Dr. Bailey referred to an excerpt from the ICNIRP 2009 Report which concluded that, at certain intensities, RF emissions have effects [on brain chemistry] but no conclusions can be drawn with respect to adverse health issues.[10]

Even A.J. Swerdlow admits that there is some evidence that RF field exposure may affect the EEG and other markers of brain function, although, he says that these effects have not been consistent across studies.[11]

Dr. Blank's Report at page 2 refers to leakage of the blood-brain barrier that causes contamination of the fluid that protects the brain and results in the death of nerve cells.

By FortisBC Undertaking #5, FortisBC provided a series of studies that chronically exposed animals to the radiofrequency signals of GSM mobile phones, which use the same modulation type (frequency-shift keying) as AMI meters. Dr. Bailey referred to these studies as

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[7] Hearing Transcript 4, page 586 (from line 25) to page 588 line 8

[8] Hearing Transcript 4, page 593 (from line 19) to page 594 line 10

[9] Hearing Transcript 4, page 620 (from line 2) to 621 line 8.

[10] Hearing Transcript 4, page 624, lines 14 - 19

[11] Hearing Transcript 4, page 615 (lines 20 - 23)

corresponding to those studies referenced in the Exponent Report as involving "grossly similar" exposure to AMI meters.

One of those "grossly similar" studies (Sommer 2004) reported that RF exposure caused the rats to get fat. Dr. Bailey agreed that the study reported the weight gain to have been caused by the exposure.[12]

10. Are there adverse bio-effects?

From the consensus as to the existence of bio-effects from RF at sub-thermal exposures, we move to the debate as to whether those bio-effects are adverse to human health. In addressing this issue, we argue that:

- the Exponent Report should be given little weight; and

- Safety Code 6 should not be adopted by BCUC, nor should it serve as a baseline for the Commission's assessment of the health and safety of the proposed technology

11. Roster of Exponent weaknesses

We make argument on the following topics in support of our position that the Exponent Report should be given little weight, if any:

- Dr. Erdreich
- No medical expertise
- No Direct Evidence on Health Issues
- Blind faith in the validity of Safety Code 6
- The mystery of the "weight of evidence" process
- It is not a health risk assessment
- Relies on dose response model
- Reliance on Swerdlow & Ahlbom
- Assumes that there are no non-thermal adverse health effects
- Assumes no risk because a causal mechanism has not been established

12. Exponent weaknesses: Dr. Erdreich

A. Failure to produce Dr. Erdreich

On the basis of the facts set out below, we submit that the Commission should draw an adverse inference from FortisBC's failure to make Dr. Erdreich available for cross-examination. In particular, we invite the Commission to draw an adverse inference regarding:

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[12] Hearing Transcript 5, page 860 (line 17) to page 863 line 5.

a. Whether Dr. Erdreich, under oath, would have continued to stand by the contents of the Exponent Report; and

b. Whether Dr. Erdreich's testimony would have been supportive of FortisBC's position on health issues.

The relevant facts are as follows:

a. The Exponent Report was authored jointly by William Bailey, Linda Erdreich and Yakov Shkolnikov.[13]

b. CSTS provided notice to FortisBC that it required an opportunity to cross-examine each of the authors of the Exponent Report. Our position in that respect was articulated at the Procedural Conference, as excerpted in Ms. Herbst's letter of February 26, 2013.

c. Prior to announcing the contents of its witness panels by letter of February 20, 2013, FortisBC had not provided any notice that it would not be calling Dr. Erdreich as a witness or otherwise making her available for cross-examination. Further, at no time prior to Ms. Herbst's letter of February 26, 2013, did FortisBC indicate its intention to reply on the Exponent Report as a written statement of an expert opinion in satisfaction of sections 10 and 11 of the *Evidence Act* [RSBC 1996] Ch.124.[14]

d. FortisBC failed to make Dr. Erdreich available for cross-examination. The reason provided by FortisBC for this failure was that Dr. Erdreich was overseas in Israel on family business.

e. CSTS challenged the admissibility of the Exponent Report on the basis that Dr. Erdreich was not being made available for cross-examination. At no time, in responding to this challenge, did FortisBC propose that arrangements be made for Dr. Erdreich to be made available for cross-examination by way of Skype and/or video conference.

f. At all material times, in planning its witness panel and in responding to the CSTS admissibility challenge, FortisBC *could* have made Dr. Erdreich available for cross-examination by way of Skype and/or video conference in the same manner as CSTS made its witnesses available.

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[13] Hearing Transcript Volume 4, page 583, lines 12 - 26 (and line 1 on the subsequent page)

[14] See FortisBC's failure to make a commitment in that regard in answering CSTS IR#1, questions 23.1, 23.2 & 23.3

We invite the Commission to draw an adverse inference from FortisBC's failure to make Dr. Erdreich available for cross-examination. In particular, it can be inferred that, under oath, she would have equivocated on her support for the contents of the Exponent Report and/or FortisBC's position on health issues. This has implications on the weight to be attached to the Exponent Report, as discussed below.

B. Dr. Erdreich did not defend the report

With respect to FortisBC's failure to call Dr. Erdreich or otherwise make her available for cross-examination, we take two positions. The first is to invite the Commission to draw an adverse inference as argued above.

In addition, we assert that the Exponent Report should be given limited weight on health issues due to the fact that the only epidemiologist behind the report did not testify or appear to defend the report on cross-examination. Although none of the Exponent authors were medical doctors, Dr. Erdreich was the sole epidemiologist amongst them.

Further, those who did appear to defend the Exponent Report on cross-examination were not independent authors of the report. Dr. Bailey testified that the whole of the Exponent Report was authored jointly by all three authors. Neither one of the three could take independent responsibility for authorship of any particular section or the report as a whole. Dr. Erdreich was a co-author of every part of the report.

Given that the Exponent Report was not independently authored by either Dr. Bailey or Dr. Shkolnikov, their testimony in defence of its contents, in the absence of Dr. Erdreich, must be given limited weight. As well, the report itself should be given limited weight.

13. Exponent weaknesses: No medical expertise

In contrast to CSTS witnesses (Dr. Blank & Dr. Carpenter), FortisBC did not tender a witness that obtained a degree from a medical school or could otherwise claim medical expertise.

Dr. Shkolnikov is an electrical engineer.

Dr. Erdreich does not hold a degree from medical school. In any case, her expertise could not be probed and cannot inform the weight to be given to the Exponent Report since she did not testify.

Dr. Bailey's doctorate is in psychology. He did not go to medical school and has not conducted scientific research into matters in issue. As will be discussed below - under the heading *Blind Faith*, Dr. Bailey's evidence was largely deferential to the findings of bodies, such as ICNIRP and Health Canada, and was void of his own independent analysis on contested matters of scientific opinion. The bodies to which Dr. Bailey defers have, themselves, omitted to publicly

disclose any reasoning or analysis behind their positions. As such, the basis upon which Dr. Bailey defers to these bodies is unsubstantiated by his evidence.

FortisBC did not adduce opinion evidence from:

- any witness with direct medical expertise;
- any witness that conducted their own studies; or
- any witness that provided their own independent analysis (on the contested health issues) in support of an opinion as to which side of the debate they support.

As such, FortisBC's evidence on health issues must be given little weight. In any case, the expert opinion evidence adduced by FortisBC is inferior in weight to the direct medical & scientific expert opinion evidence provided by Dr. Blank, Dr. Carpenter & Dr. Sears, the former of whom has personally conducted his own independent laboratory research on the very matter in issue.

14. Exponent weaknesses: No Direct Evidence on Health Issues

Dr. Bailey admitted in cross-examination[15] that there is a lack of consensus in the scientific community as to whether there are established adverse bio-effects from RF emissions.

The Exponent Report fails to acknowledge this debate. It does not even mention the Bioinitiative Report. It provides no independent opinion or analysis.

All we have in the Exponent Report is a statement of the views held by international standard setting bodies, such as Health Canada, ICNIRP and IEEE - in absence of any explanation from those bodies as to the reasoning behind their conclusions.

In cross-examination [16], Dr. Bailey demonstrated that the Exponent Report itself is void of any substantive analysis on the issue of whether there might be adverse bio-effects at the non-thermal level:

> MR. AARON: Q: Your report actually makes no mention of the body of opposing views and opposing reviews in the literature such as the Bioinitiative and the ICEMS reports, correct?
>
> DR. BAILEY: A: That's correct.

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[15] Hearing Transcript 5, page 932, lines 9 - 15

[16] Hearing Transcript 5, page 929 (from line 7) to 930 line 14

MR. AARON: Q: And Exponent has not done its own analysis in the Exponent Report on whether there's any validity with respect to the concern that there might be adverse bioeffects at the non-thermal level.

DR. BAILEY: A: We considered that and other scientific health agencies have considered that, and I think there is an agreement among these reviewers that the scientific evidence does not support Mr. or Dr. Maisch's position.

MR. AARON: Q: Right. I know that the review bodies have, through their analysis, come to that conclusion such as Health Canada and ICNIRP, correct? Although we haven't been privy to their analysis in that regard, correct?

DR. BAILEY: A: Yes.

MR. AARON: Q: And in your report you rely on their conclusions in that regard, correct?

DR. BAILEY: A: I don't rely on those conclusions. They are part of the information that is available to me as an expert in forming my opinion. But I point out that my assessment is similar to that that has been reached by other review groups in other countries and for other purposes.

MR. AARON: Q: But your analysis of the validity of the position as advocated by the non-thermal camp, the position being non-thermal levels still have adverse bioeffects, that analysis is not set up in the Exponent Report anywhere.

DR. BAILEY: A: That's correct.

The failure of the Exponent Report to engage in an analysis on the disputed facts is further set out in Dr. Bailey's evidence on cross-examination[17]:

MR. AARON: Q: And then there is another camp, so to speak -- allow me to speak colloquially. Such as the Bioinitiative working group. Such as Dr. Martin Blank, Dr. Carpenter. That are, through their own self-publications, are taking the opposite view. Correct? They are saying that they're -- there is scientific basis that indicates adverse bioeffects on a non-thermal level. Correct?

DR. BAILEY: A: Yes.

MR. AARON: Q: And they are saying that the Health Canada Safety Code 6 and ICNIRP guidelines are insufficient for that reason. Correct?

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[17] Hearing Transcript 5, page 931 (from line lines 4) to 932 line 8

DR. BAILEY: A: Yes.

MR. AARON: Q: And can I characterize this as a clash of paradigms? In your view.

DR. BAILEY: A: I don't know that it represents a clash of paradigms, but certainly there is a difference in the conclusions reached by the groups that you described.

MR. AARON: Q: Right. And there is no analysis in the ExPonent Report with a view to resolving these differences.

DR. BAILEY: A: That's correct.

MR. AARON: Q: But there has been within the offices of Health Canada and ICNIRP. Correct?

DR. BAILEY: A: It would appear so, based upon their published reports.

MR. AARON: Q: But we don't know what that analysis is. Correct?

DR. BAILEY: A: Neither do I know what the analysis is that went into the Bioinitiative report.

Dr. Bailey discounts the findings of the non-thermal camp by citing the rejection of those studies by the bodies to which he defers, without even having the benefit of their reasoning.

15. Exponent weaknesses: Blind faith in the validity of Safety Code 6

A. Admissions

Dr. Bailey, in cross-examination[18], admitted to the following:

- The Exponent Report does not consider the validity of Safety Code 6‘s standard in assessing exposure.
- The Exponent Report takes the Safety Code 6 standard and accepts it, without even acknowledging that it is impugned.
- The Exponent Report does not include an analysis of whether the Safety Code 6 standard is adequate.

[18] Hearing Transcript, page 696 (line 8) to 699 (line 9)

- The Exponent Report does not set out the criticisms of Safety Code 6 and engage in an analysis of whether those criticisms are correct or not. It does not weigh the two camps and set out the Exponent authors' reasoning as to why they agree with Safety Code 6 and disagree with its detractors.

B. Example: Bailey's approach to modulation

For example, the 1999 Royal Society Review[19], at the top of page 30, identifies the modulation/ variation of RF signals (as a result of certain digital pulsing characteristics of some systems) as a factor to be considered in evaluating the potential biological effect of RF exposure. At page 12 of that review, the authors say:

> Further research will be required as new technologies emerge, which use frequencies and modulations that have been inadequately studied previously.

Dr. Bailey testified that investigation into modulation characteristic is part of what is included in the hazard identification stage of the risk assessment process.[20] Nevertheless, Dr. Bailey admits in cross-examination[21] that the Exponent Report does not address the modulation factor.

> DR. BAILEY: A: I did not -- I did not discuss this modulation aspect. It is frequently treated, in my mind and in the scientific reviews, as part and parcel of the discussion of low level RF effects. So it's one of the hypotheses about low intensity effects. Athermal, non-thermal effects would be related to modulation. So I discuss the general topic of nonthermal effects and this is one of the hypotheses to -- that has been looked at for many years, actually, to look at that non-thermal issue.
>
> MR. AARON: Q: All right. And it's not a hypothesis that you discussed in your report, and that's all I'm asking you to affirm.
>
> DR. BAILEY: A: That's the hypothesis -- this detail that I did not discuss, correct.

C. Example: Bailey's approach to the existence of a "plausible mechanism"

The Exponent Report draws on the position that there has been no plausible mechanism established as the basis for biological effects at non-thermal levels. For example, at page 13 of the Exponent Report, it states:

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[19] Exhibit C9-17

[20] Hearing Transcript 4, page 637, lines 9 - 11

[21] Hearing Transcript 4, page 626, lines 5 - 17

> Some studies have reported effects occurring with RF exposures below the level that raises body temperature, often called non-thermal effects. Non-thermal effects or low level effects refer to effects that occur at levels not believed to cause tissue heating. These studies have been reviewed by scientific and regulatory agencies, which have not accepted this data as reliable because the observed biological effects attributed to non-thermal levels were not consistent or reproducible, <u>are not supported by any plausible biological explanation</u> as to how they could occur, and in some studies the biological effects reported are not known to be linked to adverse effects on health (IEEE, 2005; ICNIRP, 2009; HCN, 2009; NRPB, 2004; SCENIHR, 2009; SSM, 2009, 2010).

Although the Exponent Report asserts the absence of a plausible mechanism, the report fails to acknowledge that there is a debate within the scientific community as to whether such a plausible mechanism has been identified. Further, the Exponent Report is void of any analysis, discussion or reasoning concerning that issue. As stated by Dr. Bailey under cross-examination[22]:

> MR. AARON: Q: I know you defer a lot to those scientific agencies, but your ExPonent Report said there is no plausible biological mechanism. And you came to that conclusion without having provided us readers with the benefit of having set out the position of the community that there is a plausible biological mechanism, and then going to set out the position of the community that says there is not a plausible biological mechanism, and providing your own analysis in that regard. You've given us no opinion other than to say a conclusion, and base it on what ICNIRP found on reasoning that we haven't had the privy of discovering.
>
> DR. BAILEY: A: I did not provide any detail on this, and I could have written an entire report of similar length just discussing the many different theories, including Dr. Blank's, that have been proposed. But without these many different theories having been supported to a sufficient extent, I did not choose to, you know, make those a part of this report.
>
> MR. AARON: Q: Look, my problem with your report is, you set out conclusions that there is no plausible biological mechanism, and then you don't acknowledge that your conclusions -- behind your conclusions there is a lack of scientific consensus. That's my problem with your report. That it's remiss.
>
> It sets out to reassure the reader that there are no established health concerns, and it does that on the basis of conclusions that overlook the fact that the matter on which you're coming to a conclusion is a subject of debate. And on one side of debate, the debate, is a Columbia biophysicist who says there is a plausible mechanism. Don't you think that's small oversight? Not to mention that? In the context of saying there is no biological mechanism, and this is why we discount non-thermal studies. Isn't that an oversight?

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[22] Hearing Transcript 5, page 982 (from line 6) to 983 line 20

MR. MACINTOSH: I'll just ask my friend to put a little bit of a simpler question.

DR. BAILEY: A: I believe I already answered that question.

D. The implications of blind faith

The Exponent Report and Dr. Bailey say that, when all the research is considered, there is not sufficient evidence to establish the existence of adverse bio-effects at non-thermal levels. Neither Dr. Bailey nor the Exponent Report authors have opined with their own analysis on the underlying scientific controversy. FortisBC's evidence is limited to a recitation of the views of regulatory bodies that are strangers to these proceedings. In the absence of any independent analysis by FortisBC's own experts, evidence as to the controversial views of standard setting bodies cannot carry any weight, particularly where the reasoning of those bodies remains undisclosed; no representative of those bodies was available for cross-examination; and the standards set by those bodies do not have any regulatory application to the proposed AMI program.

The Exponent Report and its authors do little more than endorse and rely on the findings of standard setting bodies. They provide no independent analysis as to why the views of those standard setting bodies should prevail against the body of the scientific evidence that supports the existence of non-thermal adverse bio-effects.

The Exponent authors testify that there are no established adverse health effects at non-thermal levels. Why? Because, Health Canada, ICNIRP and others say so. On what basis do these organizations dismiss the body of evidence showing non-thermal effects? We do not know, because we are not privy to their reasoning.

In contrast, CSTS does not simply cite the Bionitiative Report and rely on its conclusions in the absence of reasoned analysis. Rather, the CSTS has adduced direct opinion evidence of medical and scientific experts who have each provided their own detailed explanation, analysis and reasoning in support of their respective positions of adverse bio-effects at non-thermal levels, amounting to a substantiated concern with respect to the effects of AMI meters on health.

16. Exponent weaknesses: The mystery of the "weight of evidence" process

A. Introduction to problem

The reliance by FortisBC witnesses on these standard setting bodies is problematic for a further reason. Health Canada and ICNIRP engage in a weight-of-evidence analysis whereby they determine, on subjective grounds, which scientific studies to rely on and which to dismiss. By way of this process, Health Canada and ICNIRP have rejected the notion that adverse bio-effects exist at non-thermal levels.

B. Generic description of process

In his evidence in the *Chateauguay v. Rogers* case, James McNamee[23] of Health Canada describes the weight-of-evidence analysis in the following terms:

> The literature that was supplied represents a large number of national and international reviews of the science which employ a weight of evidence, evaluation of the scientific literature. As opposed to going into individual research studies, these authoritative reviews that are conducted by national health agencies and international organizations, they represent a high level thorough synopsis of the scientific literature which Health Canada also is of the same opinion. [Transcript pages 6-7]
> …
> High-level summaries that most of these countries either directly adopt the recommendations of the ICNIRP, the International Commission on Non-Ionizing Radiation Protection standards, or they use them in the derivation of different policies and guidelines. Basically, they outline the approaches that are taken by most European countries. [Transcript pages 6-7]

C. The weight of evidence analysis can conclude "no adverse effects" in the face of a large number of studies to the contrary

The testimony of McNamee in *Chateauguay,* at pages 69 - 70, demonstrates how, despite "a large number [of studies] that show an adverse effect", the "weight of evidence review" can result in a conclusion that there are no adverse effects:

> Q. And do I understand that, even though there is out there some studies regarding non-thermical [sic] effects for our frequency, the position of Health Canada is that none of those studies, because it's what it's saying in Safety Code 6, is relevant and there's no change?
>
> A. We recognize that there are a large number of studies assessing virtually every health endpoint there is. There are a large number that show an adverse effect here, an adverse effect there. So, I'm not denying that there are studies showing effects, no question.
> …
> I'm not saying there's no evidence, I'm saying... based on the weight of evidence review.
>
> Q. I'm sorry, there's no health adverse effect?
>
> A. Yes.

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[23] Exhibit B-46 – White v. Ville de Châteauguay et al., (February 18, 2013) decision Beauharnois 760-05-005093-107 (Qc. Sup. Ct.), Transcript of Proceedings.

So there can be a large number of studies that show an adverse effect but, when put through the weight of evidence analysis, they do not result in the conclusion that adverse health effects are established. What makes this rather disconcerting are the facts that:

- the weight of evidence process involves the exercise of subjective judgment; and
- the weight of evidence process occurs behind closed doors without any publication of a monograph or any explanation as to what reasoning or analysis resulted in its conclusions.

D. Involves subjective judgment

Dr. Bailey's evidence in cross-examination was that the WOE process entails the exercise of judgment and opinion guided by scientific methods and procedures.[24]

Dr. Bailey affirmed the subjectivity at play in the context of the weight of evidence analysis:

> MR. AARON: Q: But you can have the same scientific data, Doctor, and different subjective judgments with respect to the quality of the data and the weight of evidence analysis, correct?
>
> DR. BAILEY: A: Yes. [25]

Dr. Bailey also provided answers to Mr. Andrews in cross-examination[26] as follows:

> MR. ANDREWS: Q: I'll move to a new point. You say that the risk assessment approach uses a weight of evidence review. That term "the weight of evidence review" is used a number of times. Would you agree with me that it's a matter of professional judgment what weight the reviewer ought to give to a particular study for a particular assessment?
>
> DR. BAILEY: A: It's based upon, you know, scientific criteria appropriate to that particular discipline and type of study, and it will involve scientific judgment and comparison with appropriate scientific norms.
>
> MR. ANDREWS: Q: And there will be occasions on which different scientists have different conclusions about the weight that ought to be given to a particular study in a particular assessment. Is that fair to assume?

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[24] Hearing Transcript 4, page 734 from line 25 to page 735 line 5

[25] Hearing Transcript5, page 889, lines 22 - 26

[26] Hearing Transcript 3, page 522 from line 23 to page 523 line 23

DR. BAILEY: A: That can happen, certainly.

MR. ANDREWS: Q: And one of the ways that science tries to approach that difference of opinion is by Documenting the conclusions that have been made so that others can look at the decisions and draw their own conclusions. Is that a fair general statement?

DR. BAILEY: A: That can some -- the level of detail may differ depending upon the situation. Certainly the scientific review bodies that I'm familiar with do not detail their thoughts about every single study that was reviewed.

E. Weight of evidence process occurs behind closed doors & no reasons are published so as to enable us to evaluate the subjective judgments that occurred in that process

Health Canada and ICNIRP, through the weight of evidence process, have concluded that adverse health effects are not established - despite the existence of a large number of studies that show an adverse effect.

The problem with FortisBC's reliance on the positions of Health Canada and ICNIRP is that the subjective determination behind this weight-of-evidence analysis occurs behind closed doors without the subsequent publication of explanations or reasons. There is no transparency as to which scientific studies were accepted/rejected by Health Canada or ICNIRP and what are the reasons for same.

In cross-examination[27], Dr. Bailey admitted that Health Canada's review process involves the exercise of subjective judgment and that nobody outside of Health Canada is privy to the reasoning behind that judgment, and Dr. Bailey, in cross examination, could offer no evidentiary basis upon which to conclude that that judgment was properly made.

MR. AARON: Q: So the way they have obtained a determination of what's scientifically established, they have done so through subjective processes which we have not had an opportunity to be privy to, or to scrutinize for their thoroughness.

DR. BAILEY: A: As we discussed a minute ago, we are not privy to the internal deliberations of Health Canada as to their development of the standard, but I would point out that the basis for that standard is similar to that of IEEE and ICNIRP.

MR. AARON: Q: Right, which we also haven't had the opportunity, with respect to ICNIRP at least, to be privy to their deliberations.

DR. BAILEY: A: Yes.

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[27] Hearing Transcript 5, page 888 (from line 21) to 889 line 8

And in further in cross examination[28]:

> MR. AARON: Q: … So I put it to you, and you've heard this before from my friend, Mr. Andrews, the process of a thorough evaluation, the language of employing a weight of evidence approach, the language of taking into account the quantity -- the quality of studies. All of that connotes the exercise of subjective judgment.
>
> DR. BAILEY: A: Parts of that would involve expert judgment.
>
> MR. AARON: Q: And are we to take Health Canada for its word that it's done a thorough evaluation? That's one question. A related question is, you know, how can we assess if that subjective judgment was properly made?
>
> DR. BAILEY: A: I would suggest that we ask Health Canada.
>
> MR. AARON: Q: There is nothing in the evidence that speaks to the thoroughness of the evaluation, is there? Other than Health Canada's statement that it's done it. Correct?
>
> DR. BAILEY: A: Yes.
>
> MR. AARON: Q: And Health Canada is not here to be cross-examined on that representation, are they?
>
> DR. BAILEY: A: No, they are not.
>
> MR. AARON: Q: And you haven't sat in on any of these evaluative processes. Correct?
>
> DR. BAILEY: A: No, I have not.
>
> MR. AARON: Q: All right. And the same goes with ICNIRP. They have engaged in the same kind of weight of evidence analysis, but they have done so behind closed doors, correct?
>
> DR. BAILEY: A: Yes.

Safety Code 6 does not include any analysis to support its conclusion that non-thermal effects have not been established. This was affirmed by Dr. Bailey in cross-exmination[29]:

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[28] Hearing Transcript 5, page 886 (from line 13) to 887 line 17

[29] Hearing Transcript 5, page 890 (from line 22) to 891 line 9

MR. AARON: Q: [Referring to Safety Code 6] And then the second paragraph:

> "Despite the advent of thousands of research studies on RF energy and health, the predominant adverse health effects associated with RF energy exposures in the frequency range from 3 to 300 -- 3 kilohertz to 300 gigahertz still relate to the occurrences of tissue heating and excitable tissue stimulation from short-term (acute) exposure."

Where in Safety Code 6 is the analysis to support that conclusion? It's not set out, is it?

DR. BAILEY: A: No.

Dr. Bailey, under cross-examination [30], also affirmed that Safety Code 6 does not include any analysis to support its rejection of non-thermal studies:

MR. AARON: Q: You would agree there are some studies that indicate from the studies -- at least the authors of the studies take the position that their studies indicate an adverse bioeffect from RF exposure.

DR. BAILEY: A: Yes.

MR. AARON: Q: And Health Canada has evaluated the quality of those studies, correct?

DR. BAILEY: A: That's what they state.

MR. AARON: Q: And in doing so they have concluded that those studies don't support the -- or scientifically establish implications for human health, that they're not well understood.

DR. BAILEY: A: That is what they describe for biological effects or responses that are reported at levels below the adverse effect result from heating.

MR. AARON: Q: We have no particulars from Health Canada in relation to their reasoning or the analysis by which they found any of these non-thermal studies to be unpersuasive.

DR. BAILEY: A: We do not have a detailed analysis from Health Canada on that point.

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[30] Hearing Transcript 5, page 895 (from line 7) to 896 line 1

In cross-examination[31], Dr. Bailey confirmed that Health Canada has not produced a monograph or any alternative summary of its evaluation with respect to the analysis that concluded in Safety Code 6:

> MR. AARON: Thank you. Dr. Bailey, whenever IARC or another agency evaluates the scientific literature for the purpose of policy-setting, it's customary for them to provide a monograph documenting the studies that were included and how they were weighed. And the studies not included. With justification for their omission. Correct?
>
> DR. BAILEY: A: Some agencies go to that extent. I would say that the more common practice would be that they summarize their evaluation of the evidence and reference documents, supporting information to the extent that they see fit. They typically do not include a listing of every study that they considered, but it didn't affect their judgment or so on.
> …
> MR. AARON: Q: So Health Canada didn't produce a monograph as I described with respect to Safety Code 6.
>
> DR. BAILEY: A: Correct.
>
> MR. AARON: Q: And there's no disclosure exactly as to how Canada conducted its weight of evidence analysis in terms of indicating which studies were included, how they were weighted, and which studies were excluded and with what justification.
>
> DR. BAILEY: A: That's correct.

Neither the Commission nor any witness in these proceedings has any insight as to the reasoning and decision making behind the weight-of-evidence analysis employed by Health Canada or ICNIRP. All the authors of the Exponent Report can offer the Commission is blind reliance in that regard. This is disconcerting in light of Dr. Bailey's testimony that "if one goes out and cherry-picks studies out of the literature, one can prove almost any position that you want to support."[32]

Health Canada's failure to explain its rejection of "a large number [of studies] that show an adverse effect"[33] was strongly criticized by Dr. Blank[34]:

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[31] Hearing Transcript 5, page 939, lines 5 - 22 and page 940, lines 16 - 25

[32] Hearing Transcript 3, page 497, lines 4 - 7

[33] McNamee in Chateauguay, at pages 69 - 70

[34] Hearing Transcript 9, page 1713 (from line 16) to 1715 line 8

MR. WEAFER: Q: Well, sir, I think there is evidence on the record. With respect to not included, I take it the complaint you have is that it's not clearly identified in Health Canada's Safety Code 6 exactly and exhaustively what specifically they relied on or discounted. Is that part of your concern?

DR. BLANK: A: No, my concern is that they have neglected a whole area of research which is particularly relevant to health effects.

MR. WEAFER: Q: They have made a judgment to not accept that evidence as persuasive in establishing their standards.

DR. BLANK: A: They have made a judgment that is nonscientific, because the scientific world has made a judgment by publishing these values. And making them available to scientists all around the world.

MR. WEAFER: Q: Yes. And whether something is published or not does not determine whether it's valid and should be accepted by a standards organization. Would you agree with that?

DR. BLANK: A: It should be entered into their considerations. In other words, they should look at it and they should comment. And if there is a whole body of information, that many people have accepted, including the scientists who have been working in the field, they have a double responsibility to point out that they don't accept it and to give the reasons why they don't accept it. They must give lots of reasons why it's not up to some kind of standard that they set, or that it's irrelevant.

MR. WEAFER: Q: Sorry, sir, I lost you on the last sentence. Would you repeat that, please?

DR. BLANK: A: I think they should give the reasons why they neglect the science that's been accepted by the scientific community and they should specify why they reject it.

MR. WEAFER: Q: And they should do that for every published document of science on the topic?

DR. BLANK: A: No. But there are certain documents that are very important and that have been recognized by people in the -- around the world as contributing to scientific efforts. And if they think that it should not be considered, they should really enter their discussion of it, and their consideration of it.

[emphasis added]

Dr. Sears' report also comments on the lack of transparency behind Health Canada's weight of evidence process resulting in Safety Code 6:

> Safety Code 6 (2009) claims to have examined all scientific literature (this review is not provided)…. [Sears report at page 5]
> ...
> Weight of Evidence: Thousands of scientific studies examine effects of electromagnetic phenomena on living creatures. Every study has strengths and weaknesses that are inherent to study design, arise from resource limitations, may be simply poor reporting of the research, or perhaps reflect ineptitude. It is not simple to apply all of these studies to real life complexities of human exposure to radiofrequency radiation; there is no single, perfect method to synthesize such diverse medical evidence. Various national and international bodies outlined in the Exponent report have retained consultants and convened panels of experts (who are human, with their attitudes, pre-conceptions and reputations) to consider this medical evidence, or often parts of the evidence, such as updates. Some panel reviews are more transparent than others; Health Canada has divulged scant details of the evidence considered and how it was weighed, for Safety Code 6. It is hoped that in the future, reviews will be more transparent and based on broader input. [Sears report at page 10]
> ...
> Safety Code 6 was re-issued unchanged in 2009, with few details of the scientific review or weight of evidence process. [Sears report at page 20]

Under cross-examination[35], Dr. Sears testified as to the discrepancy between Health Canada's practice of full disclosure on other regulatory issues and their lack of transparency on RF issues:

> MR. WEAFER: Q: That's the type of criticism you're laying on Health Canada as well, as I understand, the critiques. That Health Canada is also being selective about reports that they're relying on.
>
> DR. SEARS: A: I have no idea. It's really interesting that this radio frequency is -- they're called radio protection grant, because I've looked at other issues that Health Canada deals with. I've looked at chemicals, I've looked at pesticides, and in all of those cases you can see the science they're relying upon. In the case of radio frequencies, we can't see any of that. I don't know what Health Canada was relying upon at all. I don't have the big report that's lying behind their 2009 document. So I can't criticize it because I don't know what it was. They do point to a few others, studies and so on, but this -- your Safety Code 6 is the document when it comes to presenting the science. So I can't criticize what I can't see.

Our lack of insight (and inability to evaluate) the reasoning behind Health Canada's and ICNIRP's rejection of the non-thermal body of evidence is one problem. A further problem is that the Exponent authors rely on Health Canada's and ICNIRP's conclusions without including

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[35] Hearing Transcript 9, page 1855 (from line 24) to 1856 line 17

in their report any analysis or evaluation of the competing science. When asked in cross-examination[36] for Exponent's own analysis, Dr. Bailey could only refer to the conclusions of those agencies to which he continuously deferred:

> MR. AARON: Q: And Exponent has not done its own analysis in the Exponent Report on whether there's any validity with respect to the concern that there might be adverse bioeffects at the non-thermal level.
>
> DR. BAILEY: A: We considered that and other scientific health agencies have considered that, and I think there is an agreement among these reviewers that the scientific evidence does not support Mr. or Dr. Maisch's position.
>
> MR. AARON: Q: Right. I know that the review bodies have, through their analysis, come to that conclusion such as Health Canada and ICNIRP, correct? Although we haven't been privy to their analysis in that regard, correct?
>
> DR. BAILEY: A: Yes.

The Commission is given nothing to go on in determining the thoroughness, accuracy or independence of the process resulting in Safety Code 6. The reasoning behind that process has not been divulged and the authors of Safety Code 6, although available to testify in other proceedings, were not called as witnesses and made available for cross-examination.

FortisBC's evidence amounts to the following: science does not support the existence of non-thermal adverse bio-effects because that's what Health Canada and ICNIRP tell us. We don't have insight into their reasoning and we are providing no independent analysis as to why Health Canada and ICNIRP have got it right while the BWG and the CSTS witness have got it wrong.

CSTS has done better than that. We have adduced direct medical and scientific expert opinion evidence before the Commission as to the existence of adverse bio-effects or, alternatively, as to the existence of valid and serious concerns that such adverse effects may indeed exist. In relation to our direct opinion evidence, the blind reliance offered by Exponent Report carries little weight.

F. Example of our inability to see how Health Canada interpreted the science

An example of our inability to access or evaluate the reasoning behind Health Canada's interpretation of the science is evident at Hearing Transcript 4, pages 667 - 669:

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[36] Hearing Transcript 5, page 929, lines 12 - 26

MR. AARON: Q: Okay, let's pause there. The review of the research -- sorry. Safety Code 6, it reviewed research and you're saying it reviewed research that considered modulation patterns. Are you saying that?

DR. BAILEY: A: I am saying that in the research literature we have studies that, whenever a particular source is described, it will typically also identify the type of modulation, if there was modulation, in the exposure assessment. And so those modulations are described in the studies and so if you review the literature, then you're reviewing studies with different -- all different types of modulations.

MR. AARON: Q: Well, you're saying two different things, Doctor. First you're saying Safety Code 6 reviewed studies that deal with modulations, and then in your second answer you said what we have in the literature. So, the first answer goes to what Safety Code 6 considered and the second goes to what we have in the literature. I'm suggesting to you that Safety Code 6 did not consider modulation patterns. And you're saying that Safety Code 6 did. Correct? That in the review of the material the reviewers considered modulation patterns.

DR. BAILEY: A: I can't speculate about how they interpreted the data, because that's not described. But I can tell you that in the literature we have biological and cellular studies with exposures that are described with a variety of modulations, and any review of that literature by Safety Code 6 or any other agency would have looked at this, given that modulation has been a topic since the 1980s.

MR. AARON: Q: I appreciate that if the Safety Code 6 authors had reviewed this, they would have seen that. But I'm saying they didn't. Karl Maret says they didn't review it, and you say they did review it. Am I correct in interpreting your testimony as saying that the Safety Code 6 authors reviewed literature that dealt with modulations. Yes or no? I'll repeat the question.

DR. BAILEY: A: I understand the question.

MR. AARON: Q: Yeah. Am I correct in interpreting your testimony as saying that the Safety Code 6 authors reviewed literature that dealt with modulations? Is that what you're saying?

DR. BAILEY: A: My statement is that this literature was -- if literature was reviewed by a body, Safety Code 6 or anyone else, it included studies of different types of modulations. I don't know, I can't go into the minds of the reviewers to further intuit how they dealt with that information. But it did not result in a standard that was different for fields of different modulation.

[emphasis added]

At Hearing Transcript 4, page 687, Dr. Bailey made further comments indicating his blind faith in Health Canada on the issue of whether modulation / burst characteristics are a factor in determining adverse health effects:

> MR. AARON: Q: All right. So there's no consensus in the scientific community on that issue.
>
> DR. BAILEY: A: Well, if you define consensus by unanimity, I would agree. But for the reviews that I have referenced by national and international health agencies, I would characterize their position as being that modulation is not an important aspect of the assessment.
>
> MR. AARON: Q: And you're saying on that point, you didn't engage any analysis in that regard in the Exponent Report, but you trust the analysis that you assume Health Canada and ICNIRP to have made on that point.
>
> DR. BAILEY: A: I made no assumptions about what analysis that they had done. I read their reviews.

G. Blind faith that Health Canada conducts ongoing reviews

Elsewhere in cross-examination, Dr. Bailey demonstrated that he has no insight into the veracity of Health Canada's claim that it conducts an ongoing review of scientific material. [37] [38]

17. Exponent weaknesses: It is not a health risk assessment

The Exponent Report does not meet the characteristics that Dr. Bailey says are essential to a health risk assessment.

In the context of being qualified as an expert, Dr. Bailey testified as to the nature of a health risk assessment[39]:

> DR. BAILEY: A: Health risk assessment is a process that starts off with identifying a potential hazard, and that is done by examining <u>all</u> of the available research, and evaluating its strength and quality.
>
> [emphasis added]

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[37] Hearing Transcript 5, page 885, lines 6 - 16

[38] Hearing Transcript 5, page 890, lines 8 - 21

[39] Hearing Transcript 3, page 379, lines 7 - 10

The Exponent Report does not do this. It does not examine and/or evaluate all the available research. It makes no mention of the Bioinitiative Report and it omits *in vitro* studies from consideration.

The research that the Exponent Report does mention is not the subject of any independent analysis or evaluation of by the Exponent authors, except to say what has been accepted / rejected by national and international agencies such as Health Canada and ICNIRP.

The authors of the Exponent Report have not done their own analysis on whether there's any validity with respect to the concern that there might be adverse bio-effects at the non-thermal level.[40]

In sum, the Exponent Report is not a health risk assessment and does not engage any of the analysis / investigation that, according to Dr. Bailey, would occur in the course of a risk assessment.

18. Exponent weaknesses: Relies on dose response model

Dr. Bailey's evidence in cross-examination affirms that the Exponent Report is premised on the assumption that high dose response reliably predicts low dose response.[41] At page 18, the Exponent Report states:

> Given the dose response nature of effects on human health, mobile phone exposures represent the highest dose scenario for people in the general population and therefore the greatest potential for detecting adverse response to RF exposure.

Dr. Sears is critical of the assumption that high dose response reliably predicts low dose response:

> The historical dose response model adhered to in the Exponent report (p 7) is that high dose responses reliably predict low dose responses; i.e. that an effect continually increases with increasing dose - is "monotonic" - and that at a low enough dose there is no effect. <u>This model is outdated, and regulatory risk assessment is slowly catching up.</u> At high enough doses, radiofrequency radiation causes heating, with obvious toxicity consequences, but this toxic effect does not predict other biological effects of radiofrequency radiation at lower doses. <u>Non-monotonic dose responses occur for many reasons, including endocrine, epigenetic and other physiological reasons.[42]</u>

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[40] Hearing Transcript 5, page 929, lines 7 - 20

[41] Hearing Transcript 4, pages 637 (from line 17) to 640 (line 6).

[42] Sears Report, page 8

> Different biological effects may be observed at different doses when very low doses affect the endocrine system – the body's "chemical messaging" system. Hormones orchestrate every step of development, and regulate metabolism from gestation through the entire lifespan. They also are responsible for the "flight or fight" response. Hormones act at exquisitely low concentrations in the body, and endocrine disrupting chemicals can have different, even opposite effects at higher doses. Through epigenetic mechanisms, effects can pass from parent to offspring. A recent review of 845 scientific papers showed evidence of endocrine-disrupting chemicals having adverse health impacts at very low doses in animals and humans.[19] Based on such science, Canada banned bisphenol-A from baby bottles.[20] Indeed, even the American Chemical Society has issued a Public Policy Statement, saying that omitting low dose testing undermines the validity of regulatory toxicological testing.[21]

Dr. Sears goes on to consider the effects of RF at low doses:

> Radiofrequency radiation may affect levels of hormones such as estrogen and testosterone, stress hormones, sleep-regulating hormones such as melatonin, and others as described below. Importantly, inappropriate hormone levels during critical windows of development can cause permanent effects in children's lives, affecting their intelligence and behaviour, and making them more susceptible to infections, asthma, obesity, diabetes, reproductive failure, cardiovascular disease and cancers. For example, early life exposure to cell phone radiation was associated with behavioral disturbances in two studies of ,[22,23] and more recently with asthma (indicative of immune disturbance)[24] and obesity (metabolic/endocrine disturbances).[25]

We submit that Dr. Sears' evidence provides a strong indication that Health Canada and ICNIRP approach standard setting on the basis of the faulty assumption that high dose response reliably predicts low dose response. That faulty assumption is adopted by the authors of the Exponent Report.

The phenomenon of a power density window refers to circumstances of health effects occurring not at a higher level, not at a lower level, but at some intermediary level.

In assuming that high dose response reliably predicts low dose response, the Exponent Report does not address the phenomenon of a power density window[43]. This omission occurs despite the fact that the phenomenon of power density window is described in the 1999 Royal Society Review[44] as referenced at pages 640 to 643 of Hearing Transcript 4.

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[43] Hearing Transcript 4, pages 643 (line 25) to 645

[44] Exhibit C9-17

19. Exponent weaknesses: Reliance on Swerdlow & Ahlbom

Another factor to be considered in assessing the weight of the Exponent Report is the reliance it places in scientists A. J. Swerdlow and Anders Ahlbom, both of whom have been the subject of conflict-of-interest allegations as described in Exhibit C9-18.

At page 6 of his report, Dr. Maisch references the manner in which the Exponent Report relies on Swerdlow and Ahlbom to refute Hardel's findings of an association between cell phones and brain tumours:

> In my own thesis assessment of the RF standard setting process, primarily looking at the IEEE and ICNIRP risk assessment processes, what is apparent is that the process is very much influenced by the reviewer's affiliations. This is seen, for example, where the Exponent report dismisses the Hardel group's work largely on assessments by Ahlbom and Swerdlow. This may seem persuasive until the reviewers' financial conflicts of interest are considered, and which have the potential to influence their expert opinion. For example, Anders Ahlbom is co-founder of Gunnar Ahlbom AB, a Brussels-based lobby firm aiming to assist the telecom industry on EU regulations, public affairs and corporate communications.

In answering CEC IR question 22.2, Dr. Blank makes reference to Anders Ahlbom's conflict:

> Critiques are an essential and integral part of the scientific progress. It is, of course, essential that those making critiques fully divulge their sources of funding, investments, et cetera. As we have seen, corporate interests have distorted the scientific process, resulting in many of the critiques being invalid.
>
> [Anders Ahlbom] was recently found to have undisclosed corporate connections and was removed from EMF regulatory committees. This connection of a key committee suggests a similar mindset of other members and probably amounts to yet another report that omits references to molecular and cellular studies and proposed mechanisms already mentioned in earlier comments.

The concern about Exponent Report's questionable reliance on Swerdlow and Ahlbom is supported by further evidence.

A Report of the independent Advisory Group on Non-ionising Radiation[45] chaired by A. J. Swerdlow was dated April 2012 but it does not cite IARC classification of 2011. Dr. Bailey

[45] Provided by Fortis Undertaking #4.

cannot explain this omission and agrees with the relevance of the IARC classification to the subject matter of the Swerdlow report.[46]

This was also the subject of commentary by Dr. Sears at page 12 of her report:

> One indication of the bias in this report [UK report prepared by a panel chaired by Professor A.J. Swerdlow] is that it was published almost a year after the International Agency for Research on Cancer (IARC) determination that radiofrequency radiation is a Type 2B (Possible) carcinogen, yet this was not mentioned; the report dismisses the possibility that radiofrequency radiation may cause cancer.

The concern regarding conflict of interest is not limited to Swerdlow and Ahlbom. To contextualize this issue, we refer to page 7 of the Sears Report:

> Another undeniable bias comes from vested interests. Huss et al. reported in 2007 that industry-funded studies into health effects of radiofrequency radiation should take sponsorship into account, as although most studies (68%) reported significant biological effects, studies solely funded by the industry were almost ten times more likely to report no significant problems.15 Funding bias had not changed substantially in 2010 when the group updated their systematic review; they also noted that many reports lacked conflict of interests statements, even when authors had industry affiliations.

A further problem of conflict of interest in this field is referenced by Dr. Blank at Exhibit C9-14, question 7:

> Many biases and errors can occur in the conduct of experimental studies conducted in the laboratory. A review of some of the controversial replication reported in Microwave News indicates that the biases and errors often stem from investigators who, funded by industry, appear committed to a non-effects model. For example, Lion Singh, '95, found DNA damage on exposure of cells. Subsequently, Maliapa, in 1997, from the lab of Roti Roti funded by Motorola, published a study purported to be a replication, and they failed to find an effect. However, an examination of what they did showed that it was not a replication. They selected different cells that were less sensitive to DNA fragmentation.
>
> Another example of use of a different cell population was a study by Geoffrey Schaeffer at Battelle, who could not repeat the Goodman Henderson study showing EMF stimulation of DNA. It was subsequently shown by Goodman that Schaeffer had used a different cell population, and that genetic variations in the cell lines used by the different research groups could explain the difference in fragility.

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[46] Hearing Transcript 4, page 705, lines 6 - 22

> Since the Maliapa study was supported by Motorola, and the Schaeffer study by Battelle, one wonders about the influence of industrial support on bias.

In cross examination[47], Dr. Maisch testified that conflict of interest in standard setting is a significant problem:

> MR. MACINTOSH: Q: And just like journalists and newspapers, they're duty bound when they write a story to disclose in the story, in most newspapers ethical guidelines, to disclose the conflict. It's not as if they're not allowed to write the article.
>
> DR. MAISCH: A: Well, this is the International Committee of Medical Journal Editors. It's not just newspapers.
>
> MR. MACINTOSH: Q: Now, my final point --
>
> DR. MAISCH: A: And I just might clarify too, in my thesis this is a topic which keeps coming back.
>
> MR. MACINTOSH: Q: That is your thesis.
>
> DR. MAISCH: A: Financial conflict of interest -- yeah, that is in my thesis too, besides my statement here. Financial conflict of interest is a fundamental problem in this whole story, this whole standard setting since the 1950s really.

On the subject of conflict of interest, it is notable that the IEEE does not require that its members make a declaration of interests, whereas IARC does.[48] ICNIPR membership is by invitation[49], in relation to which Dr. Carpenter made the following remarks in cross-examination[50]:

> MR. MACINTOSH: Q: And the FCC and Health Canada and other international agencies, they all have a different view from you, don't they, on what to draw--
>
> DR. CARPENTER: A: That's correct, and many of those views are based on the ICNIRP recommendations. And I would point out that ICNIRP is very much like the Bioinitiative group. It's not a recognized -- it's not appointed by any government or government agency. It self-appoints its members, just as the Bioinitiative group did. It's not -- there's no transparency in how individuals are chosen, and I would suggest that individuals are

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[47] Hearing Transcript 8, page 1630 (from line 26) to 1631 line 16

[48] Hearing Transcript 4, page 719, lines 9 - 12

[49] Hearing Transcript 4, page 734, line 13.

[50] Hearing Transcript 11, page 2121 (from line 13) to 2122 line 1

chosen because of their points of view, one of which major one is that there are no such things as non-thermal adverse effects of radio frequency radiation.

20. Exponent weaknesses: Assumes that there are no non-thermal adverse health effects

Another factor to be considered in assessing the weight of the Exponent Report is its assumption that there are no adverse health effects at non-thermal levels. This assumption was addressed by Dr. Carpenter at page 14 of his report:

> The Exponent Report accepts the fallacious assumption that there are no adverse health effects not mediated by tissue heating. This is such a fundamental flaw so as to invalidate the whole report, as discussed above. The authors dismiss evidence of non-thermal effects by referencing reports of the IEEE, 2005; ICNIRP, 2009; HCN, 2009: NRPB, 2004; SCENIHR, 2009 and SSM, 2009 and 2010. They state that reports of non-thermal effects are not reliable, consistent or reproducible, and are not supported by any plausible biological explanation as to how they can occur and that some of the biological effects reported are not known to be linked to adverse effects on health. This reasoning is completely invalid. There is consistent and reproducible evidence that extensive and prolonged use of cell phones is associated with an elevated risk of brain cancer, certainly a biological effect that is clearly linked to an adverse effect on health. There is an enormous body of evidence, summarized in encyclopedic detail in the Bioinitiative Report, that demonstrates a variety of mechanisms, any one of which may be the basis for development of cancer. It is true that the listed reports of the various "independent" agencies dismiss adverse effects of radiofrequency fields, primarily because of there not being one specific identified mechanism or clear animal model. But in this case animals do not respond as humans do, and the evidence for harm to human is clear. A single mechanism for cancer is not known for many cancer-causing substances, as for example arsenic and dioxin, yet they are identified as known human carcinogens. However, the major basis behind all of these agency reports as well as the Exponent Report is this article of faith, not fact, that there are no adverse non-thermal health effects. This is simply not true.

21. Exponent weaknesses: Assumes no risk because a causal mechanism has not been established

Dr. Bailey admits[51] that RF emissions, such as those from the proposed AMI meters, are a factor in cancer. At the same time, he rejects the notion that a health risk has been established. Why? Because he says a causal mechanism has not been established. This, we submit, is fallacious reasoning which should further undermine any weight to be attributed to the Exponent Report.

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[51] Hearing Transcript 5, page 906 (from line 25) to 908 line 18

The relevant testimony from Dr. Bailey is as follows [52]:

> DR. BAILEY: A: The determination of cause and effect involves more than just the assessment of statistical associations. But as I said before, whether something would be considered a factor based upon epidemiology studies would be because some association had been reported.
>
> MR. AARON: Q: Right. And at the end of your report you conclude, the last sentence:
>
> > "The reviews of the recently published research, with improved exposure information, do not provide a reliable scientific basis to conclude that the operation of the advanced meters will cause or contribute to adverse health effects or physical symptoms in the population."
>
> DR. BAILEY: A: Yes.
>
> MR. AARON: Q: And so you're making a statement with respect to your ability to conclude a causal relationship, correct?
>
> DR. BAILEY: A: And whether the evidence supports that.
>
> MR. AARON: Q: But your statement, your conclusion that I just read doesn't discount the possibility that the advance meters, that the type of radiation from the advance meters could be a factor in health and disease.
>
> DR. BAILEY: A: What I --
>
> MR. AARON: Q: Short of causal effect.
>
> DR. BAILEY: A: Well, I think, for example, the fact that a statistical association has been reported between the usage of mobile phones and certain types of cancer, which was recognized in the IARC review, would be an example that that level of exposure was something that had -- the presence of that association, although not determined to be causal, is something that suggested this is a factor to be considered in doing further work to determine if the relationship is causal.
>
> MR. AARON: Q: Would you also say it's a factor to be considered in health and disease, to use the language on page 7?
>
> DR. BAILEY: A: Yes, I would say so.

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[52] Hearing Transcript 5, page 906 (from line 25) to 908 line 18

MR. AARON: Q: So then the type of emissions that arise from AMI meters are a factor to be considered in health and disease, one of which is cancer.

DR. BAILEY: A: Yes.

22. Additional Safety Code 6 Weaknesses: Overview

We have already argued at length that the evidentiary value of Safety Code 6 is weak due to the fact that:

- the weight of evidence process involves the exercise of subjective judgment; and
- the weight of evidence process occurs behind closed doors without any publication of a monograph or any explanation as to what reasoning or analysis resulted in its conclusions.

For the following reasons, Safety Code 6 should not be adopted by BCUC, nor should it serve as a baseline for the Commission's assessment of the health and safety of the proposed technology:

- Safety Code 6 has no regulatory application to the AMI program or to the instant proceedings
- Safety Code 6 fails to protect against non-thermal effects
- The authors of Safety Code 6 are entrenched in their rejection of non-thermal evidence
- Safety Code 6 does not consider chronic, proximate, continuous exposure
- Safety Code 6 does not consider modulation characteristics
- Safety Code 6 deals only with averages
- Safety Code 6 is no substitute for the risk assessment process
- Safety Code 6 is just one of various standards

23. BCUC Jurisdiction

A. Legislative context

The Commission's mandate under the CPCN analysis includes analysis of health, environmental and social interests - all of which should properly factor into the economic analysis - and none of

which is factored into the “established science” threshold used by Health Canada to set exposure standards. The analysis before this Commission is quite different from that employed by Health Canada in devising the limits of Safety Code 6.

It is well established that social, health and environmental considerations go to the determination of public convenience and necessity, as recognized by the BC Court of Appeal in *BC Hydro v. BCUC* 1996 CanLII 3048 (BC CA) at paragraph 35:

> It appears reasonable to assume the purpose of the Guidelines is to look beyond a simplistic view of utility planning as one limited to selecting the resources needed to meet anticipated demand and in doing so, to reject an equally simplistic view of regulation as ensuring that service is provided at the least cost to the consumer. It has been evident for some years now that environmental considerations are important in the formulation of the opinion represented by the phrase "public convenience and necessity".

Under the following provisions of the Utilities Commission Act [RSBC 1996] Ch. 473 (“UCA”), the Commission has jurisdiction to determine matters of safety, health and environment:

General supervision of public utilities
23 (1) The commission has general supervision of all public utilities and may make orders about
...
(i) the safety, convenience or service of the public,

Commission may order improved service
25 If the commission, after a hearing held on its own motion or on complaint, finds that the service of a public utility is unreasonable, unsafe, inadequate or unreasonably discriminatory, the commission must
(a) determine what is reasonable, safe, adequate and fair service, and
(b) order the utility to provide it.

Public utility must provide service
38 A public utility must
(a) provide, and
(b) maintain its property and equipment in a condition to enable it to provide,
a service to the public that the commission considers is in all respects adequate, safe, efficient, just and reasonable.

Certificate of public convenience and necessity
45 (1) Except as otherwise provided, after September 11, 1980, a person must not begin the construction or operation of a public utility plant or system, or an extension of either, without

first obtaining from the commission a certificate that public convenience and necessity require or will require the construction or operation.

> ...
> (8) The commission must not give its approval unless it determines that the privilege, concession or franchise proposed is necessary for the public convenience and properly conserves the public interest.

B. Argument

FortisBC's position is to defer to Health Canada and is premised on the false assumption that Safety Code 6 has some kind of regulatory application to its AMI program.

Safety Code 6 does not apply. Neither the proposed AMI program nor the present proceedings come under the jurisdiction of the federal government, the Radiocommunication Act, Health Canada or Safety Code 6. That is the end of the jurisdictional analysis. We do not have to ask the BCUC to exercise jurisdiction to amend Safety Code 6 or alter its application. Safety Code 6 does not apply in the first place.

The UCA requires that the BCUC exercise its jurisdiction to determine safety, and that exercise of jurisdiction cannot be encumbered by the federal government, the Radiocommunication Act, Health Canada or Safety Code 6.

It would be an error of law for the BCUC to fetter its jurisdiction under the UCA by holding itself to be bound by Safety Code 6 in the determination of the safety issues at hand.

24. FortisBC's approach is to defer to Health Canada

FortisBC has not done its own analysis to determine whether the proposed meters are safe. Rather, FortisBC and its consultants merely defer to Health Canada in that regard. This position is premised on the false assumption that Safety Code 6 has some kind of regulatory application to its AMI program ("the Assumption").

The Assumption is reflected in the opening remarks of counsel for FortisBC in this matter:

> In closing submissions, the evidence will be presented within the relevant legal framework, and that framework includes the fact that as the Commission noted, in Order G-177-12, and I quote here:
>
> > "It has no jurisdiction over regulations made by Health Canada and other agencies. Accordingly, it is not within the Commission's mandate to consider any changes to these regulations."

FortisBC's deference to Health Canada, and its treatment of Safety Code 6 as the ultimate determiner of health risk, is further reflected in the respective remarks of Dr. Bailey [53] and Mr. Loski [54] in cross-examination:

> DR. BAILEY: A: I understand that. And I think -- I think this is one of the reasons why it's important to -- for people who have questions, to seek information from, you know, competent authorities like Health Canada and these other major reviews, because one can go out in the internet and find a variety of information of dubious provenance and accuracy, and unfortunately I think, you know, in our search for information sometimes we don't always pick the most reliable sources and then wind up being concerned when that is not what the position of health authorities are.
> ...
> MR. LOSKI: A: Yes, and again sympathize with your friend, Mr. Atamenenko. I, in my view, I don't dismiss this lightly. We are not, at FortisBC, we are not scientists and we are not doctors, so we need to look to, as I said in the last couple of days, we need to look to the authorities, including Health Canada, to tell us, or to enlighten us, I guess, and provide direction and guidance to what we do.

FortisBC's approach was not to determine for itself whether the AMI meters are safe. Rather, its approach was to comply with what it saw to be the "competent authority":

> MR. LOSKI: A: Please. Yes. Again as I stated yesterday, we look to the competent authority here, being Health Canada and Safety Code 6 standards, and we are in compliance with them, and as I read out yesterday, Health Canada saying that smart meters are safe, do not create adverse health effects for people. And yes, we stand by, we stand by that and stand by the program.
>
> MR. AARON: Q: You're not concerned by Mr. Bailey's evidence that Safety Code 6 doesn't address long-term exposure.
>
> MR. LOSKI: A: As I said, you know, we certainly -- again as experts here, we have to look to the authorities and as I said, we understand that Health Canada looks at all -- continually or ongoing monitors the appropriate science to come to its conclusions, and we take comfort in the role that Health Canada plays in that regard and again comfortable with -- confident in the fact that the emissions from the advanced meters that we're proposing are significantly lower than the thresholds that are set out in Safety Code 6, and again, take comfort in the fact that we are compliant with those regulations.[55]

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[53] Hearing Transcript 3, page 513, lines 10 - 21

[54] Hearing Transcript 6, page 1033, lines 11 - 18

[55] Hearing Transcript 4, page 758 (from line 21) to 759 line 17

25. The federal government has no regulatory authority: Safety Code 6 does not apply

However convenient it would be for FortisBC to be subject to the regulatory authority of Health Canada, there is simply no basis for the application of Safety Code 6 to these proceedings or the proposed AMI program. As such, FortisBC is incorrect in its presumption that it is required at law to comply with the Safety Code 6 standard.

Safety Code 6 is not a law. It is neither an act of parliament nor is it a regulation enacted through the governor in council. So then what is Safety Code 6 and how are its guidelines brought into effect? That question is answered by the 1999 Royal Society Report[56] at page 17:

> *3.3.1 Background to Safety Code 6*
>
> Health Canada and Industry Canada have recently reaffirmed the November 1988 Memorandum of Understanding (MOU) - between the then Department of Communications and the Department of National Health and Welfare - which assigns to Health Canada the role of principal advisor to Industry Canada regarding radiation hazards to human health. In order to fulfill its role of protecting the health of Canadians from the potential health hazards of nonionizing radiation, Health Canada has developed, and revised, Safety Code 6 (Safety Code 6). The panel based its review on the most recent revision, received in November, 1998. <u>The guidelines contained in this document [Safety Code 6] are brought into effect through Industry Canada's licensing procedures.</u>

Industry Canada's licensing procedures do not apply to the proposed AMI meters, so Safety Code 6 does not apply. As set out above, "the guidelines contained in [Safety Code 6] are brought into effect through Industry Canada's licensing procedures."

The following analysis demonstrates that Industry Canada's licensing procedures do not apply to the proposed AMI meters.

Industry Canada's licensing procedures operate pursuant to Industry's Canada's jurisdiction under the *Radiocommunication Act* R.S.C., 1985, c. R-2 which provides:

> 4. (1) No person shall, except under and in accordance with a radio authorization, install, operate or possess radio apparatus, other than
>
> > (a) radio apparatus exempted by or under regulations made under paragraph 6(1)(m);
>
> ...

[56] Exhibit C9-17

6. (1) The Governor in Council may make regulations

> (m) prescribing radio apparatus, or any class thereof, that is exempt, either absolutely or subject to prescribed qualifications, from the application of subsection 4(1);

The *Radiocommunication Regulations* provide:

> 15. Radio apparatus that is set out in and meets a standard set out in the Licence-exempt Radio Apparatus Standards List, October 2010 is exempt from the application of subsection 4(1) of the Act in respect of a radio licence.

The AMI meter device is included within the scope of devices listed in the Licence-exempt Radio Apparatus Standards List, October 2010, a copy of which is enclosed.

Specifically, the AMI device falls within the scope of SP 896 MHz — Spectrum Utilization Policy for the Fixed, Mobile, Radiolocation and Amateur Services in the Band 896 - 960 MHz, a copy of which is enclosed.

The AMI meter device is exempt having to be licensed under the *Radiocommunication Act* and *Regulations*. It is only through this licensing requirement that Safety Code 6 applies. In the absence of the application of this licensing requirement, there is no opportunity for Safety Code 6 to apply as a regulatory standard.

FortisBC agrees that it is exempt from federal licensing requirements.[57]

If Safety Code 6 does not apply through the licensing requirements under the *Radiocommunication Act* and *Regulations* then what other application can it have? The preface of Safety Code 6 states:

> The safety limits in this code apply to all individuals working at, or visiting, federally regulated sites. These guidelines may also be adopted by the provinces, industry or other interested parties. The Department of National Defence shall conform to the requirements of this safety code, except in such cases where it considers such compliance to have a detrimental effect on its activities in support of training and operations of the Canadian Forces. This code has been adopted as the scientific basis for the equipment certification specifications outlined in Industry Canada's regulatory compliance documents(1–3), that govern the use of wireless devices in Canada, such as cell phones, cell towers (base stations) and broadcast antennae.

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[57] Hearing Transcript 5, page 960, lines 5 - 13

We approach each of these circumstances in turn.

First, neither the AMI program nor this proceeding involves circumstances of individuals working at, or visiting, federally regulated sites.

Second, Safety Code 6 has not been adopted by the Province of British Columbia.

Third, neither the AMI program nor this proceeding involve the Department of National Defence.

And finally, FortisBC is not engaged in the manufacture of any equipment and is not, therefore, subject to any equipment certification specification.

In conclusion, Safety Code 6 has no regulatory application to the operation of the proposed AMI meters. To the extent that Safety Code 6 applies in the equipment certification process, it applies to the manufacturer (Itron). In any case, Safety Code 6 has no application to FortisBC.

26. Safety Code 6 fails to protect against non-thermal effects

In her report at pages 13 and 20, Dr. Sears explains the basis for the concern that RF may have a harmful effect at sub-thermal levels:

> Bulk heating has been a convenient experimental measurement as technology has been available to quantify temperature for decades, but bulk heating is in no way a sensitive indicator of molecular effects of radiofrequency radiation. Indeed, contrary to the opinion expressed in the Exponent report that heating is a sensitive measure of potential harm, bulk heating could be considered an end-stage, least-sensitive measure of molecular perturbations caused by radiofrequency radiation. [page 13]
>
> ...
> These pulsed signals emanate from equipment with high-speed interfaces and rapid switching resulting in brief "packet" transmissions of millisecond durations; these pulses do not involve sufficient energy to substantially heat tissue, but may have other effects on DNA, smaller polar molecules and membranes, that impair homeostasis and may precipitate physiological symptoms. [page 20]

In relation to RF exposure, Safety Code 6 does not go so far as to say that tissue heating is the only health effect to be avoided. Indeed, the language of Safety Code 6 implies that there are effects, other than tissue heating, to be avoided. This interpretation was affirmed by Dr. Bailey in cross-examination[58].

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[58] Hearing Transcript 5, Page 896 (from line 13) to 897 line 1

Nevertheless, there is not a specification in Safety Code 6 to identify non-thermal adverse bio-effects within the frequency range emitted by AMI meters.[59] Dr. Bailey confirmed that the basic restrictions in Safety Code 6 are designed to limit temperature increases in tissues.[60]

27. The authors of Safety Code 6 are entrenched in their rejection of non-thermal evidence

In his evidence in the *Chateauguay v. Rogers* case, James McNamee gave inconsistent evidence as to whether there is evidence of non-thermal effects. On one hand he stated at page 69:

> A. We recognize that there are a large number of studies assessing virtually every health endpoint there is. There are a large number that show an adverse effect here, an adverse effect there. So, I'm not denying that there are studies showing effects, no question.

But prior to that he testified at page 61:

> Q. And there's no evidence today for non-thermical [sic] effects for our frequency?
>
> A. No evidence of non-thermal adverse health effects.

We submit that McNamee's "no evidence" assertion is inconsistent with a large body of scientific material including:

- Dr. Bailey's admission[61] that RF emissions, such as those from the proposed AMI meter, are a factor in cancer;
- The Interphone study's association between heavy cell phone use and brain tumours; and
- IARC's recent classification of RF emissions, such as those from the proposed AMI meter, as a class 2B possible human carcinogen.

In his evidence in the *Chateauguay v. Rogers* case, James McNamee demonstrated Health Canada's entrenched approach and the manner in which it is dismissive to evidence of non-thermal effects. We refer to his evidence at page 53:

> Q. Are you aware of this article by Levitt & Lai?

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[59] Hearing Transcript 5, Page 883 (from line 17) to 884 line 2

[60] Hearing Transcript 5, Page 881, line 2 - 5

[61] Hearing Transcript 5, page 906 (from line 25) to 908 line 18

A. I am.

Q. And was it considered, this article, by Health Canada?

A. It was not considered in reviewing Safety Code 6 in 2009. The document espouses an opinion which is contrary to that of Health Canada and to which we do not agree. With respect to...

Q. Why does Health Canada not agree?

A. We don't agree with how their review of the literature was done and the recommendations that they came to, because they don't take the same approach that most health agencies would toward evaluating the scientific literature.

28. Safety Code 6 give no consideration to chronic exposure

AMI Meters will result in chronic exposure

At the maximum theoretical duty cycle of 5% (which was determined by FortisBC in the context of its endeavors to comply with Safety Code 6), exposure to the AMI meter over 20 years would result in one year of continuous exposure. This accords with Dr. Sears statement at page 3 of her report:

> According to the Itron manufacturer, the transmitter emits at 689 milliwatts (mW) power in the 900 MHz band. In use, the meter is projected to emit at most 5% of the time for electricity consumption monitoring. It is not evident that any feature of the meter restricts transmissions; this is a characteristic of need for the proposed network.

At the average duty cycle claimed by FortisBC, exposure to the AMI meter over 20 years would result in one month of continuous exposure. Dr. Shkolnikov's calculation at Hearing Transcript 5, page 868 comes out to 0.144 years, which equates to 1.68 months.

FortisBC does not intend to turn off the AMI meters. They will operate continuously every day on a 24-hour basis.[62]

Long-term effect is a critical factor in risk assessment

The 1999 Royal Society report[63] states at page 115:

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[62] Hearing Transcript 5, page 863, lines 23 - 24

[63] Exhibit C9-17

> Microwave communications, including cellular telephones, have not been in general use for a duration sufficient for all potential health effects to have emerged.

Dr. Bailey in cross-examination[64] explicitly agreed, adding that:

> For some types of diseases we have --there's not been enough, a long enough time to exhaust all possibility of assessing the risk, because the time frame is -- for which we have good data anyway, is probably 15 years or so. And some types of tumours might take longer to develop than 15 years...for some types of diseases, there may not have been long time enough for these potential effects to be fully investigated.

Dr. Bailey in cross-examination further testified that "time is a factor in the assessment of potential health effects for RF and any such exposure." [65]

The Exponent Report states, at pages 1 - 2:

> The main public questions that arise in regard to these devices are about cancer risks from long-term exposures.

...and at page 3:

> The next step, dose response assessment, is an evaluation of the data from the hazard identification to determine what intensity and <u>duration</u> of exposure causes adverse effects that have been identified.
>
> [emphasis added]

Dr. Bailey in cross-examination[66] further stated:

> MR. AARON: Q: And so, duration, or amount of exposure, is central to hazard identification, dose response assessment and specific risk characterization. Correct?
>
> DR. BAILEY: A: It is an element of all of those.

Dr. Bailey's testimony in cross-examination was that the passage of time is a central factor in the conduct of epidemiological and cohort studies.[67]

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[64] Hearing Transcript 4, page 737 (line 24) to 738 (line 9)

[65] Hearing Transcript 4, page 739 lines 18 - 19

[66] Hearing Transcript 4, page 741, lines 10 - 14

[67] Hearing Transcript 4, page 741 (line 17) to 743 (line 22)

The Exponent Report, at page 6, says that "acute effects occur typically from short term disclosures, but chronic effects such as cancer typically are linked to long-term exposures at low levels. Commenting on this statement in cross-examination[68], Dr. Bailey testified:

> DR. BAILEY: A: That's been the pattern that's been observed for many chemicals, and so that same kind of observation has been made with regard to radio frequency fields. That very intense high exposures can lead to immediate effects and to evaluate effects that might take a longer period of time that occur at lower levels, you would have to look over a longer period of time.

The Interphone study found, on the basis of an odds ration in excess of 3.0, an association between cancerous tumours and a high volume of cell phone use. Those tumours, according to Dr. Bailey, are a kind of cancer the development of which could not be studied in a short-term study. It would require a longer period of study and observation.[69]

Dr. Bailey, in cross-examination[70], endorsed the principle that the probability of an effect occurring, or the severity of an effect, increases with a dose or amount of exposure if exposure was continued throughout that period of time and if the biological response to that exposure was something that was cumulative.

Dr. Bailey, in cross-examination[71], endorsed the proposition that "an agent can show no impact on human health at a certain amount of exposure, but can then show impact on human health with further exposure."

The Exponent Report, at page 19, says "for most cancers the duration or latency period between exposure and diagnosis is decades, not years."

The Exponent Report, at page 23, references one of Hardel's studies that "...reported positive associations for mobile phone use in brain cancer, which tended to be stronger with increased hours of use."

Dr. Bailey, in cross-examination[72], agreed that long-term exposure to RF is a concern that carries much weight amongst the scientific community.

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[68] Hearing Transcript 4, page 744, lines 10 - 17

[69] Hearing Transcript 4, page 745, lines 10 - 18

[70] Hearing Transcript 4, page 745 (from line 19) to 746 line 8

[71] Hearing Transcript 4, page 747, lines 5 - 8

[72] Hearing Transcript 4, page 762, lines 3 - 9

Dr. Bailey, in cross-examination, admitted that the extent and duration of exposure might make a difference with respect to non-thermal effects.[73]

Dr. Bailey, in cross-examination, agreed that epidemiological studies "are needed" to monitor the potential health effects of long-term exposure to radio frequency fields. He further opined that further research to resolve the issues that were raised by the Hardel and Interphone studies "should be followed up on".[74] He further testified as follows:

> MR. AARON: Q: So 1999, it's been 14 years, that's not very many decades.
>
> DR. BAILEY: A: That's correct.
>
> MR. AARON: Q: In relation to the latency period of the cancer.
>
> DR. BAILEY: A: Yes.
>
> MR. AARON: Q: This is one ongoing experiment we're in, isn't it?
>
> DR. BAILEY: A: I don't know if I'd characterize it as an experiment, but it's certainly a topic that will be followed for years to come.

Martin Blank at Appendix C9-14 in responding to the CEC information requests, specifically question 12.1, says:

> Total RF exposure is of concern. It is the result of many individual sources. Since it's steadily rising, all sources need to be considered. Sources in the home such as smart meters have a relatively greater impact because of their proximity and their sustained nature.

Dr. Bailey, in cross-examination[75], affirmed that the interval between exposures is a relevant factor in the potential cumulative impact of RF emissions.

The 1999 Royal Society Report[76] at page 27 affirms the need to consider the duration of exposure beyond the 6-minute average used in Safety Code 6:

> Since power density is a measure of the RF intensity at a given point in time, it cannot be used to define cumulative exposure to RF fields, other than in a [time-weighted average].

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[73] Hearing Transcript 4, page 755 (from line 20) to 757 line 26

[74] Hearing Transcript 4, page 757 (from line 13) to 758 line 5

[75] Hearing Transcript 5, page 796, lines 20 - 23

[76] Exhibit C9-17

> As noted later in this report, there is reason to reconsider this approach toward RF exposure assessment. Possible areas of reconsideration include the modulation characteristics of the RF signal and the duration of exposure beyond the 6 minute average now used in Safety Code 6.

29. Neither Health Canada nor the Exponent Report address the risk of chronic exposure to low-level RF emissions

As stated by McNamee in his evidence in the *Chateauguay v. Rogers* at page 59:

> Okay. First of all, the time averaging doesn't refer to any length of time that you're allowed to be exposed, it's just a reference period upon which to make your measurements.

Safety Code 6 prescribes what the allowable exposure limit is within a 6-minute time span. It does not specify a limit on exposure duration[77]. As such, Safety Code 6 does not provide a reference point for health standards in relation to the application of a technology such as AMI meters.

The Commission is considering chronic, continuous, potentially close-range exposure to AMI meters, in the absence of any regulatory limit on exposure duration. These circumstances beg for the application of the language in Safety Code 6 that warns:

> In a field where technology is advancing rapidly and where unexpected and unique problems may occur, this code cannot cover all possible situations. Consequently the specification in this code may require interpretation under special circumstances.[78]

The failure of Health Canada to specify any limit on exposure duration clearly fails to consider that the passage of time is a key factor in the assessment of the adverse bio-effects from RF exposure. In relation to the absence of such a limit, Dr. Bailey provided the following evidence[79]:

> DR. BAILEY: A: … So, the fact that Safety Code 6 did not set out a standard for chronic exposure reflects the scientific consensus that there is not a sufficient scientific basis to develop such a standard.
>
> MR. AARON: Q: And part of the reasoning why there is not a scientific basis to set such a standard is because, as you say, latency period on cancer could be decades.

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[77] Hearing Transcript 4, page 751, lines 6 - 8

[78] Hearing Transcript 5, page 884, lines 16 - 19

[79] Hearing Transcript 4, page 752 (from line 23) to 753 line 24

> DR. BAILEY: A: The standard bodies and agencies can only review evidence that they have, and they have assessed the evidence and concluded that based upon what is available to date and the latency periods evaluated, that there is not a basis to conclude that there are adverse long-term health effects including cancer.
>
> Out of an abundance of caution, of course we should continue this monitoring so that we have the same kind of 40-year follow-up such as the occupational study that I described.
>
> MR. AARON: Q: Well, we could do a study of Fortis customers. Wouldn't that be a great opportunity? To monitor the long-term effects of exposure to low level?
>
> DR. BAILEY: A: I'm sure such a study could be done. I'm not sure that many scientists would be interested in it, but --
>
> MR. AARON: Q: I'm just not sure that the subjects have agreed to participate.

FortisBC should not be allowed to subject their customers to these uncertainties, particularly when there are alternative (non-wireless) means of achieving the objectives of the AMI program. At the very least, customers wishing to opt-out should have the right to do so.

Nowhere in the Exponent Report is there any consideration and/or analysis with respect to the fact that Fortis customers are going to experience chronic exposure to these meters, on a continuous basis, for the life of the meter, which could be 20 years. When confronted with this omission, Dr. Bailey gave the following evidence in cross-examination[80]:

> MR. AARON: Q: And my question for you is in assessing -- in your risk assessment with respect to the AMI meters, is there any part in the Exponent Report where you consider and make an analysis with respect to the fact that Fortis customers are going to experience chronic exposure to these meters, day in and day out, for the life of the meter, which could be 20 years, and a baby could be born and spend 24 hours a day sleeping within three feet of one of these meters and grow up in this context of chronic exposure. Where in the Exponent Report have you considered that factor?
>
> DR. BAILEY: A: The research that we have reviewed considers chronic exposure to radio frequency fields from a variety of sources. So, for instance, there are studies that have -- that I have reviewed that looked at the cancer mortality experience of persons who had intensive exposure to radio frequency fields as part of their military work, and the health experience of those individuals were followed for a period of 40 years, following this exposure to radio frequency fields while they were in the military.

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[80] Hearing Transcript 4, page 749 (from line 14) to 751 line 5

MR. AARON: Q: You're free to go an insight those studies.

DR. BAILEY: A: But I'm telling you, this is the kind of information that I had considered in my thinking in writing this report.

MR. AARON: Q: Right, and where is that set out in your report? Or is just a latent --

DR. BAILEY: A: I did not cite it --

MR. AARON: Q: -- consideration that --

DR. BAILEY: A: Again, the purpose of my report was to provide an overview of the status of scientific research on radio frequency fields and health and issues of -- such as a report that I just described and others are cited in the reviews that I indicated in the Exponent Report.

MR. AARON: Q: So you're saying "Other people considered this in their studies and I read their studies, but I didn't engage in any explicit analysis in the body of my report on the factor of chronic exposure."

DR. BAILEY: A: I didn't not draw specific attention to that.

In addition to the factor of long-term, chronic, continuous exposure, the AMI program also presents the prospect of proximate exposure, as affirmed in cross-examination[81] by Dr. Bailey:

AARON: Q: But we're repeating ourselves a little, and I'm trying to nail you down on this point. You're saying proximity isn't the be-all and end-all of exposure. And I'm saying it's a factor. And I'm asking you to affirm that.

DR. BAILEY: A: It is a factor that determines exposure, but it can't be looked at in isolation.

MR. AARON: Q: Absolutely.

DR. BAILEY: A: Okay.

MR. AARON: Q: And that factor, in the case of the AMI system, could be, in terms of physical proximity, a matter of two or three feet, correct?

DR. BAILEY: A: Yes.

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[81] Hearing Transcript 4, page 769 (from line 17) to page 770 line 3

30. Safety Code 6 Weaknesses: No consideration of modulation

The manner in which a particular RF signal modulates may be a factor in the extent to which that signal has a bio-effect, as described by Dr. Sears at page 13 of her report:

> The Itron meters emit brief microwave pulses or "packets" rather than a continuous signal. Research has largely focused on continuous signals that are readily characterized, rather than the transmission peculiarities of myriad technologies; however, when modulated or discontinuous signals, or cell phones that are transmitting speech, are compared with continuous radiation, effects are generally more pronounced with the irregular signals than with unmodulated radiation. There are many examples, but this was recently demonstrated as more pronounced effects on slow-wave and rapid-eye-movement sleep in rats exposed to 900 MHz modulated signals, compared with unmodulated, or sham exposures [34] (Mohammed *et al*. also review radiofrequency effects on sleep, and brain circulation and chemistry).

Safety Code 6 does not does not carve out a different exposure limit for radio frequency sources with different types of modulations.[82]

Dr. Bailey could not confirm that Health Canada assessed the factor of modulations. He could only speculate that they must have considered it and he could not confirm what their thinking was on that factor. His evidence[83] was:

> So there are -- my testimony is that the -- any review of the radio frequency literature on exposures relating to health would have -- if it was at all comprehensive and not selective -- would have included studies with different types of modulations, and that those studies were -- and those reviews that discuss this topic were referenced by Safety Code 6.
>
> So my -- the implication is that the reviewers, the people who developed Safety Code 6 had read and reviewed studies that considered different types of modulation and when they set up the standard they did not set up or carve out a specific exemption or specification that related to modulation.

Dr. Bailey also testified:

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[82] Hearing Transcript 4, pages 666 (from line 14) to 667 line 5

[83] Hearing Transcript 4 at page 671 lines 17 - 23

> I can't speculate about how they interpreted the data, because that's not described. … I don't know, I can't go into the minds of the reviewers to further intuit how they dealt with that information.[84]

Dr. Bailey could not point to any study designed so as to consider whether modulation is a characteristic to be assessed in and of itself as a factor in risk assessment.

31. Safety Code 6 Weaknesses: Deals with averages

The pulsating nature of AMI meter emissions was described by Dr. Sears in her report page 3:

> The meter transmits small amounts of information, on the order of once a minute (approximately 1,268 times a day [IR1, CSTS 57.2]). The number of transmissions increases during network setup or following a perturbation.
>
> Transmission of power consumption data as well as signals to maintain and confirm the mesh network requires extremely brief transmissions (between 18 and 125 milliseconds [ms]) (IR1, CSTS 57.5). These transmissions are characterized as "packets" by the industry, or "pulses" or "bursts" by some others.

The concern with a health protection standard based on averaging was set out by Dr. Sears at page 20 of her report:

> If bulk heating was the only biological effect of radiofrequency emissions of concern, then the low <u>average</u> power of 8 to 25 millisecond packets spread over six minutes might be reassuring. If, however, bursts of radiofrequency radiation with complex wave forms have other biological effects, this averaging would be obscuring a hazard.

Further, in cross-examination[85], Dr. Sears explained that Safety Code 6 standards are based on averages (taking a short burst of energy and averaging it over a long period of time. But, she explained, the human body is going to experience the actual signal (not the average). She testified that continuous exposure to these signals could trigger compensatory mechanisms in the body. Dr. Sears suggested that standards should be associated with the appropriate time frame reflective of the nature of exposure.

Dr. Carpenter's concern with averaging is set out in his report at page 15:

> There is another important concern here. The standard practice is to average the radio frequency exposure over periods of time. It is likely that most of the time, the average exposure levels from smart meters, at distances of one meter, fall below the standard of

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[84] Hearing Transcript 4, pages 667 - 669

[85] Hearing Transcript 8 pages 1826 to 1828

> the FCC and Health Canada. However, the RF released is in the form of high intensity pulses, not continuous releases. Since the meters transmit in pulses, it is not clear that averaging the power over time is appropriate, since it may be peak power, not average exposure, that is of greater concern. The maximum transmitted power reported by PG&E was 1000 milliwatts. Given the high peak power, this at least raises
> the possibility that exposures may even exceed FCC standards which are based solely on prevention of heating and do not consider all of the above evidence, that there are serious adverse human effects at much lower exposures. This is a subject urgently in need of additional research.

Dr. Maisch's report at page 3 also refers to the concern that "the SAR time averaging calculations, as used in the [IEEE] standard, hid any biological effects resulting from modulated RF exposures." He goes on at page 14 to state:

> In addition, Safety Code 6's method of using a six minute time average for exposure is not suitable for smart meter emissions, since the transient radio frequency spikes that are constantly being emitted by an active smart meter are smoothed out by averaging over six minutes, thus eliminating the assessment of maximum peak exposures. If there are unique health effects from smart meter emissions, it might be from those brief but frequent peak exposures.

Dr. Bailey also testified that it is insufficient to assess risk in relation to the figure that relates to average power density. He admits that burst / modulation characteristics of burst need to be considered.[86]

Despite the existence of criticism of Safety Code 6's method of using a 6-minute time average for exposure determination, the Exponent Report did not consider the validity of Safety Code 6's standard in that regard.[87] Further, the Exponent Report did not consider the burst / modulation characteristics of the AMI meters.[88]

32. Safety Code 6 is no substitute for the risk assessment process

Regardless of whether it applies as a regulatory standard, compliance with Safety Code 6 does not resolve the health issues that go to the CPCN analysis. The Commission should apply Safety Code 6 in lieu of an independent exercise of its jurisdiction to determine safety under the UCA.

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[86] Hearing Transcript 4, page 684 (line 12) to 685 line 9

[87] Hearing Transcript, page 696, lines 8 - 18

[88] Hearing Transcript 4, page 685 (line 10) to 686 line 1

Safety Code 6, written before[89] the onset of smart meters in Canada, includes the following limitation clause in its preface:

> In a field where technology is advancing rapidly and where unexpected and unique problems may occur, this code cannot cover all possible situations. Consequently the specification in this code may require interpretation under special circumstances. This interpretation should be done in consultation with scientific staff with the Consumer and Clinical Radiation Protection Bureau of Health Canada.

Dr. Bailey, in cross-examination[90], affirmed that FortisBC has focused its compliance efforts on the standard set in Safety Code 6, but he admitted that compliance efforts in that regard are no substitute for a health risk assessment process independent of that:

> MR. AARON: Q: Moving on, at page 3 of the Exponent Report -- sorry. At the second paragraph, at the end of the paragraph you're describing the specific risk characterization process and you say at the end of the paragraph:
>
> > "The final step is to compare the specific exposure to the relevant standard." Correct?
>
> That's what you wrote?
>
> DR. BAILEY: A: Yes.
>
> MR. AARON: Q: What standard do you mean in this context as being the relevant standard?
>
> DR. BAILEY: A: We have stated that for the purposes of the assessing in Canada the compliance of the smart meters with Canadian regulations, we used the Safety Code 6 as the relevant standard that had to be met for deployment of the smart meters.
>
> MR. AARON: Q: So you're premising your notion of relevance -- you're premising your notion of Safety Code 6's relevance on your understanding that you had to meet that standard.
>
> DR. BAILEY: A: That -- standards are based upon -- are determined on a national basis, generally, for compliance. And so if the question is, what is the standard to which the smart meter have to comply, then that obviously points to Safety Code 6 as the national

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[89] Hearing Transcript 5, page 884, lines 16 - 19

[90] Hearing Transcript 5, page 897 (from line 2) to 898 line 9

> standard. But that is not a substitute for the scientific assessment, health risk assessment process independent of that.
>
> MR. AARON: Q: Oh. I agree with you on that. But you identified Safety Code 6 as the relevant standard on the presumption that you were required at law to meet that standard.
>
> DR. BAILEY: A: Yes. I can --

FortisBC repeats the chorus that the AMI emissions will be an order of magnitude below the power density limit set by Safety Code 6. In reply to that position we make the following points.

First, level of emissions (power density) is not the only risk factor. Additional risk factors include the continuous, cumulative long-term duration of exposure, the effect of the particular modulation contained within the AMI meter and the potential proximity of the meter. None of these risk factors are addressed by the existing regulatory structure. In fact, Safety Code 6 is regulating in a different paradigm of health risk (tissue heating), including burns. Health Canada has not stepped up to the plate with respect to regulating the concerns raised by CSTS. As such, it is no consolation to CSTS that the AMI emissions will be below Safety Code 6.

33. Safety Code 6 just one of various standards

Using Safety Code 6 as a baseline for determining the state of scientific research is arbitrary. Safety Code 6 has no particular application to these proceeding and it is just one of various standards.

In his evidence in the *Chateauguay v. Rogers* case, James McNamee testified at page 63:

> Q. Okay. Are you aware that international standards or guidelines elsewhere than Canada are lower than the ones in Canada?
>
> A. There are some.
>
> Q. There are some at your knowledge?
>
> A. I know of a lot of them.

Dr. Sears addressed the plurality of regulatory standards at pages 8-9 of her report:

> For example, even if the effects are transitory or there is an adaptive response, Russia considers that immunological effects of radiofrequencies (first observed many decades ago) were sufficiently concerning that regulatory exposures are a small fraction of those in Canada's Safety Code 6 (see Table 1).[26]

She further stated, at pages 10-11:

> The scientific consensus alluded to in the Exponent report is not reflected in exposure limits in various jurisdictions. According to a compilation for the Israeli government (referenced by Planetworks),[27] Canada is among the least protective countries (Table 1).

Table 1. Comparison of Radiofrequency Power Density Permitted in various countries (after Mazdar)[27]

Country (most to least protective)	Permitted power density, compared with International Commission for Non-Ionizing Radiation Protection (ICNIRP) Standard
Switzerland	0.01
Italy	0.02-0.2
Poland	0.02
Luxembourg	0.05
China	0.08
Israel	0.1
Bulgaria	0.12
Italy	0.02-0.2
Russia	0.2
Belgium	0.25
Greece	0.8
Canada, USA, Japan	**1.33**

34. The risk: Science hasn't established that the AMI meters are safe

The Exponent Report does not make a positive statement that the proposed AMI meters are safe. Rather, the report expresses its conclusions in the negative, i.e. that the risk of harm has not been established. Dr. Bailey gave evidence on this point in cross-examination[91]:

> MR. ANDREWS: Q: Thank you. Now, in the conclusion paragraph of your report at page 30 of the report itself, page 34 of 37, the last sentence states:
>
> > "The reviews and the recently published research that improved exposure information do not provide a reliable scientific basis to conclude that the operation of the advanced meters will cause or contribute to adverse health effects or physical symptoms in the population."

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[91] Hearing Transcript 4, page 570 (from line 20) to page 571 line 18

Do you see that?

DR. BAILEY: A: Yes.

MR. ANDREWS: Q: Would you agree with me that this is expressed in the negative? That it is -- it doesn't say that the scientific published research et cetera does provide a reliable basis to conclude that the operation of the meters will not cause adverse health effects, that that wording is presumably carefully chosen.

DR. BAILEY: A: I think we got a little bit into this issue a little bit yesterday is that scientists are necessarily cautious, and since science cannot prove the negative, that we have to be careful in not extrapolating beyond the point where the research takes us.

We submit that Dr. Bailey's position to the effect that "science cannot prove the negative" is inconsistent with the reference in the Exponent Report to the fact that there exists a standard for establishing a "reasonable assurance" of safety. That reference, at page 9 of the Exponent Report, is as follows:

> Furthermore, the position of the United States Environmental Protection Agency (EPA) is that, " ...the absence of tumors in well-conducted, long-term animal studies in at least two species provides reasonable assurance that an agent may not be a carcinogenic concern for humans" (USEPA, 2005, pp. 2-22).

Dr. Bailey's evidence was that no such reasonable assurance has been provided by the EPA with respect to the emissions at issue in these proceedings.

The failure of science to provide any assurances (with respect to adverse bio-effects at non-thermal levels) was further demonstrated by Dr. Bailey in cross-examination[92]:

MR. AARON: Q: Yeah. And they [international standard setting organizations] haven't concluded that these RF emissions are healthy, correct?

DR. BAILEY: A: They haven't proved the negative. They haven't proved that something could not occur from radio frequency fields from whatever the source.

MR. AARON: Q: They haven't come out and say, "We've done studies and on the basis of our studies we can say that the scientific evidence proves that there are not adverse bioeffects," correct?

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[92] Hearing Transcript 5, page 909 (line 23) to 910 line 10

> DR. BAILEY: A: Correct. Their assessment involves reviewing the evidence that is available and asking the questions: Does that evidence cause us to conclude that there are adverse health effects at low exposure levels?
>
> MR. AARON: Q: And would you agree with this very rough characterization that there's an order of scientific -- of scientists. You find them on ICNIRP and Safety Code 6, that have the view that there is no nonthermal adverse bioeffects. Correct?
>
> DR. BAILEY: A: I think that may be an overstatement. I think the position is that these reviews have not concluded that the evidence persuades them that there are such effects. It doesn't exclude the possibility that there could be.
>
> [emphasis added]

35. The risk: We are operating blind

In cross-examination[93], Dr. Jamieson testified that there has been no research on the health effects of smart meters before their roll out.

> I would actually tend to say that there has been no proper scientific research done on potential biological effects from smart meters before the roll-out, and there doesn't really appear to be any that's being done now.

This is affirmed by Dr. Maisch in his report at page 5:

> Currently, there is no research data that I know of specific to possible biological effects from smart meter emissions.

Over the course of 17 minutes of continued cross-examination[94] on this point, Dr. Bailey was unable to cite a study or provide other evidence to contradict Dr. Maisch's statement as cited above. The best Dr. Bailey could do was to refer to studies of exposure to GSM phones with modulation characteristics similar to that of AMI meters. However, there is no congruency to the pattern of exposure as between cell phones and smart meters. One does not sleep eight hours a day by one's cell phone. The exposure to cell phone emissions is not congruent in terms of being exposed to an AMI meter on a continuous basis.

The Exponent Report does not refer to any study of chronic exposure to RF emissions at the same modulation characteristic as the AMI meters.[95] Further, when asked to provide scientific studies of same, Dr. Bailey produced Undertaking #5 - a reference to various cell phone studies

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[93] Hearing Transcript 10, page 1962, (from line 26) to 1963 line 4

[94] Hearing Transcript 5, page 805 (from line 15) to 817 line 16

[95] 643 from line 11 to page

where no exposure pattern corresponded that which would occur from AMI meters.[96] Amongst that material is a study (Sommer 2004) where electromagnetic field exposure had a significant effect on body weight gain of female mice.

In cross-examination, Dr. Maisch queried the congruency of AMI exposure patterns to those that occurred in the studies enclosed with Undertaking #5:

> MR. ANDREWS: Q: So would you agree that that establishes a similarity between the modulations of the Itron meter in question here and the, for example, GMS cell phones that were the subject of these studies referred to in Exhibit B-43?
>
> DR. MAISCH: A: Well, I'd say they're actually similar, but going through it I look at the first one there, Smith, Studies of Chronic Exposure on page -- on this is looking at Undertaking No. 5, the first study there on page 2, the exposure was two hours a day, five days a week. On page 3, two hours a day, five days a week. And another one here on page 5, one hour a day, seven days a week. And on page 6, two 30 minute exposures per day. Now, in going through, looking at just taking no studies there, that I don't see how they can be relevant to say an exposure situation if someone's sleeping within 3 metres of a smart meter, which is a prolonged exposure every night. I'd say they're of interest but they're of little relevance in relation to the situation which I keep getting back to. A situation where smart meters would be located quite close to a bed head, which may be a child's bed head or an adult's bed head. They're interesting, but in my opinion they're of little direct relevance. And I think what I keep getting back to again is that we need to do more focused research specific to smart meters. As far as I know there's been no studies done yet that looks at smart meter emissions and possible effects, human health effects.
>
> MR. ANDREWS: Q: So the points of difference that you refer to are all differences in exposure, correct?
>
> DR. MAISCH: A: Yes.
>
> MR. ANDREWS: Q: Not differences in the type of radio frequency being emitted, correct?
>
> DR. MAISCH: A: Well, there would be some differences in -- they're using, you know, similar transmission. So these studies are using similar transmissions to a smart meter. Yes.

Dr. Maisch went on in cross-examination to emphasize the need for further studies and suggest the development of proximity guidelines.

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[96] Fortis Undertaking #5.

The absence of prior studies was also the subject of Dr. Maret's report at page 6:

> By averaging the power density over a the day, by multiplying the peak power density by the duty cycle, a much lower average value is obtained which looks quite low when compared the current RF exposure guidelines. These guidelines are based only on heating effects and do not consider any non-thermal biological or health effects. Averaging in this way, which is a commonly accepted practice, tends to obscure the potentially significant biological impact of short burst RF transmissions at peak power density levels which these meters generate. The pulsed nature of the 900 MHz transmission at irregular intervals is quite different than other existing wireless types of transmissions. Current wireless devices tend to be more continuous types of transmissions while in use and of a weaker power density level. No human, animal, cell studies or environmental impact studies involving these types of burst transmission patterns from smart meters have been carried out prior to deployment of these new technologies.
>
> [emphasis added]

Dr. Maret, at page 22 of his report, also commented on the novel exposure circumstances introduced by AMI meters with respect to sleep exposure:

> Microwave radiation exposure from RF mesh network and Home Area Network Zigbee transmitters occurring during sleep may adversely affect our biological and circadian rhythms, the daily physiological regulatory cycles. Smart Meters will pulse intermittently day and night and may have an adverse effect on sleep cycles. Unlike the users of cellphones who do not use them during sleep, RF mesh network meters will continue to emit low levels of pulsed RF radiation intermittently all night long.
>
> Exposure to microwave /radiofrequency fields affect the neuroendocrine system causing neuroendocrine chemical modulations and neurobehavioral reactions. Already in 1970s it was known that resonant absorption within the cranium may result in the focusing of energy and the production of electromagnetic ―hot spots‖ in the brain (Johnson & Guy 1972). Microwaves may disturb the critical hormonal regulatory areas including the hypothalamic-pituitary axis through ―low intensity‖ exposure. The body may elicit ―different responses relative to the timing of the exposure with respect to circadian rhythm‖ (Michaelson 1982).
>
> At night, while sleeping, the body is principally in a repair mode and the exposure to microwave radiation from these meters may potentially be more damaging than exposure during the day. It is vital that long-term exposure studies during the night be carried out to determine if pulsed microwave radiation from the meters could have an adverse biological effect on the population. One of the most common complaints from exposure to existing smart meter installations are sleep disturbances which mostly disappear when

the person is removed from the environment near the meters (see page 28 on Electrically Hypersensitive Population).

36. The risk: Individual vulnerabilities at stake

In her report, at paragraphs 16 and 19, Dr. Sears explained how some individuals are at heightened risk of adverse bio-effects from RF exposure and how this vulnerability has been recognized abroad:

> The bottom line of the current research is that exposure to doses of the radiofrequencies to be used by the proposed meters at levels much lower than present guidelines, can have biological effects on multiple systems. Furthermore, the young and those with co-morbidities are at heightened risk. Although the proposed exposure levels are less than with other technologies such as cell phones, pulsed signals are not comparable to continuous wave signals in terms of toxic effects. The strongest consensus appears to be that more research is needed. [page 16]
>
> [emphasis added]

> Sweden recognizes that electrohypersensitivity is a result of environmental exposures, and that citizens have a right to have their environment rectified.[47]
>
> The Irish Doctors' Environmental Association "believes that a sub-group of the population are particularly sensitive to exposure to different types of electro-magnetic radiation." The Association discusses symptoms clearly related to electromagnetic radiation exposure, with recommendations for patient care and more restrictive regulation of technologies.[80]
>
> The Austrian Medical Association reviewed evidence for EMF-related health problems, and released guidelines for diagnosing (including many objective tests) and treating patients with EMF syndrome.[74] [page 19]

In his evidence in the *Chateauguay v. Rogers* case, James McNamee, acknowledged at page 65 that certain members of the public can be more susceptible to harm:

> Q. You recognize that. At page 11, I highlight a sentence at paragraph number 2 saying: "Certain members of the general public may be more susceptible to harm from RF and microwave exposure."
>
> A. Would you like me to explain?
>
> Q. No, why this commentary or this affirmation is not taking into the Safety Code 6 as we know it in 2009?

> A. This is still part of the decision-making in Safety Code 6 2009. This was just an editorial change. The reason that this sentence was in Safety Code 6 1999 was to provide a rationale for having a lower tier for the general public in uncontrolled environments. All this statement does is recognize that you have a wide range of body sizes, you have a wide range of health status, you know, from the elderly to the very young, different thermal regulation properties amongst people on different medications perhaps. So, it's taking into account... and the lack of knowledge of the general population. So, all this is saying is that there isn't... we're not acknowledging electromagnetic hyper sensitivity or any of those issues, we're simply acknowledging that there's a diverse population out there and we want to provide an extra margin of safety for those individuals.

Under cross-examination by Mr. Andrews, Dr. Jamieson remarked on how much is at stake, given the number of people who claim to have EHS[97].

37. The risk: Blank and Carpenter reports

We adopt the reports of Dr. Blank and Dr. Carpenter in their entirity in support of our argument that there exists a risk of adverse health effects from RF exposure at sub-thermal levels.

38. The risk: Sears

Dr. Sears, at pages 12 - 15 of her report, addresses the risk of adverse health effects from RF exposure at sub-thermal levels:

> As well as risks of symptoms from short term exposure and cancer noted in the Introduction of the Exponent report (p 6), I would add serious concerns exist regarding effects on DNA expression, cellular processes and homeostasis, leading to multiple symptoms, including sensitivities, and delayed effects of early-life exposures. Biological effects of radiofrequency radiation is a very active area of research, identified by the US National Toxicology Program as an important priority.[28]
>
> ...
>
> BioInitiative2012 [7] (1479 pages) is a collection of chapters largely prepared by scientific researchers who have published in their respective fields of expertise. The basic thrust is that there is much greater certainty now than there was five years ago that radiofrequency

[97] Dr. Jamieson under Mr. Andrew's cross (9:47am)

radiation has adverse effects on health, and that prudent prevention is highly justified; indeed the authors contend over-due. [page 12]

...

Radiofrequency radiation affects basic building blocks of living organisms, and effects are seen in the most basic models.

Microwave radiation has been extensively studied in biochemistry, as it may affect configuration and orientation of enzymes, and thereby modify biochemical reaction rates.
…
… A 2012 publication describes significantly decreased liposomal deformability and increased rigidity following 2 or 6 hours exposure to 950 MHz, at 2.5 mW/cm^2.[37] [pages 13 - 14]

...

Hundreds of studies over decades have reported DNA damage, as well as other effects of various "non-thermal" electromagnetic exposures. With uncertainties in experimental and equipment design (poorly reported in publications) some findings were not replicated (often in ostensibly superior equipment), or ascribed to (micro-) thermal effects.[18] Nevertheless, there are strong signals of significant effects.

Cultured human HL-60 cells exposed to pulsed 2.45 GHz had altered expression of 221 genes after 2 hours exposure, and 759 genes after 6 hours.[38]

Bacterial cells exposed to microwave radiation develop pores in the membrane, that healed following discontinuing irradiation.[31] This was perhaps related to the effects seen in liposomes above, or related to calcium loss.[39]

DNA damage, measured as single-strand or double-strand breaks, or with assays such as comet assay, have clear implications for cancer. A recent review of this area identifies DNA as a "fractal antenna" that has potential to be the basis of new standards for radiation exposure.[40] Non-ionizing radiation may shift shared electrons along the structure, and more frequently used regions of DNA may be more affected. [page 14]

[emphasis added]

...

Two hour exposure of rats to 915 MHz GMS phone radiation (2W; SAR 0.4 mW/g) changed DNA conformation, affecting expression of 11 genes including proteins for neurotransmitter regulation, blood-brain barrier and melatonin.[41]

Reduced sperm motility and clumping were observed following 3 hours daily cell phone exposure of rats, for 18 weeks.[42]

Litter size, and the numbers of egg follicles in female rat pups were significantly decreased with maternal exposure to cell phone radiation 15 minutes daily.[43]

> An example of how effects are interconnected is a report of how altered cellular calcium homeostatis with cell phone irradiation (800 MHz, 1 hour per week for 4 months), is related to lymphocyte infiltration and tumour induction in a mouse model.[39] This same group studied studied calcium homeostasis related to synergism of radiofrequency radiation with aluminum[44] and with iron,[45] causing increased cancer in lymphoma-prone mice. Other researchers indicate that calcium loss from membranes such as the blood brain barrier may decrease protection of the central nervous system from drugs and toxins, as well as decreasing important hormones such as melatonin.[46,47]
>
> Cell phone radiation (call answering mode) caused inflammation in rat liver and pancreas, in a dose-response pattern.[48] [page 14 - 15]
>
> [emphasis added]

At pages 15 - 16 of her report, Dr. Sears addresses the risk of cancer:

> Carcinogenicity of radiofrequency radiation has been examined in the INTERPHONE, and in Hardell's group's studies. They came to opposite conclusions, but IARC found sufficient cause for concern to list this radiation as a possible carcinogen.
>
> Health Canada has taken the potential harm seriously enough to advise limiting cell phone calls, texting instead of talking, using "hands free" devices, and limiting use by those 18 years and under; [49] this is interesting advice from the authors of Safety Code 6.
>
> In 2012, Italy's top court ruled that a worker's brain tumour was the result of heavy cell phone use for 12 years.[50] [page 15]
>
> ...
>
> A landmark study published in the Journal of the American Medical Association demonstrated increased glucose metabolism in the area of the brain exposed to cell phone radiation (receiving mode) for 50 minutes.[55]
>
> The autonomic nervous system control of the heart is fundamental to health, and the heart is potentially sensitive to electrical disturbances. Heart rate variability (HRV) was affected adversely by mobile phone emissions.[56]
>
> Associated with the autonomic nervous system, stress markers that are reported in many studies. For example, saliva cortisol, alpha-amylase, and immunoglobulin A were modulated with exposure level from a 900 MHz antenna mounted outside the building.[57]
>
> NIRS has been used in a small sample of volunteers, demonstrating statistically significant changes in oxygenation of hemoglobin within 80 seconds of exposure to a cell phone (maximum peak SAR exposures of 0.18 W/kg and 1.8 W/kg).[58] A transient increase in blood oxygenation in the brain

In a 2007 study of neurobehavioural effects of living close to cell phone antennae, significant deficits developed in close inhabitants versus participants living at a distance.[59] The authors discuss exhaustion of homeostasis.

In a 2012 review of cell phone radiation and male reproduction, la Vignera *et al*. summarize experimental and epidemiological studies pointing to decreased sperm concentration, motility and viability with increased exposure to cell phone radiation.[60] Oxidative stress leads to membrane lipid and DNA damage in sperm. Decreased testosterone production and increased expression of genes for adhesion molecules may be significant contributors. Merhi also reviewed research on cell phones and reproduction, highlighting diverse research methods and outcome measures, some demonstrating altered physiology; more research is necessary.[61]

A prospective study recently reported changes in neurotransmitters in Bavarian villagers following installation of a cell phone tower in the centre of the village.[62] Buchner and Eger found that initial significant changes in urine levels of neurotransmitters (catecholamines) dissipated somewhat over the 1.5 year duration of the study, but chronic low levels of the precursor phenylethylamine are interpreted to be indicative of physiological exhaustion (per Selye's model). Urine levels changed in a dose-dependent pattern, with exposure estimated from outside the dwelling. All participants were affected, and the beginning of recovery was delayed at power density levels greater than 1 $\mu W/cm^2$. Participants using wireless devices tended to be comparatively more severely affected, as were the children who exhibited attention deficit disorders. Increased numbers of participants reporting sleep problems, headache, allergy, dizziness and concentration problems.[62]

As mentioned above, early life exposure to cell phone radiation was associated with behavioral disturbances in two reports on children,[22,23] and more recently with asthma (indicative of immune disturbance)[24] and obesity (metabolic/endocrine disturbances).[25]

The bottom line of the current research is that exposure to doses of the radiofrequencies to be used by the proposed meters at levels much lower than present guidelines, can have biological effects on multiple systems. Furthermore, the young and those with co-morbidities are at heightened risk. Although the proposed exposure levels are less than with other technologies such as cell phones, pulsed signals are not comparable to continuous wave signals in terms of toxic effects. The strongest consensus appears to be that more research is needed. [pages 15 - 16]

[emphasis added]

39. The mechanics of opt-out: FortisBC's position

In cross-examination, Mr. Loski's evidence was that Fortis has no plans to allow opt-outs in special cases, such as a person who presents a particular medical case.[98]

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[98] Hearing Transcript, page 964 (from line 21) to 965 line 26

FortisBC says that AMI benefits can be eroded by opt-out customers; however, it has not particularized at what point such erosion would occur.

It is clear from the opt-out program contemplated by FortisBC, that no costs would be incurred by non-opt-out rate payers.

As stated by Mr. Loski in cross-examination[99]:

> MR. LOSKI: A: The incremental cost that would be borne by the company to implement the opt-out for the customer would be recovered from that customer. Again, with the principle of cost causation, then the remaining -- or the rest of the customers would, in effect, be kept whole.

40. The mechanics of opt-out: Rights in other jurisdictions

In Canada, Hydro Quebec and Nelson Hydro allow opt-outs from their AMI meter programs.

In the United States, utilities in several jurisdictions have allowed for opt-outs from their AMI meter programs. Particulars in that regard are enumerated by way of appendix to this submission.

Further, we are advised that there is presently a bill currently before the Massachusetts state legislature, which includes provisions for a no-fee opt-out and replacement of analogs for those who want AMI meters removed, at no cost.

41. The mechanics of opt-out: New application required

We note that an opt-out program was not part of the instant application and, as such, we submit that the variables surrounding the approval and implementation of any such program should be considered in the context of a separate application. In the context of determining those variables, there are certain values to be considered and the necessary material is not before the Commission in this case.

42. The Case for Waiting

Safety Code 6 is in the process of being updated because there is a review that is scheduled to come out from the Royal Society in the autumn of 2013.

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[99] Hearing Transcript 5, page 963, lines 10 - 15

In cross-examination, Mr. Loski[100] commented on the prospect of waiting:

> MR. LOSKI: A: I'll start by saying it -- you know, certainly, can't predict what the Royal Society review is going to come up with this year. But it is our view that there is no basis to assume that there will be any change coming out of that review, or that it's likely that there would be a significant change coming out of that review, based on the science that -- the current science available. And Dr. Bailey talked about that at length over the last couple of days.

In our submission, the IARC report suspends our ability to complacently rely on past science. It is a game changer in that it is likely to influence the FCC, which is in the process of reviewing its standard as well as the Royal Society review that is scheduled for publication in the fall of 2013.[101]

43. Environment

CSTS adopts the content of the Jamieson report on the environmental impacts of the proposed AMI meters. We submit that FortisBC has adduced no evidence to counter Dr. Jamieson's valid opinion with respect to risks. Those risks factor against the public convenience and necessity.

44. Economic Argument

We submit that FortisBC's application is wanting for reason that it has failed to consider the impact of the AMI program in alienating customers, with the result that a market will emerge for an alternative electrical provider that does not impose wireless smart meters on its customers. The economic ramifications of this chain of events has not been considered by FortisBC in the present application.

We further submit that FortisBC's economic case for the AMI program is flawed in that it fails to acknowledge the health and environmental risk to be borne by customers and society in general. To use the language of McNamee, "this could be a risk". That risk is a cost of the AMI program but it is not a cost that FortisBC has factored into its analysis. Rather, FortisBC has denied the existence of that risk and externalized that cost to be borne by others in the future. That approach constitutes bad economics and harmful socio-economics.

FortisBC's AMI RFP did not set out any health and safety values - it only set out operational requirements. The RFP did not set out any incentive for the bidder to propose a technology that will be less risky to health and environment. FortisBC's RFP was silent on that point. As such,

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[100] Hearing Transcript 6, page 1024 (from line 22) to 1025 line 4

[101] Hearing Transcript 5, page 899, lines 6 - 19

FortisBC left it to the market to make determinations that stand to impact on the health of its customers.

Here, the BCUC cannot be satisfied that customers will not be exposed to the risk of harm from chronic, continuous exposure to AMI meters. Risk is always a potential attribute.

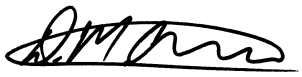
If the risk and associated costs are factored into the analysis, the AMI project, as proposed with wireless meters, becomes much more costly. The non-wireless alternatives, although more costly in the short term, may be more attractive in the long term. But this isn't an analysis that FortisBC has taken us through because it has not acknowledged the existence of the risk. Its policy has been one of denial.

45. Remedy

We request that FortisBC's application in its current form be dismissed.

All of which is respectfully submitted.

Yours truly,



DAVID M. AARON

cc: clients
cc: FortisBC Inc.
cc: Interested parties