BRITISH COLUMBIA UTILITIES COMMISSION

IN THE MATTER OF THE UTILITIES COMMISSION ACT
R.S.B.C. 1996, CHAPTER 473

And

Re: FortisBC Energy Inc.
Application for a Certificate of Public Convenience and Necessity for the Advanced Metering Infrastructure Project

Kelowna, B.C.
March 13, 2013

PROCEEDINGS

BEFORE:

L. Kelsey,	**Commission Chair / Panel Chair**
N. MacMurchy,	**Panel Member**
D. Morton,	**Panel Member**

VOLUME 9

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C. WEAFER	British Columbia Municipal Electric Utilities and Commercial Energy Consumers Association of British Columbia
E. KUNG and T. BRAITHWAITE	B.C. Pensioner and Senior's Organization, BC Coalition of People with Disabilities, Counsel of Senior Citizens' Organizations and the Tenant Resource and Advisory Centre
W. ANDREWS	B.C. Sustainable Energy Association and Sierra Club of British Columbia
D.M. AARON	Citizens for Safe Technology
C. BENNETT	West Kootenay Concerned Citizens
A. ATAMENENKO	Riding of B.C. Southern Interior
A. SHADRACK	Electoral Area D, Regional District, Central Kootenay
J. FLYNN	On his own Behalf
K. MILES	On his own Behalf
M. ENNS	On her own Behalf

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CAARS

KELOWNA, B.C.

MARCH 13, 2013

(PROCEEDINGS RESUMED AT 7:54 A.M.)

THE CHAIRPERSON: Please be seated.

THE CHAIRPERSON: Well, good morning, everybody. We're going to -- are there any preliminary matters this morning, Mr. Fulton?

MR. FULTON: No, there are not, Mr. Chairman.

THE CHAIRPERSON: Okay, thank you. In that case, we'll proceed, then, with the cross-examination of Dr. Blank. I would like to start off as we did yesterday, with an opportunity to introduce the Panel to Dr. Blank, and give him a sense of the room that we're working in. So, if Mr. Bemister could move the laptop around, we'll do that.

THE HEARING OFFICER: He's not going to be broadcasting.

THE CHAIRPERSON: Okay. Good morning, Dr. Blank. I'm Len Kelsey. I am Chair of the Panel, I'm a Commissioner with the B.C. Utilities Commission. And on my left is David Morton, another Commissioner. And the third Commissioner on the Panel, Norman MacMurchy.

Moving the camera around, Gordon Fulton is counsel for the B.C. Utilities Commission, and next to him is Mr. Aaron, who you presumably know. And on the other side, the counsel for Fortis, Mr. Macintosh, who

will introduce himself later.

The hearing is being held in Kelowna, and I think that probably gives you -- at least hopefully gives you a sense of the key people in the hearing here, and the venue that we're working in.

I'll ask the Hearing Officer to swear in the witness, and then we'll turn things over to Mr. Aaron.

THE HEARING OFFICER: Can you hear me, Dr. Blank?

Okay. Could you state your name for the record, please?

THE WITNESS: Martin Blank.

CITIZENS FOR SAFE TECHNOLOGY PANEL 2

MARTIN BLANK, Affirmed:

DIRECT EXAMINATION BY MR. AARON:

MR. AARON: Q: Good morning, Dr. Blank.

DR. BLANK: A: Good morning.

MR. AARON: Q: I'm just going to chit-chat with you just to check that you're audible to the room.

DR. BLANK: A: Oh, I guess I should say something.

Proceeding Time 8:02 a.m. T2

MR. AARON: Q: That would be a good inference. I can see I'm dealing with a logical mind here.

I will ask you just a few questions to give the Panel an overview of your of your qualifications. That'll take a very short time, 10-15 minutes max.

And then my friend -- three or four lawyers representing other participating parties, including Fortis, will cross-examine you.

DR. BLANK: A: I understand.

MR. AARON: Q: All right. So can we have again your full name for the record?

DR. BLANK: A: Martin Blank.

MR. AARON: Q: Dr. Blank, can I refer you to your curriculum vitae that you provided to me and that I included in the materials at Exhibit C9-8?

DR. BLANK: A: I have it in front of me but I can refer to it by memory.

MR. AARON: Q: All right, well, it's your CV so --

DR. BLANK: A: Yeah, but I may not have all the dates in granite, that's the problem.

MR. AARON: Q: All right, well, I can prompt you. On page 1 of your CV, Dr. Blank, I see your education started in 1950 with your Bachelor of Science in chemistry at City College of New York?

DR. BLANK: A: Correct.

MR. AARON: Q: Then between 1954 and '59 I see there are two references to a Ph.D., one at Columbia University in chemistry and one at Cambridge in England in colloid science. Are those two different degrees?

DR. BLANK: A: They are two different degrees. I got

my Ph.D. at Columbia University in physical chemistry, and went to Berkeley in Cambridge on a postdoctoral fellowship. Cambridge is one of the old fine universities that had a long tradition, and they got -- or at least they guarded that tradition very zealously. They did not recognize other Ph.D.s from a university other than their own and Oxford and Trinity College Dublin. So when I was there I was encouraged to get what they called a real Ph.D. So I more or less earned that Ph.D. *en passant.* It's the one that has a lot of prestige associated with it, but I must say I worked much harder for the Columbia one. There were courses to take, there were languages to qualify in, and as well as a research and a thesis.

MR. AARON: Q: All right, thank you. Then under the heading on your first page of you CV you referred to academic appointments spanning from 1954 to the present. You were a postdoctoral research fellow at Cambridge from '57 to '59, Columbia --

DR. BLANK: A: Yes.

MR. AARON: Q: Columbia University instructor in physiology in the late '50s, early '60s. And from '68 to 2011 an associate professor in physiology and cellular biophysics at Columbia.

DR. BLANK: A: Correct.

MR. AARON: Q: And a special lecturer in the same

Department of Physiology and Cellular Biophysics at Columbia at present.

Can you please just define for the lay audience here what is cellular biophysics?

DR. BLANK: A: Well, I guess it's the -- looking at cells like chemical systems and physical chemical systems. In other words, what happens to cells when chemical forces and physical forces act on them. And instead of working with the entire organism, the work is in the biochemical changes that occur in the cells as a result of these difference stimuli. So it's getting down to the molecular level and looking for explanations about cell function in terms of its very elementary components.

Proceeding Time 8:06 a.m. T03

MR. AARON: Q: All right, thank you. Then still on page 1 of your CV, I see you've had various other appointments around the world, not only Cambridge but elsewhere in England. In the late '60s, in the Netherlands, in Berkeley, in Israel, in the '70s in Virginia, Australia, Moscow, as a visiting professor, department of biophysics in Poland, a visiting professor at the Tata Institute in Bombay, India. Back to Israel at Beersheba in the mid-'90s. You were even up here in Victoria at UVic in the department of biology in the mid '90s. Japan in 2005. Is that

correct, sir?

DR. BLANK: A: I believe so.

MR. AARON: Q: And over into the next page of your CV, I see you've been recognized with honours dating back to 1953. One of the more recent entries under that heading is that in 2010 you were an invited expert to the Canadian House of Commons Committee on Health. HESA at the Canadian Parliament in Ottawa. What was that about?

DR. BLANK: A: Health and (inaudible). Same thing that they -- virtually it's the same issue that we are debating here.

MR. AARON: Q: All right. And who invited you to that?

DR. BLANK: A: I don't remember the name of the person, but it was the -- it came from the Committee Secretary.

MR. AARON: Q: Okay. That would be the House of Commons Committee.

DR. BLANK: A: I guess so.

MR. AARON: Q: Okay. And just this year it looks like you've been in Brazil. Is that a recent trip?

DR. BLANK: A: Yes. Apparently there is some litigation regarding the limits on power line emissions, and there is litigation going on with that, and apparently it reached what they call an open court, which I believe is comparable to the Supreme

Court in the United States. So there was a recent procedure on that, and I was part of it.

MR. AARON: Q: All right. You were an expert witness in those proceedings?

DR. BLANK: A: Yes.

MR. AARON: All right. How's the audio? Is it all right? Is the Panel satisfied with the audio?

THE CHAIRPERSON: I think the audio's fine. Unfortunately the visual part is --

MR. AARON: Muddled.

THE CHAIRPERSON: -- not up to yesterday's standards, at least.

MR. AARON: Q: All right. Proceeding on under the heading, "Areas of research", on your CV, you preface the details in bold print with the language, "Electromagnetic field effects on cells (cellular stress response, enzyme reactions and DNA reactions)". Is that your primary area of research?

DR. BLANK: A: Yes.

MR. AARON: Q: And "Membrane biophysics", on the next line. "Membrane biophysics and transport mechanisms (active, passive, excitation and mechanisms)". Is that a separate area of research?

DR. BLANK: A: It's related, but I guess it's a separate area of expertise.

MR. AARON: Q: Okay. And then also you refer to

"Biopolymers (surface and electrical properties of proteins and DNA)". Again, I presume, a related area of research?

DR. BLANK: A: Yes.

MR. AARON: Q: And then in the three details you list, the first of which is "Theoretical models of process and membranes and biopolymers, electric and magnetic field effects on electron transfer reactions, enzymes, enzymes and DNA". Is that right?

DR. BLANK: A: Yes.

Proceeding Time 8:11 a.m. T04/05

MR. AARON: Q: All right. "Specific biological systems", and you go on to list some, as well as "Interfaces and monolayer permeability". So all of that is in the field of cellular biophysics?

DR. BLANK: A: It's all related to the way cells function. The early part of my career was devoted to how membranes control the movement of substances into and out of cells. And then I moved into a cell, and more in terms of interactions with the nucleus, the DNA nucleus. But it's really all part of the same package.

MR. AARON: Q: All right. And you list some teaching appointments on page 3 of your CV. All in -- much of which is in the realm of cellular biophysics.

You have some society memberships I see at

the bottom of page 3 of your CV. The Bioelectromagnetics Society and the Bioelectrical -- Electrochemical Society. Are those two different societies?

DR. BLANK: A: Yes, we are.

MR. AARON: Q: As well as --

DR. BLANK: A: They are both relatively recent. And I was on the founding committee of the Bioelectrochemical Society, which is really the one I belonged to prior to Bioelectromagnetics. I got into the research in terms of electrical phenomenon, and moved into the electromagnetic phenomena as it became evident that these were important influences on cell function.

MR. AARON: Q: All right. And then also you're involved with the Electrochemical Society.

DR. BLANK: A: Yes.

MR. AARON: Q: The biological division of that. All right. Over on to the next page, page 4 of your CV, I see you've been involved in several editorial boards, most recently the *Electromagnetic Biology and Medicine* editorial board.

DR. BLANK: A: Yes.

MR. AARON: Q: And you were a founding member of the Bioelectrochemical Society, dating back to 1979.

DR. BLANK: A: Yes.

MR. AARON: Q: On page 4 of your CV, two-thirds of the way down, you set out that you were an author of Section 7 of the Bioinitiative report.
DR. BLANK: A: Correct.
MR. AARON: Q: And is that the 2007 version? Was that your first involvement with that?
DR. BLANK: A: Yes, I was actually on the original working party that organized the Bioinitiative report. It arose actually out of a symposium that I organized when I was president of the Bioelectromagnetic Society. I was interested in acquainting our membership with developments in Europe, and they were largely in connection with the precautionary principle. So we organized a symposium on that subject and there was a lot of -- a heated discussion among the membership, really pointing out the fact that we needed more involvement and more information to our members. And that really resulted in the development of the Bioinitiative report.
MR. AARON: Q: Okay. So, what I'm hearing from you is that you were not only an author of the Bioinitiative report, but you were an instigator of it.
DR. BLANK: A: Well, I was involved at the early stages. There were actually four of us who were involved with the very initial part, and then it grew, and now I believe we have something like 19 members of

the working party.

MR. AARON: Q: All right. So you were one of the first four.

DR. BLANK: A: Yes.

MR. AARON: Q: And were you involved in the peer reviewed update of that? Or is that necessarily done by other people?

DR. BLANK: A: No, I was actually the editor of that. So that's the update that was published in the *Journal of Pathophysiology*, and it underwent the peer review process, which is characteristic of scientific journals, and it really -- it sort of went -- it's not in the long -- the Bioinitiative report has come out with a second edition, and this was really a peer reviewed update of the 2007 version of the Bioinitiative report.

MR. AARON: Q: Okay, that peer-reviewed update of the 2007 Bioinitiative report was published in, did you say, *Pathophysiology*? Is that a journal?

DR. BLANK: A: Yes, it is.

MR. AARON: Q: All right. And again, you're an author of the 2012 version of Bioinitiative report.

Proceeding Time 8:16 a.m. T6

DR. BLANK: A: I'm one of the authors. There are 19 of -- well, there are more authors, but there are 19 subjects that are covered here.

MR. AARON: Q: All right. I'm sure you'll have more questions about that from my friends.

Over onto page 5 of your CV. I see you've had several speaking appointments on bioelectro chemistry, dating back to 1982. Was that before cell phones became a concern?

DR. BLANK: A: Well, I can really only speak to what -- the thought that concerned me, and I don't really remember the date, but I was really actually kind of -- I was stimulated into this field by reading a report of a colleague, in which they subjected cells to electromagnetic signals that were not terribly strong, and they stimulated biosynthesis. In other words, the cells started to make proteins that they hadn't been made making while being quiescent. And I couldn't believe that because I had grown up in an electrical environment, namely that the electrical forces were the ones that were influencing the way cells were functioning. And so we started discussions and I became convinced from the work that she had done, and we've actually been working very closely together for many years and we published together. And I got into the magnetic business largely as a result of that study.

Her name by the way is Reba Goodman and she was a member of the Pathology Department and is now

retired.

MR. AARON: Q: And Goodman is one of the coauthors of several of your recent publications.

DR. BLANK: A: Yes.

MR. AARON: Q: All right, thank you. On page 6 of your CV you list your invitations to meetings and workshops and panels. Sorry, that starts on page 5 and goes all the way onto page 6 and half of page 7. So I don't have time to go through all of that, but I see it starts in 1968 and includes speaking and panelist and lecturing appointments all around the world in the field of biophysics, and much of it has to do with electrical, bioelectrical issues. Am I right? Is that a fair statement?

DR. BLANK: A: And lately on electromagnetic issues.

MR. AARON: Q: All right. And I see in 2006 in Italy you were a speaker at a conference on EMF and the precautionary principle in Benevento, Italy. Is that correct?

DR. BLANK: A: Yes.

MR. AARON: Q: And in Brasilia in 2007 on the biological effects of EMF fields, and again you have your House of Commons, Canadian House of Commons Committee invitation there from 2010.

DR. BLANK: A: Right.

MR. AARON: Q: Now, from page 8 of your CV you list

publications in terms of books, reviews and chapters. There are 41 items there. I don't have time to go through much of them, but I see your work in electro-chemistry dates back to -- your publications in that regard date back to 1980 and continue recently. There's a -- your most recent work under this category is a 2010 paper "Whom the Cell Tolls" with Goodman. And you were quite busy from items 35 on to 40 with matters like cellular stress response, magnetic field inducement of expression, insights into electromagnetic interaction mechanisms, electromatic [sic] field-induced biosynthesis, and DNA reactions, stimulated by electromagnetic fields. Then -- is that correct?

Proceeding Time 8:20 a.m. T07

DR. BLANK: A: Yes.

MR. AARON: Q: And then you list publications from page 10, and you number them. The first one was in 1956, I think that was in the *Journal of Colloid Science*, and your publications go on for several pages. Seven and -- over seven and a half pages of publications, numbering 185 items. Where do I start, Dr. Blank?

DR. BLANK: A: Well, let me just say that the -- I am completing a book now on the (inaudible) associated with electromagnetics in our world today. And it doesn't appear on my CV. I guess it hasn't -- it's

now in the hands of an editor. So it will -- hopefully it would be before the end of the year.

But it's an attempt to put the problem in a perspective that I guess the ordinary citizen can come to grips with, and I'm hoping that it will do the job. But so far I've been doing most of my -- well, reporting to the scientific community and I hope that the public will be more receptive now that they have something from sort of a scientific point of view that will be out there for them. So --

MR. AARON: Q: So you said your book -- you said your -- you cut out, when you were describing the topic of your prospective book. You said it had to do with something associated with electromatic -- electromagnetic activity. Did you say the problems associated?

DR. BLANK: A: Well, it has to do with the fact that the -- electromagnetics is now a big force in our environments, and it's having profound effects on the way the body functions. But it's having also profound effects on our society. And it's an attempt to put all of this into a kind of a -- well, put it all together in one picture so that one can get an idea of what's going on and perhaps get better control over what's going on.

MR. AARON: Q: All right. I see item 173 of your

publications is Blank and Goodman, "BEMS, WHO, and the precautionary principle". Is that again published in the *Journal of Bioelectromagnetics*?

DR. BLANK: A: Yes.

MR. AARON: Q: All right. And there is one item at the top of page 17, 2005, Blank, "A proposed explanation of …" Sorry, "for effects of electric and magnetic fields on Na,K-AT pase in terms of interaction with electrons". What's that about?

DR. BLANK: A: One of the fundamental processes that occurs in virtually all cells is the need to move ions across the cell. Cells have different compositions inside and outside. Inside you have a high concentration of potassium ions and outside you have a high concentration of sodium ions. And that must be maintained. And the way it's maintained is by the action of an enzyme, which sits in the membrane and takes the sodium and pumps it out, and brings the potassium in. The enzyme that does this is the sodium potassium ATP ASE, NaK ATP ASE. And that's the name that you were reading.

And the way in which it does that is by breaking down ATP. ATP is the fuel that cells use to do their work, and so I studied that system and have used that model for the kinds of changes that occur in electromagnetic systems. And I studied that under

electric fields, which is why I got into the process in the first place, and also electromagnetic fields, which apparently have an effect even at very, very low levels. That

Proceeding Time 8:25 a.m. T8

And that's one of the interesting things, that such a fundamental process such as (inaudible) conceptions of the (inaudible) that are viable -- that are essential for life, that that process is controlled by very very low levels of electromagnetic fields.

MR. AARON: Q: And you at 183, I recognized that item, "DNA is a fractal antenna in electromagnetic fields," I think that's a paper that you included in your materials in this proceeding, correct?

DR. BLANK: A: Yes.

MR. AARON: Q: All right. So thank you for going over your CV with me.

DR. BLANK: A: Can I say something about that? The word "fractal" is apt to put some people off, and I don't want to make it sound like it's an esoteric kind of concept. Maybe it is, but I don't want it to be, because there's a book written by a now deceased but well known, a mathematician, Enwa Mendelbroth, who wrote *The Fractal* -- I don't remember the exact title but *The Fractal in Nature,* that one finds fractal

structures in all of nature. And reading that book I suddenly was struck by the fact that one of the properties of fractals is that there is a self-similarity in the structures that respond that way. And I was struck by the fact that DNA had that self-similarity.

If you look at a model of a long DNA molecule and you take the molecule, and it's really six feet long, and when you realize that it's packed into the nucleus and the nucleus is the aura of a micron, that's millions of times smaller, you realize that it has to be compacted. And the way it's compacted is you've got the double helix, which is a helix, and that helix is then wound further again into making it another helix, and it gets even larger and larger and you get one coil, and then that coil is coiled again and you get a larger coil and then have this coiled coiled structure which has this property that Mendelbroth called self-similarity.

And what we did in that paper was basically say that if you look at DNA, it has the self-similarity that one needs for fractal responses. And one of the properties of a fractal antenna is that it responds to the variety of frequencies. And that's one of the things that we found when studying DNA. DNA can react with not only power line frequencies but

also radio frequencies and even higher frequencies. So that the structure of DNA is something that lends itself to reacting with these electromagnetic fields that we find increasingly in our environment.

So the reason I took the time to mention this is because I think it's a very important paper to realize that the structure of DNA lends itself to the kinds of problems that we are experiencing more and more as a result of the proliferation of electromagnetic fields in our environment.

MR. AARON: Q: Thank you, Dr. Blank. I could see you enjoy this stuff. So you've conducted your own studies?

DR. BLANK: A: Are you referring to the fractal --

MR. AARON: Q: No, in general.

DR. BLANK: A: Fractal --

MR. AARON: Q: In general. You're not just someone who studies, who looks at other people's studies, but in addition you've conducted your own studies?

DR. BLANK: A: Yes. I do both.

MR. AARON: Q: Okay, thank you. So you authored a report for the purpose of these proceedings dated January 18th, 2013 which you entitled "The Scientific Basis for Health Concerns about Radio Frequency Radiation from Smart Meters". Is that correct?

DR. BLANK: A: Yes.

MR. AARON: Q: And would you be prepared to adopt the contents of that report? Do you stand by that report and adopt it for the purposes of your evidence in testimony today?

DR. BLANK: A: Yeah, I do.

MR. AARON: Q: And also you included with that report the DNA as a fractal antenna paper, would you adopt that for the purpose of your testimony?

Proceeding Time 8:29 a.m. T09

DR. BLANK: A: Yes.

MR. AARON: Q: And also you authored some responses to questions to Information Requests that were posed to you by three other parties in these proceedings. Would you also be prepared to adopt those responses as part of your evidence -- part of your testimony for the purposes of these proceedings?

DR. BLANK: A: Yes, I did my best to answer the questions, which weren't always worded the way one is accustomed in a sort of an academic exchange. But I'll do my -- I do adopt the answers I gave.

MR. AARON: Q: All right. Now, I'm going to ask the Panel here to approve you and accept you as a qualified expert. And the way, in my lay understanding, I try to characterize your expertise is that -- is as a specialist in physiology and biophysics. Sorry, and cellular biophysics.

DR. BLANK: A: Yeah. I would say also --
MR. AARON: Q: I should just pause, Dr. Blank. What I'm doing here is reading from my cover letter to Dr. Blank, which is at Exhibit C9-8. I tried to characterize you as an expert -- as a specialist in physiology and cellular biophysics and specifically the health-related effects of electromagnetic fields. My concern is with the last two words, "electromagnetic fields". Does that include radio frequency emission, or do I need to expand my description of your expertise so as to address the effects of radio frequency emissions in addition to electromagnetic fields?
DR. BLANK: A: A radio frequency is part of an electromagnetic fields, (inaudible).
MR. AARON: Q: All right. Well then that's all I need to do for now, Dr. Blank. Thank you very much.
THE CHAIRPERSON: Any comment from Fortis?
MR. AARON: Thank you.
MR. MACINTOSH: No, Mr. Chair.
THE CHAIRPERSON: And the other interveners? Hearing none, we will accept the qualifications as proposed by Mr. Aaron, and presumably then we can begin the cross-examination.

Mr. Fulton, would you please call our first intervener group forward?

MR. FULTON: Thank you, Mr. Chairman. British Columbia Pensioners' and Seniors' Organization, *et al.*, Ms. Braithwaite.

THE CHAIRPERSON: While Ms. Braithwaite is making her way forward, a point that I didn't mention earlier. Just so that Dr. Blank and others have a sense of the flow of the morning, we will plan on taking a break at 10:00 a.m. If there is some urgent need to break at another time, we'll do so, but we'll plan on breaking for a short rest period at 10:00 a.m., Vancouver time. Kelowna time, I guess would be more correct.

Please proceed.

CROSS-EXAMINATION BY MS. BRAITHWAITE:

MS. BRAITHWAITE: Q: Good morning, Dr. Blank. My name is Tannis Braithwaite. And I'm the lawyer for a group of residential ratepayers here in British Columbia.

I'm going to start with a warning, which is that I have an extremely limited scientific background. I have one organic chemistry class in 1984, first year, so I'm going to ask you to apply the ALARA Principle to the level of science that you give, and keep it as low as reasonably achievable, when you're giving your answers.

My understanding is, and please tell me if this is correct, is that the studies that you yourself conduct are what are called *in vitro* studies. Is that

right?

DR. BLANK: A: Yes. There were -- not exclusively. I mean, one of the studies that we did was with fruit flies, which are (inaudible) organisms, and they respond in ways that would be predicted on the basis of our cellular studies.

MS. BRAITHWAITE: Q: Okay. So let me go back to *in vitro* studies for a second. Is that studies that are conducted on cultured cells?

Proceeding Time 8:34 a.m. T10

DR. BLANK: A: Yes.

MS. BRAITHWAITE: Q: Okay. And so --

DR. BLANK: A: Not only -- well, not only on cultured cells but also on cellular components in solutions, like you would study a bunch of chemicals as well. For example, the studies that I did on the sodium capacity making (inaudible) which I mentioned earlier were done, they're called *in vitro* study, and they are pieces of cells that have been separated and concentrated so that you can study them in solutions.

MS. BRAITHWAITE: Q: Okay, I'm not sure about others here. I had a bit of a hard time hearing or understanding the answer. Did you say that was done on species of cells that were concentrated?

DR. BLANK: A: No. You take cells and you take their component -- you take them apart. So you disrupt the

membrane and get contents out and you get pieces of membrane as well and there are techniques for getting different components of cells. And when you suspend them in a solution, these are also called *in vitro*. *In vitro*, I guess is the Latin for in glass, you know, the kind of studies in test tubes rather than the entire organism.

MS. BRAITHWAITE: Q: Okay, so they're essentially studies where either a complete cell or a component of a cell is studied in isolation from the rest of the organisms. Okay.

DR. BLANK: A: Yes.

MS. BRAITHWAITE: Q: Close enough?

DR. BLANK: A: Yes. Yeah.

MS. BRAITHWAITE: Q: Okay, thank you.

DR. BLANK: A: You don't get the cigar, I guess. The thing is -- what you say -- it's not in isolation. It's actually usually in a mixture of all of these components. But you know enough about what's in there so that when you get a particular reaction, like if I study the ATPase, I see when an ATP is split, I know it's as a result of the action of the ATPase. So that when I measure the ATP, even though the other components were present, I do get a result that I'm looking for.

MS. BRAITHWAITE: Q: Okay. Now, if I understand the

thrust of your evidence correctly, it's that cells create stress proteins in the presence of very weak radio frequency signals. That is, all else being equal, they don't create those same stress proteins in the absence of those radio frequency signals. Is that right?

DR. BLANK: A: Radio frequency signals are only one of the things that will cause stress proteins to be stimulated. Power line frequencies will do -- and the distinction that was found to -- that starts stress (inaudible) synthesis was an increase in temperature. If the temperature increased, I think only 3 or 4 degrees, you would start getting this process going on. S that there are a variety of stimuli that can result in stress protein synthesis.

MS. BRAITHWAITE: Q: I need to interrupt you, Dr. Blank. I think we're having a bit of a hard time hearing you.

MR. FULTON: Yes, Mr. Chairman, I was coming to the mike to alert the Panel that I'm certainly having difficulty hearing the audio on this witness's evidence.

THE CHAIRPERSON: Yes, thank you, Mr. Fulton. I don't know what we can do to improve that, but I think we should pause and get a -- by way of submissions, get a reaction from other parties, to get a sense of

satisfaction with the audio, but I also think we should comment on the video.

Let me just perhaps start with -- you're up at the podium, Ms. Braithwaite, submissions from you on the quality of the audio and the video.

MS. BRAITHWAITE: I am having difficulty hearing or understanding some of the answers, I think because of the audio quality. The video quality doesn't really bother me, and in fact I'm wondering if shutting down the video and just using audio would improve the quality of the audio.

THE CHAIRPERSON: Okay, if you wouldn't mind just standing aside, I'll ask others to come up and make submissions on this. Sierra Club?

MR. ANDREWS: Mine is just one voice but for myself, I am able to hear what's being said and the video doesn't bother me.

THE CHAIRPERSON: Thank you. The Municipal Electric Association and CEC.

MR. WEAFER: Thank you, Mr. Chair. I would say that it's right on the line and at this point it's fine, but we certainly couldn't have any further degradation.

THE CHAIRPERSON: Thank you. FortisBC?

MR. MACINTOSH: I have nothing constructive to add to that discussion, Mr. Chair.

THE CHAIRPERSON: Mr. Aaron?

Proceeding Time 8:40 a.m. T11

MR. AARON: In terms of the video quality I'm not having a problem. In terms of audio quality, there's only an occasional blip where the transmission cuts out and one loses a word. And I submit that that can be addressed when that happens every five minutes or so. It doesn't happen frequently. Just by asking the witness to repeat himself. And perhaps we could also experiment with just turning up the volume of the audio. Other than that, I submit it meets the needs of cross-examination for now.

THE CHAIRPERSON: Thank you. Yes, I think the consensus of the Panel is that we should continue. The quality is right on the edge, and as Mr. Aaron has mentioned, at times the audio quality does break down. And so if that does happen, the cross-examiner should ask the question again and make sure we get a clear answer.

But we will persevere and we do have a hand up at the back. Just -- we'll just --

MR. WEAFER: Sorry, Mr. Chairman. If I could just make one other comment, because I'm not technically certain on the details. The audio is a bit sketchy at times. Is that the only feed the court reporter is getting? Or are they getting a better feed? Because at the end of the day, it's the court reporter whose transcript--

THE CHAIRPERSON: No, it's my understanding that we're

all -- we're all on the same feed here. So --

MR. WEAFER: So I would submit that we might wish to ask the court reporter how he is doing, because that is ultimately the transcript we're going to be quite dependent upon.

THE CHAIRPERSON: Well, that's a useful suggestion. I hadn't thought of that. Mr. Bemister?

THE HEARING OFFICER: I'll check with the person inside there, that's doing the work.

THE CHAIRPERSON: Okay. We'll just pause for another few moments, Dr. Blank.

DR. BLANK: A: Could I ask if the video were put -- I mean, if I closed my webcam, would that improve the quality of the audio?

THE CHAIRPERSON: I'm not sure.

MR. AARON: It's a working hypothesis. Let's just put it on hold for now.

DR. BLANK: A: Would you repeat that, please?

MR. AARON: We'll just suspend that hypothesis until we get further information on how your audio is being picked up by the court reporter, who is typing everything down.

THE HEARING OFFICER: She's handling it as far as we are now, but if it gets any worse, she'll notify us immediately.

THE CHAIRPERSON: Okay. That's useful input. Thank you

for raising that point. I think it's an important one. So again, the court reporter is struggling the same way we are, but able to do their work at the moment. So we do have to be concerned, though, if there is a breakdown, that the question is re-asked, as I mentioned earlier.

Mr. Macintosh?

MR. MACINTOSH: Mr. Chair, thank you. The question was posed when Mr. Bemister was out of the room as to whether closing down the video -- I think Dr. Blank raised it, among others -- closing down the video would augment -- would supplement -- would improve the audio. And I -- and Mr. Bemister wasn't here. Does he have an answer on that?

THE COURT REPORTER: It may.

MR. MACINTOSH: And so, I would just flag that as a possible approach as we -- after we see how we progress in the next little while.

THE CHAIRPERSON: Yes, thank you. Okay, let's continue. Ms. Braithwaite, I apologize for interrupting your cross, but I think it was important that we dealt with that. Please continue.

MS. BRAITHWAITE: Q: So, Dr. Blank, we were just discussing the creation of stress proteins in cells. And you indicated that not only exposure to RF signals creates this type of stress protein, but that exposure

to other things also creates this stress protein, and I believe you had mentioned --

DR. BLANK: A: Yes.

Proceeding Time 8:45 a.m. T12

MS. BRAITHWAITE: Q: And I believe you had mentioned extremely low frequency radiation or power line radiation, and you were just starting to mention temperature.

DR. BLANK: A: Well, temperature is historically actually the first thing that was identified, and that's the reason (inaudible) called heat shock things, because they were originally identified as due to a heat shock, and the cells were experiencing a heat shock.

MS. BRAITHWAITE: Q: Okay, and what temperature variation would be enough to create stress proteins in the cells?

DR. BLANK: A: I guess it varies from cell to cell, but I'd say in the order of about 4 degrees Centigrade, something like that.

MS. BRAITHWAITE: Q: Okay. Are there also other things that create the same type of stress proteins in cells?

DR. BLANK: A: The alcohol is a stimulus. The number of chemicals will do that as well. It's really the body's first -- it's the cell's first aid kind of response. It's the 911 response of cells. The body

has its own 911 system, while when the body is under stress you get the release of adrenaline, the release of cortisone which circulates around the body and mobilizes the increased circulation, more rapid breathing and things like that. While cells maintain their own 911 system and when they experience these different kinds of stresses, they start to manufacture stress proteins.

The interesting thing about the differences is that they all have different thresholds. The threshold for electromagnetic stimulation is a very small fraction. It's less than a thousand times, impacting 100,000 times lower than the energy associated with an electromagnetic -- with a thermal signal. So an electromagnetic signal is extremely effective in stimulating a stress response.

MS. BRAITHWAITE: Q: Okay. I noticed in one of the responses you gave to an information request, it was from the Commercial Energy Consumers group, you were describing a study. I'll just read it to you. The question you were asked had to do with your comments on the critique of the Bioinitiative report by Kumar in 2009. Do you recall that question?

DR. BLANK: A: Yes.

MS. BRAITHWAITE: Q: And your response was:

"The report by Kumar relies heavily on the

reports of similar groups that refer to each other without consulting the original biological literature. There is almost no analysis of the biochemical changes that occur in cells on RF exposure, and some of the information given is questionable. For example, the Utteridge paper referred to, which was an attempted replication, has been dismissed by everyone familiar with this kind of research. That study found no effect of RF because the investigators handled the experimental animals, unlike the original positive finding, and reported such high values for the controls, that the changes due to RF were found not to be significant. Handling of experimental animals stimulates the stress response similar to the effective of RF and therefore obscures the effect of RF."

Do you recall that answer?

DR. BLANK: A: Yes.

MS. BRAITHWAITE: Q: And so am I correct in understanding that to mean that the stress of being physically handled creates the same -- in a lab animal creates the same stress protein as the RF signal?

DR. BLANK: A: Yes.

MS. BRAITHWAITE: Q: And is it your view that the creation of the stress protein by a cell is an indicator of molecular damage, or is that unrelated to molecular damage?

Proceeding Time 8:49 a.m. T13

DR. BLANK: A: Apparently those -- the stress response had related it to damage caused in macro-molecule in proteins and DNA. So that the references to the molecular damage.

Now damaged can be of different kinds. One of the things that stress proteins do is to take a damaged protein, let's say, and get it back into shape so that it can get back into the cell. So that you get these kinds of processes on. And it's now commonly stated that the release of stress proteins is indicative of molecular damage.

MS. BRAITHWAITE: Q: Okay. So, the -- are you saying that the types of stresses that cells can be subject to, including changes in temperature or external stimulation of an organism, result in cellular damage?

DR. BLANK: A: Well, cellular damage can occur from a lot of things. I mentioned -- well, temperature is one thing. Temperature induces motion in molecules, and sometimes the range of motion is greater than the ability of the structure to withstand that motion. So you'll get a bond that's supposed to be at a certain

angle, twisted away from its normal shape, and that's a kind of molecular damage.

You can also get a chemical that's reacting with -- I said alcohol was one of the chemicals that stimulated the stress response. Alcohol is a solvent that differs from water, and when you put that alcohol in the vicinity of a protein, it will put it out of its normal shape. When I say "normal", it's the shape that it would have in a water surrounding.

So that these are the kinds of structural damage that will enable a protein -- or will cause a protein to lose its ability to function properly.

Stress proteins have been -- they have been studying them now and they find that the stress proteins help to put the protein into shape, so that they can do things that they have been doing previously.

Another thing that they help to do is to get the proteins into shape so that they can get back into the cell, if they have been -- if they've been damaged when they're outside of the cell, and they have to go in. So there are a variety of changes that are caused by stress proteins that help to restore the cell to its previous state.

MS. BRAITHWAITE: Q: Okay. So, if I understand you correctly, they serve both an indicator function and a

repair function. Is that right?

DR. BLANK: A: Yeah. Well, the indicator function is to us, and the repair function is really what they are designed to do.

MS. BRAITHWAITE: Q: And in your paper that you included with your report, that is, the "DNA as a fractal antenna" paper, you are addressing in this paper the frequent -- extremely low frequency signals and their effect on DNA. And you indicate that in the extremely low frequency range, you have seen reports of DNA strand breaks. And that these single strand breaks occur at field strengths higher than the levels that stimulate the stress response.

Do you see those kinds of strand breaks with RF signals?

DR. BLANK: A: Yeah, these strand breaks have been reported at a variety of frequencies, including RF.

MS. BRAITHWAITE: Q: And is it -- you see those at higher levels than needed to stimulate the stress response with RF as well.

DR. BLANK: A: The experiments -- the experiments that have been done have generally been done at higher levels of RF. So that the -- but the stress response has been found at levels of RF that are very much lower, and typically in the range that people are exposed to.

MS. BRAITHWAITE: Q: You mentioned a stress response at -- I believe it was 100,000 times lower than the standard. Which standard -- if that's correct, which standard were you comparing to?

DR. BLANK: A: Well, the stress response was originally identified in response to an increase in temperature. And that is the heat shock response. When you compare the response to ELF, which is the power line frequency, you find that that is, I believe, was it 100,000 times, or maybe more. I don't remember what the number was. But it's many times lower than the energy that's necessary for the -- causing a change in -- at the thermal level.

Proceeding Time 8:55 p.m. T14

In other words, an ELF signal is far more effective in causing this response than a thermal signal. This, of course, gets at the heart of the problem of regulating electromagnetic signals, because Health Canada apparently relies almost entirely, and by Dr. McNamee, by his testimony recently which came through on e-mail, he apparently said that all they're relying on is the thermal standard. So that by relying on a thermal standard they're missing a lot of the damage that is not a lot -- they're missing virtually all of the damage that's caused by these relatively weak electromagnetic signals.

MS. BRAITHWAITE: Q: Do you have a level with respect just to RF frequencies? And in particular we're talking about in this application, frequencies in the 900 megahertz and 2.4 gigahertz range. Do you have a level at which you see a stress response from those frequencies?

DR. BLANK: A: I'd have to look through and see. If you hold on I'll get something from my --

MS. BRAITHWAITE: Q: And while you're looking, my next question was going to be whether you have a level at which you start seeing DNA strand breaks.

DR. BLANK: A: Well, let me get back to the -- I can't locate it at the moment on -- my computer would only sleep on it. But let me say I do have a level of response to the biochemical systems that I was studying. The range in which I get is something -- can be as low as .2 microtesla for a response to the sodium potassium ATPase.

In other words, this fundamental enzyme that sits in the membrane, it can respond to signals as low as .2 microteslas. And that's at the ELF range. That, in terms of energy, is a very small fraction of the RF energy. I have not done RF measurements on this particular system. But the ATPase is a fundamental system that sits in the membrane of all cells virtually, and as a result I

think it's indicative of the kind of change that we can expect.

So I would say that based on the experiment that were done at the 60 hertz range, I would say that the effects that one would expect in the RF range would certainly occur at such low levels of exposure.

MS. BRAITHWAITE: Q: Okay, thank you for that. I also have a question about one of the studies that you reference in your report. At page 4 of your report you talk about a study of cell phone base stations in -- I believe it's Belo Horizonte, Brazil, and you say that that study showed a 13-fold increase in RF power density between 2003 to 2008, along with a 35 percent increase in cancer deaths. At page 7 of your report you indicate that cancers generally take many years to develop, sometimes decades.

And so my question is: Is it reasonable to connect a 35 percent increase in cancer deaths occurring in a five-year period, along with a 13-fold increase in power density occurring in the same five-year period, would you not expect there to be a significant lag time between the increase in RF power density and an increase in cancer death if there was a causal relationship?

Proceeding Time 8:59 a.m. T15

DR. BLANK: A: That's a very good question and it's one

that I would ask also, because the two don't quite mesh. The fact is that there are many things going on at the moment in Belo Horizonte , which is in Brazil, and it's a big city there. And one of the things that has happened is that they have made a number of changes, and the electromagnetic contribution to cancer is weak. And like you, I would say that one would expect to see a longer period, a longer infection period.

However, they have had many other things that have contributed to cancer, and one of the things that has been -- they have changed their inclusion for exactly that. That fuel system, because of the abundance of fuel that they have, they have changed the amount at the -- you know, abandoned simple -- they've changed all kinds of environmental --

THE CHAIRPERSON: I am going to have to ask that we stop at this stage, because this is an important piece of information and Dr. Blank is trying his best to explain it, and I'm afraid we're just not able to hear it adequately. So perhaps he could start again, and maybe by re-asking the question, and let's have another try.

Yes, Mr. Aaron.

MR. AARON: I'm just wondering if perhaps there is a technical -- a quick technical matter I could canvass.

Dr. Blank, is your e-mail program open and checking e-mail periodically?

DR. BLANK: A: Well, it's open, but it's not checking it, because I haven't asked it to check. Shall I shut the program?

MR. AARON: Maybe shut your other programs that connect to the internet, other than Skype.

DR. BLANK: A: Yeah. I've shut my e-mail programs. And so the only thing that I have now is, I guess, that's interactive is the Skype.

THE CHAIRPERSON: Okay, let's try that question again.

DR. BLANK: A: Well, I can answer the -- and I -- one of the problems with all of these studies, the population studies that are done, and with epidemiology studies in general, is that all you get is correlation. And it's hard to try and relate that to molecular diseases. And I agree with what you're asking. In other words, there is a problem. Why does this increase in the five-year period somehow show up so significantly when the fact of the matter is that you've got a long induction period for cancer? And that is a problem. And I don't know if one has an adequate answer, except to say that these reactions have been going on for a longer time than the power density has been measured. And there are other stimuli that are resulting in cancer induction.

So, to try and get a differential point kind of correlation, in other words, you expect this power density would show up as an increase in the incidence of cancer maybe ten years down the road, and why does it show up so soon? There may be lots of answers to it, but you're right to question it. It's not as strong a piece of evidence as a laboratory study that would show like the study that Reppicolli published many years ago, where he raised mice on a field of cell phones, and found that there was a huge increase in lymphoma as a result of their running around on top of it, on -- with these cell phones going. So, that's the kind of study that I believe you're saying one ought to be able to find in a city where you've got an increase in power density.

It's not an increase that occurs, let's say, who know how much of the increase you've got originally and how much occurred after five years. Who knows how much the -- how increase would spread in the distance? Too many problems to find an exact answer.

I may be throwing up my hands in trying to give you a good answer. There is no good answer. I think you are correct in questioning the why there should be -- why there isn't a perfect (inaudible) and I -- I'm a bit at a loss to try and give you an

adequate answer. But I do rely on the fact that it's a physiology study and they have their problems.

Proceeding Time 9:04 a.m. T16

MS. BRAITHWAITE: Q: Thank you, Dr. Blank, those are all my questions.

MR. FULTON: B.C. Sustainable Energy Association, Sierra Club of British Columbia, Mr. Andrews.

DR. BLANK: A: Before, can I ask if the quality of the transmission has improved now that I've shut off my e-mails?

THE CHAIRPERSON: Yes, I believe that did make a difference. Thank you. Mr. Aaron, thank you for that suggestion.

CROSS-EXAMINATION BY MR. ANDREWS:

MR. ANDREWS: Q: Dr. Blank, my name is Bill Andrews. I represent the B.C. Sustainable Energy Association and the Sierra Club of British Columbia. I have some introductory questions just to make sure that we know sort of what each of us have reviewed.

First of all, have you read the transcripts of the hearing on the health issues?

DR. BLANK: A: You mean this hearing, the answer is no, I haven't had a chance to read them. I just briefly glanced at them and I would not want to be held responsible for their contents.

MR. ANDREWS: Q: Thank you. And just to be complete on

that, have you listened to any of the webcasts of this proceeding?

DR. BLANK: A: Again, same answer.

MR. ANDREWS: Q: In terms of the other reports filed by the CSTS intervener, the other expert reports, I'll go through them one by one. Can you tell me, have you read the report filed by Dr. Maisch?

DR. BLANK: A: Parts of it.

MR. ANDREWS: Q: And the report filed by Dr. Sears. The report filed by CSTS from Dr. Sears, S-E-A-R-S ?

DR. BLANK: A: No.

MR. ANDREWS: Q: And the report filed by SCSTS [sic] by Dr. Jamieson?

DR. BLANK: A: Again, I've glanced but I couldn't say I read it.

MR. ANDREWS: Q: Can you repeat that answer? There was a flaw.

DR. BLANK: A: No, I did not read it.

MR. ANDREWS: Q: Thank you. And the report filed by CSTS by Dr. Carpenter.

DR. BLANK: A: That I read large sections of.

MR. ANDREWS: Q: Thank you. You begin your report by describing your background, and you say that you have also worked for several industrial labs, Unilever, Esso, CalResearch, and as a senior science liaison officer for the U.S. Office of Naval Research. Did

the industry or military funding of your work in those positions in any way affect your objectivity and scientific independence in those roles?

DR. BLANK: A: The industrial experience did not support my research. I was actually working in the research of the industrial labs and I was being paid, I guess, a similar -- whatever, they had a program where they were trying to make contact with people, and anyway I was part of that.

My work for the Department of Defence was to try and organize a program, a research program that would try and emphasize the same areas that I thought were important and were being neglected. So in the Office of Naval Research I started a program on membrane electrochemistry, which ran for a number of years and had some interesting findings.

My research has been supported largely by, I would say, you know, the NIH kind of public support and also private support.

Proceeding Time 9:09 a.m. T17

I've had a couple of foundations pay. And I even had support from EPRI, the Electric Power Research Institute, when they were interested in finding out about mechanism.

So my support has not been all that lavish to start with, because people are not interested in

fundamental problems, which I tend to focus on. But they look for results.

It might be interesting to give you a perspective on the research. I was, in one of my research assignments at Unilever, for example, I worked in the frozen foods department, where they were interested in the problem of how does one stabilize ice cream. You sell ice cream by volume, so you pack it up. And the way you pack up a package of ice cream is, you blow a lot of air bubbles in and you fill the ice cream and put more air bubbles, and you have less cream to put in. So there's an advantage in keeping it that way, so the proportions people are used to would be fine. Except that you make most of the ice cream in the winter time and you sell it in summer time. So during the period the bubbles collapse.

Now I mentioned this as a problem in ice cream economics. How does one stabilize bubbles in ice cream? But the reason I was working on it was because at the time I was working on a problem of how does the lung stabilize its air? The lungs will not keep the air suspended in this kind of very, very weak tissue unless it has a certain material present at the lining between the bubble and the tissue. This is called the lung surfactant. And it's a very vital thing.

You may recall that -- I'll just finish one more sentence. At the time -- at the time President Kennedy was in the White House, they had a birth there. And his child died of what's known as hyaline membrane disease, which was the absence of this surfactant.

So you learn a lot from doing research in certain areas that have that a translation, not only into a health problem, but also into an industrial problem. So my experience, my industrial experience, was really oriented from that point of view.

MR. ANDREWS: Q: My attempt to interrupt was to clarify a particular word or phrase that you used that broke up a little bit, and I believe the phrase was "lung surfactant". Is that correct?

DR. BLANK: A: Yes.

MR. ANDREWS: Q: So, in your case, the fact that you've received funding from EPRI, for example, has obviously not influenced the directional content of your research. Is that fair to say?

DR. BLANK: A: Yes. Well, I've completed my work, at the time, EPRI in supplying me with a decent exposure system.

MR. ANDREWS: Q: I'm afraid you'll have to repeat that answer, please. It was breaking up.

DR. BLANK: A: EPRI wanted to standardize the exposure

systems that its investigators were using, so that the results from one laboratory would be comparable to --

MR. ANDREWS: Q: And so my question was, at least in your case, having receiving funding from EPRI, E-P-R-I, has not compromised your objectivity or the direction of your research. Is that correct?

DR. BLANK: A: Yes, I can definitely say that. I shouldn't think that any funding that I've gotten has in any way compromised the direction of the research or the reporting of results.

MR. ANDREWS: Q: And would you agree that there are likely to be many other scientists for whom the same approach applies?

DR. BLANK: A: I would say that most scientists tend to do the best they can, given the pressures in our society. I would think that there are some who will not follow the highest standards, but that's true of all professions.

Proceeding Time 9:14 a.m. T18

MR. ANDREWS: Q: Thank you. *Touché*. In the second paragraph of your report, you criticize the E^{x}Ponent Report for not discussing the *in vitro* studies. Would you agree in general that, well, that the -- in short, the explanation, and my friend from Fortis will probably expand on this, but in short, my understanding of Dr. Bailey's testimony was that while

he didn't put a summary of his consideration of the *in vitro* studies in his report, he did consider them and that in addition the review studies that he refers to also considered the *in vitro* studies. Does that give you any increased comfort that the study -- that the *in vitro* studies were not entirely ignored?

MR. AARON: Sorry, excuse me, Dr. Blank. I think I have trouble with that question to the extent that it sounded like my friend was trying to elicit an opinion from the witness as to the credibility of Dr. Bailey's evidence. I don't know if I heard that correctly, Mr. Andrews.

MR. ANDREWS: I believe Mr. Macintosh would like to address that point.

MR. MACINTOSH: Well, Mr. Chair, thank you and I thank my friend, Mr. Andrews, for letting me speak, and the reason I was asking to speak is because this objection actually goes to a line of questioning I will be putting to Dr. Blank as well. Dr. Blank in his report described the Bailey report as "totally misleading", and the basis for him saying that was that Dr. Bailey's report did not rely on *in vitro* work. And I want to explore that with Dr. Blank.

And my friend's objection is not sound, in my respectful submission. My friend's objection is that Mr. Andrews was asking Dr. Blank to comment upon

the credibility of Dr. Bailey.

Well, Dr. Blank in his report has done exactly that. He has said the Bailey report is "totally misleading". And therefore, in my respectful submission, it's a perfectly proper line of inquiry.

MR. AARON: That line of inquiry I don't object to, seeking Dr. Blank's -- exploring Dr. Blank's view on Dr. Bailey's language in the E^{x}ponent Report. However, Mr. Andrews took a nuanced approach. He said something like "Dr. Bailey in his evidence said that he considered *in vitro* although didn't put it in his report," whereas that's not what's in the E^{x}ponent Report. The E^{x}ponent Report says something else. The E^{x}ponent Report doesn't speak to Dr. Bailey's consideration of *in vitro.* It just says, "This report only deals with *in vivo* studies because they are directly relevant."

So it's one thing to ask, to elicit testimony from Dr. Blank with respect to the contents of the E^{x}ponent Report, and I have no objection to that. It's another thing to say to Dr. Blank, "Well, Dr. Bailey's given this explanation that he's considered but hasn't included. Does that satisfy you?" That's a different kind of line of questioning, in my submission, and it's not for Dr. Blank to say whether he's satisfied with this representation by Dr.

Bailey that he's considered but has -- that's more of a credibility thing than a testimony with respect to the contents of the report.

So if that distinction is clear, I wouldn't object to Mr. Macintosh's proposed line of questioning, but I would object to the way it's been advanced by Mr. Andrews.

THE CHAIRPERSON: Thank you. Mr. Fulton, did you have something to add?

Proceeding Time 9:19 a.m. T19

MR. ANDREWS: If I may, before Mr. Fulton speaks, on the particular point of the relevance of the line of questions that I have, as I understand my friend Mr. Aaron's objection is that the credibility issue that I was posing to Dr. Blank had to do with Dr. Bailey's testimony, as distinct from a line of questioning to do with Dr. Bailey's report. In my submission, both are relevant lines of inquiry.

But if I may say that as a practical matter, as Mr. Macintosh has indicated that he's going to canvass this area, I propose to leave this area, and that may make this a moot point at least for the time being.

THE CHAIRPERSON: Mr. Fulton?

MR. FULTON: Yes, I thank Mr. Andrews for that. The only thing that I wish to add, Mr. Chairman, is that there

is generally broad latitude in terms of cross-examination, and one has to be very careful when one objects to a cross-examination point because the general rule is that you shouldn't be interfering with cross-examination.

THE CHAIRPERSON: Thank you. So, Mr. Andrews, you intend to leave this question and move on, then?

MR. ANDREWS: That's correct.

THE CHAIRPERSON: So I think it is a moot point. So let's continue.

MR. ANDREWS: Q: Dr. Blank, back to our dialogue. You say that many biological effects with health implications have been ascribed to low-level radio frequency radiation. And I ask you to comment on the suggestion that the problem here is that a biological effect at the cellular or sub-cellular level is quite a different thing than an established adverse health impact at the whole body level. Is that a correct characterization?

DR. BLANK: A: I would not start from where you started, because the word "establish" is very funny in science. I mean, Newton's laws were established for hundreds of years and then when quantum mechanics came in, at the beginning of the 20th century, suddenly Newton's laws had to be amended. So are you telling me that Newton's laws were not established? It's just

that "established" is a word that's perhaps best used in conjunction with (inaudible), and not with science.

MR. ANDREWS: Q: What terminology do you use for some measure of acceptance or validity?

DR. BLANK: A: What's wrong with the word "acceptance"?

MR. ANDREWS: Q: Well, let me ask you. When you use -- if you use -- one uses the term "acceptance", who is the party whose acceptance is looked to as authoritative?

DR. BLANK: A: Well, if you're dealing with science, I would look with scientists, and ask what they say.

MR. ANDREWS: Q: So, in -- since you've raised the topic, so I'll go here. Is it fair to say that the views expressed by the scientists that are the authors of the Bioinitiative report are, on those topics not accepted by the scientists who are authoring the national and international review studies and standard-setting reports?

DR. BLANK: A: Oh, scientists do not go by the Wizard of Oz mentality. If you recall the Wizard of Oz, at the end he presents a medal to somebody and says, "Now you're a hero." Well, putting somebody on a particular committee does not endow the person with the knowledge and experience that is necessary for making the judgment. I did an analysis of the committee that passed the Netlands [sic] Committee,

that passes judgment on the Bioinitiative report, and they did not have one molecular biologist on there. And yet most of the evidence in that Bioinitiative report that was important was of that sort.

Proceeding Time 9:24 a.m. T20

So I would say that the Commission, the Netlands [sic] Health Commission or something like that, the HCN which is Hypo Cyanic Acid, which is one of the toxic things that I kind of amused at the fact that they use that acronym, but the fact that they felt that they can make a judgment on the scientific accomplishments and writings of people who are actually in the field I think was in most way, in many ways preposterous.

MR. ANDREWS: Q: Well, what you've referred to there is a critique of the Bioinitiative report. Let me draw you back to the national and international studies like the ICNIRP reports and the Great Britain Advisory Committee and there's a whole host of these review analyses that don't come to the same conclusion as the authors of the Bioinitiative report do concerning whether, to use the term, it is established that there are adverse health effects from low levels of radio frequency exposure.

DR. BLANK: A: In what way do you think ICNIRP is any different from the Netherlands Commission? They

appoint people with titles but not necessarily the experience or the judgment that's necessary to come to a conclusion. And I think that there -- if the Wizard of Oz mentality again, you appoint someone to a particular commission with fancy letters on it, and you suddenly feel that they're endowed with a certain wisdom that they didn't have before. I would rather a lot more people who are doing the measuring, publishing them, and willing to defend them if you want to get a proper answer as to what it should be listened to.

MR. ANDREWS: Q: Would you characterize the field of inquiry to do with the health effects, if any, of radio frequency exposures of the non-thermal level as being polarized between one camp, so to speak, and another?

DR. BLANK: A: Could you repeat that question?

MR. ANDREWS: Q: Would you characterize the field of study of the question of whether non-thermal radio frequency exposures cause human health effects as being characterized by polarization between two camps?

DR. BLANK: A: I'm not quite sure where you're going with this question, but there certainly is a polarization in the opinions that have been expressed. But I must say there's also a very big difference between the side represented by these polar groups. I

think on one side you've got people who are doing the measurements and subjecting them to scientific scrutiny, and on the other hand you have a bunch of people, and I call them a bunch because I don't know how they were chosen. It's a buddy system. Why do people -- what are the requirements for people to go -- to get onto these committees? Also, where is the review? I mean, there's a peer review process that goes on in scientific publication. Where is the peer review for the reports that were written by these various committee? It's a travesty to make the comparison.

MR. ANDREWS: Q: In your view is this conflict of opinion greater within this topic of the health effects of non-thermal radio frequency exposure than it is in other scientific areas?

DR. BLANK: A: I really am not that familiar with scientific areas, but I would say every time there's a strong connection to economic issues, there's bound to be a kind of polarization of this type.

MR. ANDREWS: Q: I have a relatively specific question here. On page 4 of your report you quote a conclusion from the Myung *et al.,* that M-Y-U-N-G *et al.* 2009 study in *The Journal of Clinical Oncology.* And I was unable to locate that quote in a copy of that study that I retrieved from the internet. And I'd like -- I

gave your counsel a copy of the version that I retrieved. First I should ask what -- have you in turn received the PDF file that I sent to your counsel?

Proceeding Time 9:29 a.m. T21

DR. BLANK: A: Yes, I did.

MR. ANDREWS: Q: Is that -- is the version that you received, the version that you cite in your report?

DR. BLANK: A: It looks like it is, but I can't be sure. I don't have my report. I have the version that was sent by my counsel.

MR. ANDREWS: Well, perhaps -- first of all maybe it would be appropriate to introduce as -- to mark as an exhibit, the copy of the article that I'm referring to.

MR. AARON: While that's happening, just a clarification for the record. I'm not counsel for any of -- for either Dr. Maisch or Dr. Blank.

THE CHAIRPERSON: Yes, I think that's a useful clarification.

MR. AARON: I'm counsel for the CSTS, and Dr. Blank is a witness.

THE CHAIRPERSON: Thank you.

THE HEARING OFFICER: C4-20.

(ORIGINAL REPORT, VOLUME 27, NUMBER 33, NOVEMBER 20, 2009, JOURNAL OF CLINICAL ONCOLOGY "MOBILE PHONE USE

AND RISK OF TUMORS" A META-ANALYSIS", MARKED EXHIBIT C4-20)

MR. ANDREWS: Q: Thank you for that correction. The document, I understand --

THE CHAIRPERSON: Just a second. We have a small technical glitch here. Are we back in order, then? Okay. Please carry on.

MR. ANDREWS: Q: I understand that the technical difficulties have been resolved. So, the document, I understand, is entered as Exhibit C4-20.

So, Dr. Blank, the quoted paragraph in your report regarding this study does not appear to be evident in the *Journal of Clinical Oncology* version filed as C4-20. Do you have an explanation for that?

DR. BLANK: A: No, I do not. Probably I was -- well, if I have a chance to examine it, perhaps it would trigger something in my memory, but it may have been something I received from Professor Moskowitz in e-mail. And perhaps it's something that he wrote from memory, or something.

But anyway, what is the content that you are -- you find so objectionable?

MR. ANDREWS: Q: The content -- well, first of all, it's my lawyer's obsession with getting the right citations. But secondly that the conclusion in the published study essentially is weaker than the version

that you quote in your report. And turning to the end of the study, at page 5571, it concludes:

> 'In sum, in our meta-analyses of case-controlled studies, we found evidence linking mobile phone use to an increased risk of tumours, especially among users of 10 years or more. Furthermore, we found a large discrepancy in the association between mobile phone use and tumour risk by a research group, which is confounded with the methodological quality of the research. Our findings should be confirmed in prospective cohort studies to provide a higher level of evidence."

Do you see that conclusion stated in the report?

DR. BLANK: A: Yes.

Proceeding Time 9:33 a.m. T22

MR. ANDREWS: Q: And would you agree that what they are referring to there is that most of the studies finding a positive correlation are from one research group, namely the Hardell Group. And as a result, in essence, they call for further study.

DR. BLANK: A: Yes, that comes as no big surprise.

MR. ANDREWS: Q: Thank you.

DR. BLANK: A: Nearly all of the studies always end up with calls for further studies.

MR. ANDREWS: Q: Dr. Blank, would you agree that there are many, many public health risks?
DR. BLANK: A: Yes.
MR. ANDREWS: Q: And many -- even more, perhaps, possible public health risks?
DR. BLANK: A: Yeah, my old boss used to say, "You're going to die of something."
MR. ANDREWS: Q: And would you agree that no country has sufficient resources to fully tackle every single public health risk?
DR. BLANK: A: I assume these questions are rhetorical.
MR. ANDREWS: Q: No, not at all. And so the follow-up to that question is that it's important to prioritize the public health risks in terms of the ones to which scarce resources are devoted.
DR. BLANK: A: I think there are a number of things that enter into a priority consideration. I think one of the things is children. I think children are far more vulnerable to many of these influences because they are rapidly growing, and their systems are not quite as fully developed in being able to cope with a lot of these stresses. So I think that most societies would put the children as a more important item on their list.

So what I'm really telling you is that priorities would really depend on your value system.

MR. ANDREWS: Q: Two points. First, there was a breakdown of the audio there. You said most societies would -- do you recall that?

DR. BLANK: A: I think they would prioritize saving children.

MR. ANDREWS: Q: And so, just so that we're clear on the record, you are saying that in a context of acknowledging that prioritization of society's focus on health risks is an important part of the response.

DR. BLANK: A: Yes, but it's not in terms of the risk itself. It's in terms of preservation of society. I mean, when children are in a home, parents will run to the home in case there's a chance of fire, for example. They try and evacuate. Well, these are normal human kinds of impulses. We're not talking about society with limited resources, where you have to prioritize the expenditures.

MR. ANDREWS: Q: You refer to the "as low as reasonably achievable" standard as your suggestion for how non-thermal radio frequency exposures ought to be dealt with by regulatory agencies. Is that correct?

DR. BLANK: A: Yes, I think that's a reasonable approach.

MR. ANDREWS: Q: Could you repeat that answer? It broke up.

DR. BLANK: A: I say yes.

MR. ANDREWS: Q: And I'll use the term "ALARA" for that phrase. You were asked in the Information Requests to make a distinction between ALARA as a basis on which standards are set, and the standards themselves. And I gather from your response that you didn't see such a distinction. You saw them as being one and the same. Is that a fair characterization?

DR. BLANK: A: Would you please explain what you mean by that question?

Proceeding Time 9:38 a.m. T23

MR. ANDREWS: Q: Well, I put it to you that ALARA is really an objective. A goal. It's not a regulatory standard in that sense.

In order to implement ALARA, one has to answer two fundamental questions: what is achievable, and what is reasonably achievable, and that that will involve a host of factors, including identifying exactly what it is that's being targeted, what is the agent of concern, and then making responses that will vary from one agent of concern to another. Is that --

DR. BLANK: A: Well, I thought ALARA has the reasonable in it.

MR. ANDREWS: Q: Well, ALARA in the radio frequency or in the electromagnetic frequency arena is applied to ionizing radiation, correct?

DR. BLANK: A: I believe it was introduced there, but

it's obviously a -- it's a criterion that can be applied to many, many areas.

MR. ANDREWS: Q: So one of the unique features of ionizing radiation is that sometimes it's used for beneficial medical purposes, medical x-ray therapy or radiation therapy, for example.

DR. BLANK: A: Well, we're not talking about those applications.

MR. ANDREWS: Q: No, but I guess what I'm saying is that ALARA, when ALARA is applied to medical, say, radiation therapy devices, a careful examination has to be made of the potential benefits and the technology in terms of what is reasonably achievable in order to arrive at a standard, a number that might apply to a particular type of radiation therapy machine, for example.

DR. BLANK: A: That's a non-issue. We know if something has its therapeutic value, we know the levels at which it can be therapeutic, and if you think it's worth trying then you use those levels. I mean, I mean a knife can kill a person, but applied by a skillful surgeon a scalpel can make an incision in something that's potentially life-threatening.

So the thing is that you don't make a decision about the instrument that's being used. You have to deal with the application. But we're talking

about environmental things, and environmental things is something that everybody is subjected to, and I think one can make a reasonable decision about such an argument.

MR. ANDREWS: Q: So in terms of what is reasonably achievable, does it enter the consideration that these Itron smart meters that are the subject of this hearing are said to be such that exposure would meet not only the Health Canada Safety Code 6 standards but also a standard from China or Russia that was ten times as stringent, or even the 2007 Bioinitiative report suggested standard? Does that enter the decision making?

DR. BLANK: A: Well, I think that you -- the name of Health Canada in an EMF kind of discussion, I think is really inappropriate. They have neglected a good deal of the scientific information that's available, and to say that their opinion is worth anything in this discussion I think is really overestimating their contribution to the health of Canada. So I think I would not put Health Canada in that context.

And I might point out that Dr. McNamee has himself acknowledged that Health Canada does not consider, in non-ionizing radiation, non-thermal, non-thermal effects.

MR. ANDREWS: Q: Excuse me, you'll have to repeat that.

The sound broke up. Not that I like the answer but I'd like to have it again. Starting with you said Dr. something from Health Canada.

Proceeding Time 9:43 a.m. T24

DR. BLANK: A: Dr. McNamee, who is I believe the chief scientist there, recently admitted to the fact that Health Canada does not consider non-thermal effect in their evaluation of the risks associated with RF. And I think the fact that he has done so indicates that the evaluations given by Health Canada are practically worthless in terms of protecting the health of Canadians. Or for that matter anybody exposed to RF. So I (inaudible).

MR. ANDREWS: Q: I'll give you the last word, and those are my questions. Thank you, Dr. Blank.

THE CHAIRPERSON: Thank you, Mr. Andrews. We'll hear next from the -- Mr. Fulton?

MR. FULTON: Yes. I have been asked as I call Mr. Weafer on behalf of the British Columbia Municipal Electrical Utilities and the Commercial Energy Consumers' Association of British Columbia next to cross-examine, but I have been asked by the court reporters if people could try as hard as they can not to speak over each other. So, ask the question, wait for the answer, and then ask your next question. It makes it much easier for the court reporter.

THE CHAIRPERSON: Thank you. And while Mr. Weafer is getting organized, I'll just remind people that we will be taking a break in 15 minutes, and so perhaps, Mr. Weafer, you could keep that in mind too in terms of how you organize your questions.

MR. WEAFER: I will, thank you, sir.

CROSS-EXAMINATION BY MR. WEAFER:

MR. WEAFER: Q: Dr. Blank, my name is Chris Weafer, and I am counsel for the British Columbia Municipal Electric Utilities, which is a group of municipal-owned and operated electric utilities, which take supply from FortisBC, and are therefore customers of FortisBC, and I also represent the Commercial Energy Consumers' Association of British Columbia, which represents commercial customers that take service from FortisBC and are ratepayer groups, in effect, that are paying for the cost of this proceeding.

And I'd like to start, sir, with where you left off with Mr. Andrews. And it's Exhibit B-1, Appendix B-6 in this proceeding, which is Health Canada's Safety Code 6, 2009. Do you have access to that document?

DR. BLANK: A: I believe so, but let me check. Oh, maybe it's disappeared. But anyway, we can proceed.

MR. WEAFER: Q: That's fine, sir. And you probably can answer these questions without reference. Are you

aware of Health Canada's Safety Code 6 limits of human exposure to radio frequency electromagnetic energy in a frequency range from 3 kilohertz to 300 gigahertz?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And are you aware that Safety Code 6 is prepared by the Consumer and Clinical Radiation Protection Bureau of Health Canada?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And to your knowledge, does Safety Code 6 specify the requirements for the safe use of or exposure to radiation-emitting devices in the frequency range from 3 kilohertz to 300 gigahertz?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And does your report say anywhere that the advanced meters and related equipment FortisBC is proposing to install and operate will not comply with Health Canada's Safety Code 6 exposure limits?

DR. BLANK: A: I don't believe I said that explicitly.

MR. WEAFER: Q: And, sir, I understand from your evidence you have not tested whether the advanced meters and related equipment FortisBC is proposing to install and operate will comply with Health Canada's Safety Code 6 exposure limits, is that correct?

DR. BLANK: A: I have not tested them, but the thing is that I realize that the criteria aren't sufficient in terms of protecting the health and safety of people

exposed to that radiation.

MR. WEAFER: Q: Thank you, sir. You have not tested them, is that correct?

DR. BLANK: A: I believe I answered that.

MR. WEAFER: Q: Thank you, sir. Will you agree with me, sir, that Health Canada's mandate is to -- and this is at page 4 of 30 of the report -- is to, and I quote: "help Canadians maintain and improve their health." That is the mandate of Health Canada. Would you agree?

Proceeding Time 9:45 a.m. T25

DR. BLANK: A: I guess so.

MR. WEAFER: Q: Sir, where are you giving evidence today? Where are you located?

DR. BLANK: A: In Victoria.

MR. WEAFER: Q: So, and as I understand it, you've worked most of your career in New York, Columbia University?

DR. BLANK: A: I was employed at Columbia University but I've worked in various places around the world.

MR. WEAFER: Q: I see, and you had an option of living anywhere in the world and you elected to take residence in the country that, as I understand your evidence to Mr. Andrews, is that the agency in charge of health is not doing its job. You elected to reside in Victoria.

DR. BLANK: A: I believe that was not the primary consideration. I don't believe that either.
MR. WEAFER: Q: Thank you, sir.
DR. BLANK: A: (inaudible)
MR. WEAFER: Q: Sir, you're in Victoria. Are you retired at this point?
DR. BLANK: A: Yes and no. I'm not -- I'm active, I'm completing a book at the moment which I'm working on, and so it's hard to say I'm retired.
MR. WEAFER: Q: Fair enough, sir, thanks very much.

I'm going to move on to the area of your credentials, which your counsel did go through with you, and I'd just like to -- you have that document in front of you and that's Exhibit C9-8-1F. And here I'd just like to do a quick sort of count. You've published extensively and that's very impressive.

In terms of subject to check on the numbers, the book reviews and chapters that you've conducted, 39 of those are pre-2009 and two are post-2009, is that correct, subject to check?
DR. BLANK: A: I haven't checked, but that could be.
MR. WEAFER: Q: I'm sorry, sir, I did not understand the answer.
DR. BLANK: A: That could be. I don't have my CV in front of me at the moment but I'm -- you're correct.
MR. WEAFER: Q: And with respect to papers, 178 of

those are pre-2009 and seven are post-2009, does that sound about right?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And book reviews, 22 of those were pre-2009 and none post-2009, does that sound about right?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And you've had a number of other areas where you've published, the Naval Office, 26 of those were pre-2009 and none were post-2009; and Science Report Industry, five were pre-2009 and none are post-2009. Do those numbers sound about right, subject to check?

DR. BLANK: A: Yeah, well, that was a short-term appointment.

MR. WEAFER: Q: And with respect to your papers cited, 20 of those were pre-2009 and 10 are post-2009, does that sound about right?

DR. BLANK: A: About right.

MR. WEAFER: Q: Thank you. Would you agree with me that a good deal of the evidence you rely on has previously been available to ICNIRP in 2009, and ICNIRP is a document in this proceeding as Exhibit B15-1?

DR. BLANK: A: I would say it should have been available.

MR. WEAFER: Q: It should have been and it was in the

public realm, it was available, you would agree?
DR. BLANK: A: Yes, it was available, but I'm not sure they availed themselves of it.
MR. WEAFER: Q: And would you agree that a good deal of the evidence you rely on has previously been available to CHENIR, C-H-E-N-I-R, the 2009 which is Exhibit 17-19 in this proceeding?
DR. BLANK: A: Yes, the answer is the same.
MR. WEAFER: Q: Yes, and would you agree that all of the evidence you rely on will be available to Health Canada when it reviews the science again this year?
DR. BLANK: A: It's available, but that doesn't mean they avail themselves of it, and I'm certain that they did not avail themselves of it because it's not included.
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?

Proceeding Time 9:52 a.m. T26

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 non-scientific, 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.

MR. WEAFER: Q: So in your view when Health Canada does its review, it should be more exhaustive in defining and identifying those reports which it has not accepted as valid to affect the standards they implement.

DR. BLANK: A: I think you have to go back to what Health Canada has defined itself into a box. In other words, they have said that this will deal with established kinds of things, and then they neglect anything they consider not established. And certainly by their criteria they sound they're all right. "I'm all right, Jack, you know? I've got this thing boxed in. It's not an established effect, and therefore I don't have to consider it."

But how do they determine whether something is established. I think if you want a scientific fact that's established, you ask scientists. You see what is published in the scientific literature, and you get

some opinion of people who are not there as political scientists but who are actually laboratory scientists who are publishing the work and the studies.

MR. WEAFER: Q: Your response, you're referring to Health Canada as political scientists?

DR. BLANK: A: I refer to their actions as such. I don't know what their individual accomplishments are, and I look down their CVs and they probably have published papers and so on. But their actions speak louder than their CVs. I think that by neglecting the actual science that exists in the world, by established scientists, publishing in established journals, using a peer review system, for them to dismiss -- I was going to say "neglect", but I say "dismiss" -- according to what you've said. For them to dismiss a whole body of information, especially when it's relevant to health risks, I think is really an abdication of their responsibility.

MR. WEAFER: Q: Thank you, sir. We'll move on. I understand your evidence.

I'm still on your *curriculum vitae* and I do wish to make sure I clearly understand where your specific areas of expertise are with respect to your evidence. And as I understand it, I'll give you my summary, and if I'm missing anything, you can elaborate.

But as I understand, when I look at your academic appointments, your background has been in chemistry, specializing in biological chemistry related to physiology. And then adding cellular biophysics. Is that a fair summary? And here I'm looking at your -- I'm relying on your academic appointments in your CV.

DR. BLANK: A: Yes, I would say that that's -- of the broad outline. I mean, I was trained originally as a physical chemist, and I got into biology when I spent a couple of years working with an eminent physiologist in the colloid science department in Cambridge. A man who has done fundamental work and with whom I published, and we did some interesting work on the properties of membranes. You may look up the man's name. Roughton. F. J. Roughton. The man who discovered carbonic anhydrases, who discovered the reactions of oxygen and carbon monoxide with haemoglobin. And someone who was responsible for developing a system for studying very rapid chemical reactions, the kind that you can measure with haemoglobin.

And I might say that he was overlooked for the Nobel Prize. I don't know why. But the fact is that someone who developed a system -- he developed a system for studying kinetics down to the millisecond

range. That was overlooked. But then someone who went to the microsecond range was honoured with a Nobel Prize. So I think that somebody should -- for the committee to neglect someone of that stature was really an oversight.

Proceeding Time 9:57 a.m. T27

MR. WEAFER: Q: I appreciate your speaking to his expertise, sir. Can we focus on yours for these questions? Thank you.

The specific areas that I understand you focused on and areas of research are DNA, cellular membrane transport and permeability, and particularly as it relates to electromagnetic fields. Is that a fair summary of the specific research areas that you've worked on?

DR. BLANK: A: I would say the stress proteins, they've been omitted, that should be included there.

MR. WEAFER: Q: Thank you, sir.

Now, in looking at your society memberships, there's a number listed in your CV, and would it be fair to say, based on those identified, that your expertise is in bioelectromagnetics, bioelectrochemistry, colloid and surface chemistry, biophysics, organic and biological electrochemistry? Would that be indicative from your society memberships as to what your areas of specialty are?

DR. BLANK: A: Yes.
MR. WEAFER: Q: And with respect to your publications would it be fair to say that the 41 publications that you've authored have all been within your field of expertise?
DR. BLANK: A: I'm not sure where you're going with that question, but generally when one publishes it's considered an expression of some technical ability.
MR. WEAFER: Q: That's exactly where I'm going, sir. So those are where you've published and those are your areas of expertise that you bring to this proceeding. Is that fair?
DR. BLANK: A: Well, I would say that's fair, but that's not limited to that.
MR. WEAFER: Q: No, but you've developed a high level of expertise in this specific number of areas, correct?
DR. BLANK: A: Yes.
MR. WEAFER: Q: And in Information Requests CEC 1.5.2, we asked you to review the credentials of the authors of the chapters in the ICNIRP report 2009, and your response was:

> "Sufficient information has not been supplied to enable me to assess the credentials of the authors of each of the chapters in the ICNIRP report 2009."

So you've not undertaken that exercise and I accept that. But would you agree with me that there are very specific areas of comment in the ICNIRP report, and just -- I don't think you need to go there, you're free to if you wish, but Chapter 1 deals with the symmetry of high frequency electromagnetic fields on 100 kilohertz to 300 gigahertz, and it lists ten scientists who wrote on that topic.

You'd agree with me that the symmetry is an expertise field that requires special study to properly deal with setting standards for RF exposure?

DR. BLANK: A: Are these health standards you're talking about?

MR. WEAFER: Q: I'm talking about the standards reviewed and the evidence reviewed in the ICNIRP 2009 report.

DR. BLANK: A: Standard -- health standards?

MR. WEAFER: Q: The standards, the review of the science to determine what should go into the setting of standards.

DR. BLANK: A: Well, I'm not sure that that should be part of the -- you'll have to show me the whole list and then I'll be able to see what it is. But if you're asking me about health standards, I don't see how that has -- that it is the first thing that one would list.

MR. WEAFER: Q: The question, sir, is that these experts who testified with respect to the symmetry of high frequency electromagnetic fields had specific detailed credentials to undertake that work. Do you agree or disagree with that?

DR. BLANK: A: I don't know.

MR. WEAFER: Q: And the next chapter deals with in the ICNIRP report at Chapter 2, a review of experimental studies of RF biological effects, 100 kilohertz to 300 gigahertz, again a number of scientists identified as responsible for the work. Would you agree that specific expertise in RF biological expertise is a field required to properly deal with setting standards for RF exposure?

Proceeding Time 10:02 a.m. T28

DR. BLANK: A: Well, the way you ask the question, one would be expected to say yes. But I don't know whether these people are measuring anything having to do with the responses themselves.

MR. WEAFER: Q: So you have not looked at that evidence? You have not assessed -- you've been quite critical of these studies, but you haven't actually assessed the underlying expertise of the scientists who worked on the reports?

DR. BLANK: A: I do not know how these scientists were chosen, and I believe you do not know either. I think

it's a buddy system that causes these people to get on these committees and to get asked.

MR. WEAFER: Q: But you don't know?

DR. BLANK: A: I don't know. But I do know when I tried to get on an ICNIRP discussion, I had to fight tooth and nail to get some information in to Mike Reppetolli, and the thing is, he refused to take the information that I was giving him, and then in the end I don't believe it was included.

MR. WEAFER: Mr. Chairman, this is a good time to break, thank you.

THE CHAIRPERSON: Okay. Thank you. We will take a break. It's five after ten and we'll reconvene at 10:20.

(PROCEEDINGS ADJOURNED AT 10:07 A.M.)

(PROCEEDINGS RESUMED AT 10:20 A.M.) **T29/30**

THE CHAIRPERSON: Please be seated.

Mr. Weafer, please continue.

MR. WEAFER: Thank you, Mr. Chairman.

MR. WEAFER: Q: Dr. Blank, do you have a copy of your evidence with you, Exhibit C9-8?

DR. BLANK: A: I believe I have it on my computer.

MR. WEAFER: Q: Could I turn you to -- and I'm afraid your evidence is not paginated, at least the version I have, but it's three pages into the version I have. Paragraph that starts at the bottom of the page:

"The classic case-control type of epidemiology study can never be as well controlled as an experimental study done in a laboratory."

Do you have that paragraph in front of you?

DR. BLANK: A: Yes.

MR. WEAFER: Q: Now, you have -- the paragraph goes on.

"Even the authors of the recent highly publicized international Interphone study acknowledge "many biases and errors" in the design. Despite the great time and expense devoted to the project, the flaws have limited the ability to draw any conclusions regarding cell phone radiation. Nevertheless, the authors noted that there were suggestions of an increased risk of glioma at the highest exposure levels…"

Now, sir, you have confirmed in your response to Information Requests that your field of science is not epidemiology study, is that correct?

DR. BLANK: A: Correct.

MR. WEAFER: Q: And your field of study is also not the study of cancers, is it, sir?

DR. BLANK: A: Correct.

MR. WEAFER: Q: Thank you, sir. The next reference to your report is two pages over, to the top of the page.

And I'm looking at the sentence, to finish the partial paragraph on the start of the page here.

> "The 13-fold rise in RF power density over a recent five-year period in Belo Horizonte, Brazil (Dode et al. 2011) should raise alarms about the increasing background radiation that we now accept as normal in modern population centers."

Do you see that quote?

DR. BLANK: A: No, but I recall it. What page is that on?

MR. WEAFER: Q: Well, as I say, my version is not paginated, so it is the fifth page of the version I have.

DR. BLANK: A: Okay, I have the fifth page, but I don't see it. But anyway, I recall that quote.

MR. WEAFER: Q: Okay. Can you tell us how much RF in a city fully serviced with smart meters would come from the smart meters and how much would come from each of the other sources?

DR. BLANK: A: No, I cannot.

MR. WEAFER: Q: And have you personally and independently studied such a question with respect to the amount of RF smart meters contribute to exposing people to RF relative to other sources which contribute to total RF exposure of individuals?

DR. BLANK: A: I have not studied that, but I can say very, very clearly that when one is trying to limit RF exposure, one limits all exposures.

MR. WEAFER: Q: Sir, the study you reference in the paragraph I just quoted, are you aware of the ICNIRP 2009 conclusions with respect to a review of studies on environmental exposure from transmitters? And this is found at Exhibit B-15-1 of these proceedings.

DR. BLANK: A: No. But you're going to tell me, is that right?

MR. WEAFER: Q: Well, I could save some time by doing that, but if you know the answer I'm happy to hear it from you.

DR. BLANK: A: No, I don't have the answer at my fingertips.

MR. WEAFER: Q: And would you be surprised by the conclusion that was stated in that report at page 319 under "Symptoms":

> "Generally, studies of symptoms and well-being find a higher percentage of symptoms and less well-being among persons who are concerned about exposure from base stations, whereas there is little evidence for an association between measured RF levels and the studied outcomes."

Does that jibe with your recollection of their

conclusions?

DR. BLANK: A: This was the conclusion of ICNIRP?

MR. WEAFER: Q: Yes. In response to a review of studies on environmental exposure from transmitters.

DR. BLANK: A: Well, I have no comment.

Proceeding Time 10:24 a.m. T31

MR. WEAFER: Q: Do you accept that that is the conclusion? Would you like have the pull the report and review, or do you accept that subject to check that was the conclusion?

DR. BLANK: A: You've already established that I'm -- you've established that I'm not an expert in epidemiology nor on RF exposure, so I'd say I have no comment.

MR. WEAFER: Q: Okay, so your reference to the Dode study then is an anecdotal reference of little value to this Commission then, I take it, as you have no expertise in that area.

DR. BLANK: A: No, it's not quite that. It just says that there was another study which pointed out there was no (inaudible) increase in the rate of RF in a population.

MR. WEAFER: Q: Thank you, sir. Further on in your report, and here we're going to move into a discussion around the Bioinitiative report which you've had discussion with previous counsel on, and on the same

page of your report you make the statement:

"The scientific value of any judgment depends upon whether it reflects the opinion of qualified scientists who actually have first-hand knowledge of the subject matter and the experimental details of the studies."

That's a direct quote from your report C9-8, would you agree with that?

DR. BLANK: A: I recognize that.

MR. WEAFER: Q: Okay. And with respect to the Bioinitiative report which I now understand from your evidence through your counsel at the start of your appearance, you were involved in the initiation and the creation of the body which the group of scientists and academics who commenced the Bioinitiative report, is that correct?

DR. BLANK: A: Yeah, we started the report -- we hardly started work in that area. The people who got together who had been working in that area for a while. And as you know, the number involved in this has been growing, because as we introduced, more people who are involved in the study, we increased the value of the report that we'd come up with. Basically it's like a review paper or review document that has the results of many people who are involved indirectly

in the research.

MR. WEAFER: Q: Thank you, sir. Do you have Exhibit C17-24 available to you? I provided it to your counsel last week and indicated I'd be dealing with --

MR. AARON: I'm sorry to interrupt, but there's been repeated references to me as Dr. Blank's counsel, and there should be no suggestion to Dr. Blank that he and I are in a solicitor-client relationship. In fact that's inconsistent with the great efforts that we've tried to maintain in terms of separateness and independence.

MR. WEAFER: I apologize. That was certainly not the intent of my comment. I apologize to Mr. Aaron. The better way of putting this would have been I provided the document to counsel for CSTS with the specific objective of ensuring that his client -- his consultants received a copy of the document prior to my cross-examination, and that was the intent of my description and I take Mr. Aaron's comment and completely had no intention of indicating otherwise.

THE CHAIRPERSON: Thank you for that clarification.

MR. WEAFER: Q: Did Mr. Aaron provide you with the reference and a copy of the report that I had advanced to him in hard copy and electronically?

DR. BLANK: A: Well, the report again?

MR. WEAFER: Q: I'm sorry, sir. This is the Public

Utilities Commission of Texas project relating to advanced metering issues report on health and radio frequency electromagnetic fields for advanced meters. Do you have a copy of that document? It's Exhibit --

DR. BLANK: A: No, I don't have that. He sent it -- no, it's not on the -- not on my screen.

MR. WEAFER: Q: He sent it to you but you don't have it.

DR. BLANK: A: No, I don't have it available on my screen. I just took a limited number of things on my screen.

MR. WEAFER: Q: I'll give you a moment to take a better look.

DR. BLANK: A: Well, if you can tell me what it's about.

MR. WEAFER: Q: Where I'm going to go with this report is page 17 and 18, which confirm the point made earlier that the Bioinitiative report is subject to some controversy, and the specific point made is the Bioinitiative report is an example of a report that received notoriety despite being viewed negatively by the research community.

Would you agree with that comment?

Proceeding Time 10:29 a.m. T32

DR. BLANK: A: Not at all.

MR. WEAFER: Q: You would not --

DR. BLANK: A: How does one receive -- well, how does one receive notoriety?
MR. WEAFER: Q: Notoriety -- I'll try not to answer your questions, and if you could answer mine.
DR. BLANK: A: Well, I --
MR. WEAFER: Q: I take it your evidence -- I'm sorry, sir.
DR. BLANK: A: I'm trying to clarify the quote that you gave. I don't understand the concept of receiving notoriety.
MR. WEAFER: Q: Would you agree with me, as stated further in this report, that the report is often cited by opponents of wireless technology but it is widely criticized by government research agencies and subject matter experts in Australia, Belgium, the European Commission, France, Germany, and the Netherlands, and that it has also been criticized by EPRI and the IEEE? Are you aware of those criticisms?
DR. BLANK: A: I'm aware of those criticisms, but I'm also aware of the fact that the European Parliament endorsed and cited it when it said that there was an absolute need for revisiting the question of standards.
MR. WEAFER: Q: Would you agree with me, sir, that I've described a number of bodies and representative agencies of countries that have criticized the report,

that that could reasonably contribute to an assessment that it has notoriety?

DR. BLANK: A: I would say that if one had these people chosen by some method that was open to (inaudible) people, so that one knew why -- the basis on which these members of the committee got there, then I would feel that perhaps there's some basis for their comments. But notoriety is -- well, I don't know. It's in the eyes of the beholder, and if the beholder isn't worth scrutiny, then I don't know if one should pay much attention to it. If it's a scientific document that one is interested in, one should be judged by scientists, or people who understand enough about science to make a valid judgment.

MR. WEAFER: Q: Would you agree that there are scientists involved on the EPRI and the IEEE?

DR. BLANK: A: I know some of the scientists who are involved in EPRI. I don't know the current status, but I do know that there are some with -- whose credentials I question.

MR. WEAFER: Q: I understand. But they are -- you acknowledge there are scientists involved in those organizations. And would you agree that there are scientists involved with the work done by the nations that have articulated criticism and concern around the Bioinitiative report?

DR. BLANK: A: Well, I did an analysis of the Netherlands report, and found that there were basically all physicians on there. And their knowledge of science was, I would say, quite limited. I know physicians pretty much close up, because I've taught in medical school for many years. And while I meet them when they're very young, and they still have some interest in science, by the time they reach the third and fourth years of medical school, they have gone -- they've long gone from the science. And in fact if one is relying on clinical people for scientific judgment, it's a very questionable practice.

MR. WEAFER: Q: So it's not that they're scientists -- that they're not scientists. They're scientists that you don't agree with or respect.

DR. BLANK: A: No, it's -- you -- at the very beginning of this procedure, I was asked what my expertise is. And when you ask scientists what their expertise is, they'll tell you. But when you ask physicians what their expertise is, they'll give you their expertise, and it's not in science. It happens to be in their particular clinical specialty. So, and when I did the analysis of the Netherlands group, and I didn't want to go through every one of them, because I'm sure they're more or less the same, but they were all

clinical specialties. And clinical specialties just do not have the kind of background or information that is needed to assess the scientific value of a document like the Bioinitiative report.

MR. WEAFER: Q: With respect to the Bioinitiative report, you're aware of Dr. Carpenter as one of the co-authors of that report?

DR. BLANK: A: He's a co-editor.

MR. WEAFER: Q: Co-editor. And are you aware that Dr. Carpenter attempted to qualify as an expert in Canada, in a Hydro Quebec proceeding?

DR. BLANK: A: No, I'm not aware of that.

MR. WEAFER: Q: And were you -- are you aware -- so I take it then you're not aware that the board refused to grant Dr. Carpenter his expert status in that proceeding?

Proceeding Time 10:34 a.m. T33

DR. BLANK: A: Well, I find it a little hard to understand because Dr. Carpenter's credentials go way back. He was the director of the New York State Power Authority that investigated the first investigation of low frequency EMF, and I just don't understand whether there was a non-scientific component to that decision.

MR. WEAFER: Q: The reasoning of the Quebec tribunal was, and I quote from the translation:

"Clearly the witness Carpenter, expert or

not, does not meet the criteria of objectivity which this board is entitled to expect."

Were you aware of that finding of the board and that determination of Dr. Carpenter's evidence?

DR. BLANK: A: No, I'm not aware of it, but I'm wondering how I would fare there, whether I'm being accepted.

MR. WEAFER: Q: I do -- that is -- that is a good question.

DR. BLANK: A: I'm looking at the evidence that I'm confronting and I'm giving my -- it might not coincide with the opinion of some of the people who are making other decisions, but I believe I'm being objective.

MR. WEAFER: Q: Are you aware of the other co-editor of the Bioinitiative report, Cindy Sage?

DR. BLANK: A: Yes, I've known Cindy for a number of years.

MR. WEAFER: Q: And are you aware of her academic credentials?

DR. BLANK: A: You mean her degrees?

MR. WEAFER: Q: Yes.

DR. BLANK: A: Yes.

MR. WEAFER: Q: What are they?

DR. BLANK: A: I believe she has a bachelor's degree and a management degree, and the fact is she has gone

on to do a fair amount of work in an academic setting that has given her the experience that I think that many academics would envy.

MR. WEAFER: Q: Sir, I'm giving you a fair bit of latitude in answering the questions. The specific question was her academic credentials, and you identified a B.A. and M.A. Do you know in what faculties those academics credentials were earned?

DR. BLANK: A: I'm not sure. I think it may have even been in writing or something like that. I'm not sure.

MR. WEAFER: Q: Would a master -- you're not sure, that's fine. That's a master of arts and to your understanding it may be in writing.

DR. BLANK: A: Oh, okay.

MR. WEAFER: Q: That was your answer, I just want to confirm. You don't know and you say it may be in writing.

DR. BLANK: A: I don't know. But I can tell you that the measure of a person is really the accomplishment. And the fact is that when you look at what she has done, she has done an enormous amount, and especially through Sage Associates they have published very interesting results on and evaluation of smart meters. And if you look at her report it's quite well documented the kinds of readings one can get and under different kinds of circumstances. She's also

published an original piece of research on assistance PBA devices, which very few people have paid attention to, and she recently published a paper on autism, which is a subject that's -- that is RF and autism, which is a subject that's getting more and more attention, and that may very well be contributing to the increase, the enormous increase in autism that has been the experienced on the American continent.

So I think that as an academic she stacks up very well, and certainly as an editor she has done an enormous amount of work in pushing this Bioinitiative report through because she had edited and she has also gotten some support for it, which is a very difficult thing to do these days, and the fact that she's done a very good job.

MR. WEAFER: Q: Thank you, sir, and just to clarify then, a master of arts in what you understand to be may possibly be writing meets your standard as identified in your report that the scientific value of any judgment depends upon whether it reflects the opinion of qualified scientists who actually have first-hand knowledge of the subject matter and experimental details of the studies. And I understand for Ms. Sage you've reference autism, and I also understand she wrote the chapter on breast cancer in the Bioinitiative report. Is that correct?

DR. BLANK: A: I believe so.

Proceeding Time 10:39 a.m. T34

MR. WEAFER: Q: Thank you, sir. Some topics have been covered, sir, so I apologize, I'm shuffling some paper.

There has been some discussion around setting standards in health issues, and you would agree with me that there should be scientific studies based on cause and effect which are confirmed, in order to establish science-based standards for our society?

DR. BLANK: A: Yes.

MR. WEAFER: Q: And I take it from some of the discussion you've had that sufficient funds have not been provided for the relevant research required to establish science-based standards?

DR. BLANK: A: Correct.

MR. WEAFER: Q: And when would you expect those funds to be allocated to create more certainty?

DR. BLANK: A: Well -- you aren't serious in asking that question.

MR. WEAFER: Q: I'm sorry? You'll have to repeat.

DR. BLANK: A: I'm just wondering what -- well, given the fiscal climate in every country in the western world is trying to chop its budget to pieces, I don't give that a chance -- I don't see too great a chance

for that happening very soon.

MR. WEAFER: Mr. Chairman, those are my questions. Thank you, sir. Thank you, Dr. Blank.

THE CHAIRPERSON: Thank you, Mr. Weafer.

DR. BLANK: A: Thank you. I've tried to be correct and sometimes it comes across as bluntness. But if I have done that, I apologize. But I try to be honest in my answers.

MR. WEAFER: Thank you, sir.

MR. FULTON: FortisBC Inc., Mr. Macintosh.

THE CHAIRPERSON: Good morning, Mr. Macintosh.

MR. MACINTOSH: Good morning, Mr. Chair.

CROSS-EXAMINATION BY MR. MACINTOSH:

MR. MACINTOSH: Q: Dr. Blank, there was a process here about having people like yourself testify by way of Skype, and Mr. Aaron, who we certainly know is not your lawyer, but apparently on your behalf Mr. Aaron wrote to the Commission with Exhibit C9-9.

And it said, "(1) Martin Blank." It said:

> "Martin Blank, based out of Columbia University in New York, is only available after March 10. Due to the fact that he is elderly, he would prefer to testify via Skype."

Now, I heard you say today you're in Victoria right now?

DR. BLANK: A: That's correct.
MR. MACINTOSH: Q: Victoria, B.C.?
DR. BLANK: A: Right.
MR. MACINTOSH: Q: And you were only available after March 10 because you were in Brazil?
DR. BLANK: A: Correct.
MR. MACINTOSH: Q: So, why aren't you here?
DR. BLANK: A: Because I'm here.
MR. MACINTOSH: Q: Well, I wasn't thinking about metaphysics, Dr. Blank. I'm asking why is it that you are not here when there has been an enormous amount of effort to accommodate you in testifying by way of Skype, when it turns out you're in Victoria.
DR. BLANK: A: Well, I appreciate the effort. And I thank you for arranging the Skype. But I've just finished an arduous trip, and I am pretty tired. And I appreciate being able to testify from my chair in the office.
MR. MACINTOSH: Q: You testified before this Commission, sir, on at least one previous occasion?
DR. BLANK: A: Which Commission?
MR. MACINTOSH: Q: The British Columbia Utilities Commission.
DR. BLANK: A: I don't believe I did.
MR. MACINTOSH: Q: You've never given evidence regarding the Okanagan transmission line in the

Okanagan?
DR. BLANK: A: Yes. I was -- that's right. I went up there, and he -- Penticton. Penticton.
Proceeding Time 10:43 a.m. T35
MR. MACINTOSH: Q: Yes. So you have testified before this Commission in the past.
DR. BLANK: A: (inaudible).
MR. MACINTOSH: Q: I couldn't hear --
DR. BLANK: A: I didn't realize -- I don't realize but it's the same Commission.
MR. MACINTOSH: Q: Very well. And that was on something called the OTR by acronym. It was the Okanagan Transmission Reinforcement Line of my current client in this matter, FortisBC. Do you recall that now?
DR. BLANK: A: Yes.
MR. MACINTOSH: Q: You testified about EMF?
DR. BLANK: A: Yes.
MR. MACINTOSH: Q: You advocated an approach reflected in the work of the Bioinitiative which you cited in your testimony, correct?
DR. BLANK: A: Yes.
MR. MACINTOSH: Q: You're a founder and contributor of Bioinitiative?
DR. BLANK: A: Yes, I'm one of them.
MR. MACINTOSH: Q: The Commission in that case examined

the EMF from the line by comparing it to the health standards of the World Health Organization. Do you recall that?

DR. BLANK: A: Vaguely.

MR. MACINTOSH: Q: And you recall that the project was approved?

DR. BLANK: A: No, I don't remember.

MR. MACINTOSH: Q: All right, I'll ask you to take my word on that one. Now, Dr. Blank, you're an academic scientist?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: Your work is largely conducted in the laboratory?

DR. BLANK: A: Well, I guess I think of myself not only as the laboratory scientist but as someone who -- as a teacher. After all, I'm a professor and I do a lot of lecturing around, so I would say that part of my work is education on a broader scale.

MR. MACINTOSH: Q: Yes, and your research work is largely conducted in the laboratory?

DR. BLANK: A: Some of it involves library kind of work because you have to get what other people have been doing and you have to read what they're doing, and that takes a fair amount of time. So if you expand it to include that, I would say yes.

MR. MACINTOSH: Q: Of course. And the work that you

normally do in the laboratory is *in vitro* work?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And that is cell and molecular biology research?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And in lay terms, I think to use your own words earlier, that is test tube work or Petri dish work in lay terms, and I don't mean to disrespect the work in any manner whatever.

DR. BLANK: A: Well, I'd say *in vitro* would be common designation. I never use Petri dishes or test tubes. I basically -- we have specialized apparatus that's designed for keeping exposures well characterized, and also for being able to make the measurements that we eventually make.

MR. MACINTOSH: Q: When Dr. Bailey was cross-examined here last week by Mr. Aaron, he was challenged for relying on studies of humans and animals instead of relying on *in vitro* studies, and Dr. Bailey gave his explanation for his preference.

MR. AARON: Sorry, I will rise. The suggestion that Dr. Bailey was challenged for his use of *in vivo* studies instead of *in vitro* studies is just not accurate. It's a mischaracterization of the facts of what happened in these proceedings. Dr. Bailey wasn't challenged for his use of animal studies. He was

challenged for omitting to include in his report any consideration of *in vitro* studies.

So if there is going to be a reference to Dr. Bailey's evidence, what Dr. Bailey was asked, how he was challenged and how he responded, my insistence is that it be an accurate reference.

THE CHAIRPERSON: Mr. Macintosh?

MR. MACINTOSH: Mr. Chair, my reference was entirely accurate, and I can recall the challenge at some length against Dr. Bailey. But I can get to the quick of this without having to pursue it. I can go straight to your --

THE CHAIRPERSON: That may be a more efficient way to move.

MR. MACINTOSH: Q: Yes. Now, what we can do, Dr. Blank, I want you to look at your report and do you have Dr. Bailey's report?

DR. BLANK: A: I don't have it readily available. Perhaps you can just give me relevant quotes.

Proceeding Time 10:48 a.m. T36

MR. MACINTOSH: Q: I can. And in his report he was speaking to his approach and there he said, at page 8, he said, and I quote:

> "A wide variety of approaches is available for assessing the possible adverse effects associated with exposures in experimental

studies. Two general types of experimental studies are studies of the effects of planned exposures on human volunteers (usually short-term studies), whole animals, (usually long-term studies, (i.e., *in vivo* studies), and isolated cells and tissues, (i.e., *in vitro* studies)."

You would agree with those statements as being an entirely correct statement?

DR. BLANK: A: I would say that is correct.

MR. MACINTOSH: Q: And then he went on and he said,

"Human and animal studies of RF exposures are considered in this report."

MR. AARON: Well, can you finish the sentence?

MR. MACINTOSH: I just did.

MR. MACINTOSH: Q: So, in his report, Dr. Bailey, as I was just saying, at page 5 of his report, he said,

"Human and animal studies of RF exposures are considered in this report."

Period, end of sentence. Now --

MR. AARON: Well, my objection is that my friend purports to be setting out Dr. Bailey's position on this matter in the E^{x}Ponent Report, and to be fair, to the panel, and to this process, I would like to add that Dr. Bailey also wrote,

"Only human and animal studies of RF

exposure are considered in this report because they provide more direct information …"

THE CHAIRPERSON: Mr. Aaron. I think it's inappropriate for you to be adding comment here. You can object, but that's as far as you can go, sir.

MR. AARON: Well, the objection is that the fulsome manner in which Dr. Bailey dealt with this matter has not been put to the witness, and the witness is being misled. And I would like my friend to read into -- to put the question to the witness so as to include the first two sentences in the top of page 4. Sorry, the first two lines on the top of page 4 of Dr. Bailey's -- this is falling apart. Just hold that there.

MR. MACINTOSH: Mr. Chair, I say, with respect, that the objection is inappropriate, but -- but, the best way is to just press ahead. And so I'm just going to read what my friend wants me to read.

THE CHAIRPERSON: Thank you.

MR. MACINTOSH: Q: And so, at another place in Dr. Bailey's report, which is --

THE CHAIRPERSON: Mr. Aaron, please take your seat.

MR. MACINTOSH: Q: He says,

"Only human and animal studies of RF exposure are considered in this report because they provide more direct information

on human health than *in vitro* studies."

All right? So, I've read to you passages from Dr. Bailey's report. And now I want to read to you your response in your report.

Do you have your report handy? Do you have your report handy?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And will you turn in your report to -- it's not numbered. But if it was numbered, it would be page number 2. Do you have it?

DR. BLANK: A: I'm getting to it. Yes. I'm on page 2.

MR. MACINTOSH: Q: And where I'm directing you on page 2 is to your second paragraph.

DR. BLANK: A: "These potentially harmful effects, health effects …".

MR. MACINTOSH: Q: That's right. And then what you say, sir, in the next sentence is, "That report," and that's the report of E^{x}Ponent, the report of Dr. Bailey, correct?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: "That report dismissed

all information derived from *in vitro* studies, and as a result its conclusions are totally misleading."

You said that, right?

Proceeding Time 10:53 a.m. T37

DR. BLANK: A: Right.
MR. MACINTOSH: Q: And you recognize, Dr. Blank, that several international agencies have had occasion to comment on *in vitro* as compared with human and animal studies when looking at radio frequency emissions, correct?
DR. BLANK: A: I'm not sure I put that much value in that, because, after all, they can make their comments, but the comments may not be valid. I mean, if you're going to dismiss something that will be able to pick up changes in DNA, as you can with *in vitro* studies, and then try and make a conclusion about the incidents of cancer, which is what everybody is worried about and that takes many many years until it develops, then you're not going to make any sense at all.
MR. MACINTOSH: Q: That's not the question I asked you, Dr. Blank. I asked you whether it's the case that several international agencies have expressed observations about the comparative value of studies on humans and animals as compared with *in vitro* studies. That was my question. Do you have knowledge of that?
DR. BLANK: A: I will say that they may have expressed these opinions, but their opinions -- their opinions are not valid because for something to make a comment about the incidents of cancer which takes many years

to develop, you cannot pick up any hints at all unless you study the changes that occur in the DNA of cells.

MR. MACINTOSH: Q: I've passed through Mr. Aaron an extract from a World Health Organization comment on the comparison of using animal and human studies as compared with *in vitro* studies, and I have copies here to be distributed, if that will be helpful. And what the World Health Organization said, in part -- and in fairness to you, the World Health Organization doesn't say "Don't ever do *in vitro* studies". What they say, in part, is that *in vitro* studies cannot serve as a basis for health risk assessment in humans. Are you aware of that statement by the World Health Organization?

DR. BLANK: A: I would agree with the statement if they were to say it cannot serve as the sole source, sole basis.

MR. MACINTOSH: Q: All right.

DR. BLANK: A: But they optically are necessary.

MR. MACINTOSH: Q: I'll take that answer as well, but if you'll answer my question, you're aware that the World Health Organization spoke as I have suggested?

DR. BLANK: A: I suggest that they spoke that way, but they mis-spoke by omitting the importance of other studies.

MR. MACINTOSH: Q: Fine. I'm not going to have you in

a competition with the World Health Organization. I just want to have your acknowledgement that that's the World Health Organization's view on that topic.

Now --

DR. BLANK: A: Unfortunately -- unfortunately World Health Organization copy is written by humans, and sometimes humans don't express themselves exactly. I think if they -- if you were go to back you would realize that they would say that you need *in vitro* kinds of studies as well.

MR. MACINTOSH: Q: Well, let me suggest two other international agencies have expressed themselves, and just see how they did. Maybe they -- maybe you're alleging or suggesting they mis-spoke, but let's go one step at a time.

Through Mr. Aaron I had you receive the ICNIRP 2009 report. Did you get that?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And I had Mr. Aaron send you the AGNIR, that's the Advisory Group on Non-Iodizing Radiation convened by the Health Protection Authority of Great Britain, the AGNIR 2012 report. Did you get that?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: Now, I want you to turn to two pages in each -- in those respective documents, if you can.

At ICNIRP --

DR. BLANK: A: I do not have them in front of me.

MR. MACINTOSH: Q: All right. Well, then you're going to have to have me read to you portions of them, because that's why I sent them to Mr. Aaron several days ago, and I'm going to distribute portions of them to the Commission here.

Proceeding Time 10:58 a.m. T38

And for the record, the ICNIRP 2009 report is Exhibit B-15-1, Appendix BCH IR 2 2.13, and AGNIR 2012 is B-42, Undertaking No. 4, and what I'm going to read to you, Dr. Blank, is this comment by ICNIRP in 2009, and they were addressing *in vitro* studies with regard to RF, and there's a relatively long passage I have excerpted and part of it, which I have highlighted, gets to this conclusion.

> "However, the results of studies of the effects of RF exposure on stress protein expression, particularly HSPS, have so far been inconsistent, although mostly negative outcomes have been reported *in vitro*, heating remains a potential confounder and probably accounts for some of the positive effects reported."

My only question right now, Dr. Blank, is you accept that ICNIRP made pronouncements of that

nature, and that was a particular statement it made in 2009. That's the only question right now. Are you aware of that?

DR. BLANK: A: Yes, but I do not attest to its validity.

MR. MACINTOSH: Q: I know you don't. And then the second excerpt I'm putting in front of you is the AGNIR at 2012, under the auspices of the Health Protection Authority of Great Britain, and there they said in part,

> "There are now several hundred studies in the published literature that have looked for effects on isolated cells or their components when exposed to RF fields. None has provided robust evidence for an effect."

And I read further on,

> "The apparent effect on stress proteins described in previous review by AGNIR in 2003 has not been replicated in most of the newer studies."

And then I read further on,

> "At present there is no known pattern of exposure conditions that has been shown consistently to cause a biological effect from exposures below guideline levels."

Now, once again, I know you disagree with

that, and I don't even have to ask you that. I want to ask you, you recognize that that's a position that's been expressed by AGNIR in 2012, isn't that correct?

DR. BLANK: A: You don't have to ask me that.

MR. MACINTOSH: Q: Because you know that, don't you?

DR. BLANK: A: Well, you're quoting, but the fact of the matter is that they have had not find -- they look at a part of the literature that I'm not sure exists. I mean, as soon as the radio frequency effect was found it was report -- it was first reported by De Pomeray, who has no dog in this fight. And the fact of the matter is there are a number of other people who have found similar signs of effects.

The existence of the stress response is really not contested by anybody who has done any research in the effects of EMF.

MR. MACINTOSH: Q: And then yesterday Dr. Maisch was testifying here. He was testifying from Australia. And part of his filed evidence is this. Question 15,

> "What comments do you have, if any, regarding Fortis responses to CSTS IR…"

such and such,

> "…regarding the utility of *in vitro* studies."

His answer,

"On this point I agree with E[x]ponent, ICNIRP and AGNIR, that animal and human studies are of more relevance than *in vitro* studies for the question at hand, is there an adverse biological effect from smart meter emissions."

And were you aware of Dr. Maisch having expressed that?

DR. BLANK: A: No, I wasn't, but he's entitled to his opinions.

MR. MACINTOSH: Q: Yes he is, and so is Dr. Bailey, and I suggest that it was totally incorrect and inappropriate of you to characterize his report as "totally misleading", which was your words, for having chosen to rely on animal studies and human studies, that's all.

DR. BLANK: A: Well, I stand by my statement, and I'll ask you to perhaps reconsider your statement, because you are saying that when it's -- when something is totally misleading it misleads. Actually, totally misleading is a bit redundant. If something is misleading, you have misled someone, and that is total, whether it exists or not. And the fact that you deny the existence of *in vitro* evidence, this is the kind of evidence that is absolutely essential to establish the kinds of cellular changes that can lead

to the kind of bodily changes, systemic changes that one is interested in in animal studies.

How are you going to relate the cancers that show up after years of exposure if you haven't set the basis for it in the DNA changes that occur?

Proceeding Time 11:03 a.m. T39

MR. MACINTOSH: Q: Now, I'm going to ask you to switch channels a little bit, Dr. Blank, and to go to what should be page 7 of your report, it's un-numbered, but if you counted in seven pages from the front, you would be at a page where the first words are "stress response", and then you write a sentence,

"Separation into thermal and non-thermal categories makes no sense regarding these cellular responses."

And you're mindful of having written that, correct?

DR. BLANK: A: Now, what is the actual quote you're referring to?

MR. MACINTOSH: Q: It's at page -- what would be page 7 of your --

DR. BLANK: A: I have page 7.

MR. MACINTOSH: Q: Of your report, and --

DR. BLANK: A: What is it, the separation of thermal and non-thermal mechanisms, is that the paragraph?

MR. MACINTOSH: Q: Just let me go back to it. At page, what would be page 7, and I believe elsewhere in your

report, and there at the top of the page you observe

> "Separation into thermal and non-thermal categories makes no sense regarding these cellular responses."

Do you have that sentence?

DR. BLANK: A: No, I have the -- I have the "Separate the thermal and non-thermal" -- wait. Yes, that's sort of hanging there in the middle.

MR. MACINTOSH: Q: And my inference was that you were alluding then to the Health Canada Safety Code 6, which focuses for its levels of RF exposure on thermal. That's what I thought you were thinking about?

DR. BLANK: A: Yes. Well, it was more general. It was actually referring, if you look at the beginning of the paragraph you will see it was referring to the whole reliance on SAR, specific absorption rate, as a way of making a judgment of the biological response.

MR. MACINTOSH: Q: And when you were being examined by a lawyer here earlier this morning, I forget who, unfortunately, but you were being examined with regard to Safety Code 6 and I heard you make some reference to James McNamee, to say that Safety Code 6 does not take non-thermal into account. Did I hear that right?

DR. BLANK: A: Yes, I believe I received an e-mail from someone who attended a procedure that was going on in

Quebec, where apparently he did make that assertion and under some -- I don't know if it was under oath, but at least in public.

MR. MACINTOSH: Q: He was under oath, and it was in public, and I have the transcript right here in front of me. Now, before you -- before you testified to this Commission with an earlier lawyer today about Mr. McNamee basically representing the Safety Code 6 does not take non-thermal into account, I assume you had not read the transcript.

DR. BLANK: A: No, I had no access to the transcript, but I had what I thought was reliable information.

MR. MACINTOSH: Q: Well, you could have accessed the transcript before making that statement, but in any event, you --

DR. BLANK: A: Not in this document. This document was written before.

MR. MACINTOSH: Q: It's a -- you got an e-mail description from somebody of what was going on, right? And that's what you relied on.

DR. BLANK: A: Right.

MR. MACINTOSH: Q: And I have the transcript here and I can file it with the Commission, and I can advise you unequivocally that Mr. McNamee says the very opposite. The very opposite of what you advised, and he said -- and I just quote brief portions. He says, so

basically we're taking the lowest exposure level which produces an adverse health effect and using that.

MR. AARON: Sorry, George.

MR. MACINTOSH: It's Mr. Macintosh for the record.

MR. AARON: Sorry, Mr. Macintosh, the document he's referring to, he does so in a context that's inappropriate for reasons that the document hasn't been disclosed. I'd like to at least have the courtesy of receiving a copy of the document that's being put to my witness in cross. Thank you. And perhaps have an opportunity to review it before it's used in cross, and characterized.

THE CHAIRPERSON: Mr. Macintosh, do you have a response to that?

Proceeding Time 11:08 a.m. T40

MR. MACINTOSH: Yes, I do, Mr. Chair. When a witness is being cross-examined based on a prior statement he has given under oath, and especially on a topic which has just been raised, there is no obligation whatever, at law, to have previously disclosed the document that is going to be used to contradict the witness on his credibility or on his statement.

That is not to say that I was, you know, being lawyer-y here. If this issue had not come up I would have not have referenced this, and I would have distributed it earlier, because there's no reason not

to. But, as a matter of law, when a witness says something in earlier evidence that is directly contradicted by something else, I'm perfectly entitled to cross-examine the witness, and that's the point. And I don't know if Mr. Fulton wants to speak on that or not, but that is the point.

THE CHAIRPERSON: I'll let Mr. Aaron comment and then I'll ask Mr. Fulton.

MR. AARON: Well, if -- I'd be content to proceed as long as there's not a characterization by Mr. Macintosh of the evidence, and as long as he restricts it to direct references, that are representative of the testimony of McNamee, that are fair in that regard. And I can't scrutinize the fairness of it because I haven't seen the document.

THE CHAIRPERSON: Mr. Fulton, do you have anything to add?

MR. FULTON: No, I think Mr. Macintosh has accurately set out the position, and from Mr. Aaron's comments I take it that he doesn't disagree with the position that Mr. Macintosh has taken in terms of using this document. So, I think I don't have anything further.

THE CHAIRPERSON: Thank you.

MR. FULTON: Helpful to add.

THE CHAIRPERSON: Please proceed.

MR. MACINTOSH: Thank you, Mr. Chair.

THE CHAIRPERSON: I think the microphone has slipped down.
MR. MACINTOSH: Oh yes.
THE CHAIRPERSON: We wouldn't want to miss any of your --
MR. MACINTOSH: I'm sure.
THE CHAIRPERSON: Of your words.
MR. MACINTOSH: I'm just on the edge of my technical skill here. I don't know if that's going to stay or not.
THE CHAIRPERSON: We'll provide you with a role of duct tape, if necessary.
MR. MACINTOSH: Thank you. That's the one technical tool I use, plus yellow stickies.
MR. MACINTOSH: Q: Now, what we've got here --
DR. BLANK: A: (inaudible).
MR. MACINTOSH: Q: What we've got here --
DR. BLANK: A: Can I --
MR. MACINTOSH: Q: I'm sorry?
DR. BLANK: A: Could I please make a comment before you proceed?
MR. MACINTOSH: Q: Yes.
THE CHAIRPERSON: Certainly.
DR. BLANK: A: Okay. I was acting on information that I received, and apparently the information was given either premature or incorrect. But the statement that I made in my report is correct, substantially correct,

and really correct, because the Health Canada does not consider non-thermal effects in its evaluation. They dismiss them as saying that they're irrelevant, but the fact of the matter is none of these results, experimental results are part of Health Canada's evaluation.

MR. MACINTOSH: Q: Very well. Well, I respect that perseverance, sir, but I'm going to persevere and I'm going to reference the evidence under oath of Mr. McNamee, who I understand to be an employee of Health of Canada. He's the man you referenced earlier. And at transcript page 41 he is being questioned by counsel, I believe it's Commission counsel, but it doesn't matter, and there's a question put to him quoting from something, that says the guideline is designed to protect against heating, it's a thermal guideline, it doesn't take into account non-thermal. The question is,

> "Now, is it accurate to say that this guideline is a thermal guideline and not a non-thermal guideline?
>
> A It's a catchup in words."

Is what the transcript says.

> "This guideline it's actually not a guideline, it's a safety code, takes into account both thermal and non-thermal

effects. In a low-frequency range, the effects we're preventing against are peripheral nerve stimulation, which is a non-thermal effect. 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."

And he goes on at some length in that vein. At line 23,

"So, basically, we're taking the lowest exposure level which produces an adverse health effect and using that. So, we consider both the non-thermal and the thermal effects literature when establishing a safety code."

Further down at page 43, line 11,

"It takes all literature into account and it establishes limits on the lowest threshold of effect, whether it's thermal or non-thermal."

Proceeding Time 11:12 a.m. T41

And so if that's a correct transcript, sir, which I suggest will not be in issue, then certainly you would withdraw the statement that Mr. McNamee of Health Canada asserted that Safety Code 6 is confined

to thermal effects for looking after health.

DR. BLANK: A: Well, if I'm being permitted to respond to that, having heard the statement in full, I can say that he considers the only non-thermal effects is effects on the nervous system, of being able to excite a nerve. And basically what he's doing is ignoring all the non-thermal effects that are now in the literature that show that there are effects on DNA which can very well translate themselves into the health effects that Health Canada is interested in preventing.

MR. MACINTOSH: Q: And sir, I can take you to the wording in Safety Code 6 itself. Do you have Safety Code 6 available to you?

DR. BLANK: A: Not immediately, but I will just say that while I -- by not considering the non-thermal effects by the same scientists normally consider that term, and confining it to exciting nerves only, I think he is limiting it to a point where it's useless.

MR. MACINTOSH: Q: Well, sir, you don't know what he said because you didn't check it out, and I've only read to you parts of the transcript. And my point to you is a relatively simple one. My point to you is that Safety Code 6 and Health Canada closely and clearly looked at both thermal and non-thermal effects. And that when you said earlier that Mr.

McNamee said otherwise, you would retract that, wouldn't you?

DR. BLANK: A: I think the statement that I made is more descriptive of my remarks or my feeling about this than your statement. I don't want to retract anything. I still stand by the fact that Health Canada does not consider the non-thermal effects that results in changes in the DNA that eventually show up as the kinds of stages in cancer that people are very worried about. And I think that if I saw the whole statement I would probably revise what I said out loud, but the fact of the matter is that having heard the statements, and I appreciate you're reading it to me, I still say that Health Canada is not considering these kinds of non-thermal effects that are very important in understanding the way cells respond.

MR. MACINTOSH: Q: Now, I'm switching topics again, sir, and I will be brief with regard to the report of the Public Utility Commission of Texas, because Mr. Weafer ably covered it. But I'm going to go at the topic briefly a little bit more on the passage he cited at page 17 of that report. That was the -- part of the report that was critical of Bioiniative, and undoubtedly you're aware of those passages, correct?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And have you had the opportunity to

read the full report of the Public Utility Commission of Texas?

DR. BLANK: A: No.

MR. MACINTOSH: Q: I commend the first two pages, which set out the context for the work being done, because it is almost identical to the situation here. The Commission recognized that there was widespread public concerns based in part on communications through internet and texting and so on, and that it was important to try to get to the bottom of things. And at page 17, that took the Commission to the Bioinitiative report.

Now, Mr. Weafer put to you the observation of the Texas Commission, that the Bioinitiative report was widely criticized by government research agencies, and subject matter experts in Australia, Belgium, the European Commission, France, Germany and the Netherlands, and it was also criticized by EPIR and the IEEE. And all of those statements are footnoted.

Proceeding Time 11:17 a.m. T42

And just to go one step at a time, I take it you acknowledge that all of those entities criticized the Bioinitiative report. And as Mr. Aaron sometimes used to say last week, if you can start that answer with a yes or a no. The question is, I take it you acknowledge that the Bioinitiative report was

widely criticized by the various entities that I have named, is that correct?

DR. BLANK: A: I believe that the Bioinitiative 2012 would be pretty much the same reception as the Bioinitiative 2007. And so I think it's not surprising that the same sets of characters have come out of their (inaudible) to press more or less the same kinds of objections.

I still question whether the various committees, with their very high sounding names, were chosen by a process that is open for public review. I also question whether the reports were subjected to peer review, so somebody could look it over and decide whether there was scientific merit in what they were saying.

With those provisos I will grant you that they were critical.

THE CHAIRPERSON: Mr. Macintosh and Mr. Aaron, last week, when we were cross-examining -- or when you were cross-examining the Fortis panel, we ran into the same situation, where we were getting long answers to a short question. And at that time, on a number of occasions, I asked the panel -- I did allow them to proceed on many occasions, but on some occasions I asked them if they could please start their answer by simply answering the question yes or no. That was, I

think, the question that Mr. Macintosh posed.

So I would ask Dr. Blank if he could answer the question. If he wants to qualify it following that, I'm -- I think that would be quite appropriate, but I think a simple answer to the question is appropriate in this case. It was a very clearly worded, relatively short question.

MR. MACINTOSH: Q: And do you have the question, sir, or do you want me to put it again? Dr. Blank?

DR. BLANK: A: No, I believe that was just an instruction on the future. I think the answer -- that question has already been answered.

MR. MACINTOSH: Q: I'm going to take the answer you've given and leave it.

Now, you said in some earlier evidence that you're not an expert in RF exposure. Did I get that right?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: Now, through Mr. Aaron I asked you to have access to the Meret report, M-E-R-E-T. Did you get that?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And can you access that, please?

DR. BLANK: A: No, I actually looked through that one, and I don't think I'll be able to venture any of the technical questions he dealt with.

MR. MACINTOSH: Q: All right. I'm going to just give one or two tries, and if the answer remains that they're outside your expertise, that's fair enough. That's okay.

There is a power density exposure limit at 900 megahertz chart at page 13 of Meret. Do you recall seeing that?

DR. BLANK: A: Well, yes, but I don't remember the contents.

MR. MACINTOSH: Q: You don't remember the content, all right. You don't have the expertise to tell us whether or where the Fortis smart meters would fit in that graph.

DR. BLANK: A: No, but I think that it depends on who's writing the report.

Proceeding Time 11:21 a.m. T43

MR. MACINTOSH: Q: What I'm advised from the technical evidence is that the Fortis smart meters are emitting so low, taking duration and distance and so on into account, the Fortis smart meters are so low that they even comply with your Bioinitiative criteria which is shown on that chart, even at a distance of half a meter, which is more than twice as far away as Health Canada says you have to test.

Do you have knowledge to refute or agree with that statement?

DR. BLANK: A: No, I have no knowledge on that, no technical --

MR. MACINTOSH: Q: You talked about fractal antenna as part of your thesis, and part of your work earlier. Do you remember that?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And you wrote a paper, and that's what you alluded to. I believe your paper was called "DNA as a fractal antenna in EMFs". Right?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And you received a rather -- harsh is the wrong word. A rather severe critique of that in a commentary by a physicist, Ken Foster.

DR. BLANK: A: He's a fellow engineer.

MR. MACINTOSH: Q: Fair enough. So, you're aware of the critique I reference, yes?

DR. BLANK: A: Yes.

MR. MACINTOSH: Q: And then you wrote a rebuttal and so that was a matter of debate. Right?

DR. BLANK: A: Well, yes and no. Because the editor communicated that to me, and I wrote back, and I said that the comment is without merit, and it should not be published. But the editor said "I think it will be instructive if it were published along with your rebuttal." So, thinking that it might add to the discussion that's going on, I told the editor to go

ahead. But at the time, I had the option of actually mixing that, because in that journal, the author can basically write a critique that says that should not be published.

MR. MACINTOSH: Q: Hmm. Sounds like an excellent relationship with the editor.

Those are my questions, Mr. Chair. Thank you.

THE CHAIRPERSON: Thank you. Mr. Fulton.

MR. FULTON: Yes. First of all, as a matter of housekeeping, I don't believe the transcript of Mr. McNamee's evidence was marked as an exhibit, Mr. Chairman. So, I would ask that it be marked Exhibit B-46 and it's the transcript of the evidence of James McNamee on February the 18th, 2013, in the Superior Court of Quebec in the matter of *White v. the Ville de Chateauguay, Rogers Communication Inc. and Bernard Roy*.

(TRANSCRIPT OF THE EVIDENCE OF JAMES McNAMEE ON FEBRUARY 18, 2013 IN THE SUPERIOR COURT OF QUEBEC IN THE MATTER OF *WHITE V. THE VILLE DE CHATEAUGUAY, ROGERS COMMUNICATION INC. AND BERNARD ROY* MARKED EXHIBIT B-46)

MR. FULTON: Commission staff have no questions, Mr. Chairman, so it's over to the Commission Panel for any questions they might have.

THE CHAIRPERSON: Okay. Do you have any questions?

The Commission Panel doesn't have any questions. I see Mr. Shadrack's arm up.

Mr. Fulton --

MR. FULTON: Well, I'm not sure what the reason for the elevation of his arm is, so perhaps I should find out before I say anything further.

MR. SHADRACK: Mr. Chairman, I didn't wish to interfere in the previous cross-examination, but I do have a concern. And I would like to raise that concern. But I'm not a lawyer, and I don't know whether it's appropriate for me as an intervener. I've sat quietly listening to this, but I have a concern about what just happened.

THE CHAIRPERSON: Mr. Fulton, can you give us some counsel on this?

Proceeding Time 11:26 a.m. T44

MR. FULTON: Well, I'm not sure what the concern is. If it's a request that he wishes to ask questions of Dr. Blank, that's what the purpose of re-examination is for. And Dr. Blank is a CSTS witness. It would be highly unusual for an intervener who supports a position of another intervener to conduct a cross-examination of a witness after the cross-examinations have been conducted, in the order that they've been conducted, because that order contemplates that the

applicant will always have the second to the last position --

MR. AARON: I understand that.

MR. FULTON: -- in terms of cross-examination.

THE CHAIRPERSON: I'm not sure whether Mr. Shadrack wishes to cross-examine or whether he has a procedural question. I'm not sure.

MR. SHADRACK: I have no desire to cross-examine. I understand the rules around that. But I have a concern about the way a report in transcript was read out, missing out a crucial piece of information in terms of Dr. McNamee's testimony. And I have a concern.

MR. AARON: I'm going to cover that in my re-examination.

THE CHAIRPERSON: Okay, thank you.

MR. SHADRACK: So I'll just say I register that concern. I'm not saying I'm going as far as an objection but I have a real concern for the way that transcript was used.

THE CHAIRPERSON: Thank you, sir.

Mr. Macintosh, do you wish to respond to that in terms of --

MR. MACINTOSH: No, I don't. Sorry, Mr. Chair. No, I do not. I welcome Mr. Aaron referencing this transcript. The whole transcript speaks for itself, and if Mr. Aaron is re-examining with respect to it, I'll see if

they're proper re-examination questions. Otherwise I have nothing to say right now.

THE CHAIRPERSON: Fine, thank you. Mr. Aaron?

RE-EXAMINATION BY MR. AARON:

MR. AARON: Q: Dr. Blank, I'll then pick up on that point raised by Mr. Shadrack, and I appreciate you don't have before you the transcript of testimony by James McNamee although portions of it were read to you starting at page 41, line 11, where a quotation was put to James McNamee which read as follows:

> "This guideline was designed to protect the body against heating and is a thermal guideline. It does not take into account non-thermal effects as such, and as such it's inadequate to protect public health."

The transcript continues with the questioner saying:

> "Now, is it accurate to say that this guideline is a thermal guideline and not a non-thermal guideline?"

So, Dr. Blank, that is the question put to the witness in these proceedings, is whether Safety Code 6 is a thermal guideline, and it's the suggestion that it's not a non-thermal guideline. And you were read portions of James McNamee's answer starting at line 25 of page 41 down to line 11 of page 42.

However, Macintosh then omitted what

follows on line 12 of page 42, and so I'm going to read it to you and invite you to comment. The testimony reads, in reference to the challenge that was quoted to Mr. McNamee that it doesn't take non-thermal effects into account, McNamee said:

> "Where it is somewhat correct is that in the frequency ranged 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."

Your comments, Dr. Blank?

DR. BLANK: A: It sounds like the information that received originally was basically correct. Is that the way you hear it?

MR. AARON: Q: Well, it's not -- I'm not the witness, so I'm not allowed to suggest to you the way --

Proceeding Time 11:31 a.m. T45

DR. BLANK: A: Which -- I'd just like their opinion. That is the -- someone who is testifying. But it sounds to me like in the Queen's English, it sounds like what I said was correct.

MR. AARON: Q: Well, can you at least comment on the statement that thermal effects are the only effects which have been established? And can you comment on your opinion in relation to the accuracy of that?

DR. BLANK: A: I believe that's the way they have been functioning. And I think that it relies only on what they call established effects, and they're going to omit an awful lot of effects that they don't consider established, but which many scientists have already established in the common sense of the word, namely that they reported them and they verified them and replicated them. But then I think that these are a fact, the non-thermal effects, have basically been ignored by Health Canada.

MR. AARON: Q: Thank you. I have one or two other questions.

My friend, Mr. Macintosh, put to you some excerpts from the ICNIRP 2009 study as well as the AGNIR 2012 study. And he asked you particularly to acknowledge the conclusion of the ICNIRP study, which was to quote:

> "However, the result of studies on the effects of RF exposure on stress protein expression, particularly HSTS, have so far been inconsistent, although mostly negative outcomes have been reported *in vitro*. Heating remains a potential confounder and probably accounts for some of the positive effects reported."

Now, you started saying in your evidence,

in response to this conclusion, that you do not attest to the validity of those conclusions. But you weren't given an opportunity to explain yourself, and I want you to have that opportunity now.

DR. BLANK: A: Well, it's very easy to generate a negative response, but the fact of the matter is that the stress protein phenomenon has been studied from a variety of responses and there is a stimuli that results in ICNIRP, in the same response, and the fact of the matter is that most people accept the stress response as a valid and cellular response to the noxious stimuli. In fact, if you were to put a cell on trial and swear them in as a witness, then ask them to testify whether any damage has been done to the cell, the cell could not respond in language, but it can respond in stress proteins. And that's the way they do it.

And if they do it -- we have done the kind of experiment where -- that has followed up the stress protein, one particular one, HSV-70, which we have worked with at least at the molecular level, and we have found that you can take the DNA that codes for that HSV-70 and study its promoter, that is the part of the DNA that precedes the coding for the particular protein. And we take out that particular protein, that segment of protein, and attach it to another

protein -- I'm sorry.

We take that segment of DNA and attach it to another protein. And we can then stimulate the synthesis of the other protein. We have done that with two other proteins. We have done that with chloramphenicol (inaudible) transferase. We have done it with Luciferase. Luciferase is the protein that gives the firefly the light in its tail.

In other words, we've been able to stimulate a different protein using the DNA that stimulates the stress protein HSV-70. I don't know what stronger proof one needs for showing that there's a molecular connection between stimulation of a piece of DNA and stimulating the protein synthesis that follows that process.

Proceeding Time 11:36 a.m. T46

So we have done our own work. Others have followed that work. And the others probably there's frequently raised about the interference of thermal. That was very early on established by De Pomeray, De Pomeray who was one of the first to study the RF stimulation of the stressors on -- he went to great pains to establish the fact that what he was seeing was an RF stimulation rather than a thermal stimulation.

So there is an enormous literature on this

thing now, and I think for them to question the validity of this phenomenon, I think is going beyond the pale.

MR. AARON: Q: Similarly, Dr. Blank, I'm going to put to you the conclusions from AGNIR 2012, which you've said you refuted the validity of but you didn't have an opportunity to explain yourself, and those conclusions from the AGNIR, A-G-N-I-R, 2012 studies that were excerpted and put to you are as follows. This is from page 318 of that report:

> "There are now several hundred studies in the published literature that have looked for effects on isolated cells or their components when exposed to RF fields. None has provided robust evidence for an effect."

So that's one proposition. The following is that:

> "The apparent effect on stress proteins described in the previous review of AGNIR in 2003 has not been replicated in most of the newer studies."

And the third proposition, Dr. Blank, is that:

> "At present there is no known pattern of exposure conditions that has been shown consistently to cause a biological effect from exposures below guideline levels."

So if you like you can have the opportunity

to comment on those three propositions.

MR. MACINTOSH: Excuse me, Mr. Chair. This is not an opportunity for Dr. Blank to restate his thesis. These two extracts were put to Dr. Blank, along with the observations of Dr. Maisch on the point that Dr. Blank had accused Dr. Bailey of being "totally misleading" by relying on animal studies and human studies. And I was putting to Dr. Blank the fact that some pretty authoritative and learned people were questioning the current status of the *in vitro* studies, and therefore to be calling Dr. Blank -- Dr. Bailey, to be calling him totally misleading was, in essence, totally misleading.

And this is not a context, this is not a basis on which Mr. Aaron can ask Dr. Blank to restate his entire thesis, which is that *in vitro* studies are important and useful and contributive and so on.

THE CHAIRPERSON: Do you have a follow-up comment?

MR. AARON: I'm not asking him to restate his entire study. This material was put to him in cross-examination, and he started out saying that he doesn't attest to the validity of it. And my friend in cross-examination quickly moved on to the next question.

Arising from that are his reasons for not attesting to the validity of it, and it's perfectly appropriate re-examination. If Mr. Macintosh wants to

put conclusions to a witness and then try to resist an opportunity for that witness, a Columbia University biophysicist, to comment on the validity of material that falls squarely within his expertise, I suggest that's Mr. Macintosh trying to avoid the proverbial fly in the ointment, that his old Dalhousie professor taught him about.

Proceeding Time 11:40 a.m. T47

So, you know, it goes both ways. He's opened the door, and I want to invite the witness to be able to say why is it that he doesn't attest to the validity. And I don't want him to go through his whole thesis, just give the reason.

THE CHAIRPERSON: I think we can entertain a short crisp answer to the answer, but I want him to be concise and if it would be helpful to the Panel, because that's the objective here, I think we could entertain a short answer.

MR. AARON: Q: Well, Dr. Blank, you're being allowed to answer this by way of a short answer, as to what comments you have in response to those three propositions. Do I need to restate them? Or have you grasped --

DR. BLANK: A: Perhaps you could do that briefly.

MR. AARON: Q: All right. How about one at a time?

DR. BLANK: A: Okay.

MR. AARON: Q: One.
THE CHAIRPERSON: No, I think they were put together as a group, so let's go through all three, and then --
MR. AARON: Q: All right. All three together. One, there are now several hundred studies in the published literature that have looked for effects on isolated cells or their components when exposed to RF fields. None has provided robust evidence for an effect.

Two, the apparent effect on stress proteins described in a previous review by AGNIR in 2003 has not been replicated in most of the newer studies. And three, at present, there is no known pattern of exposure conditions that has been shown consistently to cause a biological effect from exposures below guideline levels.

THE CHAIRPERSON: And the question is?
MR. AARON: Q: And the question is, what's your reason for not attesting to the validity of those statements?
DR. BLANK: A: Let me try and answer this succinctly. The question really is, was stimulated by my saying that the E^{x}Ponent Report was totally misleading. And I believe by stating a false conclusion, it is misleading, and as such totally misleading, because with this slide you go down the wrong path.

Regarding the first question, that the -- people have looked for an effect and they've isolated

many and found no robust effect. The fact of the matter is that the -- one can look through the Bioinitiative report and there is a listing of all kinds of effects, and many repeated ones. My particular article in the 2007 Bioinitiative report has a listing at the end of that report, giving those reports that have found the same effect and those that have not found. It is fascinating to realize that those that have not found tend to be published in (inaudible) research, the journal that seems to specialize in non-reproducible research.

The second question was the question about HSV not being replicated. And the AGNIR report, which is kind of an interesting example of a report that describes -- that specifies one particular paper by Utteridge, which was in incredibly bad.

Proceeding Time 11:45 a.m. T48

It was so bad that it was universally reviled because they did not know how to handle animals and as a result, when they were looking for stress protein they found elevated levels in the controls. When you then try and find the effect for RF on top of that, you find the effect but it's never, you know, significant because the controls were so elevated.

They paid -- these people did such bad job

on that paper, it's amazing how it was reported and of course it was published in that journal that I just referred to earlier.

Now, the third point about the -- there is no consistent pattern that one finds, and that's frequently voiced as no consistent mechanism. And I think that question has been addressed. There are many mechanisms that can explain the effect at non-thermal levels, and these include the one, the effects on DNA which is the one that I have tended to emphasize, but there are also effects that have been found, for example, in causing the opening of the blood-brain barrier, so that one gets contamination of the brain and all kinds of neurological effects. And there's another one on interference with melatonin, which is believed to be a factor in breast cancer.

So that there are many effects that have not been given their due emphasis, and I think that the result is that this part of the literature has just not been given its due. And I think that E^{x}ponent has done a -- if I were giving a grade on the paper I would have to give it a failing grade for not adequately covering this.

MR. AARON: Q: Thanks, Dr. Blank. In your evidence at some point you were -- the context of the discussion was the Bioinitiative report. This was when you were

being cross-examined by the CEC lawyer. And you said something about the European Parliament endorsing something and I just didn't hear what you said, and if you can recall the context and what you said, could you just restate that evidence?

DR. BLANK: A: I shouldn't have said endorsed if I did, but we basically --

THE CHAIRPERSON: Just stop for a moment. Mr. Weafer is here.

MR. WEAFER: If I understood the re-examination it's because Mr. Aaron didn't hear the answer? I just want to be clear we won't get a different answer.

THE CHAIRPERSON: Well, that's -- yeah, I think the answer is evident, or will be evident in the transcript if you're simply trying to understand the answer.

MR. AARON: Well, we have audio problems and I had an audio problem on that one and it wasn't quite clarified.

THE CHAIRPERSON: Well, I think the answer was clarified and it'll appear in the transcript, Mr. Aaron. I don't want to get into an argument with you over this.

MR. AARON: All right.

THE CHAIRPERSON: Mr. Weafer, your concern here is that the answer is, as I understand it, the answer was given and Mr. Aaron may not have heard the answer.

The answer was given and you're concerned that we may now get a different answer.

MR. WEAFER: That's correct, sir, and the time to say, "I didn't hear," was at the time the answer was given, not for redirect.

And I would add, sir, that it was -- we did not ask for video testimony, and if there was a problem at the time, the party that has asked for video testimony should have stood up and said, "I didn't hear," and addressed the technical problem. The Chair asked for us to deal with that early this morning and we said we would go ahead.

THE CHAIRPERSON: Yes, thank you.

MR. WEAFER: So the time to correct was when the answer was given. Thank you.

THE CHAIRPERSON: Thank you. Do you have any follow-up to that?

MR. AARON: No, no.

THE CHAIRPERSON: Thank you.

MR. AARON: Q: Well, I'm not permitted to ask you that so I'll move on to my final question. It was suggested to you by Mr. Macintosh that the Fortis -- the emissions from Fortis's proposed meter meet the standards set out in the Bioinitiative report. What standards are set out in the Bioinitiative report?

Proceeding Time 11:50 a.m. T49

DR. BLANK: A: Well, the 2007 edition had standards. (inaudible). And I think the new edition has a somewhat lower level. I'm not sure they give that as a number.

I don't know what the point of the question is, because it's not the energy -- or it's the thermal effect is not what one should be worried about, regarding health effects. Then complying with a standard that is set by their own criterion is not necessarily a vindication, or a chance to go ahead, or a go-ahead signal. I think that once you've established proper biological standards and then be able to proceed if systems (inaudible).

My own feeling about what should be the case is the ALARA standard. I think everybody should try and make things as safe as possible. That's the way we deal with automobiles. We make them safer and safer. We might make them faster so we increase the potential for danger, but we put in seat belts and padded dash and all kinds of things that enable people to, you know, deal more effectively with the risk associated with it.

And I think we should do exactly the same with the EMF in our environment because it's really getting very, very dense out there and I think more people are beginning to show symptoms.

MR. AARON: Q: Well, that concludes my re-examination. I'll just check before I bid you farewell, Dr. Blank, if there is anything else arising.

THE CHAIRPERSON: I don't believe so. So we will at this stage then thank Dr. Blank for participating. We appreciate your involvement and enjoy the rest of your day in Victoria.

MR. AARON: Thank you, Dr. Blank.

THE WITNESS: Well, thank you very much for the invitation, and I appreciate the chance to tell people about this. My role as a professor and teacher, I think has been amply demonstrated. I've tried to be -- to not get too emotional in my presentation of my point of view, but I hope I can get across the urgency of my message. Thank you.

THE CHAIRPERSON: Thank you, sir.

(WITNESS ASIDE)

MR. FULTON: Mr. Fulton?

MR. FULTON: Yes. That concludes the evidence for this morning, Mr. Chairman. Our next witness is Dr. Sears, and so that would be at 12:55.

THE CHAIRPERSON: And I note that it's currently 11:54. So we'll come back in just over an hour. And so we'll reconvene, then, at five minutes to one. Thank you.

MR. FULTON: Thank you.

(PROCEEDINGS ADJOURNED AT 11:54 A.M.)

(PROCEEDINGS RESUMED AT 12:56 P.M.) T50/51

THE CHAIRPERSON: Please be seated.

Dr. Sears, good afternoon. At the beginning of each of the video cross-examinations we've just taken a few moments to introduce the Panel and a few other people that are participating in this hearing. The people who will be cross-examining you will introduce themselves as they come up to do so.

I'm Len Kelsey. I'm with the B.C. Utilities Commission, a Commissioner and Chair of this Panel. On my left is Commissioner David Morton, and on my right Commissioner Norman MacMurchy. And then we'll swing the laptop around and Gordon Fulton is Commission Counsel, and I believe you know Mr. Aaron, and I'll let the other individuals introduce themselves as they come forward to cross-examine.

As you probably know, the hearing is being held in Kelowna, British Columbia, and we welcome you to the hearing today and welcome you to Kelowna, British Columbia. I'd ask the Hearing Officer to swear in the witness, please.

CITIZENS FOR SAFE TECHNOLOGY PANEL 3

MARGARET SEARS, Affirmed:

THE CHAIRPERSON: Have we asked Dr. Sears to make sure that her e-mail is turned off? That seemed to help last time and it may be a factor again.

EXAMINATION IN CHIEF BY MR. AARON:

MR. AARON: Q: Dr. Sears, just a couple of technical points.

DR. SEARS: A: Yes.

MR. AARON: Q: Just to make sure that your internet line is not otherwise occupied by any programs on your computer that might be checking e-mail or engaging on-line, it might be an idea to shut those down.

DR. SEARS: A: Yes.

MR. AARON: Q: And the Court Reporter has asked that we speak in turn and try to avoid overlapping with each other.

THE CHAIRPERSON: Mr. Aaron, I might just add that -- and I apologize, I should have mentioned this a moment ago, we will plan on taking a break at 3:00 give or take, just so everybody is aware of that. Thank you.

MR. AARON: Q: Can you state your name for the record?

DR. SEARS: A: Margaret Sears.

MR. AARON: Q: Okay. Do you mind just telling us your address or your business address? I just want to check your sound level.

DR. SEARS: A: Oh, it's 107 Mast Lane, that's RR1 in Dunrobin, Ontario.

MR. AARON: Q: All right, thank you.

DR. SEARS: A: K0A 1T0.

MR. AARON: Q: Thank you.

DR. SEARS: A: Is that (inaudible)?

MR. AARON: Q: I think that's working fine.

So what I'm going to do, Dr. Sears, is ask you some questions just to give an opportunity for the Panel here to have an overview of your qualifications and I'm going to seek to qualify you as an expert. Thereafter you're going to be subject to cross-examination by three or four other lawyers for other parties that are adverse in interest. So I'll start.

You provided a CV to me along with the report that you authored in these proceedings, so I'm going to refer to that for starters.

DR. SEARS: A: Okay.

MR. AARON: Q: So you are Dr. Sears, not to be confused with the Dr. Sears who authored the *What to Expect When You're Expecting* or *Pregnancy Book.* That's not you.

DR. SEARS: A: No. No, I didn't.

MR. AARON: Q: You have your Ph.D. in what, Dr. Sears?

Proceeding Time 1:01 p.m. T52

DR. SEARS: A: Well, actually my Ph.D. was in biochemical engineering. Well, Ph.D.s don't technically have a topic associated with them, because the idea with a Ph.D. is you learn how to research. But I worked in the labs at the National Research Council, the microbiology labs here in Ottawa, and the

Ph.D. is from McGill. And I was associated with the Department of Chemical Engineering and working in biochemical engineering. Since then I've done a lot more.

MR. AARON: Q: All right. And what is it about your education that being -- your Ph.D., your Master's of chemical engineering, and your B.A. in applied chemistry, that is pertinent to the expertise that you've purported to profess in the context of your opinion in these proceedings?

DR. SEARS: A: Several things. First of all, the -- I have a lot of experimental background. I've worked with cultures and so on. I also --

MR. AARON: Q: Just -- I'm just going to interrupt. There might be a tech --

THE CHAIRPERSON: I'm having a very big problem with the audio. And I think others in the room are as well. I see hands up at the back. So, we can hear submissions on this, if you like, but at this stage I don't think the audio is adequate. We can, as I say, we can hear submissions on this. I don't know -- before we do that, I'll just ask technically, is there anything we can do to -- any suggestions --

If we could just pause for a few minutes and let our technicians work with this, we may at some point have to have submissions on this. But I think

at this stage let's just try to do a technical fix.

MR. AARON: Q: Okay. Did you hear that, Dr. Sears?

DR. SEARS: A: Yes, yes. I can understand you okay.

MR. AARON: Q: All right. Well, maybe just -- do you need her to keep talking? Oh, we're going to take a break. So we're going to adjourn for five minutes and see if the technical folks can work with you to improve your audio quality.

DR. SEARS: A: Okay, thank you.

(PROCEEDINGS ADJOURNED AT 1:03 P.M.)

(PROCEEDINGS RESUMED AT 1:10 P.M.) **T53/54**

THE CHAIRPERSON: Please be seated.

Mr. Aaron, please continue.

MR. AARON: Q: Dr. Sears, then, I was asking you to explain how your education, your Ph.D., your Master's and your Bachelor's of applied chemistry and chemical engineering with honours pertain to your expertise as being claimed as the basis for your opinion evidence in these proceedings.

DR. SEARS: A: Well, my training in chemical engineering gave me a lot of experience in mathematical modeling, and I took advanced courses in mathematical modeling. I also gained a lot of experience in laboratory research. I carried out a lot of projects for various professors at the University of Toronto, and I worked in research in

research labs. So I have a very good appreciation of the kinds of pitfalls and the sorts of things that happen when you try to do things like replicate research.

Part of my research has been involved with cell cultures, so I have some idea of the kinds of things involved with *in vitro* research. And then also the whole process of going for a Ph.D. really teaches you how to ask experimental questions and scientific questions, and appreciate the difference between what you can answer, what you can't answer, and how to ask focused questions, so that you can get something that -- some information that's useful out of the experimentation.

MR. AARON: Q: All right, thank you. And just some feedback on your audibility. It's great, thank you. At some points, your voice does drop, so I'll just remind you to try to keep it high the whole time. And then there's some words that are big words, and you say them very fast, like "mathematical compatibility". And we don't have the high enough transmission rate here to get the full word. So if it's a big word, please just say it slowly.

DR. SEARS: A: Okay.

MR. AARON: Q: So, you have an appointment listed in your CV as a senior clinical research associate.

DR. SEARS: A: Yes.
MR. AARON: Q: At the Ottawa Hospital Research Institute. What's that about?
DR. SEARS: A: That's the -- oh, they just changed the name to Ottawa Health Research Institute, actually, just to be a little bit more accurate. They didn't have to change the acronym.

I'm working with a group in clinical epidemiology. That's epidemiology of health interventions, usually, as opposed to the observational sorts of stuff you would be looking at in RF exposures in people. But this is a group that gathers information from the medical literature and looks at studying weaknesses, studies strengths, how to focus research questions, and then brings together a whole bunch of information to answer very focused questions.

And this group has been at -- it's been contracted by groups like the Agency for Health Quality Research in the States, and we've looked at some very large types of questions that -- and have worked on projects that have -- research studies and so on.

MR. AARON: Q: So, have you, Dr. Sears, worked in clinical settings?
DR. SEARS: A: In this -- no. It's -- the word

"clinical" is because the interventions are clinical.

MR. AARON: Q: Okay.

Proceeding Time 1:14 p.m. T55

DR. SEARS: A: As opposed to of to observational. So we looked at questions about whether or not this drug was better than that drug in a clinical setting.

MR. AARON: Q: And you --

DR. SEARS: A: But it involved a lot of judgment.

MR. AARON: Q: You authored a paper in 2006 called "A Medical Perspective of Environmental Sensitivities" for the Canadian Human Rights Commission.

DR. SEARS: A: Yes.

MR. AARON: Q: Is that the administrative tribunal, the Canadian Human Rights Commission?

DR. SEARS: A: Yes, the *Canadian Human Rights Act* is kind of administered by the Canadian Human Rights Commission, and within that there is what they call the Knowledge Centre, and they commission research. And so they put out an RFP to have the medical perspective on environmental sensitivities examined, and I put in the -- you know, I applied for it and although my name is on the front there is -- in the appendices, I wanted to have them up front too. In the appendices there's a great long list of people who collaborated on that, so it wasn't just me in the end. I worked with a lot of physicians and architects and

that kind of thing, putting together all of the information and trying to make it understandable.

MR. AARON: Q: And did that document, that 2006 report, include anything that has to do with exposure to radio frequency emissions?

DR. SEARS: A: Yes, it did. Yes, at the time that was identified by the clinicians and so on as being significant, and so that was actually included in the reports, and the recommendation was to use the least toxic or least risky product and ways to accomplish and -- so if you have a choice between a wireless and wired option, then you would choose the option that would expose people to the least -- well, in this case radio frequencies. It would be the same for cleaning products. You would use cleaning products that would have the least chemicals coming off them. So fragrance free things and so on.

MR. AARON: Q: Doctor --

THE CHAIRPERSON: Mr. Aaron, I'm going to ask you to just stop for a moment. I'm going to just canvass around the room and call for submissions on the quality of this audio. The video is entirely acceptable but I want to get comment on the audio stream, please, because these are important issues and important questions.

I'd ask the B.C. Pensioners' and Seniors'

Organization, could you just come and make a submission on this?

MS. BRAITHWAITE: I'm actually not having difficulty understanding this witness. I found this morning's witness much more difficult to understand.

THE CHAIRPERSON: Okay, thank you. Sustainable Energy?

MR. ANDREWS: I am able to hear the witness, that is except at times when she speaks very quickly, and I think that's something we'll contend with.

THE CHAIRPERSON: Okay. CEC?

MR. WEAFER: Mr. Chair, I'd agree this is slightly better this morning, so at this point it's fine.

THE CHAIRPERSON: Thank you. Fortis?

MR. MACINTOSH: Yes, I echo those kinds of remarks. I have nothing to contribute further.

THE CHAIRPERSON: Okay, Mr. Aaron? You're satisfied, Mr. Aaron?

MR. AARON: Yes, although it would be great if we can turn the volume up. Shall I proceed?

THE CHAIRPERSON: Yes, please.

DR. SEARS: A: I'll speak slowly.

MR. AARON: Q: That would help, thank you. Slowly and at a high volume.

DR. SEARS: A: Okay. So if I'm speaking too quickly, raise your hand or something.

MR. AARON: Q: All right. You've lectured on

epidemiology and toxicology at the University of Ottawa and the University of Toronto?

DR. SEARS: A: Lakehead.

MR. AARON: Q: Oh, okay.

DR. SEARS: A: And Northern School of -- well, Lakehead Northern School of Medicine, it's a joint master's course in public health.

Proceeding Time 1:20 p.m. T56

MR. AARON: Q: All right. And you've reviewed scientific documents for the David Suzuki Foundation?

DR. SEARS: A: Yes.

MR. AARON: Q: And you have worked as an investigator for the Canadian Institutes of Health on Toxic Metals in the Environment?

DR. SEARS: A: Yes, the Canadian Institutes of Health Research is the major Canadian funding agency for medical research, and so it's pretty competitive. But I was the primary investigator, so that's the lead sciences on the scoping review. So we looked at everything from sources to routes of exposure to everything from *in vitro* and then *in vivo* and human health effects and looked at public health measures to reduce exposures, to optimize public health, and then we looked at clinical measures, everything from diet to drugs. And we also looked at saunas. So if think that you're exposed to toxic metals in saunas,

sweating them out is another way you can get rid of them.

MR. AARON: Q: Okay, well, that wasn't audible, just so you understand. It wasn't an important thing you said, but just so you know that what you said about saunas wasn't audible because you said it very quickly and you dropped your voice. But we'll move on.

You have certain publications that you can take credit for?

DR. SEARS: A: Yes.

MR. AARON: Q: Including a 2012 publication called "Environmental Determinants of Chronic Disease and Medical Approaches"?

DR. SEARS: A: Yes.

MR. AARON: Q: And one called "Ion Exchange/Complexation of the Uranyl Ion" by Rhizopus biosorbent" in 1984?

DR. SEARS: A: Yes, that was my doctoral work.

MR. AARON: Q: Okay, thank you. And you do some editing for a peer-reviewed journal, is that correct, called *Environmental and Public Health?*

DR. SEARS: A: Yes, as a guest editor and I'm currently a guest editor on another special edition of a different journal. And I'm frequently asked to -- I'm very frequently asked to carry out peer reviews of medical journal articles.

MR. AARON: Q: The other guest editor role that you have is with respect to *The Journal of Environmental and Public Health?*

DR. SEARS: A: Yes.

MR. AARON: Q: All right. And you have a section in your CV called Peer Review and you list some journals: *The Canadian Medical Journal, The European Journal of Internal Medicine, Reproductive Toxicology, Journal of Forensic Science, Pediatrics,* and I won't go on. What is your role as a peer reviewer, and what is peer review?

DR. SEARS: A: A peer reviewer first of all receives an e-mail asking if they feel that they're qualified and if they are able to, you know, in terms of time and so on, to peer review an article. And typically you're given the abstract at this time, and then you indicate if you are capable of doing that. And this is something which is not for compensation, it's just because as a scientist you contribute to the scientific community by carrying out this kind of thing.

And then a peer reviewer is supposed to go in detail through the article, make a decision whether it is suitable to be published, and if it's not suitable to be published as is, to make comments on it, to suggest either improvements if it could

possibly be improved and then published, or to reject it for strong reasons.

Proceeding Time 1:24 p.m. T57

MR. AARON: Q: Thank you. And at the top of your CV you hold yourself out as someone experienced in the assessment of scientific literature.

DR. SEARS: A: Yes.

MR. AARON: Q: Is that -- does that -- is that a good summation of what you are quite experienced at, is assessing scientific literature?

DR. SEARS: A: That's one of my strengths. I've had to do a lot of it.

MR. AARON: Q: All right. And --

DR. SEARS: A: Yes.

MR. AARON: Q: And that goes along with research and writing also of scientific literature.

DR. SEARS: A: Yes. Yes, when we're going -- when we're doing one of these big systematic reviews, then we have to read every single one of a very large number of studies. We take data out of them, but then we also have to look at how the study was done, whether there are weaknesses in that particular study. And then we've pulled together data when and where we can pull it together.

MR. AARON: Q: And -- oh, sorry.

DR. SEARS: A: And so I've had to read an awful lot of

scientific literature and make comments on it. Tends -- sometimes, you know, there's large groups of people working on this together, and my job often has been at the end of the day to pull together all of the different bits that were written by various specialists and so I review them all and if there's something which doesn't really sit right, then I go back to the primary sources. And several times, quite a few occasions, I've gone back to them and said, "Well, you know, maybe we could interpret it this way or that way." And you sort of revisit a lot of things.

So it isn't that science is just a black and white, yes or no kind of operation. There is a lot of -- you need to have a lot of background knowledge and some sense of how science is conducted, in order to assess it and recognize these strengths, and then to pull it together into a story. Because ultimately that's what we're telling, is the story of how much we know, what we know well, and what we don't know about whatever the topic is in hand.

MR. AARON: Q: Would it be fair to say you have expertise in the processes or culture, or ways of the world, by which scientific literature is assessed in the scientific community?

DR. SEARS: A: Yes. I think so. In terms of the work

in clinical -- looking at clinical epidemiology, and I've also looked a lot at the -- in the toxic metals, that there is a lot of observational studies. So there are studies that we don't set up in a lab, you're not going to set up to expose a pregnant mother to a toxic exposure. So it's a very different kind of study that you have to do. And so in the course of examination of issues to do with (inaudible) my Canadian Institutes of Health Research work on toxic metals, I have gained a lot of experience in assessment of the observational studies.

MR. AARON: Q: And you authored a report in these proceedings dated January 24th, 2013, in the form of a letter to me. Is that correct?

DR. SEARS: A: Yes.

MR. AARON: Q: And do you stand by the contents of that report?

DR. SEARS: A: Yes.

MR. AARON: Q: And do you adopt that report, the contents of that report, as a part of your evidence, part of your testimony in these proceedings?

DR. SEARS: A: Yes, I do.

MR. AARON: Q: You also answered certain questions posed by other parties in these proceedings, Information Requests. Correct?

DR. SEARS: A: Yes, I did.

MR. AARON: Q: And would you adopt as part of your evidence in these proceedings your answers to those questions?

DR. SEARS: A: With one exception. A few days ago, I e-mailed to you that an answer on page 25 of that document, in answer to 7.12.3, I had -- I'm not sure exactly what happened, but it was a very -- it was incomplete. And as it stood, it really didn't make any sense at all.

MR. AARON: Q: Okay, I'll --

DR. SEARS: A: I don't know if you have that --

Proceeding Time 1:29 a.m. T58

MR. AARON: Q: I'll give you a chance to clarify that with the party that asked you that question. Which party was that? Was it Fortis or the CEC or BCSEA?

DR. SEARS: A: Oh, hang on. I'll have to scroll up here through my document and I want to go through quickly here. That was from FortisBC Inc.

MR. AARON: Q: Okay, and it was a clerical error, you say.

DR. SEARS: A: Yes, what happened was that somehow or other, what I had written hadn't been saved or it was incomplete. And I did send to you what it should have been.

MR. AARON: Q: Okay, well.

DR. SEARS: A: It's simply (inaudible).

MR. AARON: Q: I'll leave it to counsel for Fortis to take an opportunity to clarify that.

All right, would you mind taking this opportunity to clarify it?

DR. SEARS: A: Okay, just a minute here. I'll just make this a little bigger, easier to read without -- okay, in answer to 7.12.3, the last sentence should read:

"If the signal strength was indeed approximately one-thousandth of the actual signal strength (equals 60 millisecond transmission…"

Then square bracket because I'm qualifying,

"…[range 8 to 125 milliseconds] times 6 transmissions [approximately 1 times per minute] divided by 360000 milliseconds in the 6 minutes averaging time], it is conceivable that the device would work."

MR. AARON: Q: Thank you.

DR. SEARS: A: Sorry, "would not work".

MR. AARON: Q: Wouldn't, would not work.

DR. SEARS: A: "Would not work."

MR. AARON: Q: "Would not work." Thank you. All right. Thank you, Dr. Sears.

So to the Panel I propose that Dr. Sears be qualified to provide an expert opinion as a researcher

and author of scientific literature with expertise in the scientific body of material relating to the health effects of electromagnetic fields, including radio frequency emissions.

THE CHAIRPERSON: Mr. Macintosh?

MR. MACINTOSH: I have no position to take against that then, Mr. Chair, thank you.

THE CHAIRPERSON: Thank you. We'll accept your witness then, under the terms that you describe.

Mr. Fulton.

MR. FULTON: British Columbia Pensioners' and Seniors' Organization *et al.*, Ms. Braithwaite.

THE CHAIRPERSON: Good afternoon.

MS. BRAITHWAITE: Good afternoon, Panel.

CROSS-EXMINATION BY MS. BRAITHWAITE:

MS. BRAITHWAITE: Q: Good afternoon, Dr. Sears.

DR. SEARS: A: Good afternoon.

MS. BRAITHWAITE: Q: Sorry, I'm speaking over you already. Dr. Sears, my name is Tannis Braithwaite. I'm a lawyer for a group of residential utility customers here in British Columbia. In describing the process to you a bit earlier, Mr. Aaron said you'd be questioned by various lawyers who are adverse -- whose clients were adverse in interest to you or to his client. My clients certainly don't consider themselves adverse in interest to you or to Mr.

Aaron's clients in any sort of ordinary sense of the term. I have to accept that label "adverse in interest" in its legal sense of the term in order to be able to ask you questions here today.

Proceeding Time 1:34 p.m. T59

But the questions I'll be asking you are directed at trying to understand your evidence, and I hope that that's how they will be answered.

So with that said --

DR. SEARS: A: I'm just here to assist the Commission.

MS. BRAITHWAITE: Q: Okay, thank you. I note that on page 3 and also on page 4 of your report, you say that the 3 gigahertz ZigBee emissions should be included in the cumulative assessment of potential exposure. This is actually on page 3, this particular sentence that I've just read. And you say:

> "Of note, the in-home feature has in some jurisdictions become mandatory and within shared facilities, such as apartment buildings, all tenants will be exposed to signals to and from their neighbours' appliances."

DR. SEARS: A: Yes.

MS. BRAITHWAITE: Q: And over on page 4, you make a similar point, down at the bottom of page 4, where you say:

"It is key to distinguish between exposures that people may avoid - for example, by not using microwave ovens or wireless devices - and exposures that are unavoidable when equipment is mounted on their dwelling."

I'm curious about this, because it seems to me that if my neighbour is using a microwave oven, or I'm sitting on the bus and the person next to me is using their cell phone, that I am just as exposed to those emissions as I would be to my neighbour's -- the emissions from my neighbour's smart thermostat or smart washing machine. Is there any reason to distinguish between the types of appliances controlled by the ZigBee, in terms of mandatory exposure, I think, as you put it and other types of exposure that I can't really avoid if I'm in a public place or in a multi-unit building?

DR. SEARS: A: It's really hard in this world today to be avoiding all wireless signals, but there are some people who are very affected by them. Apparently. According to the physicians that I work with. And so there are people who don't, for instance, take public transit because they can't stand the exposures within public transit systems. And these people might also be sensitive to perhaps diesel fumes and so on. But the medical experiencing -- by Canadian physicians

testing that people who are quite sensitive to chemicals can also become very sensitive to these electromagnetic frequencies.

And so it's really hard -- can't draw a line to one person. But within an apartment building, this will certainly be adding to the -- to the load of electromagnetic frequencies, because if there isn't one of these devices to connect to stoves and so on, then you don't need to have the appliances that would connect with them. And so the people are being exposed to it kind of from two ends, once from the meter and I suppose in an apartment building also from the -- I don't know, stove, or whatever, on the other side of the wall. But you know, you do have a point in that there are an awful lot of exposures out there these days.

MS. BRAITHWAITE: Q: Okay. So is it fair to say that it's not really a distinction between exposures that you can avoid and exposures that you can't avoid? You're saying if this is added in a multi-unit building, it adds to the already existing load of radio frequency emissions.

Proceeding Time 1:39 p.m. T60

DR. SEARS: A: Yeah. What we're finding these days is that we're -- every time a new technology becomes available, then people kind of go nuts with it. And

we've seen this for the last century actually. After the last world war, then there was this huge expansion in the number of chemicals that we were able to spread in our environment and so on, and we're still seeing in our wildlife and in our children the effects of DDT and PCBs and so on. And so there's an explosion of use of whatever the technology of the day is, and then we realize, oh, we should have been a lot more prudent about how we use it, use the technologies.

And right now we're seeing this explosion in the use of radio frequency enabled devices, and I really expect that within the coming 20 years we're going to say, "Whoa, this is something which we should be using just as prudently as we possibly can."

And so, you know, in Russia they have -- instead of sending their telephone signals across the entire landscape wirelessly, they just send the first kilometre wireless and then it gets into the wires, into the fibre cables or whatever, and so they're trying to be as prudent as they possibly can and using this wireless technology only when absolutely necessary.

MS. BRAITHWAITE: Q: Okay, I take your point that any or maybe all of these wireless technologies aren't necessary. We did manage to survive for thousands of years without them. I'm just a bit hung up on the

idea that there's a mandatory component to being exposed to the ZigBee portion of the smart meter program that's proposed here. And I think my original question was comparing it to a neighbour's use of anything else, any other radio frequency emitting device.

Would you agree in some sense it's mandatory that I am exposed to those if I'm going to live in a multi-unit building, for example?

DR. SEARS: A: Yes. Certainly you are. In a neighbourhood, of course, the emission from the in-home, you know, your meters are mounted on the outside of your house so that signal is going out to the neighbourhood as well as into the house to control the stove or whatever. Which is different from the emission that originates within it.

MS. BRAITHWAITE: Q: Right, I understand. I wanted to have you address a little bit the issue of electro hypersensitivity.

DR. SEARS: A: Yes.

MS. BRAITHWAITE: Q: My understanding from your report, you've described a lot of the problems with studies that try to draw a causal connection between the symptoms that are reported by people who believe they have electro hypersensitivity syndrome, and RF emissions. Are you aware of any provocation studies

that show a positive causative effect between the presence of electromagnetic radiation generally, whatever the frequency, and the onset of the EHS symptoms?

DR. SEARS: A: There was a -- well, there was a case study that I cited in my report, and then the study reported that there were increases in headaches amongst the people, even amongst the people who were not self-identified as being electromagnetically sensitive. That, I think, is actually positive study.

Proceeding Time 1:43 p.m. T61

When I was talking to my neighbour the other day about this report and issue he says, "Oh yes, I can't use my cell phone because I get a headache from it." So there's lots of people, and this the same in the chemical sensitivity. There is -- well, then you realize that people have varying degrees -- this isn't a black and white kind of thing, this is a varying -- varying degrees of sensitivity that they don't necessarily think of as being anything more than, well, this is just something I have to cope with in my general everyday life.

But it is -- it's a symptom that if not recognized and addressed in their lifestyle, could lead in the longer run to deteriorating health.

MS. BRAITHWAITE: Q: Okay. You mentioned a case study

in your report. Was that -- I don't recall seeing that one. Did that involve a single -- by "case study" do you mean involving a single individual?

DR. SEARS: A: Yes, that's right. That's a case.

MS. BRAITHWAITE: Q: Okay. And that's -- was that a case of an individual who was able to detect the presence of electromagnetic radiation by having an increase in symptoms in its presence?

DR. SEARS: A: Yes. This was a -- it was -- I'm trying to remember the details of that particular case now. What was it? It was a case where they were exposing a person without them realizing what they were being exposed to, and seeing physiologically measured changes, so it wasn't just self-reports. And I'm just trying to remember the actual details of it, where I put that in here.

So there were studies where they have actually found physiological effects in terms of heart rate variability, and the EEG, the glucose metabolism in the brain. And there are older studies that found various biomarkers such as immune markers. But that was in relation to lower frequencies.

MS. BRAITHWAITE: Q: Lower frequencies, being --

DR. SEARS: A: Then there is an Italian group.

MS. BRAITHWAITE: Q: Sorry --

DR. SEARS: A: Pardon?

MS. BRAITHWAITE: Q: You said those were -- those involved lower frequencies? Is that the extremely low --

DR. SEARS: A: Yeah, the video --

MS. BRAITHWAITE: -- frequency range?

DR. SEARS: A: -- video display terminals. Those are the cathode ray terminals. So that would have been lower frequencies. But it's electromagnetic radiation, nevertheless.

MS. BRAITHWAITE: Q: Okay. Maybe my question wasn't --

DR. SEARS: A: But details on pages 15 and 16. In my report, first letter to (inaudible). And then the very interesting study, of course, was done in Bavaria.

MS. BRAITHWAITE: Q: Sorry --

DR. SEARS: A: Where they --

MS. BRAITHWAITE: Q: Could I stop you for a second? You just said something about page 15 and 16 that I didn't understand. It was breaking up a bit.

DR. SEARS: A: Oh. Okay. These are physiological effects of radio frequency radiation.

So there are definitely physiological effects of frequency radiation. And --

MS. BRAITHWAITE: Q: Sorry. Are you speaking now of ELF -- the extremely low frequency?

DR. SEARS: A: No. Cell phone frequencies. If we look

at the study of -- in Bavaria. It's Buchner study. It's reference number 62, Buchner and Eger or -- it's E-G-E-R. I'm not sure how you pronounce that.

They actually found that there were changes in neurotransmitters, the catecholamines. These are part of the neuro-endocrine system.

Proceeding Time 1:48 p.m. T62

MS. BRAITHWAITE: Q: Okay.

DR. SEARS: A: So these are very important biochemicals that regulate a lot of, you know, how your body works.

MS. BRAITHWAITE: Q: So I'm going to stop you --

DR. SEARS: A: Anything from (inaudible)

MS. BRAITHWAITE: Q: Sorry. I'm going to stop you again.

DR. SEARS: A: Sorry.

MS. BRAITHWAITE: Q: Because we've heard a fair bit already in this proceeding about biological effects versus health effects, and I think what you're talking about now are biological effects, as opposed to health effects that people report and experience, people who have symptoms of EHS.

DR. SEARS: A: Okay.

MS. BRAITHWAITE: Q: So, if I could just --

DR. SEARS: A: Now --

MS. BRAITHWAITE: Q: So I just want to go back and focus on people who have -- who experience or say they

experience symptoms of EHS. And am I correct in believing that the only type of study on this group has been provocation studies? That is the only type of study that's designed to show a causal connection between radio frequency emissions and the symptoms, are provocation studies?

DR. SEARS: A: That's the only kind of study that would be designed to show that direct link.

MS. BRAITHWAITE: Q: Okay.

DR. SEARS: A: But in the case of provocation studies, and I did go into this a bit in my letter, it's very, very difficult to accurately carry out this kind of study amongst the population. There is a lot of limitations. First of all the people who are most severely affected, you're not going to get into that kind of study, because they're going to be scared witless and they're just not going to go near the facility. People who are suffering -- and this has been -- these kinds of hurdles have been experienced by people who have tried to examine chemical sensitivities. So we have a lot of experience in looking at provocation studies in the case of chemical sensitivities. And a lot less in the case of electromagnetic sensitivities.

So first of all the most severely affected people are not going to be in your study, because

they're just not going to go. And then you're going to have some people who self-identify as being electromagnetically sensitive, but amongst these people you're going to have a broad range of effects. Some of them may suffer skin rashes and flushing. Some will have pain. Some will have headaches. Some will have foggy thinking. So, you're going to have different kinds of symptoms, which are attributed by various individuals.

And then in your control group you're going to have people like my neighbour, who gets a headache when he uses his cell phone, but doesn't think that he's electromagnetically sensitive. So those are some of the problems.

Another issue is that people who are chemically sensitive and electromagnetically sensitive have a difficult time adapting to research facilities and research protocols. So in order to carry out reproducible research, you actually have to have sessions to begin with that are kind of acclimatization sessions. Or you're going to be measuring furious effects that are kind of people's nervousness over experimental procedures.

But the really big thing that at the end of the day wrecks your experiment is this -- what they call contamination of your two groups, by people like

my neighbour in the control group. So if you are trying to look at a group who is sensitive and compare them to a group who aren't sensitive, and yet they really are not different, then of course at the end of the day you don't see a difference.

Does that help?

MS. BRAITHWAITE: Q: It does help. I appreciate that very much in your report your description of the problems with doing these kinds of studies. But I don't think it answers the question --

Proceeding Time 1:53 p.m. T63

DR. SEARS: A: Another --

MS. BRAITHWAITE: Q: -- of whether there have been any of these studies successfully carried out that have shown a causal connection.

DR. SEARS: A: Well, there have been studies that -- for instance I didn't cite it, but way back in the '90s, for instance Dr. Ray, he conducts -- he found that people experienced reproducible symptoms with radio frequency and other electromagnetic from lower frequency as well exposures, but -- where was I going with this now? So there have been some studies that have shown some kinds of effects.

But when you're talking about causal, then causal in terms of science is a really big, big word. And so in order to establish -- and this is where

Health Canada kind of falls down as well, you're talking about established health effects. And so these are health effects that you're going to have to see in animals, you're going to have to see in several of these very very difficult to carry out human experiments. You'll have to see in, you know, perhaps some reasons to believe that it would happen in cells, you'd want to see some kind of biochemical differences.

Now, the Austrian documents, the Austrian doctors' documents that I referenced in my reports, they've actually done an extensive review of this kind of issue and do recommend a whole suite of tests on people which would help to indicate that they were susceptible and were experiencing some kind of electromagnetic sensitivity. And they do improve things like stress proteins.

MS. BRAITHWAITE: Q: Okay. I'd like to go --

DR. SEARS: A: Stress response (inaudible).

MS. BRAITHWAITE: Q: -- to go back to something you mentioned a minute ago, was a study in the 1990s, I believe you said, by Dr. Ray.

DR. SEARS: A: Yes. I didn't reference that particular study in here, unfortunately.

MS. BRAITHWAITE: Q: Oh, that study is not referenced in your report. Sorry, is that what you --

DR. SEARS: A: I've referenced six of the most recent ones in this report.

MS. BRAITHWAITE: Q: Okay. Okay. So the study by Dr. Ray that you mentioned, was your evidence that that study did show a causal connection in a provocation study between exposure to radio frequency emissions and health effects?

DR. SEARS: A: Once again I have to say that as a scientist if you're saying causal, then that's a huge suite of evidence that you need.

MS. BRAITHWAITE: Q: Okay.

DR. SEARS: A: And so as a scientist you're not going to say that one study proves causality. But you certainly publish a very strong study showing that in these people that they had symptoms that were related to the electromagnetic exposure.

MS. BRAITHWAITE: Q: Okay.

DR. SEARS: A: I should mention that just a couple of weeks ago I was asked about a provocation study that is being proposed to be done in Quebec, and what happened there was that they have a room that is shielded. Now, in some of these provocation studies it turns out that the room wasn't even properly shielded, so there would have been extraneous exposures which may have been also contaminating their results.

But they had a chair and they were trying to make sure that it was all clean and so on, so they took this removable cover from the chair and they washed it and then they dried it with Bounce, which is a fabric softener that is very highly scented, and people with chemical sensitivities would have been reacting to that chair, which is another -- it just shows how many details you have to really take care of when you're talking about people and you're experimenting with people who have compromised biochemical and physiological systems.

Proceeding Time 1:57 p.m. T64

Because people with electromagnetic hypersensitivity, they are sort of like the canaries. They are delicate, in terms of their physiology. And so they're going to react not only to the electromagnetic exposures, but they may also be reacting to other things. So these experiments have to be carried out with exquisite attention to detail.

MS. BRAITHWAITE: Q: Okay, thank you. I'm going to move on a little bit. At page 17 of your report, you discuss general adaptation syndrome.

DR. SEARS: A: Yes.

MS. BRAITHWAITE: Q: That is as a model. And if I understand it correctly, given the right physiology and the right exposures, people can develop a syndrome

where their body has -- loses the ability to cope with sort of everyday stressors, if I can call them that. Toxins in the environment.

DR. SEARS: A: Mm-hmm.

MS. BRAITHWAITE: Q: Whatever that -- the majority of the population is able to -- their bodies are able to process without suffering obvious adverse effects. Is that a fair enough description?

DR. SEARS: A: Yes.

MS. BRAITHWAITE: Q: And as I understand it, one of the ways that people who suffer from this kind of syndrome, it can improve their health is to have a reduction in stressors. Is there any reason --

DR. SEARS: A: Yes.

MS. BRAITHWAITE: Q: Sorry, I didn't give you a chance to answer. Is there any reason to single out any particular stressor?

DR. SEARS: A: Well, some people tend to react more or less strongly to various stressors. And it's really important with people who have developed chemical sensitivities, then it's very important to reduce their exposures and then they can also do things to increase the exclusion of potentially toxic things.

Usually what physicians would do if they were confronted with somebody who said that they were electromagnetically hypersensitive, that they couldn't

use their phones, that they had these kinds of problems, they would first do a general physical work-up and look very hard for other reasons for this kind of thing. You had you had an infection or that sort of thing. They would treat the nutritional deficiencies, and then they would look for things like toxic metals, and treat these -- try to improve their physiological functioning.

But an important part of it is to reduce their total exposure. So if they were living in a highly polluted area, then they would have to do something to clean up their environment. They may have to do renovations. Or things -- you know. Filter their air, that kind of thing.

But for some people they are increasingly being found to be extremely sensitive to electromagnetic phenomena. And this is what I'm hearing from the director of the environmental health clinic at University of Toronto, Women's College Hospital in Toronto. And also from physicians here in Ottawa who are treating these kinds of people. That they are very, very sensitive. And they're seeing children who are very sensitive to these kinds of things, and who are suffering a lot of headaches, and heart palpitations, and are unable to deal well in school if there is a lot of WiFi in the school.

MS. BRAITHWAITE: Q: So, just with --

Proceeding Time 2:02 p.m. T65

DR. SEARS: A: Basically in the end you're -- I -- it's very important to take a really good history. And I do reference the environmental history. So it's not just a history of the electromagnetic exposure, it's the history of their food and so on as well.

But increasingly the physicians are finding that electromagnetic exposures are a very critical component for these people.

MS. BRAITHWAITE: Q: And just to clarify, I guess with respect to your last comments, they relate to individuals reporting to their physicians on their symptoms. Is that correct? Really what I'm asking you, is that the extent of the evidence that's out there, is people reporting and physicians making recommendations for reducing stressors?

DR. SEARS: A: Sorry, could you repeat the second part of that? Physicians reporting and --

MS. BRAITHWAITE: Q: Yeah. I think really what my questions down to is I'm trying to get a handle on the state of the evidence connecting symptoms to particular sources or causes. I'm reluctant to use the word "causes" because I know that has a high standard in your world. But is it that the evidence that we're talking about is individuals reporting to

their physicians on symptoms, and the physicians making recommendations for the reduction of certain stressors in the person's environment? Is that what the evidence comes down to?

DR. SEARS: A: The evidence is lot vaster than that. That's an important component. The individual finds that their symptoms occur with an exposure, and that when that exposure is removed they get better, and that when they rechallenge themselves they experience the same symptoms. So it's not a question of, oh, this happened once. It's a question of every time I go to this particular location where there is a high level of WiFi, or every time I use this device, and in between I go away to my cottage and I'm fine, or I turn off this device and I'm fine. So it's a lot stronger than simply, "oh, I think that it's this."

And so the physician first of all has ruled out other possibilities, and then it's a repeatable phenomenon that you get these symptoms in association with the exposure. The Austrian doctors also say that along with that there is a suite of biochemical markers, and then we have animals' evidence that there are a lot of stressed proteins, and then we also have the *in vitro* evidence. And so it's not simply one -- you know, there isn't just one piece, but it's putting together the entire fleet of what we know about

biochemistry and all the way up to the patient's experience.

The other one comment I would make in terms of self-reports is that a huge amount of medicine is based on self-reports. Pain is based on self-report. Psychiatry, psychology, all of that is based on self-report. There's a huge amount of medicine that is self-report. So saying that shouldn't be used as something to kind of minimize this type of assessment.

MS. BRAITHWAITE: Q: Okay, thank you for that, Dr. Sears. Those are all my questions.

DR. SEARS: A: You're very welcome.

MR. FULTON: B.C. Sustainable Energy Association and SCBC, Mr. Andrews.

CROSS-EXAMINATION BY MR. ANDREWS:

MR. ANDREWS: Q: Good afternoon, Dr. Sears.

DR. SEARS: A: Good afternoon.

MR. ANDREWS: Q: My name is Bill Andrews. I represent the Sustainable Energy Association of B.C. and the Sierra Club of B.C.

First let me ask you, have you reviewed the transcripts of the proceeding regarding the health panel?

Proceeding Time 2:07 p.m. T66

DR. SEARS: A: I have reviewed some of them. There are probably a couple of thousand pages. I tried to tune

in to some of the proceedings as well. I can't say that I've reviewed every single page of the transcript. But I have a sense of what's happened.

MR. ANDREWS: Q: Thank you. In terms of exposure, briefly, Dr. Shkolnikov says that the AMI meters that are proposed here would meet not only Safety Code 6 and other roughly similar standards, but also a standard that has been attributed to Russia or to China that is approximately a tenth lower. And even the Bioinitiative report, 2007, proposed standard.

Do you have any reason to contest that?

DR. SEARS: A: Well, it's interesting. And I tried to explore that a bit in my submission, in my first letter to Dr. Aaron, and then further in my answers to the questions. All of these standards are based on averages. They're -- and what we're taking is a very short burst of energy and then averaging it over a very long period of time. And the -- first of all, the receiver that's receiving this signal, it couldn't possibly figure it out if it was averaged over six minutes instead of 18 milliseconds or something. But the human body that's experiencing this is going to also experience the actual signal.

And within the body there are a lot of different mechanisms. So if you expose somebody to a continuous pressure or a continuous exposure, then you

have a compensatory mechanism. You know, if it's a continuous chemical exposure, then your liver enzymes self-regulate. And your body can compensate for a lot of exposure. Whereas if it's intermittent like that, then it's plausible, and we don't have a lot of research on it, and we do need it, but it's plausible that we have different effects.

So Safety Code 6 and these other standards or guidelines or whatever you want to call them, they are based on averages and just as I mentioned in my letter, all standards have to have associated with them the appropriate kind of time frame. So if you want to regulate flood plains, you don't do it on the basis of annual rainfall, you do on the basis of what happens right at the time. And just the same, I really do feel that when we're looking at these pulsed emissions, that we should have a standard that reflects the nature of the exposure and -- so that's kind of the failing of the system.

MR. ANDREWS: Q: Did you review in detail Dr. Shkolnikov's evidence regarding the ratio between peak and average, and the number of pulses per second, and how that relates to the calculation of the standards?

DR. SEARS: A: No, I'm afraid I missed that part. I wish that that had been -- as far as talking to you.

MR. ANDREWS: Q: Would you agree with Dr. Shkolnikov's

testimony that the pulsed nature of the modulation, if I have the right terms, of these AMI smart meters is similar in particular to the GMS cell phone?

DR. SEARS: A: Yes. I believe that the cell phone also has a carrier frequency. And the cell phone is actually more frequent. I believe that Dr. Shkolnikov said that the modulation was a characteristic of the pulse, and that there were pulses. So those are two different phenomena. But he -- the phone is actually putting out pulses more frequently, which in the case of a physiological response, may actually allow the body to Adapt more than it would to a less frequent pulse.

Proceeding Time 2:12 p.m. T67

MR. ANDREWS: Q: You said that you have, and you do, I assume, have experience doing systematic reviews of a particular area of scientific focus, correct?

DR. SEARS: A: Yes.

MR. ANDREWS: Q: Just to be clear, you have not done a systematic review of the literature on the health effects of radio frequency exposure at non-thermal levels.

DR. SEARS: A: No.

MR. ANDREWS: Q: And you haven't done a systematic review of the literature --

DR. SEARS: A: How are you supposed to answer a

negative? I have not done --

MR. ANDREWS: Q: Well, have you done a systematic review of the literature? You described having done them on some other topics and I'm asking, have you done one on non-thermal RF health effects?

On our end there was a long pause in the transmission, which may reflect that we didn't hear an answer that you provided. Can I go back and ask that question again?

DR. SEARS: A: Okay.

MR. ANDREWS: Q: Okay. You have described the process of doing systematic reviews of the scientific literature and that you have done such things and are doing them in other contexts. And my question is, is it correct that you haven't done such a systematic review regarding the health effects of non-thermal RF exposure?

DR. SEARS: A: That's correct. I have looked at literature and I've identified some issue within it, but I have not done a systematic review.

MR. ANDREWS: Q: And similarly you have not done a systematic review of the literature on electro hypersensitivity.

DR. SEARS: A: No. I should caution you that a systematic review is done on a very small, focused research question. So the questions that you've posed

to me would not be actually suitable for a systematic review. They would have to focused more in terms of research questions.

MR. ANDREWS: Q: Fair point, and it's true, though, you haven't done a systematic review even on a subset of those general topics, correct?

DR. SEARS: A: That's correct. I have looked at some systematic reviews. When we're gathering together information, then it's quite legitimate to look at recent systematic reviews and to assess them. So, for instance, there was a systematic review done on provocation studies, and it was interesting because these provocation studies, as I discuss, they're biased towards the mean. That means that as a characteristic of the kind of experiments that you have to carry out, you are more likely to find nothing than -- you are -- sorry, I should restate that.

There is a probability that you will find nothing when something is really happening, and you are less likely to find a serious result. In other words, you're not as likely to find that something is actually happening mistakenly than you are to find that nothing is happening mistakenly.

MR. ANDREWS: Q: Interesting though this is and even though I would like to get to this topic, the actual question was much much -- intended to be much much

more specific, and it was just confirming that you haven't actually done the systematic review. You've said for example on EHS there was a systematic review of the provocation studies and you read that and my question is, just to confirm, you haven't done such a thing yourself.

Proceeding Time 2:22 p.m. T68

DR. SEARS: A: Correct.

MR. ANDREWS: Q: Thank you. And I'm going to pick up a few things that you've said earlier. One is, you referred to Russia and the state of exposure to RF frequencies in Russia. Is that the -- do you have any additional information to the Wikipedia source that you were using in your response to the Information Requests?

DR. SEARS: A: I was in touch with Dr. Yuri Gregiov, who is an expert in Russia.

MR. ANDREWS: Q: Is he one of the authors of the Bioinitiative report?

DR. SEARS: A: I can't remember if he was on the Bioinitiative report or not. He may have been. I can't confirm that.

MR. ANDREWS: Q: Is it correct that --

DR. SEARS: A: He's been on various expert panels and I did reference a report that he authored along with Repetolli and in that report they were looking at the

Russian experiment that led Russia to initiate some -- many, many years ago -- much stricter restrictions on exposure to radio frequencies.

MR. ANDREWS: Q: Well, two points from that. One is, you don't have any data on actual ambient RF exposure in Russia compared to ambient RF exposure in Canada or in North America. Is that correct?

DR. SEARS: A: No, I don't even have data on ambient RF exposure just in Canada.

MR. ANDREWS: Q: Thank you.

DR. SEARS: A: Do you?

MR. ANDREWS: Q: And in terms of the Russian standard that has been described and Dr. Shkolnikov said there are actually three different ones, would you -- I referred earlier to Dr. Shkolnikov's testimony that the AMI smart meter in question here would meet even that exposure standard. Do you have any basis for disagreeing with that?

DR. SEARS: A: The standard as it's laid out is very clear, and I can't disagree with Dr. Shkolnikov, because he's really the expert. I would not necessarily agree that the standard is well stated or formulated, but that doesn't change the standard.

MR. ANDREWS: Q: Granted. I wonder if I could get your thoughts on a question that sometimes gets muddied in this discussion. Which is, there are in a sense two

possibly different types of effects that are attributed to radio frequency exposure. One is the cancer, the long-term major types of conditions, and the other is the EHS, or electro hypersensitivity. And my question is, are we to assume that the same causation mechanism is operating in both? Or is it safe to assume that it's probably not the case and that whatever is causing -- if there is something causing cancer, it's not the same thing that's causing somebody a headache?

DR. SEARS: A: I would expect that there is probably a lot of overlap in the biological mechanisms.

MR. ANDREWS: Q: Okay.

DR. SEARS: A: For instance, a lot of inflammatory processes could be headaches, but inflammation is also a very significant contributor to the development of cancer.

I should also mention that there are other things. For instance, the Russians identified back in the '50s or '60s, something like that, effects on the immune system. And then in my letter I referenced a paper where they found that children who had been exposed to higher levels of EMS *in utero*, lo and behold, had higher levels of asthma later on.

So we're seeing that there are common mechanisms in terms of inflammation, effects on the

immune system, and also effects on the nervous system. The same group that did the asthma study also found obesity and there has been some work on behavioural studies -- behaviour in children.

Proceeding Time 2:22 p.m. T69

So we're seeing a picture where the endocrine system and the inflammatory system, the immune system all can contribute to various types of chronic disease such as cancer, such as asthma, and there are a lot of other chronic diseases that may -- we don't have any research into, but that the same mechanisms feed into.

MR. AARON: Just an audio clarification. You said there was a study linking exposure to asthma and you said there was another study linking exposure to something else I didn't quite hear.

DR. SEARS: A: There was an exposure linking the *in utero* -- sorry, there was a study linking *in utero* exposure to obesity in children. These were large studies that were done by the medical insurance companies in California. So they were quite large and very strong studies in that they were done prospectively. So it's generally thought that if you start out your study and then you follow groups through time, the stronger study design.

MR. AARON: Q: In your response to information requests

you were asked among other things about the definition of EHS that you use. And first let me get this part clarified. EHS is not a disease or a condition that's at this point in time included in the DSM 4, is that correct?

DR. SEARS: A: That's correct. It's not specifically.

MR. AARON: Q: So you said that your definition, if I can paraphrase, is a combination of objective and subjective factors, and you used an example of a criteria or protocol that could be used to result in a designation of EHS, is that correct?

DR. SEARS: A: Yes.

MR. AARON: Q: And at the end of that protocol if a person is designated in that category, just to be clear here, that does not imply that it has been established that radio frequencies actually are the cause of the symptoms that put the person in that category.

DR. SEARS: A: I'm not entirely sure about your question, but for the -- from the point of view of the patient, if the doctor has treated what symptoms and diseases have been identified and has addressed other issues within their life, be it their diets and so on, if the patient has reproducible symptoms in response to particular exposures, then for the sake of that patient they are going to act as if that's the cause

and try to avoid those exposures. And the clinical evidence is that they improve with this kind of action, and they can improve over time to the point where later on they are able to tolerate things that are more commonly tolerated than they may have previously able to tolerate and that for a period of time they were unable to tolerate.

MR. AARON: Q: And all this reproducibility is based on self-report, correct? We're not talking double-blind control on the individual. We're talking a person comes in, back to their physician and reports on what happened since the last visit.

DR. SEARS: A: Oh, this is -- I'm talking about the clinical practice. I'm not talking about the research study. This is the way that the doctors in Toronto and in Ottawa are dealing with people who are self-reporting that they are unwell. And the typical experience is that these people may have other sensitivities as well, which is one of the things that makes the research into electromagnetic sensitivity quite difficult because it may not be the only sensitivity that these people are experiencing at that time.

Proceeding Time 2:27 p.m. T70

MR. ANDREWS: Q: Now, that leads me to my next topic, which is the way you're describing the individuals who

have the reported symptoms of EHS describes people who are in quite a considerable degree of distress and discomfort, pain, interference with their normal activities of daily living. And in that context, it sounds to me as though those people are experiencing a state of ill-health that is significantly worse than that of the general public. Is that -- am I right there? We're not talking about the sort of -- the kind of everyday problems that one could say, "Everybody gets a headache from time to time."

DR. SEARS: A: Actually, when they first present to the doctors they may fall into the kind of description or category that you have indicated. But some of these people actually become very, very healthy. They're very high functioning. But they simply can't tolerate certain environments. So as long as they are kept -- they keep themselves a good diet and avoid the types of exposures that give them problems, they can be very healthy, very strong. They can be very, very high functioning.

MR. ANDREWS: Q: The people who are not high functioning -- let me put it this way. You've described the difficulty of a provocation study concluding -- coming to a positive conclusion. And one of the confounding factors is the contaminated control problem, correct?

DR. SEARS: A: Mm-hmm. Yes, that's right.
MR. ANDREWS: Q: And what that would mean is that in the control group, which by definition is some kind of random selection of the general population in question --
DR. SEARS: A: Mm-hmm.
MR. ANDREWS: Q: -- and the problem would be if some of those people actually have the same sort of EHS symptoms or condition as the subject, as the test group. Correct?
DR. SEARS: A: Correct.
MR. ANDREWS: Q: I guess I find it hard to imagine that there could be such a large number of hidden EHS people in the general population who aren't aware of it, that they would totally cancel out another group which is completely selected because they have identified themselves as being subject to the same condition. In other words, there may be some. But how could it be that you would get so many in the general population that would totally cancel out a group that's entirely selected on the basis of being EHS?
DR. SEARS: A: Well, you've got to appreciate that within the kind of research, it's not a question of entirely cancelling out. Within any population, you're going to have the norm, but in the research,

you're going to be measuring a spectrum. You're going to be measuring a range. And if -- you're only going to get a significant difference if those two ranges don't overlap.

And in any kind of provocation study, there are a lot of things that are going to make that range quite wide. So you have to actually have a huge real difference before those two ranges don't overlap. And this is just the nature of this kind of study. You know, if you were looking at, say, the heart rate variability, there's just a natural range, and so somebody who was sensitive but normally had a low heart rate variability, maybe their change in response to the electromagnetic radiation wouldn't be enough to really show up.

Proceeding Time 2:31 p.m. T71

And this leads me to one of the things that happens in the kinds of provocation studies. Typically the way the data is analyzed is that you take the self-identified group and you identify them as a group, and then you take the people who have not self-identified as being sensitive and you analyze them as a group.

Now, there is another way that you can analyze this data that's very seldom done, but it would be a stronger way to assess the data, and that

is to look at baseline compared to provocation measurements for each individual.

But the group -- and here you see that there are some people who are reporting positive results, for instance Dr. Ray's study. He would have looked at each individual and looked at provocation versus non-provocation for each individual. And there you can see a difference. But if you bunch together these two groups, then there's so much diversity amongst the group that you don't see a difference between the groups because the normal ranges are so broad.

Does that -- I'm not sure if I -- do you understand that?

MR. ANDREWS: Q: Well, fortunately for the Commission, my understanding is not the critical factor here. The factor is the information that is conveyed to the Panel members, and I guess at the risk of beating a dead horse, that the provocation study that you say is difficult to result in a positive correlation is due to the overlap between two populations, each of which has a range. And would you agree with me that it is at least remarkable on the surface that despite the strength and the conviction with which people affirm their electrosensitivity, that that does not translate into identifiable differences between a population of

randomly selected people and that body of people who complained of this problem? Is that not in and of itself a remarkable fact?

DR. SEARS: A: Well, not really, unfortunately. I wish it was. There are few issues. First of all sometimes the instrument that they're using, they have what they call sham exposures, and in the cell phone experiments there is an issue of heating. So even with the sham exposures they still have some hookup to provide a little bit of heating so you can't tell the difference between the exposure, the real exposure and the -- and nothing, because -- and then there actually is not a nothing exposure. And then there is also all of the other types of things that people may be exposed to in the process.

So it's possible that by the time the people with electromagnetic hypersensitivity have gone through the experimental process, they are already, you know, I don't know how you would put it but sort of maxed out. And also some of these symptoms are delayed. So just because you don't have a symptoms right, you know, within five minutes of them switching something on, doesn't meant that you don't -- you're not going to experience a symptom.

For instance, there are studies where exposure during the afternoon has changed sleep

patterns, and this has been well established, the effects on sleep. And so if an afternoon exposure can affect sleep in the evening and the night, you know, not having an immediate reaction is not necessarily an indication that these people will not experience some symptoms later on.

Proceeding Time 2:36 p.m. T72

MR. ANDREWS: Q: I'm going to move on the topic of public health. And this certainly applies to children's health as well as to adults' health. Would you agree with me that one of the things that's going on these days, and maybe it always has, but a sort of phenomenon of health education by tabloid headline. That is, one day, you know, coffee causes cancer. The next day, coffee is good for you. Some vitamin is the key to everlasting life, and then the next day, you know, it's going to cause you some problem. This is a significant issue in health education, correct?

DR. SEARS: A: Oh, certainly. There is a lot of significant issues. But I want some of that vitamin you talked about.

MR. ANDREWS: Q: Yeah. Be careful what you ask for.

DR. SEARS: A: -- too.

MR. ANDREWS: Q: So, am I right in principle that there is a danger in public health of chasing every car that goes down the street? There are a whole bunch of

different potential public health problems, and if every single one of them is given equal attention, then the ones that are the most important may not get sufficient attention. Would you agree with that, as a general principle?

DR. SEARS: A: I'm not entirely sure what you mean. Certainly there are lots of different issues out there, and some may in the end be more important than others. But --

MR. ANDREWS: Q: Well, let me put this way. If it were the case that people who have, for example, symptoms of -- that are described as EHS were actually experiencing those symptoms as a result of some cause other than low-level exposure to radio frequencies, it would be very, very unfortunate if they -- if efforts to identify that cause and resolve it had been diverted because of the focus on something that actually was not a causal -- a cause and effect relationship.

DR. SEARS: A: Well, if that was the case, then yes, don't want people chasing red herrings. It -- yeah.

MR. ANDREWS: Q: Well, at that level, I will leave -- those are my questions. Although I think the Chair is going to say something.

THE CHAIRPERSON: No, I was just getting concerned about cutting off the witness, and so on. But does that

conclude your questions?

MR. ANDREWS: That concludes my questions, although if there is something that the witness wants to add to that last question, I'm certainly open to hearing it.

THE CHAIRPERSON: No, hearing no --

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, our chemicals, our radio frequencies as prudently as we possibly can.

Proceeding Time 2:41 p.m. T73

THE CHAIRPERSON: Thank you.

MR. ANDREWS: Q: Thank you, those are my questions. Thank you, Dr. Sears.

DR. SEARS: A: You're very welcome.

MR. FULTON: Commercial Energy Consumers of British Columbia and the British Columbia Municipal Electrical Utilities, Mr. Weafer.

And just a reminder again that it makes it much more challenging for the Court Reporter when two people are speaking at the same time.

THE CHAIRPERSON: Thank you. Mr. Weafer, I see --

DR. SEARS: A: Sometimes it's delay which can make it tricky too.

THE CHAIRPERSON: I see us at about the same time as we were, relative to our break, when you commenced your cross-examination with the previous witness. So we are going to break around 3:00 but I'll give you some latitude and you can tell us when it works best for you, within a reasonable window there.

MR. WEAFER: That may be more up to the witness than me, Mr. Chairman. We'll see how that goes, but I know

that 3:00 is your time.

THE CHAIRPERSON: Yes.

CROSS-EXAMINATION BY MR. WEAFER:

MR. WEAFER: Q: Dr. Sears, my name is Chris Weafer and I'm counsel to the Commercial Energy Consumers' Association of British Columbia, which are commercial class customers of the utility FortisBC, and I am counsel to the British Columbia Municipal Electric Utilities, which are five municipal owned electrical utilities which take service from Fortis. And therefore it's a customer group and I would highlight our interests are not necessarily contrary. We are concerned about health. We're not adverse in interest that you're speaking about health. And so part of what we do is try to get clarification with the common objective to have a good record for the Commission. And so with that in mind I actually have fairly limited questions for you as Mr. Andrews covered some ground, but I will start with a series of questions and be referring to Exhibit B-1, Appendix B-6, which is Health Canada Safety Code 6.

DR. SEARS: A: Okay, I've got that right here.

MR. WEAFER: Q: And actually before we even go to that, I just want to make sure, because I'm going to get to this at least after the break, I had provided your counsel a copy of the Public Utility Commission of

Texas -- sorry, not your counsel. I provided Mr. Aaron a copy of the Public Utility Commission of Texas report and it's Exhibit C17-24 in this proceeding, and I believe you have had IRs on this report already. So I just want to confirm now you do have that handy and we'll be able to talk about that later in his cross-examination.

DR. SEARS: A: Yeah, I have that on my screen.

MR. WEAFER: Q: Okay, we're not going to go there now. I just wanted to give you the opportunity to make sure you knew we were going to get there and to get it on the break if needed.

So the first questions, back to Exhibit B-1 and Appendix B-6 and Health Canada Safety Code 6, I have a series of fairly direct questions that I'd like to put to you. Are you aware of Health Canada Safety Code 6 limits of human exposure to radio frequency electromagnetic energy in a frequency range from 3 kilohertz to 300 gigahertz? You're aware of that document?

DR. SEARS: A: Yes.

MR. WEAFER: Q: And are you aware that --

DR. SEARS: A: Yes.

MR. WEAFER: Q: Sorry. I apologize, I spoke over you. You're aware of that document?

DR. SEARS: A: Yes.

MR. WEAFER: Q: And are you aware that Safety Code 6 is prepared by the Consumer and Clinical Radiation Protection Bureau of Health Canada, and that's at page 3 of 30 of that document?

DR. SEARS: A: Yes. Yes, I see that.

MR. WEAFER: Q: And to your knowledge does Safety Code 6 specify the requirements for the safe use of or exposure to radiation emitting devices in the frequency range from 3 kilohertz to 300 gigahertz? That's set out on page 5 of 30 of that document?

DR. SEARS: A: That's what it says.

MR. WEAFER: Q: So you're aware of that?

DR. SEARS: A: Yes.

MR. WEAFER: Q: And does your report say anywhere that the advanced meters and related equipment FortisBC is proposing to install and operate will not comply with Health Canada's Safety Code 6 exposure limits?

Proceeding Time 2:45 p.m. T74

DR. SEARS: A: No. I'm not saying that they don't comply with the Safety Code 6. What I am saying is that Safety Code 6 represents a minimum, and that just as throughout Canada municipalities and provinces are going well, well beyond what Health Canada says in terms of use of pesticides, certainly exactly the same thing can happen. You can't not comply with Safety Code 6, but you can certainly go beyond.

MR. WEAFER: Q: I thank you for the additional commentary, but the answer was yes? Sorry, the answer was no, your report does not say anywhere that the advanced meters or related equipment FortisBC is proposing to install and operate will not comply with Health Canada's Safety Code 6 exposure limits?

DR. SEARS: A: My understanding is that these meters meet the standards laid out in Safety Code 6.

MR. WEAFER: Q: Thank you. And I understand you have not tested whether the advanced meters and related equipment that FortisBC is proposing to install and operate will comply with Health Canada's Safety Code 6 exposure limits? Is that correct? You have done no testing?

DR. SEARS: A: I have not tested them. Sorry. I'm sorry, that was hard to understand. Could you repeat the question, please?

MR. WEAFER: Q: Certainly. You have not tested whether the advanced meters and related equipment FortisBC is proposing to install and operate will comply with Health Canada's Safety Code 6 exposure limits. Is that correct?

DR. SEARS: A: By "tested" do you mean I have actually -- have I measured the emission?

MR. WEAFER: Q: Yes, or any other specific hands-on testing of those meters. No clinical testing.

DR. SEARS: A: I have not measured them, but I actually have an Itron meter on my house, because this has happened in Ontario, and I know it's perhaps -- well, it's relevant in terms of exposure, but the internet providers here are having a great deal of difficulty because of the interference from these meters. And in fact I was told today that some are going out of business because they can't provide service as a result of the interference since these meters have been installed. And I have not measured them, but I've heard recently that there is a lot of problems that way.

So if there is enough exposure to interfere with internet service, then perhaps it's significant.

MR. WEAFER: Q: I'm going to ask --

DR. SEARS: A: But I have not tested --

MR. WEAFER: Q: Maybe I haven't been clear on the question. So I'll ask it one more time, because I don't think you're actually answering the question that I am asking. You have not tested whether the advanced meters and related equipment FortisBC is proposing to install and operate will comply with Health Canada's Safety Code 6 exposure limits, is that correct?

DR. SEARS: A: Right.

MR. WEAFER: Q: Thank you. Would you agree with me

that Health Canada's mandate is to, and I quote, "help Canadians maintain and improve their health"? And that's at page 4 of 30 of the document.

DR. SEARS: A: That's what Health Canada tells us. I'm sorry, which page?

MR. WEAFER: Q: Page 4 of 30. Top of the page.

DR. SEARS: A: Oh, I see. Yes. That's what they say.

MR. WEAFER: Q: Thank you. I'd just like to move on, then, to your present affiliation. As I understand, you're with the Ottawa Health Research Institute? And would that be involved with the Knowledge Synthesis Group?

DR. SEARS: A: Yes.

MR. WEAFER: Q: And is there a reason you're not identified on their web page with the -- I've got about 20.

DR. SEARS: A: Pardon?

MR. WEAFER: Q: Is there a reason that you're not identified on their web page along with -- there's about --

DR. SEARS: A: Because I'm an associate, and so I'm not employed there full-time.

MR. WEAFER: Q: I see. So, do you do contract work for them? Or you come in a project-by-project basis?

Proceeding Time 2:50 p.m. T75

DR. SEARS: A: No, it's -- I used to do contract work,

but the way that it works now is that I'm -- I do things project by project. So, right now, because of family health concerns, I wasn't working for them for the last while. But I've worked on -- well, you can see all of the papers that I've co-authored with this group. And so it's project by project. But that's why I'm not on their website.

MR. WEAFER: Q: Thank you. And there was also earlier the discussion around the report -- the work you did for the Canadian Human Rights Commission, and the medical perspectives on environmental sensitivities. And just to confirm, in that report, the opinions given in the report are considered your opinions and those who did the report as opposed to the Canadian Human Rights Commission. Is that correct?

DR. SEARS: A: That's what's written on the front page of the report. But I think that it had a significant effect on the opinion of the Canadian Human Rights Commission, because as a result of that report and a legal report, they instituted a policy on environmental sensitivity, which you can find on Canadian Human Rights Commission website.

MR. WEAFER: Q: Thank you, Dr. Sears. But what --

DR. SEARS: A: So although the report is not theirs, they acted upon it. And its actions speak louder than words, then -- you can take it from there.

MR. WEAFER: Q: Thank you, Dr. Sears. I just wanted to confirm that that's what's written on the front of that report, and you've confirmed that. Correct?
DR. SEARS: A: That's correct. That's a fairly standard disclaimer that they put on the fronts of their reports.
MR. WEAFER: Q: We can move on -- Dr. Sears, you confirmed with Mr. Andrews that in terms of -- I think you refer to it as your letter to this Commission, you were not retained to undertake any kind of systematic review or weight of evidence review on any topic that you commented on, in your letter. That's correct?
DR. SEARS: A: That's correct. That would have been an enormous undertaking that would have vastly exceeded the time and resources available.
MR. WEAFER: Q: I understand --
DR. SEARS: A: Both times I just looked at the report that other people had done, that were of that type.
MR. WEAFER: Q: Right. And you would agree with me that the confines of this process, this procedure, don't lend themselves to doing that kind of report. So I don't intend that to be a criticism. That's a reality of the type of information you're trying to convey to the Commission.
DR. SEARS: A: Mm-hmm. Yes.
MR. WEAFER: Q: You could really give a snapshot

picture of your view, not based on a systematic review. Is that correct?

DR. SEARS: A: That's mostly correct. And I don't want to nitpick too much. I apologize for that. But when we're doing systematic reviews, one of the first things we do is look for a recent systematic review. And so for some of the topics what I did in my letter was tried to tease out individual topics. And for some of those, there is -- there are recent systematic reviews.

So for instance on the provocation studies, there is a systematic review which said -- and the conclusion of the systematic review was basically that there is not a lot of evidence regarding these provocation studies. But if you look -- if what you do is you take all of the ones that showed nothing, and not worry about them. If you look at the ones that showed some kind of effects, then they were overwhelmingly positive in that they were showing an effect.

So, as somebody who's experienced in this kind of literature, I would say that given that the bias is -- and this isn't to say bias is a bad thing. Bias simply as, you know, a scientific phenomenon, that the bias is towards no -- that seeing that the ones that showed effects were showing, like, a

positive effect, some -- was an indication of concern, that this was a real effect.

Proceeding Time 2:55 p.m. T76

MR. WEAFER: Q: Thank you, Dr. Sears. But in doing that, you would agree that you are selecting certain reports to support your position, and I'd submit to you that your letter is weighted towards reports that support your position as opposed to providing a balanced letter to the Commission. Would you agree with that?

DR. SEARS: A: I think that what I've tried to do is to be of the greatest service to the Commission because, you know, that's really what I'm trying to do. And so there are a lot of reports that are really not very informative on some issues, and it's a very broad-ranging report. So you might have to be a little bit more specific.

MR. WEAFER: Q: Well --

DR. SEARS: A: But I tried very hard to rely upon the best quality reports that I could find. And some of the reports that perhaps you might think I should have cited, for some reason or another when I looked at them I thought that they were poorly done.

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.

MR. WEAFER: Q: So you're not criticizing it.

DR. SEARS: A: For lack of evidence, not for -- but you know, I find it very concerning in this whole section of Health Canada that they're not engaging in the kind of open science and public participation that is apparent in other branches in Health Canada and Environment Canada.

MR. WEAFER: Mr. Chair, this would be a good time for a break if that suits you.

THE CHAIRPERSON: Okay, thank you. We will take a break then now, and reconvene at 3:15.

(PROCEEDINGS ADJOURNED AT 2:58 P.M.)

(PROCEEDINGS RESUMED AT 3:16 P.M.) T77/78

THE CHAIRPERSON: Please be seated.

And Mr. Weafer, we'll ask you to continue please.

MR. WEAFER: Thank you, Mr. Chairman.

MR. WEAFER: Q: Dr. Sears, are you online?

DR. SEARS: A: I believe so. Can you hear me okay?

MR. WEAFER: Q: Yes, we can, thank you.

DR. SEARS: A: Excellent.

MR. WEAFER: Q: The last area of questioning I have is I'm going to refer you to Exhibit C17-24 which is the Public Utility Commission of Texas report, and before we go there I take from your evidence and from your earlier discussions with Mr. Andrews that you are -- to your mind, electromagnetic hypersensitive is a result or can be a result of EMF exposure. Is that correct?

DR. SEARS: A: I believe that for some people that is correct. I have met people who have had that kind of problem, and I've met people who've actually recovered from it to a large extent.

MR. WEAFER: Q: If I could take you to -- in terms of the evidence in your letter, you don't provide much in

the way of a balanced view in terms of the position that says it's not been demonstrated that EHF -- EHS is related to EMF exposure. Is that a fair statement?

DR. SEARS: A: I don't think so. You know, people who were saying that tobacco smoke is not for you, generally I don't know what you would call a balanced view on something?

MR. WEAFER: Q: Your position is as an advocate, that this is an issue that needs to be dealt with, is that fair?

DR. SEARS: A: I wouldn't call me an advocate in that I have never taken part in advocacy on this issue. I've never -- I haven't been writing letters, and I'm a scientist who has looked at the information and who has talked to physicians and tried to assist the Commission to the best of my ability.

MR. WEAFER: Q: Right, but there's another side to that viewpoint, you'd agree. There's another viewpoint out there that questions the relationship to EMF exposure and EHS, would you agree with that?

DR. SEARS: A: There's a segment that questions all environmental sensitivities.

MR. WEAFER: Q: Thank you. Can I turn you to page 55 of Exhibit C17-24.

DR. SEARS: A: Okay, is this the -- let's see. The page numbers that are written at the bottom there?

MR. WEAFER: Q: That's correct, Dr. Sears.
DR. SEARS: A: Okay, hang on.
MR. WEAFER: Q: And I'm going to ask you to take the opportunity to review page 55 and page 56 of the document.
DR. SEARS: A: Mm-hmm. Sorry, I'm a slow reader.
MR. WEAFER: Q: Why don't we stop it at the top of page 56 --
DR. SEARS: A: That's okay.
MR. WEAFER: Q: -- and we'll just deal with the World Health Organization. And I just want to make sure you had a chance to review the report because I'm not sure when you were provided with a copy. And I take you to the fourth paragraph and it states:

> "The World Health Organization document noted that a number of scientific studies have been conducted where EHS individuals were exposed to EMF similar to what they have attributed to the cause of their symptoms. The aim of the studies was to elicit symptoms under controlled laboratory conditions. The WHO Fact Sheet stated that the majority of studies indicated that EHS individuals could not detect EMF exposure any more accurately than non-EHS individuals. Double-blind studies which

were well controlled and well conducted had shown that symptoms were not correlated with EMF exposure. Therefore it stated EHS has no clear diagnostic criteria and there is no scientific basis to link EHS symptoms to EMF exposure."

Now, do you know if that summary is consistent with the World Health Organization findings?

Proceeding Time 3:22 p.m. T79

DR. SEARS: A: Well, what summary?

MR. WEAFER: Q: The summary I've just written [sic] from this report. Do you know whether that is consistent with the report? As this is a report that was prepared by the Texas Public Utilities Commission staff. So I just wanted to confirm that that summary -- and were you aware of the World Health Organization work on this topic?

DR. SEARS: A: I think I looked -- well, I know I looked at that before, when I was preparing the Canadian Human Rights Commission report. I'm just looking for the link on it. So, we're looking at 2004 report.

So I was aware that the World Health Organization had at that point looked at the research. And we've already spoken this afternoon about the

difficulties with this kind of report -- or this kind of study. So, yes, there have been double-blind studies that found no effect. And that could be for a very wide range of reasons, because it's very difficult to work with these kinds of people under a controlled laboratory situation.

MR. WEAFER: Q: Dr. Sears, I'm not actually going to the detail of the research, I'm just going to whether you were aware of the material and if so why would this not have been referenced in your report, in your letter to this Commission?

DR. SEARS: A: Well, I did reference the systematic review that's much more recent than this 2004 report.

MR. WEAFER: Q: You did. But this is another fairly significant organization's report on the topic of EHS and EMF exposure. Would you agree?

DR. SEARS: A: Yes. This is an old report, though. There are lots of reports out there. I could have had 500 references, probably, but there is limits to time and space and -- but I did reference something that was more recent than this (inaudible).

MR. WEAFER: Q: Thank you. And the next page, over to the next page, where we're dealing with the King's College, London systematic review of provocation studies for EHS, I would give you the opportunity to read that page just to make sure that you are current

with it.

DR. SEARS: A: I don't actually have the full references here. So I'm just looking to see what's actually the --

MR. WEAFER: Q: Have you got page 56 of the report?

DR. SEARS: A: Oh, I've got page 56 of the report. I'm just trying to figure out what they're actually referring to. Because they don't actually reference -- they're referencing websites, but they're not referencing the actual studies, unless -- I can't actually (inaudible) a study here. There is a 404 note. There is --

MR. WEAFER: Q: Dr. Sears, the question is --

DR. SEARS: A: There is references here at the bottom of the page.

MR. WEAFER: Q: Yes.

DR. SEARS: A: They have to the references. But the links don't work and they're not specific enough to tell me what study they're actually talking about.

MR. WEAFER: Q: Are you --

DR. SEARS: A: So, I can't make any comment, because their references aren't actually valid.

MR. WEAFER: Q: Dr. Sears, were you aware of work being done in this area in 2009 at King's College, London?

DR. SEARS: A: Yes.

Proceeding Time 3:26 p.m. T80

MR. WEAFER: Q: And does this research ring consistent as to your understanding of the work that was done there and the results that were obtained, or do you not know?

DR. SEARS: A: Well, since I can't be sure what study they're actually referring to, I do know that this group has been criticized for actually what I mentioned before, was that using unshielded groundings, and supposedly (inaudible) exposure that actually did exposure people to a certain amount of electromagnetic radiation, but I don't know the details of it. And as I say, their paper actually doesn't have a legitimate reference in it.

MR. WEAFER: Q: The report is a report of the Public Utilities Commission Staff in Texas. They provided this information and you have no knowledge of this information, is that correct? You don't -- you're telling this Commission now you don't know whether these studies were done, or you don't know and you're unable to testify in relation to that evidence, is that correct?

DR. SEARS: A: I know that this group has done some work and I know that they did a systematic review. But what I'm saying is that the references that are provided for these statements in respect to this report, the references and links at the bottom of the

page, they don't actually say anything to the research that they're talking about.

MR. WEAFER: Q: Fair enough.

DR. SEARS: A: So since the references -- I can't comment on something that's referenced, supposedly referenced, but then the references don't work. So these are vague statements and I'm sorry, I can't comment on them.

MR. WEAFER: Q: That's fair enough, Dr. Sears. We can leave it you're aware of research of this kind was done. You're critical of the research but you're not sure exactly what study this document is referring to. Is that correct?

DR. SEARS: A: That's correct.

MR. WEAFER: Q: That's fair enough.

Mr. Chairman, I'm going to leave it at that.

DR. SEARS: A: The document --

MR. WEAFER: Q: Sorry?

DR. SEARS: A: The deficiency of this document --

MR. WEAFER: Q: I'm sorry?

DR. SEARS: A: I said the deficiency of this document, they've got references there that don't work. They have links there that lead to 404 and page not found and this kind of thing. And that may be an indication of quality of this Texas report too.

MR. WEAFER: Q: Well, it may or may not be. The document has statements. You're aware of the information. You're just not sure what study this refers to and you didn't choose to reference this material in your study, is that correct?
DR. SEARS: A: I can't remember, I may have actually referenced -- I did reference a systematic review and I can't put my finger on it right now. But let me -- I may have actually referenced the systematic review because -- but I'm not a hundred percent sure.
MR. WEAFER: Q: So your evidence now is that your evidence may have been in reference to this study, but you're not sure.
DR. SEARS: A: Hang on. I don't want to leave a very vague statement like that.
MR. WEAFER: Q: Well, it's quite direct. Is this the study you were referring to or not? Or do you not know?
DR. SEARS: A: Well, I can't know because they're not specific as to what study they're talking about.
MR. WEAFER: Q: But in and around this time, a study of nature was done by this institution with conclusions similar to this? Is that your evidence?
DR. SEARS: A: I know that they did a systematic review and I know that the vast majority of studies that they looked at found (inaudible), and that doesn't surprise

me at all because I know that that's very common when you're trying to conduct this kind of research. But as to the rest of it I can't attest to it, so (inaudible).

MR. WEAFER: Q: That's fine, Dr. Sears. Thank you for your answers to the questions. That's my cross-examination, Mr. Chairman.

MR. FULTON: FortisBC Inc., Mr. Macintosh.

THE CHAIRPERSON: Good afternoon, Mr. Macintosh.

MR. MACINTOSH: Good afternoon, Mr. Chair.

Proceeding Time 3:31 p.m. T81

CROSS-EXAMINATION BY MR. MACINTOSH:

MR. MACINTOSH: Q: Good afternoon, Dr. Sears, and as Mr. Fulton just said, I'm George Macintosh and I'm the lawyer for FortisBC.

DR. SEARS: A: Hello.

MR. MACINTOSH: Q: Do you have Safety Code 6 at hand? I'll question you a little bit on it fairly soon.

DR. SEARS: A: Yes. Right here.

MR. MACINTOSH: Q: Thank you. Thank you. As I read your report, you referenced exposure limits in various jurisdictions, RF exposure limits in various jurisdictions. That's correct, isn't it?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And the first part -- and I should preface everything I'm doing here. I hope to be

relatively brief, although that's a lawyer talking, and I hope to just have four topics. And this is the first one. And on the first part of the first one, I think we're on common ground, but just hear me out.

So, on the exposure limits in the various jurisdictions, Health Canada Safety Code 6 basically is comparable to the standard in the FCC for the United States. Do you understand that to be the case?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And similarly, Health Canada Safety Code 6 is essentially similar to the ICNIRP standards?

DR. SEARS: A: I believe it's a little bit higher.

MR. MACINTOSH: Q: But you would agree that in comparison with the magnitudes that are being discussed here, and in comparison with what these AMI meters emit, that Health Canada Safety Code 6 and ICNIRP are very comparable -- relatively close to one another.

DR. SEARS: A: Yeah. They're within the same order of magnitude.

MR. MACINTOSH: Q: Thank you. And as I am instructed, as I am told by my advisors, the European Union recommends to its members that the safety levels be set based on the ICNIRP levels. Does that accord with your understanding?

DR. SEARS: A: I'm not entirely sure about what the

European Union recommends. I know that there are some jurisdictions within the European Union that have lower levels than others. Or lower standards than others.

MR. MACINTOSH: Q: I believe that's right. And I should have at my fingertips the number of countries in the European Union, and it's in the ballpark of 25. And I should have the exact number. And there is a small number within there that have their own standard, which is more strict. And that's your understanding as well?

DR. SEARS: A: Yes. Switzerland is much stricter.

MR. MACINTOSH: Q: And it's not in the European Union, but that's just fine. I mean, Switzerland is a wonderful nation and so on and so on, but --

DR. SEARS: A: Yeah.

MR. MACINTOSH: Q: But coming back to what I said earlier --

DR. SEARS: A: (inaudible).

MR. MACINTOSH: Q: Coming back to what I said earlier, I didn't quite get your evidence, I apologize. Are you aware that the European Union recommends the ICNIRP standards for its member nations?

DR. SEARS: A: I am not -- I couldn't say that for sure, although it makes sense.

MR. MACINTOSH: Q: All right.

DR. SEARS: A: I wouldn't refute it.
MR. MACINTOSH: Q: All right. And here, of course, the Commission that we're in front of here today, obviously it's looking at Safety Code 6. But equally important, of course, is the emissions from the smart meters in question, both in comparison to Safety Code 6 and in absolute terms. I mean, just how much do they emit? Those are both fair inquiries for the Commission. Fair enough?
DR. SEARS: A: Yes. Yes.
MR. MACINTOSH: Q: And --
DR. SEARS: A: And --
MR. MACINTOSH: Q: Go ahead.
DR. SEARS: A: Yes, what they actually emit in terms both of sort of quantity and quality.
MR. MACINTOSH: Q: Of course. What they emit in every possible way.
DR. SEARS: A: Yeah.
MR. MACINTOSH: Q: Right?
DR. SEARS: A: Yes. Yes.
MR. MACINTOSH: Q: And with regard to the particular Itron meters that are being utilized in the Fortis application, do you know the level of their emission and how it compares to the limits that are called for in Safety Code 6?

Proceeding Time 3:36 p.m. T82

DR. SEARS: A: What I understand from the information that's before the Commission is that they are low compared to Safety Code 6. I also know that Itron meters, and I have no idea if they're the same model, are putting internet companies out of business in the rural areas of Ontario and Quebec. So if --

MR. MACINTOSH: Q: Can we just pause there? Can we just pause and take it one step at a time? First of all, as I hear your answer, you acknowledge that the Itron meters that are the subject of this application emit at levels below Safety Code 6, is that correct?

DR. SEARS: A: That's my understanding of the information that's before the Commission.

MR. MACINTOSH: Q: Right. And I take it you are not in a position to dispute that information which is before the Commission, are you?

DR. SEARS: A: No.

MR. MACINTOSH: Q: All right. And are you in a position to discuss the extent to which these meters are below the requirements of Safety Code 6?

DR. SEARS: A: That's not my major area of expertise, and I think you probably (inaudible).

MR. MACINTOSH: Q: That's not your major area.

DR. SEARS: A: Well, I did look at the data and I understand that according to the information that they are orders of magnitude below Safety Code 6.

MR. MACINTOSH: Q: Very well. Now, where you live, are you by chance -- you're near Ottawa somewhere?
DR. SEARS: A: I'm technically in Ottawa actually, yes.
MR. MACINTOSH: Q: And are you --
DR. SEARS: A: I used to be in Ottawa, but Ottawa expanded and it's included now.
MR. MACINTOSH: Q: And are you served by Hydro One?
DR. SEARS: A: Yes.
MR. MACINTOSH: Q: And I'm told that Hydro One is using Trilliant meters. Have you heard that name before?
DR. SEARS: A: I believe I've heard that. I looked on the meter on our house and it says "Itron" written on it.
MR. MACINTOSH: Q: Very well. Now, you said that -- no, let me leave the topic because I don't have enough knowledge to question you with respect to it.

Now, my second topic would have me asking you to reference the E^{x}ponent Report. Do you have it available?
DR. SEARS: A: Yes, I do. I think I'll have to look at that when I'm (inaudible). In a second. I'll dig that up. Here we go. Okay.
MR. MACINTOSH: Q: And in the E^{x}ponent Report at pages 26 through 29, there's a four-page discussion under the heading "Symptoms Related to Well-Being". Can you access that?

DR. SEARS: A: Okay.
MR. MACINTOSH: Q: Do you have that?
DR. SEARS: A: Yes.
MR. MACINTOSH: Q: And in those four pages E[x]ponent references several studies. You can see --
DR. SEARS: A: Yes.
MR. MACINTOSH: Q: And am I correct that in that part of the E[x]ponent Report on symptoms, that none of the studies that it cites are found as referenced in your report, is that correct?
DR. SEARS: A: Actually I haven't compared that. So if you have done the comparison I'd have to take your word for it, but I didn't actually look at that. Or my reference --
MR. MACINTOSH: Q: For what my comparison is worth, my statement, my suggestion would be a correct one.
DR. SEARS: A: Are my studies referenced in their report?
MR. MACINTOSH: Q: Yes. I think it goes both ways a little bit. In the E[x]ponent Report they reference a number of studies regarding the symptoms, and what I gather is that none of them is addressed in your report. That's my first question.

Proceeding Time 3:41 p.m. T83

DR. SEARS: A: I would have to take your word for it.
MR. MACINTOSH: Q: All right. And then flipping it

around, and going to your own report, you at pages 17 to 19, you address the topic of environmental sensitivity with particular focus on electromagnetic fields. Do you have that?

DR. SEARS: A: Yes, I do. I've seized up printing these things out, because I was going to slaughter half a forest. So, page 17?

MR. MACINTOSH: Q: And in your report I believe the comparable topic, that is, environmental sensitivity, is at pages 17 to 19.

DR. SEARS: A: Yes. Environmental sensitivity is quite broad -- much broader than electromagnetic sensitivity.

MR. MACINTOSH: Q: Yes. I'm not saying they're identical, but in any event, bear with me. At pages 17 to 19, you address the topic of environmental sensitivity with particular focus on electromagnetic fields. Right?

DR. SEARS: A: Mm-hmm.

MR. MACINTOSH: Q: And when I look in there, I don't see any citing of any primary studies from any of the published scientific literature. Am I correct?

DR. SEARS: A: No.

MR. MACINTOSH: Q: What do you cite that is a primary study from the published scientific literature?

DR. SEARS: A: Well, there is the LCP study.

MR. MACINTOSH: Q: Say again?
DR. SEARS: A: Seventy-one. The -- let's see. I can't even remember how I referenced these now. Let's see.
Let's just have a look at what references we're talking about. So we're talking about sort of early '60s to -- well, there's number 62 is a primary study. Number 63 is a review. 64. 65. The number 68. 69. 70. Oh, these are peer reviewed studies.
MR. MACINTOSH: Q: Right.
DR. SEARS: A: They --
MR. MACINTOSH: Q: Is there one primary study?
DR. SEARS: A: But the Buchner one, 62 is a primary study.
MR. MACINTOSH: Q: Yes.
DR. SEARS: A: All right. I've got some -- I believe that 71 is a primary study. At least it's referring to a few primary -- very small number of -- then there is the --
MR. MACINTOSH: Q: Let me back up.
DR. SEARS: A: Oh, the systematic that I referred to was not the one from King's College. It was a more recent one than the King's College one. It was published in 2012.
MR. MACINTOSH: Q: And so --
DR. SEARS: A: That's why I referenced the most recent systematic review, going back to the previous

question.
MR. MACINTOSH: Q: Yes. And --
DR. SEARS: A: And so, no, there are not a lot of primary studies there.
MR. MACINTOSH: Q: There is one.
DR. SEARS: A: Pardon? Please repeat?
MR. MACINTOSH: Q: Is there one?
DR. SEARS: A: There's at least two. There is a systematic review, which is considered to be a higher level of evidence than primary studies.
MR. MACINTOSH: Q: Well, let's postpone for either later or even for another day the comparative value of reviews and primary studies. My question was relatively isolated. I was just asking you to let me know what the primary studies are. And is there one?
DR. SEARS: A: Number 62 is definitely a primary study.
MR. MACINTOSH: Q: All right. Now, there are experimental studies to examine the responses of people that are exposed to radio frequency, correct?

Proceeding Time 3:45 p.m. T84

DR. SEARS: A: Yes.
MR. MACINTOSH: Q: And those are laboratory studies in the sense that they are in a controlled setting. Fair enough?
DR. SEARS: A: Yes.
MR. MACINTOSH: Q: And in such studies there's a

comparison ordinarily with a control group which is sometimes referenced as a sham exposed group, is that correct?

DR. SEARS: A: No. No, the control group is a group of people who would not self-report as being electromagnetically hypersensitive.

MR. MACINTOSH: Q: I didn't mean to imply -- I didn't mean to imply that they were.

DR. SEARS: A: Pardon?

MR. MACINTOSH: Q: I apologize for crossing over with you. In your answer you were saying in part that the control group are not self-reporting. I didn't mean to imply that they are.

DR. SEARS: A: No. In this study you're going to have two groups of people. One group will self-report. That's the magnetically hypersensitive. And the other group does not self-report. And then each of those groups will be -- depending upon the experimental design, may either take some of each group and expose them only to one type of exposure, or may take every individual in each group and expose them on one occasion to a sham exposure and on one occasion to the real, usually a cell phone exposure.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: Exposure, the sham exposure in some cases is still exposing them to some electromagnetic

fields, but just not to the cell phone radio frequency exposure. This is one criticism, that sham is not real exposure scenario. It's just some other kind of exposure scenario, which some people might actually be sensitive to.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: And then when you get some -- once you've collected the data, I assume that you've got two groups of -- and then you expose each of those two groups to two types of exposure, you can either lump each group together and compare one group to another, or you can take each individual and compare each individual response to either the sham or the real exposure.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: So there's two ways of doing analysis and analyzing how it comes together may tend to kind of nullify any real results that you would otherwise find.

MR. MACINTOSH: Q: Yes. Have you finished explaining? It's helpful, but I just want to see if you're finished before I ask another question.

DR. SEARS: A: Go ahead.

MR. MACINTOSH: Q: The controlled studies in the laboratory, they're often called provocation studies?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And specifically they attempt to determine whether people who identify themselves as sensitive, as well as those who don't, can distinguish between the exposure and the sham exposure. I think that's been addressed as part of your answers to me earlier. That's the idea, isn't it?

DR. SEARS: A: Not usually. That may be one aspect of it, but any good study is also going to be looking at other things. They're going to be looking at perhaps the EEG or the heart rate variability. They'll be looking at things as well as whether or not the person is developing sort of softer symptoms.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: Any good study is going to be looking at harder symptoms as well. So they can take blood samples, look at stress proteins or something before and after. There are a lot of other things you can look at, quite apart from other whether the person will say, "Oh, I know that phone is on now."

MR. MACINTOSH: Q: Yes. Fair enough. And I asked Mr. Aaron, who is the lawyer representing the group who solicited your expert opinion, to send you the AGNIR 2012 evaluations. Did you receive those and do you have some knowledge of them?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: To both questions?

DR. SEARS: A: I believe you sent the AGNIR and the IC -- the other one.
MR. MACINTOSH: Q: Yes.
DR. SEARS: A: The ICNIRP one.
MR. MACINTOSH: Q: That's right.
DR. SEARS: A: Are those the two studies that you're referring to?
MR. MACINTOSH: Q: Yes.
DR. SEARS: A: They're not studies. The two reports.
MR. MACINTOSH: Q: And the AGNIR 2012 evaluated 37 experimental studies on the potential response of regular and self-identified sensitive subjects.

Proceeding Time 3:51 p.m. T85

DR. SEARS: A: Can you identify the page number that you're talking about?
MR. MACINTOSH: Q: Page 243.
DR. SEARS: A: It's a very large report. It's almost 400 pages long. I should note that there is a large overlap between the -- there is an overlap between the authors of these two reports. So I wouldn't say that they were completely unique. Two forty -- oh, 243.
MR. MACINTOSH: Q: Yes.
DR. SEARS: A: Okay, that's the number on the bottom of the page.
MR. MACINTOSH: Q: I have to apologize and I have to hope, because I have an extract in front of me. And

the portion that I've been given contains this passage, so let me read it and see if you can locate it before we have any questioning on it.

DR. SEARS: A: Okay.

MR. MACINTOSH: Q: The passage is, after evaluating 37 experimental studies, this is the passage I am given.

> "The experimental evidence suggests that short-term exposures to RF fields below guideline levels does not cause acute symptoms either in the general public or in people who report being sensitive to electromagnetic fields. Similarly, these studies have found no replicable evidence that healthy individuals or people who report sensitivity are able to detect the presence of the RF fields."

Do you find that passage in that page?

DR. SEARS: A: Page 243 in the document that I have here is simply a table of these studies that they're talking about.

MR. MACINTOSH: Q: All right. Well, then, sadly, I may have to leave that, because I don't have the bulk of the report with me. You don't have anything at page 243 with those words on it?

DR. SEARS: A: No, on my document, page 243 is simply a table with the study end points, exposure conditions,

response comments -- they have comments like study (inaudible) blinds and small groups, single-blind studies.

MR. MACINTOSH: Q: Excuse me for interrupting you. Are you in the AGNIR study, or the other one? Because I've now been handed a hard copy of page 243 of AGNIR, and it's under the subtitle of --

DR. SEARS: A: Oh.

MR. MACINTOSH: Q: So were you in the wrong study?

DR. SEARS: A: I was. Sorry about that. But you know what?

MR. MACINTOSH: Q: That's okay.

DR. SEARS: A: It's relevant.

MR. MACINTOSH: Q: Well, that may be. So let's go to the other one. Let's go to the other one, for now. Let's just go to AGNIR. Can you do that?

DR. SEARS: A: Okay. I've got AGNIR in front of me. 243, on AGNIR. That's amazing, the same topic would be at the same page numbers. Wow.

MR. MACINTOSH: Q: And there should be a Section 6.1.4, "Summary".

DR. SEARS: A: This is -- okay. (inaudible) study. 243. Okay.

MR. MACINTOSH: Q: And --

DR. SEARS: A: So the section is detection of RF fields.

MR. MACINTOSH: Q: What I have for AGNIR, page 243 at the top of the page, under "Observational studies", is Section 6.1.4, and a summary.

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And it's within there. In the second half of that paragraph that I read to you, the passage that was of interest to me. And it was the passage, "The experimental evidence suggests …", et cetera.

DR. SEARS: A: Okay.

> "The experimental evidence suggests that short-term exposure to RF fields below guideline levels does not cause acute symptoms in the general public or in people who report being sensitive."

So, you're looking at short-term and acute, in the studies, whereas people who are electromagnetically hypersensitive are worried about a chronic condition.

Proceeding Time 3:57 p.m. T86

MR. MACINTOSH: Q: Mmm. And that may be. And it may not. I don't know. But with respect to what is addressed here, do you accept this as being a correct statement after AGNIR evaluated the 37 experimental studies?

DR. SEARS: A: I just messed it up. Let's go back to

that. I have not gone over those studies in detail. So, you know, as far as identification of whether a phone is on or off acutely, short term, that's very difficult to -- I believe that a lot of studies would have shown negative results.

MR. MACINTOSH: My third topic, and Mr. Chair, I'm going to apologize in advance to the Commission because I'm on an agency mission with Dr. Shkolnikov. He's asked me to ask a couple of technical clarification questions, and I think they're to try and have the record provide certain evidence that may be relevant to an approach that he would ask us to address in argument. And so this -- I ask the Commission to just bear with me for a minute because it's not going to be very interesting.

THE CHAIRPERSON: It was certainly interesting when he asked the question.

MR. MACINTOSH: I know. That's because he knew completely what he was talking about.

DR. SEARS: A: He may well be addressing what I corrected earlier, because what I wrote in that response, when I reread it I thought, "What happened?" because it really didn't make any sense at all. So if he has spent time and effort addressing what I wrote in detail in that response, I really apologize.

MR. MACINTOSH: Q: That's okay, Dr. Sears, it's

actually something else.

DR. SEARS: A: Okay.

MR. MACINTOSH: Q: I'm going to be asking you to provide an undertaking, and Mr. Aaron can work with you offline afterward about what that exercise involves. But it has to do with something found at page 20 and at page 2 of your report, and probably it's easiest to turn first to page 20. And I apologize because this will be highly technical but I'll try and keep it brief.

DR. SEARS: A: Okay.

MR. MACINTOSH: Q: Are you at page 20?

DR. SEARS: A: Of my letter to Mr. Aaron?

MR. MACINTOSH: Q: Yes, I believe so. At the top it begins ".4 Safety Code 6".

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And it's the first paragraph that I reference where you state:

> "Exposure to radio frequency radiation is restricted according to Health Canada Safety Code 6…designed to prevent bulk heating of tissues. To this end the emissions are averaged over six minutes reflecting biological mechanisms of heat dispersion (chiefly blood flow)…"

And then you add this:

"A slightly more restrictive exception is made for pulsed exposure, but this has not yet been applied in the present case."

So you've got the passage I just referenced you to?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And that links back to some calculations that you presented at the bottom of page 2 of your letter, or what I will call your report.

DR. SEARS: A: Mm-hmm.

MR. MACINTOSH: Q: Which you have asked as a sort of a footnote at the bottom of page 2. Do you see that?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And the number which Dr. Shkolnikov has instructed me to pursue with you is in the second of the three lines of numbers where it says "750", seven five zero, averaged over .1 seconds?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: And that is the focus underlying the request for you to revisit this formulation. And before going ahead, as I understand it, when you make the references to Safety Code 6, you are referencing page 18 in Safety Code 6, and I'd ask you to just confirm that.

Proceeding Time 4:02 p.m. T87

DR. SEARS: A: Yes. So --

MR. MACINTOSH: Q: And what you're referencing in particular is at the bottom of page 18, which is 2.2.1, "Peak field strength limit for pulsed fields", and the related equation at the top of the next page, which is 2.7, if you see it at the top of the next page. Is that what's being addressed in your calculation at the bottom of page 2?

DR. SEARS: A: I'm sorry, could you please repeat that?

MR. MACINTOSH: Q: Yes. I'm instructed -- take it one step at a time. I'm instructed by Dr. Shkolnikov that this calculation by you at the bottom of page 2 of your report, the only place that it could be linked to Safety Code 6 would be in the section 2.2.1 at page 18 of Safety Code 6, correct?

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: Very well. And Dr. Shkolnikov asks me to ask you to recalculate, taking two things into account.

DR. SEARS: A: Yes, I see I made a mistake there.

MR. MACINTOSH: Q: Very well. He asks me to ask you this, all right? He says, one, shouldn't the complete derivation include a ratio of averaging time to pulsed duration TA to T, and then he has a second question, if you used a pulsed duration of .1 seconds, 100 milliseconds, wouldn't the allowed peak exposure increase by a ratio of averaging time to .1 second

pulsed duration. And he tells me that that gives you a different answer.

Can you take those two suggestions into account and have another go at the -- what you presented at the bottom of page 2?

DR. SEARS: A: Could you please give that to me in writing? Because --

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: -- I don't want -- the transmission is not ideal.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: And if you could give that to me in writing I would very much appreciate it, and I'd be very happy to do that.

MR. MACINTOSH: Q: Thank you very much.

DR. SEARS: A: In much more detail.

Information Request

MR. MACINTOSH: Q: Yes, yes. And it'll be crystal clear, and I'll, of course, have him sign off on the specific wording. Thank you.

DR. SEARS: A: I'm happy to assist you in that way.

MR. MACINTOSH: Q: Thank you very much. And then I'm back to the more normal questioning, perhaps. It's my fourth and final topic, and in your report at page 7 you make reference to -- on that page, and I quote,

"…large tumour registries to detect

increased brain tumours, to examine questions of cell phone radiation carcinogenicity."

Do you have that located?

DR. SEARS: A: Could you tell me which paragraph that is?

MR. MACINTOSH: Q: I apologize, I'll get to it myself. I just again had mine extracted, but bear with me.

Yes, and I think that's why I must have it underlined, and Mr. Aaron's helped out here, if you could hear him. But in any event, it's on page 7 in the -- I think in the first full paragraph.

DR. SEARS: A: Okay.

MR. MACINTOSH: Q: Where you say,

"This is one reason that the spotlight of scrutiny is now turning to larger tumour registries to detect increased brain tumours…"

Now, I located at noon time the newest data from the Canadian Cancer Statistics, 2012, published under the letterhead of Stats Canada and Public Health Canada and the Canadian Cancer Society, and in fairness to you, this is something you don't have and so I want to proceed very slowly.

Is this data that you would have? In other words, do you have the 2012 Canadian Cancer

statistics?

Proceeding Time 4:96 a.m. T88

DR. SEARS: A: Not readily available, although I could probably find them. I have looked at them in the last couple of months ago, in other -- I could comment on -- comment on this topic.

MR. MACINTOSH: Q: You can?

DR. SEARS: A: A few comments on this topic, actually.

MR. MACINTOSH: Q: Yes. Can I ask you a question?

DR. SEARS: A: Certainly.

MR. MACINTOSH: Q: What the data implies to me, as the reader, is that the incidents in males and females for brain cancer has declined from 1998 to 2007, albeit at a negligible level. So in other words, I'm advised that the rate of decline is statistically insignificant. So it wouldn't be called a decline. It would just be called neutral. That there hasn't been an increase in the incidents of brain cancer, which is what people link to cell phones in some of the studies from 1998 to 2007.

And I don't want to be unfair to you. Obviously that's the statistic I have in my hand. But is that a statistic that you can accept as being correct or would you want to just check that?

DR. SEARS: A: I understand that -- there's a couple of issues here. First of all, the brain tumour cancer

information that we have in Canada is -- they put all of the brain cancers together.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: So, it's kind of unspecific stuff.

MR. MACINTOSH: Q: Fair enough.

DR. SEARS: A: And I just understand that it has not been -- also, we're going up to 2007. So given that there's a latency of, people say, for brain cancer 15 - 20 years. As of 2007 we would not be expecting to see already a huge increase in brain cancers as a result of cell phone.

Another issue that --

MR. MACINTOSH: Q: No, Doctor, I completely respect that you want to make counterpoints to the data.

DR. SEARS: A: Oh, sorry.

MR. MACINTOSH: Q: And you've made two and you can make more. You can make more. But are we on common ground, do you accept the statistic that the data indicates that from 1998 to 2007 there has been no detected increase in brain cancer?

DR. SEARS: A: Lumped altogether, yes, I expect that that's the case.

MR. MACINTOSH: Q: Very well. And then you were saying, in fairness to you, one that just lumps in all brain cancers, and then you had a second point and you've probably got a third point.

DR. SEARS: A: Oh, well, yes, the -- the Canadian data is not super high quality. Another point is that as of 2007 we would not have really covered off the latencies that -- of 15 to 20 years of heavy cell phone use that you would expect to see brain cancer in Canadians.

So saying that before you expect it to happen, it hasn't happened yet, is perhaps not very informative. And so what happens in the next 20 years is going to be more informative regarding brain cancer.

Now, this issue has been brought up, it's a very -- it's kind of considered the *coup de grâce* in terms of the hypothesis that cell phones can cause the brain cancer, and --

MR. MACINTOSH: Q: Let me interrupt -- I mean, trust me, I was not intending to deliver that as a *coup de grâce*. Were you saying this is a *coup de grâce*? This --

DR. SEARS: A: No, I'm not saying -- I'm saying that it's depicted as that.

MR. MACINTOSH: Q: Oh, well not by me. I just --

DR. SEARS: A: Okay.

MR. MACINTOSH: Q: I'm putting it to you.

DR. SEARS: A: Is that in this excerpt?

MR. MACINTOSH: Q: And your point is, it's not a

helpful statistic. You wouldn't take solace from it, in the cell phone realm, for the reasons you've said.

MR. AARON: Excuse me, Mr. Macintosh.

MR. MACINTOSH: I was actually completely on-side with this.

MR. AARON: I realize you're on-side, but I think she could better explain it if she'd be allowed to finish.

MR. MACINTOSH: Q: Before you do finish, if I may, Dr. Sears, your point is that you don't take solace from that statistic in connection with cell phones for the reasons you've said.

DR. SEARS: A: Yes.

MR. AARON: (inaudible)

DR. SEARS: A: (inaudible)

MR. MACINTOSH: That's fine. You can say more.

DR. SEARS: A: (inaudible) and we haven't really -- if there was going to be a tsunami of brain cancers from cell phones, it would be in the future.

MR. MACINTOSH: Q: Mm-hmm, very well.

DR. SEARS: A: It would be after 2007. So it's premature to come to any conclusions.

MR. MACINTOSH: Q: Very well. Well, as helpful as my people that work with me are, they don't have statistics for the time that isn't here yet, so I can't go there. But you would say that this data is unhelpful for the reasons you've said.

Proceeding Time 4:12 p.m. T89

DR. SEARS: A: Yes.

MR. MACINTOSH: Q: Uninformative, I should say.

MR. AARON: Mr. Macintosh --

MR. MACINTOSH: Sorry.

DR. SEARS: A: I have one very serious concerns regarding this whole issue of looking at tumour data because it's stated in the AGNIR report, and I'm sorry, I can't point to a specific page, and I think in other reports and from commentaries that I've read, is that they can't imagine what else would have caused brain cancer in the past, that could be kind of counterbalanced by increase brain cancers in the future from cell phones. But I can't -- because I was -- you know, I was the primary researcher in this large study on lead, and lead has been very very important, not only in trials heard -- neurological difficulties, but lead causes brain cancer.

So if in the past we had brain cancers arising from lead exposure, and if as lead exposure goes down, cell phone exposure goes up, you may have brain cancers just continuing along on a -- kind of a plateau as a result of varying exposures to different environmental factors.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: Going into the future, this brain tumour

registry information, given that we don't have the information in the past of lead exposures, and we -- and we can't carry on doing any other epidemiological studies concerning tumours and cell phones, because everybody has a cell phone, we're kind of in a scientific limbo with that.

MR. MACINTOSH: Q: Yes. The only reason I raised the statistics, which you say is unhelpful, and it may be. It may be, I don't know. But is because of what you said in your report. In your report you said

> "This is one reason that the spotlight of scrutiny is now turning to large tumour registries, to detect increased brain tumours to examine questions of cell phone radiation carcinogenicity."

That's the only reason I put it to you.

DR. SEARS: A: Yes. I was just trying to cover off the range -- well, I was trying to give the Commission a sense of the scientific progress, the scientific debate in this, in this area.

MR. MACINTOSH: Q: Yes.

DR. SEARS: A: And how --

MR. MACINTOSH: Q: They've got that message.

DR. SEARS: A: It's not going to really get any better.

MR. MACINTOSH: Q: Yes. I'm reminded of -- maybe you've heard it, Prime Minister Disraeli, he said

"there's lies and then there's dam lies and then there's statistics". Have you heard that?

DR. SEARS: A: Oh, I've heard that attributed to all sorts of different people.

MR. MACINTOSH: Q: Right. Yeah. A lot of people pick up on it.

DR. SEARS: A: I'm sure Moyer must have said that at some time.

MR. MACINTOSH: Q: Probably. Thank you. Thank you.

THE CHAIRPERSON: Thank you, Mr. Macintosh. Commission counsel?

MR. FULTON: I'm sure Dr. Sears will be happy to learn that Commission staff have no questions of Dr. Sears.

THE CHAIRPERSON: Thank you.

DR. SEARS: A: Oh, no. I was looking forward to talking to them.

THE CHAIRPERSON: I'll question my colleagues to -- I have a question. Let me just find it here.

Dr. Sears, it's a question that relates to something that you said much earlier in your cross-examination. It was about 1:20 or 1:25 Vancouver time or Kelowna time, and it had to do with peer reviews. And I ask it really just to clarify.

Proceeding Time 4:16 p.m. T90

When we were talking about how peer reviews happen, or when you were talking about how peer

reviews happen, and this may not be an exact quote, but I'll be as accurate as I can be. You said the perspective peer reviewer receives an e-mail asking if they would be able and willing to undertake a peer review. And then the discussion went on. But who does the e-mail come from? And how is the perspective peer reviewer chosen? I was left wondering, you know, whether the e-mail kind of comes from outer space and who -- how do they decide who to send it to?

So perhaps you could elaborate on that for me.

DR. SEARS: A: Yes. Well, the journals tend to develop databases of people that can -- who they think are credible. They may be people who have previously submitted articles to them, or it can be for a variety of reasons. Sometimes they'll search the peer reviewed literature to find out who has published in that kind of topic and who are leaders in that topic area.

So, there's a variety of ways that they come up with names, but generally they try to identify people who are qualified. And they do ask you to indicate that you feel you are qualified, you know, on the basis of your experience and knowledge, that kind of thing.

THE CHAIRPERSON: Who are "they"?

DR. SEARS: A: The journal editors.
THE CHAIRPERSON: Sorry?
DR. SEARS: A: And there's actual -- the journal editors. it's actually a very big job, and they have groups called (inaudible) journal editors. So these are the people who are heading up the -- be it the Canadian Medical Association Journals or -- so the journal editors, and then, of course, they have staff under them to help with this kind of thing.
THE CHAIRPERSON: Okay, you're voice is breaking up a little bit. Just -- let me just feed back what I think you said. And that is that the paper that is going to be subject to a peer review would appear in a journal of -- a professional journal of one form or another, and the editor or an editorial board of that journal would then select individuals in the way that you mentioned, to do the peer review. Is that correct?
DR. SEARS: A: Yes.
THE CHAIRPERSON: And send them the e-mail, as you referred to earlier.

Proceeding Time 4:19 p.m. T91

DR. SEARS: A: Exactly. That's the -- what happens if you want to publish in the -- in a scientific journal is that you submit your paper generally to an on-line process now, and some of it's automated, but there

will be reviewers assigned to it. So, and today, before I spoke to you, I was invited to peer review one paper and I submitted a peer review for another paper, because I'm this guest editor, so I have responsibilities that way.

So, they have -- each journal will have some kind of database of people who they think are good peer reviewers. And if they don't have somebody who would be appropriate in their database, then they may search the literature and find people who they think would be experts in the topics at hand, and just invite them.

So you can get blind invitations -- not blind, but invitations that seem to be out of the blue because you're a scientist that got (inaudible) in previous publications.

THE CHAIRPERSON: Just a follow-up question then, and that is if the journal has a particular theme to it or a particular mission, as really any organization has a mission, and I'm not meaning that in a negative sense, how is a lay person to be assured that the peer review was not carried out by people that share a similar point of view?

DR. SEARS: A: Well, it's all people that -- you know, there's no perfect system, and this does come up. For instance, you probably heard about the Danish cohort

study, and right now the British Medical Journal is really under fire regarding the peer review of that latest study, because it was so badly done. So there's a big issue there, actually, about the peer review.

So it's something which is very difficult in the scientific community, particularly since you don't pay peer reviewers. So this is a volunteer activity. So I spend many many hours a year, entirely as a volunteer, simply trying to make sure that we have good quality science out there. And I'll have to tell you, I don't tell them that every journal article that's given to me is to be published. And I read some and I just wish so much that they had done a better job, because I think that there's an important issue but it just wasn't presented properly, it wasn't written well, it wasn't substantiated, it wasn't structured well.

So, no, I've rejected papers that I wish had been better done.

Proceeding Time 4:22 p.m. T92

THE CHAIRPERSON: Thank you. I'll ask the Hearing Officer to move the laptop back to the podium and we'll now have re-examination by CSTS. Thank you.

MR. AARON: I have no questions in re-examination for the witness.

THE CHAIRPERSON: Okay.
MR. AARON: Thank you, Dr. Sears.
THE CHAIRPERSON: Thank you. In that case then I'll thank Dr. Sears for the time she's spent with us and the information that she's passed on to us. This is an important matter that we're reviewing, and we do appreciate your participation in it. Thank you very much.

(WITNESS ASIDE)

THE CHAIRPERSON: Mr. Fulton.
MR. FULTON: Thank you, Mr. Chairman. So, in terms of going forward for tomorrow, we have Dr. Jamieson at 7:55, and he is the only expert witness who we will be hearing from tomorrow. And if the schedule goes as it has gone today and yesterday afternoon, I would expect that Dr. Jamieson would be finished by the lunch break, given that each of the experts have taken approximately four hours. Dr. Sears has been a little bit shorter.

And then in terms of the afternoon tomorrow, because we don't have any witnesses, we do have some other business to attend to. First of all, there are the outstanding reasons on the requests for responses to certain IRs on the written hearing phase. Secondly, Mr. Shadrack's application to participate in the cross-examination of Dr. Carpenter on Friday. And

finally, Mr. Aaron has asked me to bring forward his request that the Commission revisit its decision on the Li reports that the Commission made on Monday.

You'll recall that you ruled those two reports inadmissible. At that point it was not known that they were hyperlinked to Dr. Sears' report, I believe. That knowledge is -- Mr. Aaron now has that knowledge. So, that is the third matter that we need to deal with tomorrow, with your leave. And in terms of the discussion on the Li reports, to refresh people's memories, that discussion -- the original application and submission took place in transcript Volume 7, at pages 1380 to 1387, and the Commission's ruling was at transcript 1434 to 1435.

THE CHAIRPERSON: Thank you. I did have -- at least I do have two items that I wanted to raise. Is this a convenient time for you?

MR. FULTON: Yes.

Proceeding Time 4:26 p.m. T93

THE CHAIRPERSON: For me to raise them? They both relate to undertakings. When I asked Dr. Shkolnikov for an undertaking, I was somewhat vague in my expectation on when that -- when I would expect that undertaking to be delivered, and I think we have to be more precise, because we do have a need to close off submissions and so on. And so I -- you suggested a date, Mr. Fulton.

Could you remind me of that date?

MR. FULTON: Yes, this was a date that I suggested to you, I believe, off-line, Mr. Chairman, and that was a week this Friday, which would be Friday, the 21st. That would -- I think the final argument from Fortis is due on the 28th. So, that's a week before the final argument.

THE CHAIRPERSON: Yes.

MR. FULTON: And I think as well, that in terms of the undertaking that Fortis requested, that undertaking should be provided no later than the same date as well, and so that will give Fortis time to incorporate that undertaking in its argument. So it would be March 21st, by 4:00 p.m. for both those undertakings.

THE CHAIRPERSON: Okay, you anticipated my second item. So that was -- that covers that off. Thank you.

MR. FULTON: Thank you.

THE CHAIRPERSON: And Fortis has committed to provide the details of the question in writing. Presumably you'll be able to do that within the next 24 hours.

MR. MACINTOSH: Yes, that's right, Mr. Chair. And those dates that Mr. Fulton just referenced, I think those are all well doable. I guess the request to Dr. Shkolnikov from the Chair had -- when he got working on it, had a few more dimensions in it than he had at first thought, and it took a little more time than he

had been thinking might be the case. But in any event, if that is not doable -- I think it is. I will very quickly let Mr. Fulton know.

THE CHAIRPERSON: Thank you.

MR. MACINTOSH: And then for Dr. Sears, it's great me standing here pledging Dr. Shkolnikov's time around here, but I'm going to suggest that that's going to be doable by noon tomorrow. If that's not, I'll have to tell Mr. Fulton. But that's my guess.

THE CHAIRPERSON: Thank you.

MR. FULTON: Because he gave me the rough wording already.

THE CHAIRPERSON: Okay, thank you.

Proceeding Time 4:29 p.m. T94

MR. AARON: Mr. Chair, I just want to flag that it's a concern of my client that the undertaking requested of Dr. Shkolnikov, for figures of certain levels of exposure, with greatest respect to yourself, Mr. Chair, the request had some vagaries in it, which leave it open for all sorts of assumptions to be made by Dr. Shkolnikov in answering that undertaking. There are so -- there are a multitude of factors, as we've heard, that go to exposure.

And my concern is that that information is not going to be subject to cross-examination. We're not going to be able to ask Dr. Shkolnikov "Well, what

about this and what about that and what were your assumptions", and so I just want to flag that concern.

THE CHAIRPERSON: I think I was quite clear in requesting the undertaking, that I asked him to detail what the assumptions were. So, to the extent that there are numbers presented in that undertaking, I would expect that they would be supported by assumptions. People may or may not agree that the assumptions are reasonable, but at least the assumptions will be there. I don't expect just a list of numbers.

MR. AARON: Still there may be elements which my client takes issue with, and it's just information in the form of testimony, it's not a document, it's not -- it's in the form of opinion evidence, that's not subject to cross-examination.

THE CHAIRPERSON: I understand that. Mr. Fulton?

MR. FULTON: It is not uncommon in hearings, as you know, that undertakings will be requested of witnesses during the course of the hearing. Those undertakings will come in after the hearing. The undertakings will be subject to assumptions, and if parties disagree with those assumptions, then they address those in final argument. They say that those assumptions aren't valid for these reasons.

So, the request that you made is not out of the ordinary in terms of Commission processes in the

past, and quite often it happens that the undertakings -- much as the undertakings from Dr. Sears, there will be no opportunity to cross-examine on the answers to those undertakings, even if any of the parties here don't like those answers, and that's just the reality of the way the process unfolds.

Proceeding Time 4:32 p.m. T95

And so I would expect that if Mr. Aaron's clients were not happy with the assumptions and they believe that Dr. Shkolnikov should have taken into account other assumptions, they can make those arguments in their final submissions and point out what effect -- if Dr. Shkolnikov had adopted those assumptions, what that effect would have been.

THE CHAIRPERSON: That's correct. Ultimately, based on argument, we'll apply weight to that undertaking, or the results of the undertaking.

Mr. Aaron, do you have -- okay, so I think that concludes our hearing for today, and I'll thank everybody and remind people, everybody that we are again reconvening at five minutes to eight tomorrow morning, to allow for technical hook-up and so on, so that we can get underway at eight o'clock.

Thank you.

(PROCEEDINGS ADJOURNED AT 4:33 P.M.)