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TABLE DES MATIÈRES

	<u>PAGE</u>
LISTE DES PIÈCES	ii
AUDIENCE CONTINUÉE DU 3 MAI 2002.	
PRÉLIMINAIRES	2
SUITE DE LA PREUVE DE LA MISE EN CAUSE, NIOCAN INC.	
<u>TESTIMONY OF:</u>	
DOUGLAS B. CHAMBERS (EXPERT WITNESS)	
Examination by Me Marc Laperrière	53
Examination by Me Louis-Victor Sylvestre	63
LE TÉMOIN EST DÉCLARÉ TÉMOIN EXPERT	149
Examination by Me Marc Laperrière	151
DISCUSSION	240
Examination continued by Me Marc Laperrière	288
THE TESTIMONY OF THIS WITNESS IS SUSPENDED	293
AUDIENCE CONTINUÉE AU 30 MAI 2002 À 9H30.	295

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28 mai 2002

and (inaudible) India where the Madagascar, where I've worked by the way, the radiation levels can be ten (10) or a hundred (100) times background, simply because of the natural radiation in the rocks and in the brick that they make their homes from.

Q And what's the effect of that on the environment?

A So far as we can tell, we can't see any effect. And it is - there are a number of studies now, but there is certainly no visible effect and that is well documented.

I was unable to find actual measurements of radioactivity in the Oka area so what I did is I took information from UNSCEAR, United Nations Scientific Committee report, volume 1 which is...

Q (Inaudible).

A Pardon me? 2000. United Nations - I hope it's in my reference list. Yes, it is thankfully. The information that's in the table on page E-3 was taken from the reference on the United Nations' report and in that report there's twenty (20) some countries and all of the countries submit information that they have collected, the national authorities have collected and they also gather information from other countries.

For example, Germany will collect data from Poland and Hungary and etc.

India will collect data from whatever neighbouring countries it can. And so, basically the table on page E-3 shows the concentration - it consolidates concentrations in rock and soil and air that are measured for potassium-40, uranium-238, lead-210, polonium, thorium-232 and then it shows data on what the concentrations are in various kinds of vegetation and agricultural products that are grown in the same areas, so, in my opinion it is reasonable to assume that the same kinds of concentrations when you scale for the basic radioactivity in the Oka area should be expected to be what you would see in Oka. So, to estimate the concentrations in Oka you could take these numbers and just adjust them by the concentrations on your particular farm for example if you had that. And they would certainly be within the range of these numbers, numbers on the table which is within the range of what's measured in nonindustrial natural background areas using conventional agricultural practice. I think that's all I want to say.

Q So if we look at - my comprehension, if we look at the chart on E-3 the range of concentration, plants transfer - do plants transfer uranium and thorium series from soil?

A Yes, they do.

Q And what's the impact?

A The impact is as you see here, some small fraction of the radioactivity can be transferred to plants and from plants to animals that graze on the plants. This is absolutely natural and these are indications of the levels that you would expect to see.

Q So, if I'm buying again, tomatoes or carrots or cabbage, strawberries in a local Loblaw and one grown in Oka, would there be any difference?

A I would not expect to see a difference, no, there's certainly - and it will vary. I might add - I might add, if you use triple phosphate - triple superphosphate fertilizer, you have potential to affect the amount of uranium in your plants as well.

Q Why?

A Because all fertilizers, all phosphate fertilizers at least contain natural levels of radioactivity.

Q And how would that compare to the Oka region, the phosphates?

A Phosphate rock? It would be above the average but lower than the maximum that we reported earlier, certainly in the range that you can measure in Oka.

I think basically I would summarize it up by now is, I like cheese, I like milk, I like eating, I have no hesitation eating food grown in that region of the province now and I would certainly have no reason to hesitate eating the food or having - I don't have grandchildren, but if I had grandchildren, I would have - there's no reason they shouldn't eat the food in my opinion either, either now or in the future.

Q So is my understanding correct that, even though if we look at the Oka region and the carbonatite, the level, should it be higher than elsewhere, are they in your opinion still at a level that's more than secure?

A In my opinion they're within the range that would be - would cause me at least no concern.

Q We've done all the appendices, shall we go back to Appendix A or...

A Sure. I think that's fine...

Q ... I see you were looking at your notes, do you want to...

A No. I'm trying to find a number and I apologise I should be paying attention.

Q Okay. No, no, that's fine.

A Too many pieces of paper here.

Q Okay. What's the objective of Appendix A, it's relating to the famous Coefficient of 1 I presume?

A This is the famous - the famous coefficient.

Q Okay.

A And I think basically I'd just like to make a few comments. This issue of the S.Q. originally came up at the time my company was working with "Albright" Wilson at Varennes and...

Q When you say the S.Q....

A The ratio, the coefficient...

Q Okay.

A ... the coefficient, and the Quebec Environment Ministry had adopted quantities from the Atomic Energy Commission of Canada that were intended to screen for licenses, not to designate them hazardous, they were intended to screen as to whether or not the Atomic Energy Control Board should issue a license. In the recent Atomic - Canadian Nuclear Safety Commission Control Act they specifically say they're not going to regulate norm, but they do provide exemption quantities and they're quite clearly intended to be exemption from licensing as opposed to being hazardous and - so - basically, these numbers which were intended as I say to provide an exemption from the licensing process to streamline activities were adopted as these ratios, and I might ask my friend to my left here to identify the proper terminology for the Quebec Hazardous Waste Regulations.

My opinion is - my opinion is they were improperly chosen, but they exist, so what I thought I could do is provide some context on what the ratios are and I've already referred for example to fertilizers, triple sodium phosphate fertilizer would have an S.Q. of between two (2) and three (3). Monoammonium phosphate fertilizer would have an S.Q. of three (3) or greater and...

Q Are those fertilizers freely used or...

A You can go to any cooperative and buy them and put them on your farm, put them on your yard and they're not considered hazardous.

**Me LOUIS-VICTOR SYLVESTRE:**

Q Sorry - can you repeat the numbers, we have to take notes?

A Oh, yes.

Q Go slowly, sir, please.

A My apologies. TSP fertilizer will have an S.Q. greater than two point three (2.3) and monoammonium phosphate will have an S.Q. greater than two point seven (2.7), in actual fact I believe that will be greater than three (3) because the three (3) radionuclide signs I don't have numbers for.

So I guess my point is you have this artifact of the guidance being adopted from the C.N.S.C., Canadian Nuclear Safety Commission which it was originally, and it's being used to identify or categorize something as hazardous when in fact there is no significant hazard associated with diffuse source. The exemption limits are for point sources. If you had a lot of radioactivity in a pencil or something like that.

The - if you were to put materials classified as radioactive on the ground and have a worker, Niocan for example stand on the ground for two thousand (2,000) hours a year, you would never exceed the radiation limits for members of the public, the radiation levels are not that high to be hazardous or to exceed limits that are typically suggested for use for members of the public or for workers.

The most radioactive materials that will be produced by Niocan are the slag, much of the - most of the radioactivity ends up in the slag material and my understanding is that the slag from the ferro-niobium process at Niocan, and I believe - I stand to be - and I believe the slag from the St. Lawrence Columbium project will be placed underground in cemented backfill at the Niocan project, so, setting aside the issue of the Quebec Hazardous Waste Regulations, and I emphasize that exceeding the ratio of one (1) doesn't make the materials hazardous, it's a categorization.

**Me JOËL MERCIER:**

It's a question of law.

**THE WITNESS:**

It's a question of law, it's not a question of hazard, that's what I'm trying to say. Thank you.

**Me JOËL MERCIER:**

Okay. And you're not allowed to testify on a question of law.

**THE WITNESS:**

Okay. Sorry. Okay. I can comment on the hazard though and it does not exceed, would not exceed commonly adopted limits for radiation dose.

And I'm not sure what else to say. I don't know whether you have a question on this or not.

**Me LOUIS-VICTOR SYLVESTRE:**  
You were commenting.

**THE WITNESS:**  
I sort of got stopped in my tracks by - because I'm not a lawyer and I can only thank my lucky stars for that.

**Me LOUIS-VICTOR SYLVESTRE:**  
Thank you very much...

**THE WITNESS:**  
I have many lawyers in my family, so I use that as...

**Me LOUIS-VICTOR SYLVESTRE:**  
It's quite audible you have a lot of experience in testimony.

**THE WITNESS:**  
The - I think the basic point I cannot comment on the law is properly indicated, but I can comment on the hazard. The sheer fact that some material, whether it's phosphate fertilizer or whether it's a slag from SLC or from Niocan exceeds, has a ratio that exceeds one (1) doesn't by itself make it hazardous, that's the fundamental point that I would like to make.

**Me MARC LAPERRIÈRE:**

- Q So, basically, if we may summarize, the operation of the mine, what will be the effect on the production of radon, will it be significant?
- A In my opinion, no, it won't be significant, it won't be measurable.
- Q On the quality of water, will it be significant?
- A My opinion there'll be no significant impact on water whatsoever with respect to the Niocan project.
- Q And on the radioactivity factor which I think we can consider as different as radon, will there be a significant impact?
- A In terms of radioactivity in vegetation or agricultural products my opinion would be there will be no change whatsoever in the levels of radioactivity in vegetation or other agricultural products from current conditions if the Niocan project - when the Niocan project proceeds.
- Q But you do agree that the Oka region is different than the surrounding regions because of the carbonatite?
- A Yes, indeed, the Oka region is quite different from the surrounding regions and has small pockets where the levels are several times higher than the surrounding region.

**Me MARC LAPERRIÈRE:**  
These would be - those are about the questions I would like to ask. Working as a team, I would like to have a pause and see if I've missed anything and...

**THE PRESIDENT:**  
Um-hum.

**Me LOUIS-VICTOR SYLVESTRE:**  
I just want to make a point with Mr. Chambers.

- Q You're going to be cross-examined.
- A I understand.
- Q Yes, eh? You made it very clear...

**THE PRESIDENT:**  
By your smile, maître Sylvestre...

**Me MARC LAPERRIÈRE:**  
We don't seem...

**Me LOUIS-VICTOR SYLVESTRE:**  
It's going to be with great pleasure. Tea for two (2), eh?

**THE WITNESS:**  
Tea for two (2).

**Me LOUIS-VICTOR SYLVESTRE:**  
Yes.

- Q You said the mining activities in Oka won't have any effect, and correct me if it's not right, with atmosphere, no effect on vegetation in terms of radioactivity, no effect on water on the surface, underground water and no effect on the soil, is what I said quite loyal and the exact résumé if I can say so of what you priorly said, it's quite important for me.
- A That's a question?
- Q Yes. Well, those informations are...
- A Fine.
- Q ... is it right...