



July 25, 2016

Dr. Gordon Edwards
Canadian Coalition for Nuclear Responsibility
53 Dufferin Street
Hampstead QC H3X 2X8

Dear Dr. Edwards:

Thank you for your letter dated May 18, 2016 (enclosed).

At this point, it is clear that we are no closer to resolving our fundamental differences of opinion regarding the interpretation of the science with respect to the risks to modern uranium miners from exposure to radon decay products. Rather than continuing through correspondence, we would like to invite you to a face-to-face meeting with technical experts from the CNSC and Cancer Care Ontario (CCO) for a scientific discussion on the matter.

Taking into consideration the availability of CCO scientists, potential dates for a technical meeting are:

- August 17 – 19
- August 22 – 24
- September 26 – 27

Should you be interested in such a technical meeting, please contact Alan DuSautoy, Director, Radiation and Health Sciences Division at Alan.DuSautoy@canada.ca.

Yours sincerely,

Terry Jamieson
Vice-President, Technical Support Branch
Canadian Nuclear Safety Commission

Paul Demers
Director, Occupational Cancer Research Centre
Cancer Care Ontario

70 years of nuclear safety in Canada / 70 ans de sûreté nucléaire au Canada

Enclosure: (1)

c.c.: The Right Honourable Justin Trudeau, Prime Minister of Canada
The Honourable Catherine McKenna, Minister of Environment and Climate Change (Canada)
The Honourable Jim Carr, Minister of Natural Resources (Canada)
The Honourable Philippe Couillard, Premier of Québec
The Honourable Pierre Arcand, Minister of Energy and Natural Resources
The Honourable David Heurtel, Minister of Sustainable Development, the Environment and the
Fight Against Climate Change

From: [Gordon Edwards](#)
To: [Binder, Michael \(CNSC/CCSN\)](#)
Cc: [pm@pm.gc.ca](#); [Ministre / Minister \(FC\)](#); [Office of the Minister / Bureau du Ministre \(NRCAN/RNCAN\)](#); [site_premier_ministre@mce.gouv.qc.ca](#); [ministre@mddelcc.gouv.qc.ca](#); [ministre@mern.gouv.qc.ca](#)
Subject: L'Uranium au Québec - La vérité et ses conséquences/Uranium in Quebec - Truth and Consequences /
Date: Wednesday, May 18, 2016 3:31:10 PM
Attachments: [RSN Binder paq 18 mai 2016 f.pdf](#)
[ATT00001.htm](#)
[CCNR Binder pack May 18 2016 e.pdf](#)
[ATT00002.htm](#)

Michael Binder, Ph.D., président,
Commission canadienne de sûreté nucléaire
Canadian Nuclear Safety Commission

Monsieur,

Veillez trouver ci-joint ma réponse, disponible en français et en anglais, à votre lettre du 27 avril 2016 qui prenait la défense de la présentation de la CCSN du 22 janvier 2016 devant le Comité interministériel québécois sur l'extraction de l'uranium. Le Regroupement pour la surveillance du nucléaire (RSN) continue de croire que la présentation de la CCSN contenait des renseignements inexacts.

Dear Dr. Binder:

Please find attached my response, available in English and French, to your April 27, 2016 letter defending the CNSC's January 22 2016 presentation to the Quebec Inter-Ministerial Committee on uranium mining. The Canadian Coalition for Nuclear Responsibility (CCNR) continues to believe that the CNSC presentation contained incorrect information.

Gordon Edwards, Ph.D., président,
Regroupement pour la surveillance du nucléaire,
Canadian Coalition for Nuclear Responsibility.

en français: http://ccnr.org/RSN_Binder_paq_18_mai_2016_f.pdf

en anglais: http://ccnr.org/CCNR_Binder_pack_May_18.2016_e.pdf



BY E-MAIL

Michael Binder, President,
Canadian Nuclear Safety Commission (CNSC).

May 18 2016.

Dear Dr. Binder:

In a letter dated July 27, 2015, addressed to the Honourable David Heurtel, Quebec's Minister of Sustainable Development, the Environment, and the Fight Against Climate Change, you wrote : "It is very troubling to have the BAPE present your government with conclusions and recommendations that lack scientific basis and rigour." In the letters that you have subsequently sent to me, dated March 24 and April 27, 2016, you insist that CNSC relies on "solid science" and "rigour". The Canadian Coalition for Nuclear Responsibility (CCNR) strongly disagrees with your assessment. Consequently we have some questions for you.

1. The CNSC presentation of January 22 2016 to the Quebec Inter-Ministerial Committee on Uranium Mining asserted that "a recent epidemiological study of the Ontario uranium miners cohort (1965-2007) showed that their risk for lung cancer was no higher than for the Canadian population", which is simply untrue. The report shows no such thing, and the authors of the study stated no such conclusion. This has been called to your attention more than once.

In your letter dated April 27, 2016, you admit that the report is inconclusive. You say "modern miners could have lower, the same or slightly higher risks than the unexposed workers". This is not what was said in the CNSC presentation. Based on the results of the study itself, there is no scientific basis for the conclusion articulated by CNSC staff in its January 22 presentation..

Why have you not seen fit to apologize for this apparent misrepresentation of the findings of a scientific study that was commissioned and financed by CNSC ?

2. In paragraph (a) you take exception to our use of the phrase "mortality factor" to distinguish the Excess Relative Risk (ERR) for *lung cancer mortality*, from the Excess Relative Risk (ERR) for *lung cancer incidence*. This is nothing but a quibble. The ERR for lung cancer mortality is in fact an excess relative mortality factor, although not an absolute mortality factor. We made that distinction quite clear in our discussion and in our use of ERR in subsequent calculations.

In the same paragraph, you fail to mention that both ERR figures were incorrectly cited by CNSC staff in the Technical Response attached to your letter of March 24. The ERR figure for excess mortality was stated as 64% instead of 66%, and the ERR for excess incidence was stated as 63% instead of 64% – an evident lack of scientific rigour on the part of your staff. Both confidence intervals cited in the Technical Response attached to your letter of March 24 were also wrong – a total of six numerical errors in just two lines [*Technical Response, p.4*].

You also fail to point out that in 2010 an absolute mortality factor for lung cancers caused by radon was published by the International Commission on Radiological Protection (**Lung Cancer Risk from Radon and Progeny and Statement on Radon**, ICRP Publication 115).

“Based on recent results from combined analyses of epidemiological studies of miners”, the 2010 ICRP report indicates a risk of 5 lung cancer deaths per 10,000 persons per WLM of exposure, which is almost twice the value of 2.8 per 10,000 persons per WLM that was estimated by ICRP in 1993 (Publication 65). The ICRP refers to this number as “a fatality coefficient for radon-induced lung cancer” – in other words, it is indeed a mortality factor.

Why did CNSC choose not to communicate the latest scientific results from the International Commission on Radiologic Protection to the Quebec Interministerial Committee? Instead, CNSC chose to present the opinion of its own staff, as if that opinion had been confirmed by an Ontario epidemiological study whose data were clearly inconclusive on that very point. Not only is this not “solid science”, not only is it not “rigorous”, it is deceptive.

3. Article 9 of the Nuclear Safety and Control Act states that one of the obligations of the CNSC is “to disseminate objective scientific, technical and regulatory information to the public concerning ... the effects, on the environment and on the health and safety of persons, of the development, production, possession and use” of nuclear energy or nuclear substances such as uranium.

Under this law, we at CCNR feel that the CNSC is legally required to provide scientific information that is accurate, reliable, unbiased, even-handed, and balanced, to assist citizens and decision-makers in understanding the potential dangers surrounding uranium mining, nuclear power and the use of radioactive materials. According to several dictionaries we consulted, the word “objective” means that the information should not be coloured by the personal opinions of staff. ***Is this your understanding of article 9(b) of the Nuclear Safety and Control Act?***

4. The CNSC bases its regulatory regime on the Linear No-Threshold (LNT) Model of radiation-induced carcinogenesis. “Linear” means that the number of lung cancers in a given population is directly proportional to the total radon exposure (in WLM units) in that population. “No-Threshold” means that there is no level of exposure which can be regarded as perfectly safe, because of the linear relationship that exists between radon exposure and radiation-induced lung cancer deaths. These are clearly defined scientific terms that do not lend themselves to other interpretations. ***Are we correct in asserting that CNSC uses the LNT model as a scientific basis for its regulations? If not, please refer us to a document that states otherwise.***

In paragraph (c) you say that using the LNT model for large populations exposed to small exposures is “not grounded in science”. On the contrary, for CNSC to abandon linearity, or to presume the existence of a threshold, is indeed “not grounded in science”. It is not “solid science” nor is it evidence of good governance to deny the predictions of a well-established model that has been formally adopted as the basis for your regulatory regime. The cautions that have been expressed by various bodies in this context are based on socio-political concerns as well as the fact that such predictions have an unavoidable degree of uncertainty. However, this does not mean that such predictions are wrong or that they are “not grounded in science”.

5. In paragraph (d) you say the “math is wrong” in our use of the LNT model to estimate 60 excess lung cancer deaths due to a average cumulative occupational radon exposure of 8.343 WLM in a population of 24,000 miners. In fact our math is simple, straightforward, and correct. Indeed, our estimate of 60 extra lung cancer deaths in such circumstances – an estimate that was

based on the incorrect ERR figure given by CNSC staff in the Technical Response attached to your March 24 letter – is probably an underestimate.

If, instead of using the incorrect ERR figure, we use the 2010 ICRP “fatality coefficient” mentioned above (5 lung cancer deaths per 10,000 persons exposed for each WLM of radon exposure) we obtain a total lung cancer mortality estimate of $(24,000) \times (8.343) \times (5/10,000) = 100$ deaths from occupational radon exposures among 24,000 miners. That is 70 percent greater than the 60 lung cancer deaths we estimated earlier. ***If these mathematical calculations are wrong, where precisely are the errors?***

6. In the second paragraph of your letter of April 27 you say that radon exposure levels among underground uranium miners in Canada were “0.1 WLM, or lower, for every year from 2001 to 2013”. This assertion flatly contradicts CNSC Publication INFO-0813, which indicates that in 2006 the average radon exposure was about 80 percent higher than the figure that you give. Nevertheless, if we assume a radon exposure of 0.1 WLM for a working lifetime of 45 years, we obtain a cumulative exposure of 4.5 WLM. Such an average cumulative exposure in a population of 24,000 miners would result in an estimated $(24,000) \times (4.5) \times (5/10,000) = 54$ extra radiation-induced lung cancer deaths, using the 2010 ICRP absolute “fatality coefficient”. ***But your staff calculates “less than one” lung cancer death in this population at current rates of exposure. May we please see the details of this calculation?***

7. In the second paragraph, you also state that 0.1 working level months (WLM) of radon exposure is equivalent to 0.5 millisieverts (mSv) of equivalent radiation exposure. This conversion is incorrect. It is based on an outdated estimate whereby one working level month of radon exposure was considered to be equivalent to five millisieverts of radiation dose. When ICRP updated its scientific database in 2010 and found that the risk of lung cancer deaths from radon exposure are actually much greater than previously thought, the conversion factor was altered so that 1 WLM of radon exposure is now considered to be equivalent to 12 millisieverts and not 5 millisieverts as was previously thought. (James W. Marsh, John D. Harrison, Dominique Laurier, et al: Dose conversion factors for radon: recent developments, in: Health Physics Vol. 99, No. 4, Oct. 2010, p. 511-516). ***Does CNSC have a reason for not accepting this updated scientific conversion factor, and if so, what is it?***

8. In our letter of April 11, 2016, we called attention to the 40-year-old regulatory limit on radon exposures for uranium miners, pointing out that lung cancer mortality would double or triple if workers were exposed to this limit throughout their working lifetime. In paragraph (b) of your response, you say “discussing continuously elevated exposure situations which do not occur under CNSC regulatory oversight is of little value.” We, in turn, ask what value is there in describing a barbaric and antiquated radiation exposure limit, one that corresponds to totally unacceptable working conditions, as a “safety standard”? Patsy Thompson, Director General of the CNSC Directorate of Environmental and Radiation Protection and Assessment, referred to this 40-year-old limit as an “international safety standard” in her January 22 presentation to the Quebec Inter-Ministerial Committee, established to assess the 2015 BAPE report and recommendations regarding uranium mining and milling in Quebec.

Why has CNSC chosen not to tighten this regulatory limit on radon exposures for uranium miners on scientific grounds? Thirty-six years ago, in 1980, the British Columbia Medical Association urged that the radon exposure limit for uranium miners be reduced by a factor of

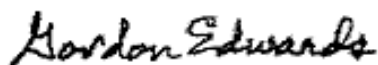
four, but nothing was done in that regard. (The Health Dangers of Uranium Mining, by R.F. Woolard M.D. and E. Young M.D., BCMA, 1980)

9. In the grand scheme of things, an increase of 50 or 100 lung cancer deaths may be deemed “statistically insignificant” by the CNSC – but such deaths are highly significant for the families of the workers who suffer and die from such illnesses. This is especially true when the burden of proof is unjustly placed on the shoulders of the grieving widows who must try to obtain compensation for their husband’s occupationally-related deaths by “proving” that the illness was caused by occupational exposure to radon – a scientifically impossible task. ***Does CNSC feel that it has any responsibility toward those afflicted workers and their families?***

The US government is now paying sizable compensation packages to the families of many uranium workers who have suffered from any one of a long list of cancers and other illnesses, without the necessity of having to prove a causal relationship. This is the case for the Navajo miners of the Colorado Plateau and the workers at the Fernald uranium enrichment plant, for example. Here in Canada we have no such policy in place and it certainly does not help when the regulator denies that there is any excess illness at all, despite strong scientific evidence to the contrary.

We recognize that there have been improvements in reducing radiation exposures to miners, brought about in large part because of pressure from unionized workers, three separate Royal Commissions of Inquiry (in Saskatchewan, Ontario and British Columbia), numerous independent environmental assessment panel hearings, and the vigilance and whistle-blowing activities of non-governmental organizations such as the Canadian Coalition for Nuclear Responsibility, the Inter-Church Uranium Committee, and many others. However, to deny that there are still significant dangers needing to be confronted is irresponsible nonsense. To paraphrase the British Columbia Medical Association (*from their 1980 publication “Health Dangers of Uranium Mining”*) it would be troubling to hear such attitudes coming from the uranium industry, let alone from the federal body that has been set up to regulate that industry.

Yours very truly,



Gordon Edwards, Ph.D., President,
Canadian Coalition for Nuclear Responsibility.

Attachments :

Letter from Dr. Michael Binder to the Honourable David Heurtel (July 27 2015).

Letter from Dr. Michael Binder to Dr. Gordon Edwards (April 27 2016).

- cc. The Right Honourable Justin Trudeau, Prime Minister of Canada
The Honourable Catherine McKenna, Minister of Environment and Climate Change (Canada)
The Honourable Jim Carr, Minister of Natural Resources (Canada)
L’Honorable Philippe Couillard, Premier Ministre du Québec
L’Honorable Pierre Arcand, Ministre de l’Énergie et des Ressources naturelles (Québec)
L’Honorable David Heurtel, Ministre du Développement durable, de l’Environnement, et de la Lutte contre les changements climatiques (Québec)