

Re: *The Need for a Study Estimating Health Costs of Nuclear Fuel Cycle Radiation Related Conditions Including Diagnosis, Treatment & Work Loss*

Marion Fraser
Senior Policy Advisor
Minister of Energy

It was good to meet with you, Energy Minister Donna Cansfield and others from the Ministry staff on November 3rd. Since many of us have been involved in electricity issues for over three decades, it was good to learn of your comprehensive grasp of demand management perspectives and needs, and that you will meet with us to follow up on our initial discussion on radiation-related health costing. I also reviewed this matter with Minister Cansfield at the Conservation Council meeting two weeks ago.

As mentioned in our meeting, what many of us find lacking in most energy discussions are the negative health impacts of ionizing radiation, given the abundance of known scientific evidence revealed over many years.

Coincidentally, the day after our meeting, on November 4th, CBC Radio News headlined the fact that Ontario's health costs will rise to possibly half the province's budget in the not-too-distant future. This is staggering indeed, and clearly an indication of the urgent need to prevent environmentally linked diseases and conditions. Determining the health costs of radiation-related illnesses, including diagnosis and treatment, becomes even more relevant in light of that costly prediction.

Thus we recommended that you solicit both George Smitherman, Minister of Health and Dwight Duncan, Minister of Finance in this endeavour as soon as possible. The studies estimating health costs of ionizing radiation such as tritium and other radionuclides routinely emitted from CANDU reactor operations and other nuclear power-related sources undoubtedly will be significant in this discourse.

Fortunately, an excellent, comprehensive study already exists on the health effects of generating electricity – nuclear, coal and hydro – published in 1992 in preparation for the 25 year plan of Ontario Hydro, the *Demand Supply Hearings*. All calculations are done per gigawatt energy produced. If the health effects found were given dollar values, you would already have what is envisioned in our request. This study was done by the Public Health Coalition, the Ontario Public Health Association and the International Institute of Concern for Public Health, with numerous scientific collaborators. It is a four-volume report, consisting of two volumes and expert papers written by the scientists, a one-volume summary, and one volume containing the CVs of all contributors.

Hence, there is no need to reinvent all the wheels, since much of the preliminary information required now exists in the records of the Ontario

Ministry of the Environment and possibly at the Ministry of Energy too. The report is called:

**REPORT
of
The Public Health Coalition
Ontario Public Health Association
International Institute of Concern for Public Health**

**RESPECTING THE
HEALTH EFFECTS OF ONTARIO HYDRO'S DEMAND/SUPPLY PLAN
(HEALTH EFFECTS REPORT)**

**presented to:
ENVIRONMENTAL ASSESMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY HEARINGS**

To review the reasons we are making this request at this time: Radioactive tritium (tritiated hydrogen) is a known human carcinogen, mutagen and teratogen (in that it crosses the placental barrier). Hydrogen is a basic building block of all organic molecules. Tritiated hydrogen becomes incorporated directly into the molecules of our cells, a different mechanism from other pollutants.

It was also noted that human beings can be exposed to organically-bound tritium through the ingestion of plants and animals exposed in an effluent pathway, in addition to direct uptake through inhalation, absorption and drinking contaminated water. Especially sensitive to the effects of tritium are rapidly growing cells such as fetal tissue and young girls' pre-pubescent developing breasts, genetic materials and blood forming organs. Tritium can affect protein precursors that in turn make up the chromosomal strands of DNA, damaging it and creating a mutational effect. The results of all these processes can result in cancers, miscarriages, birth defects, sterility, hypothyroidism, etc. – not only in those initially exposed, but also in their offspring, and theirs.

In 1992, a published case control study conducted by the Ontario Cancer Treatment and Research Foundation and the Atomic Energy Control Board (AECB) indicated that death rates from childhood leukemia were 34% above the provincial average around the Pickering and Bruce Nuclear stations (97% confidence level). In May 1994, the Advisory Committee on Environmental Standards (ACES) recommended dramatically reducing the amount of allowable tritium (This recommendation was not adequately acted upon).

Years earlier, other important studies and recommendations attested to the dangers of tritium. These include:

The Safety of Ontario's Nuclear Reactors (The Select Committee on Ontario Hydro Affairs, 1980) which contains important scientific information about tritium and carbon 14;

- 1978 *Report of the Porter Commission* commenting on the increasing levels of radionuclides in the Great Lakes;
- a British study, the *Committee Examining Radiation Internal Emitters* (CERRI) Report (www.cerrie.org) pointing out that short track emitters can be significantly more dangerous than previously estimated;
- *Biological Effects of Ionizing Radiation* (BEIR June 2005) and National Academy of Sciences Reports clearly illustrating that any amount of ionizing radiation, whether very large or exceedingly small, can cause cancer.

As well, there are health costs not being considered resulting from production of nuclear fuel at the current operations of Cameco's Blind River refining facility and Cameco's conversion facility, Zircotec in Port Hope, where Cameco's fuel is turned into fuel pellets. In addition, General Electric's rod assembly facilities in Peterborough and Toronto present additional adverse environmental and therefore human health impacts. The regulator, the Canadian Nuclear Safety Commission (CNSC) specifies within each facility's operating license the amounts it can release into our environment.

CNSC staff admits in an email to Alexandra McKee-Bennett that it has not conducted studies to indicate that release limits are safe. McKee-Bennett outlined the cost projection for childhood asthma in her paper, *The Future for Our Children*. The study is from Toronto's Hospital for Sick Children (HSC).

The implications for the effect of fluoride on the developing brain are also outlined. This data is from China and is related to the fluoride pathway exposure in the use of the burning of coal. Cameco releases 507 kilograms of fluoride into the air over Lake Ontario on the shores of Port Hope, 60 kilograms of uranium in air, 1 kilogram of uranium in water, 9.3 tonnes of ammonia, and 113 tonnes of nitrous oxide, which of course create additional ground level ozone. Ontario, of course, will need more of these releases to fuel nuclear's so called 'clean energy'.

Notwithstanding the pain, suffering and misery of cancer and other conditions on the victims and their families, the billions of dollars that could be saved in future health care costs must also be considered. As predicted earlier this year, the costs of cancer treatments are rising exponentially according to a recent, widely reported Canadian Cancer Society study.

We would like to see much greater attention paid to these issues not only because of the obvious suffering caused to patients and their loved ones, but because of the staggering health costs incurred. We need to factor all these real externalized costs of cancer and other radiation-related diagnoses and treatments into the fiscal equation for Ontario.

There are health economists who do such research with other toxic substances, for example, as in Muir, T. & Zegarac, M. *Societal Costs of Exposure to Toxic Substances: Economic and Health Costs of Four Case Studies That are Candidates for Environmental Causation*". Environmental Health Perspectives 109 (suppl 6):885-903 (2001).

In the US relating to children's health, see:

- Landrigan, P., Clyde.B. Schechter, Jeffery M. Lipton, Marianne C. Fahs, and Joel Schwartz. *Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer and Developmental Disabilities*. Environmental Health Perspectives, Vol. 1101, No.7, July 2002, and
- Massey, R. and Ackerman, F. *Costs of Preventable Childhood Illness: The Price We Pay for Pollution*, Global Development and Environment Institute, Tufts University, Medford, MA., September 2003,

Then further, relating to security and health costs:

- *Study sees 44,000 radiation deaths.*

<http://www.thejournalnews.com/newsroom/090804/b0108nukestudy.html>A new study predicts that a September 11-type terrorist attack on the Indian Point, New York nuclear power plants could result in 44,000 deaths from radiation poisoning and more than a half-million deaths over time from radiation-induced cancer in residents living within 50 miles of Buchanan. White Plains Journal News <<http://www.nyjournalnews.com>> , New York. <http://www.thejournalnews.com/newsroom/090804/b0108nukestudy.html>

We are curious to know whether there are similar health studies relating to security and health costs of such acts at the Pickering, Darlington or the Bruce nuclear reactors here in Ontario?

All of these are serious questions related to calculating the economic costs of ionizing radiation, nuclear power and health. We believe there is an urgency for such a study. We will be pleased to assist you in this work in any way possible and look forward to meeting with you and others about this matter at your earliest convenience. Thank you for your kind attention.

Sincerely.

Dorothy Goldin Rosenberg MES, PhD, Environmental Health Educator

Dolores Sicheri, MD, FRCP, Oncologist, Windsor Regional Cancer Centre

Lee Ann Gallant, MD, FRCP, Pediatrician

Riina Bray, MD, FRCP, Chair, Environmental Health Committee, Ontario College of Family Physicians

Marion Odell, RN, International Institute of Concern for Public Health

Alexandra McKee-Bennett, BA, RN, MSN, RM

Milica Kovacevich, President, Ontario Council of Women

Shirley Farlinger, Voice of Women

Cathy Walker, Director, Health and Safety Department, CAW-Canada

Elizabeth May, Executive Director, Sierra Club of Canada

Some Relevant Health and Energy Resources:

- *Panel Affirms Radiation Link to Cancer: US National Academy of Sciences*

By H. Josef Hebert, The Associated Press

http://www.truthout.org/issues_05/070105HC.shtml

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- Also, please see the *Biological Effects of Ionizing Radiation* (BEIR)

Report No. 7, which confirms these findings

www.nap.edu/reportbrief/11340/1340rb.pdf

- *Where the billions should go*

Press release for the Amory Lovins report. Advise reading the whole article on the RMI website.

(P.S. Amory Lovins is an energy analyst who worked with Canadians in the 70s on *soft energy path* directions for the now-defunct, Trudeau inspired, *Science Council of Canada*. Its landmark study, *Canada as a Conserver Society* was chaired by University of Toronto Professor Emeritus Ursula Franklin. It said all of these things then, although there is clearly greater sophistication and availability of technologies in the field today.)

Article from Rocky Mountain Institute

Small-Scale Renewable Energy Producers Are Walloping Nuclears in the Marketplace

Rocky Mountain Institute researchers today doused the hype about "nuclear revival" in an icy bath of real-world data. They documented that worldwide, the decentralized, low- or no-carbon sources of electricity-cogeneration and renewables, all claimed by nuclear advocates to be too small and too slow to help much with climate change-are already bigger than nuclear power and are quickly leaving it in the dust. "Nuclear advocates are desperately trying to create an illusion that their failed option is being revived," said RMI CEO and cofounder Amory Lovins, the lead author of the analysis, "so all its remaining costs and risks, which private investors have rejected, can be loaded onto taxpayers. This bailout, now being debated in Washington, is claimed to be vital because nuclear power is the only power source big and fast enough to combat climate change. But industry and official data reveal that claim to be false. While nuclear power dies of an incurable attack of market forces, its derided smaller-scale competitors are already a bigger global power source and are growing very rapidly, while nuclear power continues to fade away."

The analysis appears as the cover story in RMI's summer 2005 newsletter, published today (available online at <http://www.rmi.org/sitepages/pid1154.php>), and documents the global growth of two kinds of decentralized electricity generation: cogeneration (producing electricity and useful heat together) and renewable sources (wind, biomass power, geothermal, small hydro, and solar, but excluding big hydro dams-any over 10 megawatts). In 2004 alone, these small-scale, low- or no-carbon sources added 5.9 times as much net generating capacity and 2.9 times as much electricity production as nuclear power did. By the end of 2004, the decentralized competitors' global installed capacity totalled roughly 411 gigawatts - 12 percent more than global nuclear plants' 366 gigawatts - and produced about 92 percent as much electricity. (The difference is because some kinds of renewable sources run fewer hours per

year.)

Thus, the article notes, these so-called "minor" alternative sources-often claimed to be unimportant, uncompetitive, and far in the future - actually overtook nuclear's global capacity in 2003, rivaled its 2004 and will match its 2005 electricity output, and should exceed its 2010 output by 43 percent. Official and industry forecasts indicate that in 2010, they'll add 177 times as much capacity as dwindling nuclear power will-the ultimate test of energy technology in the free market. Not, of course, that the market is actually free: nuclear power is far more heavily subsidized (http://earthtrack.net/earthtrack/index.asp?page_id=177&catid=66 [http://earthtrack.net/earthtrack/index.asp?page_id=177&catid=66] [http://earthtrack.net/earthtrack/index.asp?page_id=177&catid=66]) than its competitors. That makes their market victory even more remarkable, with manufacturers earning about ten times as much 2004 revenue selling renewable power equipment as nuclear plants- and the latter all selling to centrally planned power systems, not those disciplined by markets.

Due to a lack of global data, these comparisons don't even count competition from the demand side-more efficient use of electricity, wringing more and better work from each kilowatt-hour. Lovins says that's generally bigger, faster, and cheaper than any way to produce electricity. (He's widely considered one of the world's leading authorities on saving electricity, of which he led a uniquely detailed assessment in the 1980s and '90s. RMI earns most of its revenue by consulting for major companies on advanced energy efficiency.)

"So the big question about nuclear 'revival' isn't just who'd pay for such a turkey, but also why bother?" Lovins asks. "Why keep on distorting markets and biasing choices to divert scarce resources from the winners to the loser - a far slower, costlier, harder, and riskier niche product - and paying a premium to incur its many problems? Nuclear advocates try to reverse the burden of proof by claiming it's the portfolio of non-nuclear alternatives that has an unacceptably greater risk of non-adoption, but actual market behavior suggests otherwise."

Lovins also debunks the notion that nuclear energy is the best investment against carbon dioxide emissions and global climate change. The goal, he says, should be to displace the most emissions soonest for each dollar invested. As the market is proving, both efficient use of electricity and decentralized production can be installed faster than nuclear plants, and thus can displace coal-fired generation earlier. But the key difference isn't just speed; it's also cost. An alternative that delivers electricity at one-third the cost of a new nuclear plant, as many do, will buy three times as much climate solution per dollar as spending that same dollar on the nuclear plant. Conversely, because nuclear power is the costliest option, choosing it actually makes climate change worse than if the best buys were bought instead.

Operating a nuclear plant emits essentially no carbon, but the same is also true of renewable sources and efficient use. Fossil-fueled cogeneration's emissions depend on its fuel (~60-70% worldwide uses low-carbon natural gas); generally it emits ~30-80% less carbon than the separate power stations and boilers it replaces (often fueled with coal, the highest-carbon fuel).

"I've always been, and am today, open-minded about the possibility that [nuclear energy] may have hidden merits," Lovins notes. "But based on the literature and on

deep practical experience of electric efficiency and production in scores of countries, I see no evidence that nuclear power, using any technology, under any political system (let alone an attractive one), is or promises to become an economically, technically, or socially sound energy solution."

For more information, please contact Cameron Burns at 970-927-3851 or cameron@rmi.org or Anne Jakle at ajakle@rmi.org. You can also visit RMI's website at www.rmi.org.

Rocky Mountain Institute is a twenty-three-year-old, independent, nonpartisan, entrepreneurial, nonprofit organization. Its mission is to foster the efficient and restorative use of resources to make the world secure, just, profitable, and life-sustaining. RMI's nearly fifty staff members show businesses, communities, individuals, and governments how to meet their goals in ways that create more wealth and protect the environment simultaneously - often through advanced resource efficiency. For more on our work, please visit our main website at www.rmi.org, or go to our Media Materials section at www.rmi.org/sitepages/pid65.php [<http://www.rmi.org/sitepages/pid65.php>] . Source: Rocky Mountain Institute

- *On Electricity, McGuinty should learn from Schwarzenegger: California to Conserve 1500 MW and net savings of US \$2.7 billion while Ontario to Spend over \$2 billion rebuilding old nukes to generate the same amount of power*

(Toronto) Today, the Toronto Environmental Alliance called on Premier McGuinty to steal an electricity policy page from California governor Arnold Schwarzenegger (by Keith Stewart, Toronto Environmental Alliance, written prior to the Bruce plant refurbishment announcement)

"California has just announced its largest-ever energy conservation program, which is expected to save as much electricity as would be produced by two nuclear reactors while consumers will net savings of US \$2.7 billion," said Keith Stewart of the Toronto Environmental Alliance.

California's conservation programs will cost US \$2.7 billion, but save the equivalent of 1500 MW of power and reduce consumers bills by US \$5.4 billion. Details can be found at http://www.cpuc.ca.gov/published/news_release/49757.htm
http://www.cpuc.ca.gov/published/news_release/49757.htm

Press reports indicated the McGuinty government will make an announcement next week on rebuilding the two privately-operated Bruce reactors at a cost 'significantly north' of \$2 billion. To date, Ontario has not implemented any significant conservation programs and has even cancelled PST rebate on energy-efficient appliances brought in by the Eves government.

"Energy conservation is the cheapest and cleanest solution to our electricity crisis," said Stewart. "Dalton McGuinty should explain to the people of Ontario why he will hand over \$2 billion of rate-payers money to the privately-operated Bruce nuclear plant before having implemented any significant conservation program in this province."

Last year, the Pembina Institute delivered a report to the Ontario government on how it could reduce consumption by 40% over the next 15 years and bring green

power on-line to keep the lights on and costs down while phasing out coal and nuclear power.

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