

**Physicians for Global Survival**  
Written Submission, Public Hearings, 2011  
Darlington New Nuclear Power Plant Project Joint Review Panel

*By Sharon Baker (Coldstream MM member)*

Good morning Mr Chairman, panel members, ladies and gentleman. My name is Dr. Sharon Baker. I have with me two young people and a community member who are also deeply concerned about the future of our planet; Justin and Shawn Hertwig and Don Baker.

Thank you for the opportunity to speak to you today. I am here as a member of Physicians for Global Survival. I have been a physician in Ontario for 26 years. I currently work as a Palliative Care Physician Consultant and Site Chief at University Hospital – London Health Sciences Centre. This includes a position as an assistant professor in the Schulich School of Medicine and Dentistry at the University of Western Ontario. I also served for 10 years as an acting Medical Officer of Health in Elgin County.

Physicians for Global Survival is an organization concerned about global health.

I am sure that many of the people in this room have been affected by cancer whether directly or indirectly. As a Palliative Care Physician, I care for people everyday who are actively dying from this devastating disease. Cancer is largely preventable with education about healthy lifestyle choices and the elimination of toxic substances from our environment.

As a society, Canadians have raised billions of dollars to find a cure for cancer. We walk, run, relay, ride, and row. While these are noble acts, and I applaud these people, still there is no cure. Albert Einstein defined insanity as doing the same thing over and over again and expecting a different result. The insanity needs to end. Our approach to health care has been seriously flawed. We need to move from treating illness, and turn our focus to prevention. April is cancer awareness month. Cancer can be prevented.

Cancer in general is not caused by just one thing - it is multifactorial. It is the result of the cumulative exposure to carcinogens over time referred to as a body burden. Carcinogens often work synergistically with one another, to produce cancer. Therefore, the more carcinogens to which a person is exposed over time, the more likely cancer is to develop.

In order to decrease rates of cancer, exposure to known carcinogens must be decreased, period. This is a societal choice.

Radiation is a known carcinogen. This is not debatable. Madame Curie, in her research taught about radiation including its potential to be fatal. Exposure to radiation is accumulative. It builds up in biological organisms including human bodies; the more exposure—the greater the likelihood of getting cancer<sup>1</sup>. Humans are constantly exposed to low levels of radiation in the environment, some that can't be controlled. Attention needs to be directed to what we can control.

Radiation toxicity is accumulative. There is no safe level of radiation exposure. As physicians we recognize this. We weigh the risk and benefits when ordering X-rays, mammograms, CT scans and radioisotopes. We try to limit exposure to decrease the risk of cancer or genetic defect.

The assignment of “acceptable risk” is completely arbitrary. This approach has more in common with a game of chess, or rolling a dice than actual science.

Increasing the global burden of radioactivity increases the incidence of cancer. Nuclear technology increases humanity's collective exposure to radiation. The increased risk is not limited to emissions from nuclear reactors themselves. It is also the culmination of all the risks of exposure from processing uranium, the mining, milling and the handling and the management of toxic wastes from all these processes.

Choosing to expand nuclear technology and thus the global burden of radioactivity is like determining that it is acceptable that some people are expendable. That person might be your neighbour, someone in this room or an impoverished aboriginal that you will never meet. Choosing nuclear power puts the sweep of the pen to someone's or some people's death sentence. I would not want to live with that responsibility.

The negative impact that uranium mining has upon the environment is gargantuan. The fossil fuel requirements for the mining, milling, refining, enriching and transport of uranium ore are enormous. However, I will only discuss the health risks of radioactivity here. Uranium miners are exposed to multiple types of excess radiation. This includes a radioactive gas called Radon 220 which is a decay product of uranium. When this is inhaled, it increases the risk of lung cancer.

In the early 20<sup>th</sup> century, a number of people, primarily women, were employed to paint numbers on watch dials with radium enriched paint so the numbers would glow in the dark. The women would lick the brushes so that the numbers would be precise. They believed what they were doing was safe. However, many developed painful bone cancers called osteosarcomas, or leukemia from this radioactive material. This same Radium is also in mines and can be ingested via the dust with the same resulting cancers these watch makers faced.

The mining of uranium ore results in a destabilized radioactive environment. When mines are abandoned the water that has been pumped out often re-enters the mine contaminating the ground water. Milling - extracting uranium from ore - results in further risk of exposure and production of radioactive waste products. These toxic waste products, or tailings, require safe isolation from the environment. In the post World War II era, in Canada, this sludge was often deliberately dumped directly into our lakes, contaminating the groundwater. Accidental dumping also occurs as in the 1984 spill of 100 million litres of contaminated liquid at Key Lake, Saskatchewan. Currently, industry is experimenting with ponds and hoping the experiments don't fail. These tailing ponds will be radioactive essentially forever. We cannot let our hunger for power be used to excuse leaving a toxic mess for our children to inherit.

The uranium mining industry has still not effectively addressed the issue of contamination that resulted from mines that have been abandoned. For example, contamination remains a problem in the rural community of Deline in the Dene Nation of the North West Territories, and El Dorado at Uranium City in Saskatchewan.

Developing more uranium mining when the unconscionable contamination of the past has not been addressed is a travesty to social justice.

An extensive amount of uranium mining and milling in Canada is done on Aboriginal land, usually without consultation. This a health issue, a human rights issue and a native rights issue. The nuclear reactors themselves are not innocuous. They are a risk factor for increasing background radiation. Workers are exposed to low dose radiation. The arbitrary figure that has been chosen by many nuclear power facilities as acceptable for worker exposure in one year is equivalent to 400 chest x-rays.

The issue has been studied extensively in Europe. A 15 country collaborative study among workers in the nuclear industry demonstrated that this type of low-dose radiation exposure resulted in a risk of developing cancer that was equal or greater than the risk of the survivors of the atomic bomb in Japan.

Furthermore living near a Nuclear Reactor has been shown irrefutably to increase the risk for children of developing leukemia<sup>2</sup>. This has been studied extensively in Germany. The closer children live to a Nuclear Reactor the more likely they are to develop leukemia before the age of five. There are other toxins in the environment which can cause Leukemia such as pesticide exposure. Observing clusters of children who have suffered from other toxic exposures does not negate the dangerous effects of living near a nuclear reactor. In fact, the findings of an increase incidence of childhood leukemia are expected. Their parents are more likely to work in the reactor. The chronic radiation levels that they are exposed to can affect their sensitive germocytes resulting in genetic damage. In addition, water containing tritium is released by nuclear power plants into the environment both by planned events and accidentally. On March 16 of this year 73,000 litres of demineralised water was released into Lake Ontario when a pump seal failed at the Pickering Nuclear Power Plant. Tritium is dangerous. It binds with oxygen in water. For biological organisms, including humans, this radioactive water is indistinguishable from normal water and it becomes incorporated in every cell of the body. Tritium has a half- life of 12 years meaning it can do damage over a long period of time. Moreover industry data shows spikes in the local measurements of radioactivity when reactors are opened for refuelling.

Nuclear Power Generating Plants also produce radioactive waste that must be stored and guarded essentially forever. Again, the need and greed for power does not justify leaving a radioactive inheritance for generations to come.

While my focus today has been on cancer we must not forget that accumulative exposure to radiation also causes other illnesses. It contributes to genetic damage, birth defects, immune system dysfunction, diabetes and heart disease.

This issue cannot be addressed effectively without mentioning the possibility for human error. Accidents happen! With all of the marvellous fail safes and back up plans planes still crash, the Space Shuttle Challenger disintegrated, and patients die from human errors. While accidental leaks of radioactive water are relatively common, serious accidents also happen. There was a significant meltdown of a reactor in Rolphton Ontario in December, 1952. We have also experienced very serious accidents at Three Mile Island in Pennsylvania in 1979, Chernobyl in 1986, and Tokaimura Japan in 1999. And now our hearts go out to the people of Japan. The accident in Fukashima that began on March 11 is devastating. It humbles us to realize that nature can be relentless and that man-made fail safes can and do fail. People have already died because of this nuclear disaster. Many more will become ill and die. The global burden of radioactivity has increased forever.

While I conclude that the serious risks to Public Health and human life from nuclear technology is indisputable, if doubt did exist we would still be ethically required to follow the "Precautionary Principle". The **precautionary principle** states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is *not* harmful falls on those taking the action. You have seen that there are many scientists that conclude that nuclear power is unacceptably dangerous. We must implement the precautionary principle. Nuclear power must be phased out. This is the same approach that lead to banning cosmetic pesticides in Ontario and many other provinces.

Beyond error, particularly since 9-11, we have lived with the fear of a terrorist attack. This raises a seldom mentioned point - the astronomical costs of security. It doesn't take a rocket scientist, or a nuclear physicist, to do the math.

Guarding nuclear reactors and nuclear waste costs society enormously more than protecting Wind Towers and Solar Farms.

The risk of a terrorist attack is low; nevertheless, over 100 million dollars is spent annually in this province on special weapons and tactical forces to protect Nuclear Power Plants and the valuable nuclear bomb making materials contained within.

The NPP at Darlington is protected by the Nuclear Division of the Durham Regional Police Force. This plant, as Pickering was in January 2010, is to be transferred to the Ontario Power Generation Nuclear Security Branch.

The Bruce Nuclear Generating Station is protected by a privately owned and operated highly trained tactical force larger than the police force of many large Ontario cities. These tactical team salaries, the extensively high level of training, and the expensive equipment, results in costs that are exorbitant.

The extreme cost of military presence cannot be justified when no other form of power generation requires even a fraction of this defence cost. While the probability of a terrorist attack on a nuclear reactor may be low today, the future is unknown. Public funds are better allocated to health care, education and employing people to fix and repair existing environmental problems. Every dollar wasted on expanding and protecting nuclear technology is a dollar diverted from the development of true green energy.

In Conclusion, nuclear power is costly. It is costly to human health, the environment and the taxpayer. Nuclear power is a cancer on society. It increases the global burden of radioactivity and human exposure to radiation. Radiation causes cancer. Developing nuclear power will contribute to untimely deaths. Now is the time to turn our attention to prevention.

Nuclear power should be phased out, not expanded. Thank you.

Respectfully submitted,

Sharon Baker MD,MCFP

#### **References:**

This reference list is incomplete; a complete list can be submitted upon request.

- 1) *BEIR VII (U.S. Academy of Science report on the Biological Effects of Ionizing Radiation) unequivocally states that "no low level of radiation exposure is safe".*
- 2) *Kaatsch P., Kaletsch U., Meinert R., Michaelis J. An Extended Study on Childhood Malignancies in the Vicinity of German Nuclear Power Plants. Cancer Causes Control 1998; 9: 529-33*
- Hofmann W., Terschueren C., Richardson D. B., Childhood leukemia in the Vicinity of the Geesthacht Nuclear Establishments near Hamburg, Germany. Environmental Health Perspectives 2007; 115: 947-52*
- Spix C., Schmiedel S., Kaatsch P., Schulze-Rath R., Blettner M. Case-Control Study on Childhood Cancer in the Vicinity of Nuclear Power Plants in Germany 1980-2003. Eur. Journal of Cancer 2008; 44:275-284*
- Kaatsch P., Spix C., Schulze-Rath R., Schmiedel S., Blettner M. Leukemia in Young Children Living in the*

*Vicinity of German Nuclear Power Plants. Int. J. Cancer 2008; 1220: 721-26*

American Cancer Society. Radiation and Cancer. 2010. <http://www.cancer.org/Cancer/CancerCauses/OtherCarcinogens/MedicalTreatments/radiation-exposure-and-cancer>.

"Annual General Assembly Resolution No. 17/2008." Assembly of First Nations. 17 July 2008. Web. 21 Feb 2011. <<http://64.26.129.156/article.asp?id=4280>>

Caldicott, Helen. *Nuclear Power is Not the Answer*. New York: The New Press, 2006. Print.

Diehl, Peter. *Uranium Mining and Milling Wastes: An Introduction*. 2010. <http://www.wise-uranium.org/indexu.html>.

Environmental Protection Agency. *Understanding Radiation: Health Effects*. 2009. [www.epa.gov/radiation/understand/health\\_effects.html](http://www.epa.gov/radiation/understand/health_effects.html).

Goncharova, Roza. "New insight into cancer risks." Institute of Genetics and Cytology: Belarus, IPPNW World Congress. 2010. Web. [http://www.ippnw2010.org/fileadmin/user\\_upload/Plenary\\_presentations/Plen4\\_Slides\\_Goncharova\\_Basel\\_291008.pdf](http://www.ippnw2010.org/fileadmin/user_upload/Plenary_presentations/Plen4_Slides_Goncharova_Basel_291008.pdf)>.

Harding, Jim. *Canada's Deadly Secret: Saskatchewan Uranium and the Global Nuclear System*. Winnipeg, ON: Fernwood Publishing Company, 2007. Print.

London Police. "2011 Budget." Web. [police.london.ca/Headlines/Images/2011LPSBPublic.pdf](http://police.london.ca/Headlines/Images/2011LPSBPublic.pdf).

McKay, Paul. *Atomic Accomplice: How Canada deals in deadly secret*. 2009. Print.

National Research Council of the National Academies. *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2*. 2006. [www.nap.edu/openbook.php?record\\_id=11340](http://www.nap.edu/openbook.php?record_id=11340).

"OPG's Commitment to Security - Safe Station, Safe Community." Ontario Power Generation. Darlington Nuclear Neighbourhood Newsletter, Dec 2010. Web. <<http://www.opg.com/community/activities/newsletters/DN%202010-12.pdf>>

Tufts, Heather. 2010. "'Canada, O Canada!' Uranium Mining and Indigenous Communities: The Impacts of Uranium Mining on Indigenous Communities." *Native Unity Digest*. "Radiation Exposure Information and Reporting System (REIRS) for Radiation Workers." U.S. Nuclear Regulatory Commission. 12 Feb 2008. Web. <<http://www.reirs.com>>.

Zielinski, et al. "Low dose ionizing radiation exposure and cardiovascular disease mortality." Low dose ionizing radiation exposure and cardiovascular disease mortality. Study based on Canadian national dose registry (NDR) of radiation workers. Ottawa, ON, 2010. [27-33] Web. <[http://www.ippnw2010.org/fileadmin/user\\_upload/Plenary\\_presentations/Plen4\\_behar\\_slides\\_CHRONIC%20LOW%20DOSE%20RADIATION.pdf](http://www.ippnw2010.org/fileadmin/user_upload/Plenary_presentations/Plen4_behar_slides_CHRONIC%20LOW%20DOSE%20RADIATION.pdf)>.