Climate Change and Nuclear Power

By Bill Adamson

Following is the viewpoint of the writer, a retired professor of theology at the University of Saskatchewan.

More and more citizens are becoming concerned about increasing incidents of climate change due to global warming. The emissions of carbon dioxide CO_2 from fossil fuels is warming the atmosphere. Now it turns out that the particulates of sulphur dioxide and nitrogen oxides are also harmful to human lungs.

The thousands and thousands of cars, trucks, transports, tractors, trains and planes used across Canada are largely responsible for the increased emissions and resulting consequences. However, the citizens of Canada are reluctant to change their driving and traveling modes.

Many people are not aware that an extensive amount of radium is mixed in with uranium ore. Hence, with 20% grade uranium ore there are approximately 3000 becquerels (disintegrations per second) of radioactivity per gram of ore. That is a lot of radiation being released! Recent mines use robotic engineering to mine the ore, and the ore is

moved through steel pipes to reduce the hazard to miners. However, some alpha radiation escapes in the mine, and then in the mill the ore is ground into a fine powder for leaching, so that most of the radiation is released from the rock.

The radium disintegrates into radon, and into the radon daughters of Polonium 218, Polonium 214, and Polonium 210, which then ultimately changes to lead, and such radioactivity has a half-life of 1600 years. The ore is processed to yield the relatively benign yellowcake (uranium oxide or U3O8), so that much of the radioactivity goes into the tailings. The tailings from 7 mines are going into the JEB pit, the size of 4 football fields and 30 stories deep. This is only 150 metres from the Fox Creek water system. Currently, water pumps circle the pit to obviate ground water flow. Will our politicians and companies be able to keep those pumps running for 1000 years?

At present, huge fans are used in the mine shafts and mills to exhaust the radon and alpha radiation to make it safer for the workers. So, the radiation is blown downwind across the vegetation, creeks and lakes. Alpha radiation is so powerful that it affects the somatic and genetic cells of living things. There are new tools of molecular biology to assess the effects of radiation on the plants and creatures of the ecosystem. However, the regulatory Agencies and the Mining companies decline to spend the money for research to find out what the effects really are.

We know that in the Beaverlodge area following 1951, some 6 million tonnes of radioactive tailings were dumped into Fookes Lake and Greer Lake. Now it has been found that some 90% of the Chubb fish in Greer and Fookes lakes, and 77% in Marie lake have cataracts and edema. (See Consultants' Reports--Ruggles & Rowley 1978, TAEM 1996, Golder 2002, Senes 2003) Water experts from Senes Consultants estimate that it will take another 150 years before the radium content in the water will be restored to normal levels, and 250 years before normal levels of uranium in the water are reached. (p. ES-2)

We also know that a carload of radioactive sand and tailings are blowing into Lake Athabasca every day, and no one seems to know the effects on the water creatures and the fish. (CBC documentary with David Common, Nov. 4, 2002).

Another Study of the Cluff Lake mine area has found increased levels of radium and uranium in Snake Lake and Island Lake, which has done damage to the zooplankton and benthic communities, plus increased levels of arsenic and metals in the waters of Cluff Lake. (Comprehensive Study Report of the Cluff Lake Decommissioning Project, pp. 6-46, 6-45).

Some proponents of nuclear power state that nuclear reactors give off few carbon emissions. However, they give off other pollutants as well. Nuclear reactor plants give off radioactive tritium (3H) into the atmosphere, which has a half-life of 12 years. Increased levels of tritium have been found in the waters of the Great Lakes which are near major reactors in Ontario.

Moreover, the enrichment plants which prepare the fuel pellets for reactors us a lot of electricity from coal-fired generators, and also emit large amount of chlorofluorocarbon gas (CFC's) which help destroy the ozone layer, and are 10,000 to 20,000 more potent than carbon dioxide in contributing to global warming. No panacea here! Plus, there are a great many carbon emissions from the trucks, bulldozers, and motors that work for 10-12 years constructing the nuclear reactor plants.

We have another major problem with the high level radioactive waste produced by nuclear reactors, for which scientists have not yet found a satisfactory remedy in 60 years. This waste is highly radioactive and contains much plutonium which is deadly dangerous for thousands of years. In Canada we now have 1.9 million fuel bundles or 40,000 tonnes of it in storage.

Germany has passed legislation to down-phase and gradually close down its nuclear reactors. It tried storing high level waste in underground salt mines

at Moresleben. Now huge salt blocks are falling from the shaft's ceiling. To prevent total collapse, authorities are proposing to fill the shaft with a special concrete, 4 million cubic feet, taking 15 years to complete, at a cost of $3 billion CDN.

Atomic Energy of Canada Ltd. (AECL) took 15 years developing a plan for waste disposal deep in granite rock (1994). However, the Whiteshell shaft and laboratory at Pinawa, Manitoba was embarrassed by a continuous inflow of water. After surveying all the water-plagued deep rock gold mines across Canada, the geologists P. Fritz and S.K. Frappe, found that there was salt water, under high pressure, underneath the Canadian Shield rock, pressing in through any fissures or cracks. It was not a safe, non-reactive storage place for radioactive waste!

After 8 years of study and public hearings, the Seaborn Commission found the AECL plan unsatisfactory. Now the Nuclear Waste Management Organization has proposed a plan which essentially spreads the AECL plan into 3 stages, taking nearly 60 years to implement. Many of us will be dead by then, and our children and grandchildren will be left to cope with the dangers, if that proposal is adopted.

We have 20 "red hot" swimming pools of high level waste connected with our reactors in Canada, and 80 in the USA south of the border, plus the missile silos, enrichment plants, and ammunition factoriesÑso the statistical probability of a radioactive accident steadily increases on our continent.

For many years, Regulatory Agencies and Mining Companies thought that if radiation levels were kept low, the danger to mine workers would be lessened. However, alpha radiation is very intense and powerful. A heavy dose will kill cells and the body will try to replace them. Low levels of radiation will damage lung cells, but the body is not able to repair them thoroughly. Some 10 or 15 years later those damaged parts may become cancerous. Just this last June 2005. the BEIR VII (Biological

Effects of Ionizing Radiation Committee), under the National Academy of Science in the USA, announced that there was no safe level of radiation exposure.

Hence, Canadian citizens are faced with the onerous and complex task of diminishing carbon emissions into the atmosphere so as to slow the present climate change. They also need to take care that they are not lured into energy sources that increase the radiation hazards around us that will last for thousands of years. Is it not strange that the scientists, promoters, and business editors, who propose benefits and profits from increased uranium and nuclear usage, rarely mention the hazards of radiation? Dr. Helen Caldicott, a medical doctor in Australia, was interviewed by the journalist, Gregory Dicum. In that interview she stated: "It takes a single mutation in a single gene in a single cell to kill you. (The most common plutonium isotope) has a half-life of 24,400 years. Every male in the Northern Hemisphere has a small load of plutonium in his gonads. What this means to future generations God only knows--and we are not the only species with testicles. What we're doing is degrading evolution, and not many people understand that." (Grist Magazine, Environmental News and Commentary, 2005/05/03).

For additional background information see the website: ccnr@org