



Conseil Cree de la santé et des services sociaux de la Baie James
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Cree Board of Health and Social Services of James Bay

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PREMNAT10

Les enjeux de la filière uranifère au Québec

6211-08-012

**Inquiry into the impacts of uranium development in Quebec
Bureau des audiences publiques sur l'environnement and
James Bay Advisory Committee on the Environment**

**Statement and questions from the Director of Public Health
Dr. Robert Carlin and Mr. Paul Linton, Assistant Director**

July 11, 2014



According to a Cree Nation Government scientific advisor¹:

Uranium is widespread in the environment, and occurs in concentrations of a few parts per million. It is about ten times as abundant as silver and mercury combined. We take in one or two micrograms a day in our diet, and store in our bodies around a tenth of a milligram.

It is the U235 isotope which after various transformations, is used in nuclear power plants, and to make medical isotopes (and weapons). Uranium 235 is naturally fissionable (when bombarded with neutrons). The energy yield from the fission is the basis of the nuclear power industry world wide (with about 500 nuclear reactors).

...It is useful to keep in mind that we live in a naturally radio-active environment and that we are exposed to varying levels of alpha particles, depending on where we live and what we are doing.

One of the products of the radio-active decay of uranium is radon gas. One of the precautions which are taken in exploration work is to allow time for gas exchange with the atmosphere and so limit worker exposure to radon.... It is important for this reason to control the inhalation of dust by exploration teams. In general, it is government policy to take precautions so that the life-time exposure of workers to alpha radiation is not significantly increased by work in uranium exploration or mining. Exposure is closely monitored.

Uranium mining usually includes milling (a first stage of concentration of the ore) at the site of the mine. Milling involves mixing ore and water with various chemicals. The product of milling is called yellowcake, which is put into barrels and transported for further processing².

After mining and milling, two separate facilities in Ontario carry out 2 further steps - refinement and conversion. Conversion produces fuel bundles for the types of nuclear power reactors found in Canada – Candu heavy water reactors.

The kind of nuclear power reactor found in some other parts of the world – light water reactors – require further enrichment of the uranium ore, which is not currently done in Canada. Light water reactors use low-enriched uranium (LEU), which contains 3 to 5% U235 (compared to 0.71% in natural uranium). For atomic bombs, and to make medical isotopes, uranium has to be enriched to over 90% (called highly-enriched uranium (HEU) or weapons-grade uranium).

¹ Penn, Alan. Uranium Exploration in Eeyou Istchee. Sept 12, 2008. Cree Regional Authority, Internal memo, 6 pages.

² This information is from a uranium company website : Cameco (a major uranium company in Canada) site: http://www.cameco.com/uranium_101/



Our questions

Re Health of the environment

Many people have raised questions about the management of waste rock and tailings from uranium mines. For how long do these sites have to be monitored and who is responsible? This is a quote from the Canadian Family Physician³ journal:

Contamination from uranium mining activity will persist for generations. The dust that blows away from the sites and the copious amounts of water used for dust control and uranium extraction all contain long living radioisotopes that are being disseminated into the environment. In the tailings, thorium 230 decays to produce radon gas. With a half-life of 76,000 years, it will produce radon for millennia. In the atmosphere, radon decays into the radioactive solids polonium, bismuth, and lead, which enter water, crops, trees, soil, and animals, including humans. In intact rock formations, radon gas is largely trapped within the rock during its decay process. In finely ground tailings, it has multiple access routes to the surface and the atmosphere. Planting over the tailings will result in the uptake of radioactive substances by vegetation which, in the usual cycle of growth and decay, will be deposited on the surface.

The effects of all these sources of contamination on human health will be subtle and widespread, and therefore difficult to detect both clinically and epidemiologically. Incidences of cancers, fertility problems, and inheritable defects can be expected to rise with the increasing background radiation... We ask whether our increasing burden of cancer, intellectual disabilities, and metabolic diseases has any relationship with an increasingly radioactive environment.

Various websites being consulted by members of the community make worrisome statements such as:

During the few decades that uranium has been mined, many ruptures of tailing dams have occurred. Such tailing spills, cause radium and other contaminants to get into the environment. Radium works its way up into the food chain in increasing concentrations. It is common for radium levels to be 500 to 1,000 times higher in algae than in the surrounding water. Saskatchewan studies show that downstream from uranium tailing ponds radium levels were 1,500 times normal in the flesh of northern pike and 11,400 higher in its bones. The Serpent River near Elliott Lake, which used to be a favorite place for sports fishing, has been so polluted that fish can not be found up to 55 miles downstream from the tailing ponds.

<http://www.boundaryalliance.org/mole.pdf>

"In fact, up to 85 percent of the radiological elements contained in the original uranium ore end up in the tailings." http://www.pembina.org/reports/ClearingAir_UraniumMining.pdf

³ Dewar D, Harvey L, Vakil C. Uranium mining and health. Canadian Family Physician 2013;59:469-471,



We don't question the dangers of nuclear weapons, or of uranium enrichment and nuclear power generation where accidents are possible and have occurred in the past. These dangers are clearly present. However, as persons with knowledge and experience in the area of human health, we need further information from experts in environmental sciences, since contaminants in air, water, soil, plants and wildlife can impact the health of the population of Eeyou Istchee. Specifically, our questions are:

- A. Dust and air pollution –
 - a. Is radioactivity in dust from tailings and mining waste a danger to workers and people living near a mine, or to people living further away? How far can it be disseminated in the environment and then within the food chain?
 - b. Is there evidence for increasing background radiation – are humans exposed to more radiation now than in the past? Are we, in fact, living in an increasingly radio-active environment, and if so, is have estimates been made of the health impacts of these increases?

- B. Water.
 - a. Presently, municipalities operating drinking water systems must test for uranium once a year. If the level is above the norm of 20 micrograms/L, special filters must be installed or the source of the water needs to be changed. The threshold for health effects of uranium in water is lower for its chemical toxicity than for its radio-activity because natural uranium is only weakly radio-active. But there are no requirements to test water for radio-activity or for radio-isotopes. There is no commercial lab that can do this in Quebec. Could radioactivity in drinking water from radio-isotopes other than uranium be a danger to human health?
 - b. Regarding effluents from uranium mining sites, should they be tested for radio-activity in addition to chemicals? Presently no private laboratory in Quebec offers this service.
 - c. To what extent are chemicals or radio-activity in mining effluents found in fish and other wildlife? Is the citation (above) regarding rivers near Elliot Lake (Ontario) and northern Saskatchewan correct?

- C. Wildlife health – other than mercury levels in fish, very little research is being done in Quebec to our knowledge to monitor contaminants in wildlife (fish, birds, mammals). Research that has involved the participation of the Cree Health Board, shows that levels of contaminants in human beings who eat wildlife are not alarming. It is also clear that traditional food (local fish, birds, mammals, and berries) is an excellent source of many nutrients important for human health, and often healthier than many store-bought

