Mémoire présenté dans le cadre de de la commission d'enquête du Bureau d'audiences publiques sur l'environnement (BAPE) portant sur les enjeux de la filière uranifère au Québec

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(version anglais)

1-Introduction

The opportunity to present this submission to BAPE is greatly appreciated. I hope to be able to provide a perspective on the potential development of any uranium (U) resources in Quebec that provides some assurance that such a development can be performed without significant hazard for workers, the public and for the natural environment. I wish to focus on addressing one particular concern that arises in the consideration of any uranium development, whether related to exploration, active mining, or closing out a mine – radioactivity.

2- D. Grant Feasby – Background and Experience

I have had the interesting experience to have been a plant manager at a uranium mine in Saskatchewan, more than 30 years ago. This was a time when radiation and waste management practices were being significantly improved in the uranium mining industry in Canada and the USA. I was able to participate in these improvements. Following the industry experience I learned much more about the technical, environmental and social aspects related to uranium mining during the following activities:

- Manager, Canadian National Uranium Tailings Program , 1982-85
- Expert advisor, uranium mine waste in Portugal, Germany and Eastern Europe -1986-92
- Manager, Program on Acid Generating (uranium mine) Wastes – 1986-89
- Consultant to corporations, governments and local peoples – re. Potential U mine development in BC. Alberta, Nunavut, Quebec and Labrador
- Expert advisor to Inuit of Labrador (Nunatsiavut) in decision to overturn a moratorium on U mine development

This professional experience and many related experiences have provided the opportunity to understand the technical aspects of the radioactivity associated with uranium mining as well as the genesis of concerns raised by individuals in the public and by organisations that champion anti-uranium positions.

3-Uranium Mining in Canada – a 70-year Perspective

Uranium mining originally started at the Port Radium mine on the eastern shore of Great Bear Lake in the 30's. The initial mine's purpose was to recover radium, a radioactive "daughter" of uranium. The uranium was initially a low value waste product, but became valuable for military uses in the 40's. The demand for U for this purpose expanded in the 50's and 60's and many uranium mines were opened in North America and in the former Soviet Union.

Early worker safety, radiation and waste management practices were rudimentary – workers toiled in risky conditions and mine wastes were dispersed in an uncontrolled manner. These aspects were found in all types of mines in Canada at that time.

Most of the historical uranium mines in Canada were exploiting what can be described as low grade deposits - containing less that 0.1 %U. Records confirm that the working environment in the early underground uranium mines did not practice adequate ventilation to remove dust and radon, and smoking was widespread - a practice we now know to significantly multiply lung disease risk to workers.

Today, there are 3 uranium mines operating in Saskatchewan and the uranium content in two of the ores is 200 times higher than the historical Elliot Lake ON uranium ores, and 50 times higher than the resource grade of the recently proposed Strateco advanced exploration.

Given the reality that uranium-sourced radioactivity in a rock is directly proportional to uranium content, a question may be raised on how or whether such high grade uranium mines can be operated safely. We will discuss this shortly.

4- Radioactivity and Uranium Resource Development

Intuitively it may be reasonable to expect that a person may react with some concern, even fear, of exposure to radioactivity. We all recognise that uranium is radioactive and that other there are associated radioactive elements that could cause harm – e.g. radium, radon and polonium. Also many of us also might consider that any increase in exposure to radiation might represent a health risk.

What may not be well understood is that radioactivity is all around us, everywhere, all the time, and an individual's radiation exposure depends on where we live, our life styles and the medical procedures (e.g. x-ray) that we have encountered.

Scientists, supported by the best experts in the world, have developed procedures for measuring and evaluating radiation exposure - radiation dose to a person is measured in units called millisieverts, (mSv) or 1/1000 th of a Sievert. The following table gives some example radiation exposures that a person might experience:

Radiation Doses - mSv

	Per exposure	Annual
"Background", Canada, world		1.8, 2.4
Calgary, Winnipeg		2.3, 4.0
High natural background locations (Brazil, India, Iran)		20 - 50+
Chest x-ray	0.02-0.05	
CT scan	2-11	
International air crew		1 to 5
Miners, high grade Canadian uranium mines, average (2001-2005)		1 to 5
Dose below which no health effects measureable	100	

Interestingly, the annual increase in radiation exposure above "background" that a Canadian miner receives in a high grade uranium mine Saskatchewan is similar to that received by air crew travelling the polar route, and much less than that received in a single medical CT scan in any local hospital. It can be concluded the Canadian miners are not exposed to significantly elevated levels of radiation.

5- How Uranium Resource Development Can Be Safely Performed in Quebec

Base on current experience in Saskatchewan, verified by independent regulators and experts, a high grade uranium mine, with associated processing plants and waste management facilities can be operated safely and with a high degree of acceptability by the public. The same principles can be reasonably applied to any potential uranium development in Quebec – the following are clear reasons:

- The same National Agency (Canadian Nuclear Safety Commission) and equivalent Quebec (to Saskatchewan)l agencies would provide thorough and detailed regulation and assurance of safety as well as absence of public legacies on closure,
- Proven technology is available and is being used to ensure the protection of air, water, soil and flora and fauna,

- Known Quebec uranium resources are generally low grade uranium resources, permitting radiation exposure to the workers to be very low and any increase exposure to the public to be below detectable levels during operations and on closure, and
- Potential contaminants present in the high grade Saskatchewan uranium resources (e.g. heavy metals, arsenic) have not been identified in the Quebec resources.

6- Design for Acceptability

No mineral resource can be developed without a reasonable level of social acceptability. Concerns, often based on mistaken perceptions, about the spread of radioactivity from uranium resources can impede exploration and development.

Our experience, supported by the apparently high degree of acceptance of uranium mining in Saskatchewan is that acceptance originates from understanding of the basic physics and principles of radiation and its management, actual mine experience and independent verification.

Concerns about radioactivity in potential uranium mine development are not the only potential aspect social acceptability – other aspects may include land rights and ownership and nuclear non-proliferation. However acceptability can to a large extent be enhanced by:

1. A good understanding of natural radioactivity by all citizens,
2. Application of best practices and technologies to manage radiation exposure to levels as low as reasonably possible, and
3. Independent confirmation of personal and environmental protection.