Submission to the Canadian Nuclear Safety Commission

From the Canadian Coalition for Nuclear Responsibility

Regarding the request for a licence renewal from SSI

(submitted on April 2, 2012)

The Canadian Coalition for Nuclear Responsibility (CCNR) was formed in the summer of 1975. One of our mandates is to attempt to educate the public on the hazards associated with nuclear technology and radioactive materials, since neither the industry nor the various levels of government in Canada have assumed that responsibility in any coherent or consistent fashion. Indeed, the principal message from both industry and government has been that nuclear technology in Canada is safe and that chronic exposure to radioactive materials is harmless, despite abundant evidence to the contrary. This message has been regularly echoed by Canada's nuclear regulatory agency – originally the Atomic Energy Control Board (AECB) and now the Canadian Nuclear Safety Commission (CNSC).

Paradoxically, nuclear technology and radioactive materials are considered sufficiently dangerous to require the existence of a unique federal agency to regulate and licence facilities and activities related to nuclear technology and radioactive materials. The Nuclear Safety and Control Act (NSCA) requires the regulator (CNSC) to protect the health and safety of people and the environment. It also requires the regulator (CNSC) "to disseminate objective scientific, technical and regulatory information to the public concerning . . . the effects, on the environment and on the health and safety of persons," related to such facilities and materials [article 9(b), NSCA] .

Members of the public can be forgiven for thinking, therefore, that the CNSC is supposed to be on their side in protecting them from unwanted and unnecessary exposures to radioactive materials, and informing them – in clear, easy-to-understand language – of the various known and suspected medical effects that may sometimes result from such exposures.

In the case of SSI, we have a private, profit-making facility that is in the business of making sealed sources filled with radioactive tritium gas for a variety of commercial uses, some of which are not divulged to the public. All of them (presumably) make use of the visible light given off by these radioactive sources.

The tritium is obtained from the Tritium Removal Facility (TRF) at Darlington, a facility owned and operated by Ontario Power Generation (OPG). The purpose of this unique facility is to remove much of the tritium contamination from the heavy water inventory used in Ontario's nuclear power reactors.

Although heavy water itself is not radioactive, chronic bombardment by neutrons in the core area of the reactor transmutes many of the non-radioactive heavy hydrogen atoms, called deuterium atoms, into even heavier radioactive hydrogen atoms, called tritium atoms. Year by year, the tritium levels in the heavy water (used as both moderator and coolant in all existing CANDU

reactors) increases, getting higher and higher. Inevitably some of this tritium is released into the reactor building and into the environment, primarily in the form of radioactive water molecules. This radioactive water is called "tritiated water".

Tritiated water is chemically identical to ordinary water, and as such it cannot be filtered out or otherwise removed from drinking water by any available domestic or municipal water treatment. Like ordinary water, tritiated water enters freely into all living things. The radioactive hydrogen atoms (i.e. tritium atoms) are readily incorporated into all types of organic molecules, including DNA.

The amount of radioactivity released into the atmosphere and into the receiving water bodies from CANDU reactors is overwhelmingly made up of tritium. The amount of internal radioactive contamination in the bodies of atomic workers who work in CANDU reactors is also overwhelmingly made up of tritium.

According to OPG, the occupational and environmental hazards of tritium provided the motivation for building the TRF:

> "To help keep workers safe, and to minimize the amount of tritium going into the environment, a tritium removal facility was opened at the Darlington site in 1990. This plant extracts tritium from heavy water used in OPG's nuclear reactors. The tritium is safely stored in stainless steel containers within a concrete vault."
> [http://www.opg.com/power/nuclear/darlington/]

And again, according to the Health Physics Society,

> "The purpose of the Tritium Removal Facility (TRF), located at the Darlington Nuclear Generating Station, is to reduce the tritium concentration in the heavy water moderator. A low concentration of tritium is desirable, as it would significantly reduce the tritium occupational exposures and any environmental emissions during the life of the station."
> [http://hps.org/meetings/midyear/abstract392.html]

It is therefore clear that SSI's business consists in marketing a radioactive waste byproduct from CANDU reactors – the unwanted tritium, which is extracted as a radioactive contaminant from the heavy water in Ontario's nuclear power plants – a material which is acknowledged to be both a significant occupational hazard and a significant environmental pollutant in the context of reactor operations.

Instead of safely storing the radioactive pollutant in "stainless steel containers within a concrete vault", as OPG maintains, large amounts of tritium are shipped to Peterborough where SSI tries to turn a profit by fabricating glow-in-the-dark devices utilizing the waste byproduct in the form of radioactive hydrogen gas.

Experience has shown that SSI cannot carry out this activity without spilling large amounts of tritium into the environment – so much so that the atmospheric tritium emissions from SSI are comparable to the atmospheric tritium emissions from any single CANDU reactor in Canada.

Elevated levels of tritium have been measured in nearby fruit and in drinking water at the airport. Tritium from the SSI facility has not only contaminated the local air and ground water, but has also been found at extraordinarily high concentrations in the soil around the plant. Unless this soil is removed and stored somewhere else as radioactive waste, it will remain radioactively contaminated with man-made tritium for more than a century.

In our view, if the utilization of this radioactive waste byproduct cannot be carried out cleanly and safely, without polluting the environment with radioactive tritium, then the facility should not be licenced at all. The role of the CNSC is not to ensure a private company's profits, but to protect the health and safety of people and the environment. In effect, any licence to operate under existing conditions is little more than a licence to pollute.

And for whose benefit? Certainly not the people passing through the airport, or dropping off traveling friends and relatives, or picking up visitors!

The Canadian Coalition for Nuclear Responsibility is opposed to the granting of a 10-year licence to Shield Source Incorporated (SSI) as requested by the licensee. CCNR is also opposed to the granting of a 5-year licence to SSI as recommended by CNSC staff. Indeed, CCNR is opposed to *any* relicencing of the SSI facility as long as it is, in effect, a licence to pollute.

It is clear that SSI does not possess the technology to control this dangerous radioactive material without spilling large amounts of it regularly into the environment. To that extent, SSI is actually undoing the work that the TRF was designed to do.

CCNR learned long ago that the cardinal rule with regard to radiation protection is that all unnecessary exposures should be prevented unless they can be justified on the grounds of some countervailing benefit to those who are so exposed. This principle is clearly enunciated in seminal documents from the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission for Radiological Protection (ICRP).

There is no good reason why the citizens living in Peterborough or passing through its airport should be exposed to this unnecessary radioactive hazard. In the case of a CANDU reactor, we have a government-owned facility which is at least providing a public service in the form of electricity. In the case of SSI, there is no public benefit whatsoever being provided to the people who are exposed.

CCNR would be in favour of a licence extension for three years or less, but only on condition that SSI uses that period of time to relocate to a site which is far removed from public residences and/or public venues such as the Peterborough airport. Indeed, until technology advances to the point where these operations can be carried out in an emission-free manner, such facilities should either not be allowed at all, or should be confined to nuclear reservations such as the Bruce Nuclear Complex, where there is a well-defined exclusion zone.