



# **Radioactive Steam Generators**



## **15 facts that citizens need to know**

- 1. Radioactive wastes are piling up at nuclear power plants around the world.**

Highly radioactive spent fuel wastes, estimated to total 340,000 tonnes worldwide as of 2010, are growing by 12,000 tonnes each year. However, many other types of radioactive waste are also accumulating. These include *radioactive steam generators*, enormous cylindrical hulks of metal, each the size of an 18-wheeled tractor-trailer, weighing from 100 to 800 tonnes. Each one contains thousands of contaminated tubes having a combined length of 1000 km or more.
- 2. Steam generators (SGs) are an integral part of CANDUs and many other reactors.**

Highly radioactive primary coolant water passes directly from the nuclear fuel rods to the inner tubes of the SGs. As they age, these tubes become increasingly radioactive, corroded and brittle. Eventually the SG needs to be replaced. According to the US Department of Energy, "In order to properly store decommissioned steam generators, mausoleums or storage vaults are designed to minimize the radiation release and exposure to plant personnel and the public."
- 3. Bruce Power (BP) has 16 radioactive SGs in storage on-site near Lake Huron.**

Ontario's Bruce Power (BP) runs the largest nuclear generating station in North America, and is currently refurbishing 2 of the 8 reactors there. This requires replacing the 16 steam generators. During a 2006 environmental assessment of the refurbishment project, the SGs that were removed were classified as radioactive waste. For that reason it was stated that the SGs could not be recycled and that they would be managed in perpetuity on site in a monitored waste management facility owned and operated by OPG, along with additional radioactive steam generators from the planned refurbishment of the other reactors run by BP.
- 4. Used SGs are contaminated with plutonium and other radioactive materials.**

Ninety percent of the radioactive mass in each used SG is made up of five different varieties of plutonium. The quantity of plutonium-239 alone in the 16 SGs would be enough, in principle, to give 52 million atomic workers their maximum permissible body burden of radioactive contamination. Plutonium-239 is a highly toxic radioactive element that remains hazardous for tens of thousands of years. The SGs also contain a host of other long-lived radioactive isotopes.
- 5. In 2010 Bruce Power asked for a licence to ship 16 SGs to Sweden for "recycling".**

Disregarding earlier commitments made in 2006, BP struck a deal in 2009 with a Swedish company, Studsvik, to disassemble each SG, melt the outer, less-radioactive shell, then cut and compact the interior tubes which Studsvik describes as a "highly radioactive tube bundle". The less radioactive metal would be sold as scrap for unrestricted use. The most radioactive portion – about 450 tonnes – would be shipped back to Halifax and then trucked back to Bruce Power.
- 6. The SGs would be transported via the Great Lakes and St. Lawrence River.**

BP's deal with Studsvik requires that the steam generators be hauled from Kincardine Ontario to Owen Sound, then shipped through the Great Lakes and St. Lawrence River, across the Atlantic Ocean to the Studsvik facility in Sweden. Each steam generator contains sufficient long-lived toxic radionuclides to seriously contaminate local water bodies should an accident occur such as the recent flipping of a barge in St. John harbour, which resulted in two new 107-tonne steam turbine rotors sinking to the bottom of the harbour in October 2008.
- 7. When Bruce Power applied for a transport license a storm of protest erupted.**

Dozens of non-governmental organizations, municipalities, First Nations and other Aboriginal communities have expressed strong opposition to the shipment. Over 200 municipalities bordering the Great Lakes and the St. Lawrence River have passed resolutions challenging the proposed shipment. Many First Nations and other aboriginal communities have expressed displeasure at not being consulted or even notified about the proposed shipment. The Canadian Nuclear Safety Commission (CNSC), which is the licensing body, was compelled to hold two days of public hearings in September 2010 to listen to the views of 80 intervenors from Canada, the US and overseas. The CNSC extended the comment period and postponed its decision on the license application, but finally granted the licence on February 4, 2011.

- 8. The radioactivity in the SGs exceeds the maximum allowed on a single vessel.**  
The International Atomic Energy Agency (IAEA) regulations lay out the maximum amount of radioactivity allowed on a single shipment. The CNSC admits that the sixteen SGs from Bruce Power exceed the IAEA standard by a factor of at least six times. Intervenor maintain that the SGs exceed IAEA standards by more than sixty times because of the more stringent limits laid down by the IAEA for inland waterways such as the Great Lakes and the St. Lawrence River.
- 9. This transport restriction has been waived under a CNSC “Special Arrangement”.**  
In exceptional or urgent circumstances, IAEA regulations state that shipments containing higher amounts of radioactivity may be allowed under a “Special Arrangement.” The intervenors oppose this “Special Arrangement” on the grounds that the proponent has not demonstrated any necessity for the shipment. Ontario Power Generation (OPG), the provincial corporation that owns the Bruce reactors, can store used steam generators from all Ontario reactors on site.
- 10. Processing would contaminate the scrap metal market with radioactive waste.**  
There is no market for radioactive metal. Nobody wants it. Studsvik plans to blend the radioactive metal from the SGs with uncontaminated metal in the ratio of 1 to 10. The resulting mix will be sold as scrap metal with no warning that it contains plutonium and other man-made radioactive pollutants. In recent years, the United Nations, the Steel Manufacturers Association, and the Bureau of International Recycling have condemned the alarming practice of contaminating the world’s scrap metal supply with radioactive waste materials.
- 11. There is an accepted and CNSC-approved alternative for the steam generators.**  
OPG transferred ownership of the steam generators to BP in October 2009 at BP’s request. Up to that time there was an accepted plan for storage of the SGs in perpetuity on site. During a 2006 environmental assessment, BP stated that the SGs would be stored in a surface facility until 2043 and underground thereafter. Meanwhile, a “segmentation facility” was to be built by the owner, OPG. This proposal was accepted by the CNSC. BP and CNSC stated in 2006 and 2007 that the SGs are radioactive waste and so cannot be recycled for environmental and safety reasons.
- 12. Shipment of the SG wastes poses unnecessary health and environmental risks.**  
Intervenor such as the Great Lakes Cities Initiative have demonstrated that under a worst-case accident scenario involving the SGs, an entire city's drinking water could be contaminated to a level that would require finding alternative drinking water sources. Ninety percent of the mass of the radioactive inventory in the SGs is plutonium, well known as one of the most toxic man-made radioactive materials – one that lasts for tens of thousands of years. Any major accident releasing such material could have consequences for generations.
- 13. Dangerous precedents will be set if this shipment of SGs is to proceed.**  
This will be the first time that radioactive debris from old nuclear reactors has been *transported* through the Great Lakes and St. Lawrence Seaway. If this shipment takes place, many more such shipments will follow. This will also be the first time that radioactive waste from Canada has been *exported* to another country. It will be the first time that radioactive waste from Canada has been *disseminated* into international commerce, and the first time that radioactive waste has been *imported* to Canada from another country. These are dangerous precedents.
- 14. The CNSC is not the proper body for setting government policy.** The CNSC is a licensing agency, and unless a rule or policy forbids it, they usually grant requests from industry. But in this case there is a policy vacuum. There is no policy framework on the management of radioactive debris from refurbished or dismantled nuclear reactors at either the federal or provincial levels. Leadership has to come through our democratic institutions, after wide-ranging public consultations to determine what is in the best interest of Canadians.
- 15. Canada needs clear policies on so-called “low-level” radioactive wastes.**  
In order to chart a responsible course for the future, Canada needs clear policies on the export, import, transport and classification of radioactive wastes currently described as “low-level wastes”. Better classifications are needed to discriminate between different kinds of radioactive wastes, based on toxicity and longevity. Most importantly, we need clear policies on how to keep nuclear wastes safely isolated from the environment of living things in perpetuity.

**More information is available at <http://ccnr.org> – the Canadian Coalition for Nuclear Responsibility – where citizens can access a resolution to stop the shipment.**