

**International Institute of Concern for  
Public Health (IICPH)  
Presentation to CNSC**

**May 19, 2010**

**Application by SRB Technologies for  
License Renewal 2010-2015**

# Presentation Outline

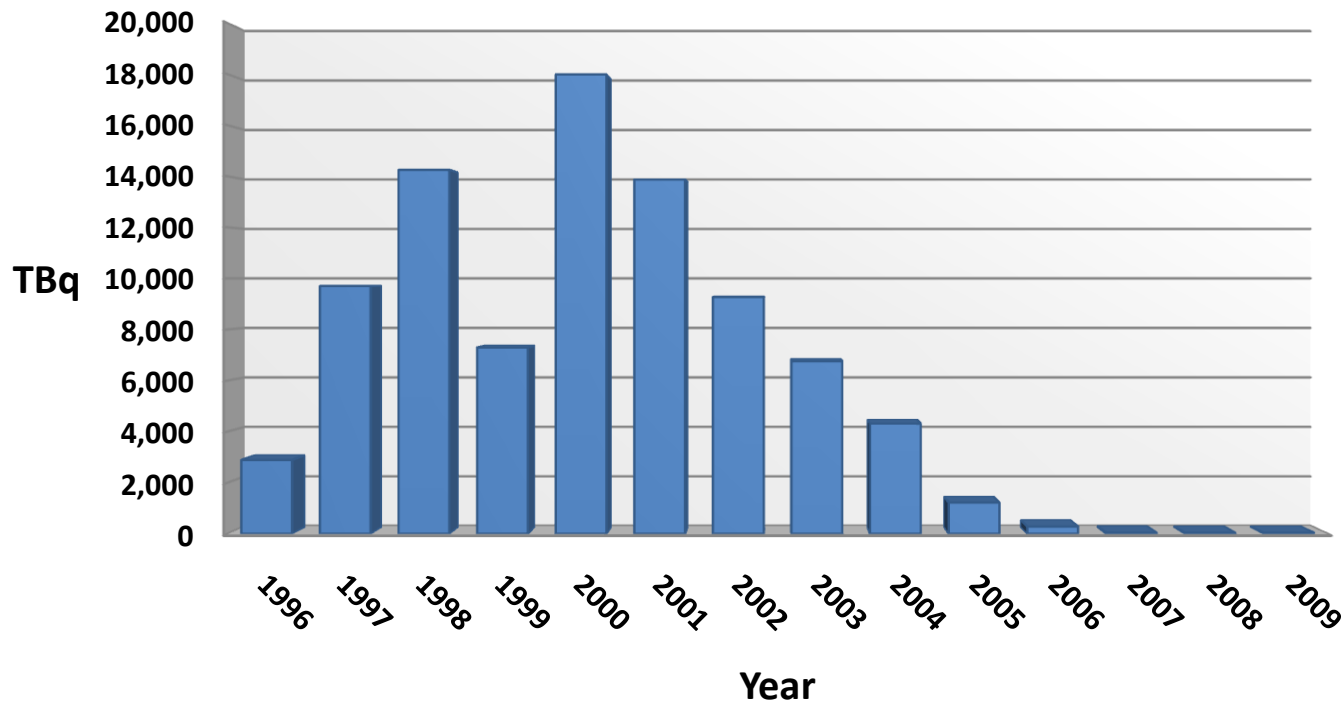
- **Overriding Issues**
- **Emissions of Tritium to Air**
  - Annual emissions, Accumulated emissions
- **Emissions to Sewers**
- **Groundwater Contamination**
- **Derived Release Limits (DRLs)**
- **Mass Balance Calculation**
- **Health Issues**
- **ICRP Dose Calculations**
- **Conclusions**

# Overriding Issues

- **Transparency of information**
  - Public access to data - role of CNSC
- **Community Issues:**
  - Location of facility in residential area
  - Community has been exposed to excessive tritium emissions since inception of SRBT in 1991
  - Over 800 residential wells are located within a 5km radius of SRBT.
  - High tritium levels have been found in wells, garden vegetables, swimming pools, other areas.

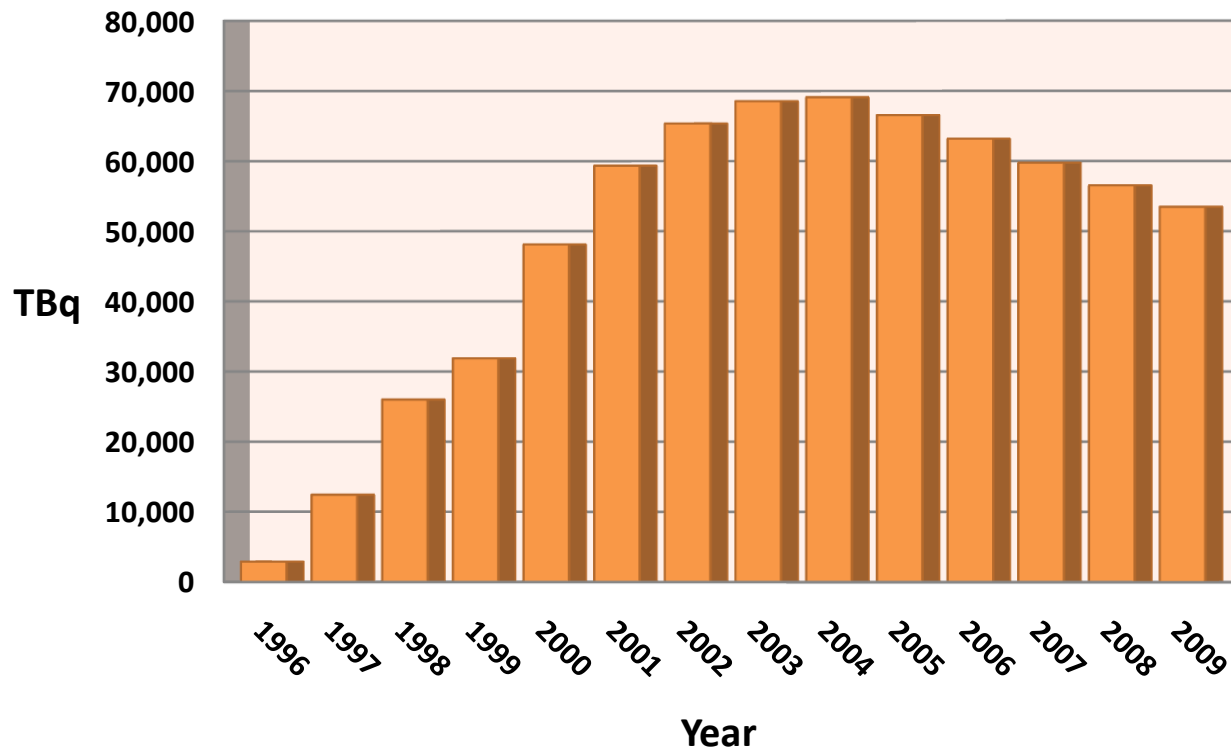
# Emissions of Tritium to Atmosphere SRB Technologies

Tritium Emissions (HTO and HT)  
TeraBecquerels (TBq) per year



# Accumulated Air Emissions

Accumulated Levels of Tritium  
1996-2009 (in TBq)



# Emissions to Sewers

Year	Amount (GBq)
2009	62
2008	29.5
2007	8
2006	43.2
2005	40

- Release Limit - 200 GBq/yr
- Results in contamination of sewage sludge, spreading to other areas
- Tritium combines with organic matter in sludge to form Organic Bound Tritium (OBT), which is the most harmful form of tritium contamination.

# Groundwater Contamination

Monitoring of wells commenced at the end of 2005. From 2006 to the present;

- All the monitoring wells and more than half of the business and residential wells exceed the recommended ODWAC standard of 20 Bq/L.
- Over the past four years, about two-thirds of all these wells have shown an increase in radioactivity despite the reduced level of activity at SRB in 2007-8.
- How can any increase in activity at SRBT be justified when already unacceptable drinking water contamination has gotten worse?

**Soil Chemistry (MW07-29)**  
Well Depth < 0.15 m = 6,711 Bq/L  
Well Depth > 7 m = 301,918 Bq/L



- ▲ WELLS IN CLAY
- WELLS AT SURFACE OF BEDROCK
- ⊙ WELLS IN SHALLOW BEDROCK
- × WELLS IN DEEPER BEDROCK



<b>SRB Technologies</b>		
Location of Groundwater Monitoring Wells Installed on and Around SRB		
	December 2007	Figure 13

# Derived Release Limits (DRLs)

- The CNSC regulates licensees using models that translate public doses into site-specific “Derived Release Limits” (DRLs). These regulatory models are prepared by the licensee and reviewed by the regulator.
- The methods for calculating DRLs do not take into account the accumulated doses over a number of years.
- The DRL-setting process is closed to the public and does not involve peer review by independent scientific experts.
- DRLs for tritium are extremely lax: the emissions in 2006 that caused tritium processing to be halted in 2007-8 were only 5% of the DRLs.
- DRLs are a license to emit and not an incentive to reduce.

# Mass Balance Calculation

A mass balance calculation is needed to determine how much tritium goes into the operations of SRBT, and how much comes out in products and wastes of various kinds.

Unfortunately, the necessary information has not been made publicly available.

# Health Issues

- Exposure comes from inhalation, ingestion and absorption through multiple pathways (food, water, soil, air).
- Occupational exposure (permanent staff, contract workers, sewage workers).
- Vulnerable populations (children, women, the foetus).
- Tritium is a carcinogen, mutagen, teratogen and developmental toxin which is easily absorbed into the body.
- It exchanges easily with H atoms, and binds with organic compounds to form Organic Bound Tritium(OBT).
- It becomes incorporated into DNA.
- It disrupts the genetic code of women's reproductive cells- genetic effects can be carried to future generations.
- Because it is in food and water, there is chronic exposure to tritium.

**There is no safe level of exposure to radiation (BIER VII).**

# ICRP Dose Calculations

The models used to calculate DRLs use ICRP permissible doses. But the determination of these doses is based on many highly debatable assumptions.

- Distribution of OBT in the whole body is assumed to be homogeneous. This is not the case, as it is actually localized in certain tissues.
- The relative biological effectiveness (RBE) of tritium is seriously underestimated.
- No consideration is given to the greater harmfulness of Organic Bound Tritium (OBT) compared to HTO.
- Chronic exposure is not taken into account.
- Non-cancerous effects are not considered.
- The damage done by tritium to DNA, enzymes, hormones and other essential proteins is not considered.

# Conclusions

## In light of:

- Unacceptably high accumulation of tritium;
- Continuing groundwater contamination;
- The lack of accountability (e.g., mass balance calculations, release limit determinations);
- SRBT's silence on reclamation;
- The health effects from exposure to tritium; and
- Expected revisions to Ontario's Drinking Water Objective for tritium (20 Bq/L);

**To grant the license renewal that SRBT has requested would make an unacceptable situation even worse.**

**Therefore, IICPH is requesting the Commission to issue an Order rejecting SRBT's application for license renewal.**