

## Company Background

- SRB has been in operation since 1990 and is located at 320 Boundary Road in Pembroke.
- Our company employs 44 hard working local residents.
- SRB is a locally owned and operated Class 1B Nuclear Substance Processing Facility regulated by the Canadian Nuclear Safety Commission (CNSC).
- We are totally committed to protecting the local environment, our employees, the public and to meeting the safety requirements of the CNSC.

## Description of Manufacturing Processes

- All products manufactured and designed by SRB use Betalights™.
- A Betalight™ is a sealed glass capsule internally coated with a phosphorescent powder and filled with a radioactive gas called tritium to produce continuous light.
- Our products are manufactured to strict procedures audited on a regular basis by a number of independent third parties from government and industry.
- Our company is ISO 9001 registered, ensuring all processes are performed in an organized, controlled and repeatable manner.
- Any radioactive waste generated from the facility is disposed to a CNSC licensed waste facility or by other means with the approval of the CNSC.
- During the manufacturing process small quantities of tritium are released into the environment through our two exhaust stacks.
- Tritium is our single largest cost and precautions are taken during manufacturing to ensure emissions to the environment are minimized.
- Emissions have dropped significantly. Tritium released per week has dropped significantly from 23,546 GBq/week in 2005 to 477 GBq/week in 2017, a decrease of just over 98%.

## Outline of Company Products

- Our products are used in safety and emergency applications all over the world.
- Without electricity, batteries or any other source of power, our products will help to reduce energy consumption which helps the environment against global warming.
- SRB also manufactures many illuminated products used by Canadian, British, American and other peacekeeping troops.
- We also supply a variety of light sources for use in compasses, gauges, dials and other lighting applications.
- The energy emitted from tritium does not penetrate Betalights™, so there is no external radiation hazard from our products.
- The Betalights™ within each device and the devices themselves are thoroughly tested to minimize the possibility of breakage.
- In the unlikely event that an exit sign containing 20 curies of tritium is broken, the dose to an individual is expected to be less than the annual public dose limit set by the CNSC of 1.0 millisieverts (mSv) and would depend on the amount of tritium left in the device and the size and ventilation in the room where the device is broken.



Specialty Exit Signs



Aircraft Signs



Landmine Route Markers



Flight Refueling Markers

## Tritium

- Tritium is a colorless and odorless radioactive isotope of hydrogen.<sup>1</sup>
- People are exposed to small amounts of tritium every day, since it is widely dispersed in the environment and in the food chain.<sup>1</sup>
- Tritium is produced naturally in the upper atmosphere. Tritium is also produced during nuclear weapons explosions and as a byproduct in reactors. Tritium is also used in studies investigating the safety of potential new drugs.<sup>1</sup>
- Tritium enters the body when people swallow tritiated water, and may also enter the body when people inhale tritium as a gas in the air, and absorb it through their skin.<sup>1</sup>
- Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted through the urine within a month or so after ingestion.<sup>1</sup>

## Effects on the Environment and the Public

- Based on monitoring results, at maximum, the dose to a child or adult due to SRB would be just over 0.003 mSv/year, much less than 1% of the public dose limit of 1.0 mSv/year. This assumes this child or adult resides very close to SRB, breathing air due to the emissions from SRB, drinking well water or formula mixed with well water and assuming this individual ate 100% of their diet from local gardens.
- Since SRB has been in operation, radiation doses to the public have been well below the public dose limit of 1.0 mSv/year, and have not caused an unreasonable risk to the health of the public.
- Below 50 to 100 mSv, which includes occupational and environmental exposures, risks of health effects are either too small to be observed or nonexistent.<sup>2</sup>
- The International Commission of Radiological Protection (ICRP) have attempted to determine the probability of fatal and non-fatal cancers, and hereditary effects from any dose of radiation. The probability in total is 0.000073 per mSv.<sup>3</sup> Therefore one out of approximately 4.5 million people could possibly develop these effects if every individual received a dose of 0.003 mSv.
- SRB continued to contribute to the decommissioning fund in 2017. The decommissioning fund is now fully funded at 100%, with one payment remaining in 2018.

## Groundwater

- SRB's groundwater study includes monitoring data from 57 wells drilled to various depths, 36 wells are located within 150 meters of our facility.
- The contamination of groundwater is at a level that does not pose a risk to any member of the public. The groundwater on the land where SRB is located is not being used as a source of drinking water.
- The planned decrease in emissions together with natural decay will eliminate tritium concentrations in groundwater in excess of the drinking water guideline over time.
- Tritium concentrations in wells used for some drinking water ranged from <4 Bq/L to approximately 923 Bq/L, which is less than 14% of the Ontario Drinking Water Guideline of 7,000 Bq/L.

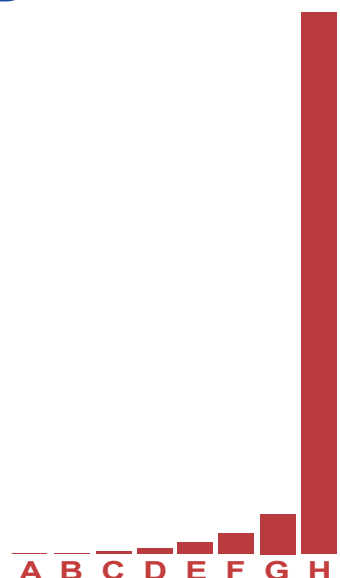
## Monitoring

WHAT IS MONITORED CURRENTLY	FREQUENCY
Facility stack emissions	Weekly
40 air monitoring stations	Monthly
29 monitoring wells	Monthly
9 residential and business wells	Every 4 Months
5 CN monitoring wells	Every 4 Months
Muskrat River	Random
Locally grown produce	Yearly
Local milk	Every 4 Months
8 precipitation monitors	Monthly
6 facility downspouts	Random
Sludge samples	Twice Yearly

NOTE: All results are communicated to the CNSC and available on our web site.

## Public Dose in Perspective

mSv	
100.00	<b>H</b> 994 out of 1000 individuals exposed to 100 mSv would not develop cancer. <sup>4</sup> Risk of disease or death is increased by 10% among those who receive 100 mSv. <sup>5</sup> (H on Graph)
7.00	<b>G</b> Brain Scan. <sup>6</sup> (G on Graph)
2.40	<b>F</b> On average, public radiation exposure in Canada due to all natural sources. <sup>6</sup> (F on Graph)
1.00	<b>E</b> CNSC annual public dose limit. (E on Graph)
0.50	<b>D</b> Abdomen x-ray. <sup>6</sup> (D on Graph)
0.46	<b>C</b> The highest dose to an SRB employee (in 2017). (C on Graph)
0.045	<b>B</b> The average dose to SRB employees (in 2017). (B on Graph)
0.003	<b>A</b> Maximum annual dose to the public due to SRB (in 2017). (A on Graph)



## Reference Documentation

1. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, TRITIUM, <http://www.epa.gov>
2. HEALTH PHYSICS SOCIETY, Radiation Risk In Perspective, Richard J. Burke, Jr., Executive Secretary Health Physics Society, <http://www.hps.org>
3. ICRP PUBLICATION 60, 1990 Recommendations of the International Commission of Radiological Protection, PERGAMON PRESS
4. HEALTH PHYSICS SOCIETY, Answer to Question #4703 Submitted to "Ask the Experts", <http://www.hps.org>
5. INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, World Health Organization, Cancer risk following low doses of ionising radiation - British Medical Journal, June 29, 2005, <http://www.iarc.fr>
6. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation, People and the Environment, <http://www.iaea.org>

## SRB In Our Community

### Some of the organizations and individuals we proudly support:

- Community Living Upper Ottawa Valley
- Algonquin College
- Main Street Community Services
- Bernadette McCann House for Women
- Canadian Breast Cancer Foundation
- Festival Hall
- Muskrat Watershed Council (MWC)
- Renfrew County Regional Science Fair
- Carefor Mental Health Wing
- Pembroke Regional Hospital
- CHEO
- Local Sports Teams

### For further information on tritium and radiation hazards, please visit the third party sites listed below:

- Canadian Nuclear Safety Commission: <https://www.cnsccsn.gc.ca>
- United States Environmental Protection Agency: <https://www.epa.gov>
- International Atomic Energy Agency: <https://www.iaea.org>
- International Commission on Radiological Protection: <http://www.icrp.org>
- Health Physics Society: <http://hps.org>
- International Agency for Research on Cancer: <https://www.iarc.fr>

### For more information or if you are interested in a plant tour, please contact:

Stephane Levesque, President

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For further information please visit:  
<http://www.srbt.com>

## Radiation measurements

are often represented in various units and can cause confusion:

PRESCRIBED LIMIT TO PUBLIC = 1 mSv

1 mSv = 0.001 Sievert

1 mSv = 1,000 microSievert (µSv)

1 mSv = 1,000,000 nanoSievert (nSv)

1 mSv = 1,000,000,000 picoSievert (pSv)

PRESCRIBED LIMIT FOR DRINKING WATER = 7,000 Bq/Litre

7,000 Bq/L = 7 Bq / millilitre

7,000 Bq/L = 7,000,000 milliBecquerels (mBq)/Litre

7,000 Bq/L = 7,000,000,000 microbecquerels (µBq)/Litre

7,000 Bq/L = 0.000 000 189 Ci / Litre

RADIOACTIVITY IN KNOWN MATERIALS 5

1 kg of coffee = 1 000 Bq

1 Household smoke detector = 30 000 Bq

1 kg of coal ash = 2 000 Bq

1 kg of granite = 1 000 Bq

ISO 9001  
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# SRBT, Part of Your Community