

Nuclear Regulator Allows 'Tritium Unlimited'

by Gordon Edwards, Ph.D., President of CCNR, September 15 2012

Background:

On February 1, 2010, a tritium light factory (SSI) located at the Peterborough Airport released 147 trillion becquerels of tritium to the atmosphere in about 5 minutes. This did not become public knowledge until 2012.

Instead of being alarmed and galvanized by this enormous radioactive release, the Canadian Nuclear Safety Commission staff trivialized the event by saying that the release was far below the "derived release limit" of 34 MILLION trillion becquerels per year -- a limit so astronomical in size that it is literally absurd.

In fact the sudden release of 147 trillion becquerels of tritium was about 30% of the maximum allowed annual release according to the LICENCED release limit of 500 trillion becquerels per year -- a very permissive limit indeed! But that limit is 68,000 times LESS than the "derived release limit"

Are you confused? Well, congratulations! That's exactly what the nuclear establishment seems to be seeking to accomplish: confusion to the point of mystification.

The paper below was written by Dr. Hendrickson three days before it was discovered (April 12 2012) that Shield Source Incorporated (SSI) had been exceeding the LICENCED maximum permissible annual releases of tritium (specified in its CNSC licence) throughout the years 2010 and 2011 without the CNSC ever knowing.

It was revealed that SSI's actual tritium emissions had been about 5 times higher than those that were officially reported to the CNSC, and about 3 times higher than the maximum permissible LICENCED annual releases as specified in the CNSC licence.

***[Maximum allowed licenced releases: 500 trillion becquerels per year;
Actual releases: approx. 1500 trillion becquerels per year.]***

In August 2012, a "Root Cause Analysis" Report concluded that SSI had been similarly understating its annual tritium releases for 18 years without the CNSC ever noticing.

To understand what follows (Dr. Hendrickson's paper, reproduced below), some explanation may be helpful:

H is the chemical symbol for hydrogen, and T is the chemical symbol for tritium -- which is radioactive hydrogen.

A normal hydrogen gas molecule consists of two hydrogen atoms bonded together: symbolized HH or H₂. In a radioactive hydrogen molecule, one of those hydrogen atoms is radioactive, so it is symbolized as HT.

Tritium is formed naturally in the earth's upper atmosphere by the action of cosmic radiation from outer space interacting with ordinary hydrogen H to produce radioactive hydrogen T. The "global natural tritium production rate" is the amount of tritium that is naturally produced by that mechanism every year. This number is well-known.

The "total world steady state natural inventory of tritium" is the accumulated amount of naturally-produced tritium found in the environment, excluding the tritium that is human-made -- which comes from nuclear explosions and nuclear reactors. This number is given in many publications, such as UNSCEAR = UN Scientific Committee on the Effects of Atomic Radiation.

The main point of Dr. Hendrickson's article is to document how ineffective the CNSC often is in limiting radioactive emissions and thereby protecting the public.

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Note: On August 24 2012 SSI released a report ("Root Cause Investigation: Tritium Stack Emissions Reporting Discrepancies", <http://tinyurl.com/9d2e874>) indicating that routine reported tritium emissions for the last 18 years have been understated by approximately a factor of 5 or more. Thus the actual release of tritium on February 1 2010 may have been closer to 735 trillion becquerels rather than the 147 trillion becquerels that were reported. If that is the case, this one 5-minute release would have exceeded the ANNUAL licenced limit by 47 percent.

Not to worry, however. It is still WAY below the derived emissions limit of 34 million trillion becquerels. "CNSC will NEVER compromise safety; CNSC ALWAYS keeps radioactive emissions As Low As Reasonably Achievable (ALARA)!"

SSI's absurd release limit for tritium enables CNSC to cover up a serious accident

by Ole Hendrickson, Ph.D., Concerned Citizens of Renfrew County,
April 9, 2012. http://www.ccnr.org/Derived_Release_Limit.pdf

When Shield Source Incorporated (SSI) – a Peterborough, Ontario-based manufacturer of tritium lights – applied to the Canadian Nuclear Safety Commission (CNSC) in 2009 for a renewal of its operating license, Dr. Ole Hendrickson of Concerned Citizens of Renfrew County pointed out the absurdity of SSI's "derived release limit" for tritium gas (HT) in the following statement:

*"CNSC has currently set the derived release limit for HT from SSI at $3.40E+19$ Bq/year (3.4×10^{10} GBq/a). [That's 34 million trillion becquerels per year.] This is **over 200 times higher than the total global natural tritium production rate, and more than ten times the total world steady state natural inventory of tritium.** [emphasis added]*

"Each year during the past five years, in theory, SSI could have emitted more than ten times the world's current natural tritium inventory. Had they done so, tritium levels in rainfall, and in every water body in the world, would have risen several hundred-fold, reaching levels exceeding those measured at the peak of nuclear weapons testing in 1963.

"This would have triggered a global health crisis. There would have been a tremendous outcry from scientists, health professionals and civil society around the world.

"This scenario, of course, is impossible. All the reactors in Canada could not produce enough tritium for SSI to do this. The derived release limit is literally absurd.

"No responsible regulatory agency would accept such absurd tritium release limits.

"But when it comes to tritium – indeed, when it comes to all environmental releases of radionuclides – the CNSC is not a responsible regulatory agency."

The charge that the CNSC is not a responsible regulatory agency was confirmed when the Commission awarded SSI its current 3-year license in July 2009, for the CNSC retained SSI's chosen "Derived Release Limit" in Appendix E of the license.

Why did CNSC act so irresponsibly on tritium "derived release limits" when the problem had been clearly raised during the licensing hearing?

Incorporating absurd release limits in licenses is CNSC's way of covering up and trivializing radiation releases. This was clearly illustrated when SSI had a large accidental release of tritium gas in February 2010. In a document prepared by CNSC staff for SSI's January 2011 mid-term hearing, we read the following:

“On February 1, 2010, SSI released 147.25 Terabecquerels (TBq) of tritium gas into the environment due to an accidental release from the Tritium Fill Machine, which exceeded SSI's weekly action level of 17 Terabecquerels, but is far below the licence release limits of 34 million Terabecquerels per year.”

In making this statement, CNSC staff misled Commissioners and greatly understated the severity of SSI's February 2010 accident. They failed to tell Commissioners that Appendix E of SSI's license, in addition to the “derived release limit”, also contains a licenced “release limit”. Under condition 4.1 of its license, SSI “shall not exceed” the licenced limit. During the February 2010 accident (which apparently only lasted about five minutes – CNSC has refused to release details) SSI released 30% of its legal yearly licenced limit for tritium gas.

“Derived release limits” are calculated by licensees themselves – not by the CNSC. SSI's derived released limit is absurd, and has no legal effect. So why have two so-called “limits” for radioactive emissions from a Canadian nuclear facility?

The answer is simple. The far higher “derived release limits” serve the CNSC and licensees as a useful communications device: a way to assure the public that radiation releases – whether “routine” or accidental” – are of no concern. For years, Canada's nuclear regulatory agency has used derived release limits in this fashion. Canadian radiation release limits (derived or otherwise) generally greatly exceed those for nuclear facilities of equivalent size in other countries.

Does the CNSC intend to continue its practice of incorporating dual release limits in its licenses – one limit for communications purposes, and another limit for legal purposes?

Unbelievably, the answer appears to be “Yes”. A new draft operating license for SSI, prepared by CNSC staff for the Commission's May 2, 2012 public hearing on SSI, still includes a “derived release limit” of 34 million trillion Becquerels of tritium per year, unchanged from past licenses.

[Note (September 15 2012): The May 2 meeting was cancelled when it was learned that SSI had been violating its licence for at least two years, and since then SSI has not been allowed to engage in tritium-handling operations. However, it is very likely that CNSC will want to approve the restart of the facility in the coming months. G.E.]