

To the City Clerk:

April 13, 2018

Please accept my comments for the April 16, 2018 Board of Health meeting on item 2018.HL26.1, *re-affirming the City of Toronto as a Nuclear Weapons-Free Zone*

I understand that my comments and my personal information may appear in various documents that will be accessible to the general public and I am perfectly comfortable with that prospect.

Comments:

I am delighted that my home town, the City of Toronto, has reaffirmed its status as a Nuclear Weapons Free Zone. As a graduate from the University of Toronto with a Gold Medal in Mathematics and Physics, as a one-time member of the ZLAN Committee (Zone Libre des Armements Nucléaires) for the City of Montreal, and as President of the Canadian Coalition for Nuclear Responsibility, I am cognizant of the incalculable destruction and suffering that can be inflicted on a City like Toronto or Montreal by a single nuclear weapon detonated in the air above the city (as at Hiroshima on August 6, 1945) or as a ground burst. I designed and taught a provincially accredited course at Vanier College (Montreal) on "Science, Technology, and Nuclear Weapons".

As the organization *Mayors for Peace* has emphasized, cities are the main targets of nuclear weapons, and elected representatives have a duty to the citizens to do everything in their power to remove this Sword of Damocles from the millions and billions of people who live under such a terrifying existential threat. [*Mayors for Peace currently enjoys representation from 7,568 cities in 163 countries and regions.*]

All cities are vulnerable to devastation by nuclear attack, but Toronto is in double jeopardy because of the very close proximity of the Pickering Nuclear Generating Station. Pickering NGS, with its six operating reactors, is one of the largest nuclear power stations in North America. It is also exceptionally close to the heart of Toronto, and hence has a greater population within a 40 km radius than any other nuclear power station on the continent

According to the Nuclear Waste Management Organization (NWMO), there are over 400,000 irradiated fuel bundles in the spent fuel pools at Pickering NGS. Unlike the cores of the six operating reactors, each containing less than 2600 irradiated fuel bundles, these pools are not protected by heavily reinforced concrete structures. The incomparably destructive blast and the incredible heat from the fireball of a nearby nuclear explosion would vaporize the water in the pools and ignite the zirconium cladding of the fuel bundles, creating a blazing inferno in the fuel pools of unprecedented proportions. Such a "fuel pool fire" has no containment structure to limit radioactive releases. Such a fire would release far more radioactivity into the environment than has been released hitherto by all 2000 test nuclear explosions conducted to date, as well as all previous nuclear core meltdowns, such as at Chernobyl and Fukushima Dai-ichi, leaving a legacy of contaminated land that would remain totally uninhabitable for centuries.

Because there was relatively little local radioactive fallout from the Hiroshima explosion, the City could be rebuilt and is now a thriving metropolis. If there had been very heavy contamination of the City premises with long-lived emitters of intense gamma radiation such as cesium-137, reconstruction would have been difficult or impossible.

If a nuclear weapon were to be targeted on or near Pickering NGS, it is likely that the a large percentage of the irradiated nuclear fuel bundles in the spent fuel bays at Pickering NGS would be melted and or vaporized, liberating all the cesium-137 along with hundreds of other radionuclides contained in the spent fuel as gases, vapours or aerosols. According to data published by the Nuclear Waste Management Organization, the irradiated fuel bundles in the Pickering spent fuel pool contain an average of 10 trillion becquerels (10 terabecquerels) of cesium-137 per bundle. That amounts to 4 million terabecquerels of cesium-137 altogether, which is 50 times greater than the 80,000 terabecquerels of cesium-137 released by the Chernobyl nuclear disaster. Can anyone imagine the long-term consequences of fifty Chernobyl disasters happening simultaneously within 35 or 40 kilometres of downtown Toronto? I must confess, I cannot.

Even today, 32 years after the Chernobyl disaster, the government of Germany, Sweden and the Czech Republic report that hunters must not eat the meat of any wild boars they kill because the meat is much too contaminated with cesium-137 from the nuclear accident thousand of miles away and decades ago. In Japan, too, wild boars are showing up to 500 times the maximum permissible concentration of cesium-137 in their meat.

Cesium-137 is chemically similar to potassium, so it goes to the red blood cells and the soft organs of the body, concentrating in the meaty parts of animals and fish. It also concentrates in leafy vegetables, animal fodder, mushrooms and mosses, including seaweeds.

By all means, the City of Toronto should change its charter if need be in order to be legally empowered to pass and enforce bylaws to prohibit the manufacture and/or transportation of components of nuclear weapons or their delivery systems through the City, as Montreal did when I was a member of the ZLAN Committee years ago. The City should also take steps to hasten the shutdown of Pickering NGS, which has long outlived its projected lifetime and should be already retired. The faster the plant is shut down, the sooner the pools can be emptied, and the long-lasting after-effects of any nuclear weapons attack can be significantly reduced. Of course the only real solution to nuclear weapons is to hasten the day when they are eliminated, and the same may be said for nuclear reactors that all have extremely vulnerable spent fuel pools.

Gordon Edwards, PhD, President,
Canadian Coalition for Nuclear Responsibility.

Two relevant references:

www.ccnr.org/CCNR_Emergency_Plan_2017.pdf

www.ccnr.org/hlw_chart.html