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**Health Effects of Ionizing Radiation**

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The only way in which the nuclear industry can receive public support is by denying the human health effects of ionizing radiation. I will outline three sources of natural radiation, very briefly discuss how radiation affects human cells and close with three examples where we know dose and result.

Background radiation is cancer-causing. There is no “zero”, there is no lower limit at which ionizing radiation doesn’t affect cells.

A Swiss study indicates that there is a difference in health between two levels of background radiation.

There is no controversy over the fact that cosmic rays have negative health effects on all for example: skin cancers, cataracts.

Canadian Public Health warns about radon gas, in homes and especially in basements. This is entirely, or almost entirely natural element, the result of uranium-238 and thorium-234 decay. It causes 20% of lung cancers in non-smokers and increases incidence by 17% in smokers.

Decay of radon-222 undergoes 6 or 7 steps to eventually reach lead 206. The entire staircase of decays from uranium-238 to lead-206 is called a decay chain.

“Decay” is the release of energy from an atom producing another atom which may or may not be stable.

When radon-222, a gas, decays to polonium-218, a solid, the polonium can fall out of the air and contaminate rooms, sheets and pillow cases and plants.

Alpha and beta particles, gamma and x-rays are all ionizing radiation which means that they do exactly that – they cause ions, they break chemical bonds in cellular walls, structural proteins, carbohydrates and genetic material. All of these can have broken chemical bonds.

Sometimes the cells recover, sometimes they cannot.

We have known for at least 120 years that x-rays cause cancer.

Early radiographers used their hands to focus x-ray beams. In spite of having their cancerous hands amputated, they died painful deaths from metastatic disease.

We have also known that x-rays and gamma rays are practically identical. In 1903 Ernest Rutherford, a UK scientist, wrote in his journal after Pierre Curie proudly showed off his sample of radium – “Pierre had the typical signs of someone who worked with x-rays.

Medical exposure provides the single greatest body burden of ionizing radiation.

Technitium-99m is a pure gamma emitter used to evaluate the blood vessels and damage to the heart after a heart attack. For every 10 mSv of energy, there is 3% in cancers.

No one can deny that radiation has been life saving therapy for many cancer sufferers. When it is used, however there is an increase in secondary cancers of 3 – 18% - the range makes the increase practically meaningless unless we know the type of ionizing radiation, how it's administered – external beam or implants and the dose.

The Canadian Medical Association Journal published a study this week (April 24 to 27) of the results of CT scans in children essentially concluding that the more CT scans a child received and the younger the age, the more likely they would develop various types of solid cancers.

In conclusion, we all have radioactive elements strontium-90 and caesium-137 from nuclear bomb tests and nuclear power generation – all part of a secretive, misguided unprincipled industry that knew from the beginning that what they were working with was not good for human health.