

Eleven questions submitted by viewers were left unanswered at the end of the Uranium panel event. Here are those questions, and Gordon Edwards's answers, including his links to further documentation.

### **1. Gordon, did uranium go into the Tripartite mission on the nuclear weapons used on Japan? From Uranium City?**

Yes, uranium from Great Bear Lake, as well as uranium-bearing residues stored at Port Hope went into the WWII A-Bomb project. When the much richer Congolese uranium concentrates were discovered on Staten Island, they were sent to Port Hope for refining before being used in the Bomb project as well.

“Although some of the [uranium came from Bear Lake in Canada](#) – about [907 tonnes \(1,000 tons\)](#) are thought to have been supplied by the [Eldorado mining company](#) – and a mine in Colorado, [the majority came from the Congo](#). Some of the uranium from the Congo was also [refined in Canada before being shipped to the US](#).”  
<https://www.bbc.com/future/article/20200803-the-forgotten-mine-that-built-the-atomic-bomb>

Uranium City did not come into the picture until after the war. Until 1965, all the Uranium City material went into tens of thousands of nuclear weapons built during the Cold War.

### **2. Would people working in nuclear facilities like Point Lepreau, be exposed to nuclear radioactivity and suffer disease because of this, or is it mostly just during the mining process?**

Under normal circumstances, workers in reactors are less exposed than miners; but after an accident or during dismantling or refurbishment, radioactive contamination can result in much larger exposures. Nevertheless, even under normal circumstances, studies show that reactor workers suffer somewhat greater incidence of cancers as a result of cumulative radiation doses.

### **3. Does radioactive plutonium get into crops other than tobacco?**

Correction: it is radioactive polonium, not plutonium, that is in tobacco. Polonium-210, to be precise, the very isotope that was discovered and named by Marie Curie back in 1898. Plutonium did not come into perceptible existence before 1939, with the discovery of nuclear fission. Unlike polonium, which is a naturally-occurring “decay product” of uranium, plutonium is a human-made material created inside nuclear reactors.

Does polonium get into other crops? I am sure the answer is “yes” but not to anything like the same extent as tobacco. Tobacco has a very thick canopy of leaves, which traps radon

gas underneath (radon is 7 times heavier than air). Moreover, tobacco leaves have sticky resinous “hairs” on the underside, and when the radon gas atoms turn into solid radioactive materials, these “stick” to the hairs and so are harvested along with the tobacco. The radioactive solid that stays with the tobacco during curing, roasting, shredding and rolling into cigarettes, is actually lead-210, with a 22-year half-life. But these radioactive lead atoms are constantly producing polonium-210 atoms as "decay products", and the smoker inhales both the lead-210 and the polonium-210 into his or her lungs. Some of it passes into the blood as the lungs are busy oxygenating the blood. The build-up of alpha-emitting polonium causes both lung cancer and cardiovascular diseases (strokes and heart attacks) by stimulating the build-up of arterial plaque with subsequent blood clot formation.

#### **4. Is it only fertilizer from Blind River area which contains radioactive material? Or need we be aware of this issue?**

Almost all phosphate fertilizer contains some radioactive material, but the uranium industry has taken advantage of the fact that natural phosphates fertilizer has some radioactivity to justify selling their radioactive “raffinate” wastes (waste residues from a uranium refinery) as fertilizer also. In truth, there should be a requirement to REMOVE the radioactive materials from natural fertilizers in the interests of public health and to PREVENT the sale of known radioactive wastes from uranium processing for use as fertilizer. See [www.ccnr.org/CCNR\\_BAPE\\_2014\\_rev.pdf](http://www.ccnr.org/CCNR_BAPE_2014_rev.pdf) from page 22 onwards.

#### **5. Could Gordon say more about the Quebec moratorium?**

The 2013 Quebec moratorium on the exploration for uranium and mining of uranium was forced by a series of citizen actions: (1) the James Bay Cree declared a moratorium on uranium in the vast Cree territory of Eeyou-Istchee where most of the northern uranium deposits were located; (2) 22 medical doctors from a hospital in Sept-Îles wrote an open letter saying that unless the government of Quebec banned uranium mining in the Cote-Nord region (a region that is non-overlapping with Eeyou-Istchee) they would resign from the hospital and leave the town of Sept-Îles, and possibly even leave Quebec; (3) citizens from the Mont-Laurier district in the high Laurentides and from the Gatineau region in the Ottawa Valley also protested very strongly against uranium exploration activities. In response, the PQ government declared a temporary moratorium pending a one-year environmental assessment to be conducted by the BAPE (Bureau d'audiences publiques sur l'environnement). Here is CCNR's summary argument to the BAPE: [www.ccnr.org/CCNR\\_BAPE\\_2014\\_rev.pdf](http://www.ccnr.org/CCNR_BAPE_2014_rev.pdf).

A group of Cree youth walked in bitter freezing weather from Mistissini in Eeyou-Istchee to Quebec City and then on to Montreal, arriving on the last day of the BAPE hearings. They were later awarded the Nuclear Free Future Award in a ceremony in Washington DC.

Meanwhile, Nature Quebec and the Cree co-sponsored a World Uranium Symposium right across the street from the National Assembly in Quebec City resulting in a powerful anti-uranium-mining declaration [www.ccnr.org/declaration\\_WUS\\_e\\_2015.pdf](http://www.ccnr.org/declaration_WUS_e_2015.pdf).

BAPE recommended a permanent moratorium on uranium exploration and uranium mining in Quebec, and although the Liberal government did not declare such a permanent ban, and although CNSC astoundingly wrote to the government of Quebec denouncing the BAPE and attempting to discredit those who has intervened against uranium, nevertheless the moratorium is in effect extended indefinitely. Without a formal declaration by the government, and without a legal basis, unlike Nova Scotia that has passed a law against U exploration and mining, and unlike the BC government that declared that BC would never allow uranium mining in the province, but without enacting legislation to that effect.

## **6. What about the Moltex Wasteburner SSR-W reactor that is designed to use nuclear waste?**

“Using” nuclear waste is an exaggeration. Moltex wants to extract less than one percent of the material in the irradiated nuclear fuel that has been accumulating from the Point Lepreau CANDU reactor (i.e. plutonium plus the minor actinides) for use as fuel in their own smaller “molten salt” reactor.

Moltex will be leaving 99.99 percent of the radioactive inventory behind -- but only after converting it from the present solid form (CANDU fuel bundles) to a liquid form (molten salt solution) thereby making the waste much less manageable than it is now. They will also be adding significantly to the very long-lived fission products and activation products that will remain dangerously radioactive for more than 10,000 years.

## **7. The SMR proponents claim their reactors will use the spent fuels from CANDUs and pressurized water reactors to generate heat for electricity. Is this just hokum or can they be used to exhaust nuclear waste?**

The first nuclear reactors were built not to produce heat or electricity but to produce plutonium for use as a nuclear explosive in nuclear weapons. Later it was thought that since a great deal of heat is also produced, why not boil water and use the steam to generate electricity? Meanwhile, these “power reactors” still produce plutonium, and that plutonium can still be used to make nuclear weapons. Since plutonium has a 24,000 year half-life, and since the irradiated fuel itself remains dangerous for millions of years, it can be asserted that the MAIN products of nuclear reactors are (1) plutonium and (2) radioactive waste, with only a very brief (20 to 40 years) period producing electricity - just a short little blip at the very beginning.

From the beginning of the nuclear age, even before the end of WWII, nuclear proponents

have wanted to “get at” that plutonium to use it as nuclear fuel instead of using uranium as fuel. The only reason for this is to extend the lifetime of their industry by having another type of fuel to fall back on.

But plutonium is an immediately usable nuclear explosive material and so using it as an article of commerce guarantees that it will also fall into the hands of criminals, terrorists and militaristic regimes. Eventually everyone in the world can acquire a nuclear weapons capability. This threat is so frightening that President Jimmy Carter banned the civilian use of plutonium in 1977 and tried to have this policy embraced worldwide, with partial, but not total success. Prime minister Pierre Elliot Trudeau in 1978 advocated a “strategy of suffocation” to end the nuclear arms race by “choking off the vital oxygen on which it feeds” - meaning to stop producing nuclear explosive “fissile” materials like highly enriched uranium and plutonium. To this day, the Canadian government advocates a “Fissile Materials Cutoff Treaty” to further the “strategy of suffocation”.

BUT the Moltex plan goes in the exact opposite direction to this. Nine prominent US experts have written three letters to Prime Minister Justin Trudeau warning about the dangers of the Moltex plan “undermining” the global non-proliferation efforts that have been in operation for over 50 years.

So yes, plutonium can be used as a fuel, if you don’t care much about the dangers of spreading nuclear weapons capabilities far and wide. And if you don’t care about making the radioactive waste problem even more problematic than it already is.

#### **8. Does anyone know if it is true that Mark Carney and Bill Gates have already invested millions of dollars of their own money in SMNRs?**

I believe this is true. Even though nuclear energy is not economical, those who supply the equipment and so on always make very handsome profits. It's like the military and weaponry in general; the military industrial complex and weapons manufacturers make obscene profits at the cost of society in general. Bombs and weapons are profitable for the arms makers, not for society at large. One of the main reasons why the German and Japanese economies did so well after the war is because they were not allowed to invest in arms and the military.

Similarly, the nuclear industry has no lack of money despite incredible down-sides for society. The US government is providing many billions of dollars in bail-outs to their own nuclear industry, year after year, and Canada has always been subsidizing our own domestic nuclear industry as well. About a billion dollars per year are going directly to Atomic Energy of Canada Limited (AECL), most of it passed on to the consortium of multinational corporations that own and operate CNL (Canadian Nuclear Laboratories) - SNC-Lavalin and two US corporations with ties to the nuclear weapons industry. (All three have histories of fraud and corruption.)

**9. We currently have uranium mines producing at McLean Lake and McArthur River in northern Saskatchewan. Please comment on the massive amounts of tailings, my guess is about 1,000 million metric tonnes, these are leaching into fresh water lakes around the north. Does anyone know more about what is happening there?**

The Joint (provincial-federal) Environmental Assessment Panel that reviewed these projects concluded that these wastes are without doubt the most toxic wastes in all of Canada. I do not know the numbers, perhaps the ICUCEC (Inter-Church Uranium Committee Environmental Cooperative) has collected these figures. It should be noted that the radioactive components in the uranium tailings are directly related to how much uranium is extracted, not to the volume or mass of the tailings. As the grade of the ore goes up (more uranium per kg of rock) the volume and mass of the tailings goes down, but the total radioactive inventory is then just more concentrated in a smaller volume.

**10. Nuclear risks are horrific, but could someone comment on the toxicity of the uranium itself? There are high levels in groundwater in areas, even where it is not mined. There seems to be some chronic neurological and other effects.**

Uranium is certainly a dangerous and poisonous material. It is a heavy metal that is also radioactive, so it carries a double whammy. It is particularly hazardous to the kidneys. The officials generally say that the chemical toxicity of uranium is probably greater than the radiological toxicity, but this depends on what you are measuring.

"Inhaling large concentrations of uranium can cause lung cancer from the exposure to alpha particles. Uranium is also a toxic chemical, meaning that ingestion of uranium can cause kidney damage from its chemical properties much sooner than its radioactive properties would cause cancers of the bone or liver."

**11. The cold war is over, and the proliferation of nuclear weapons is over with reduction of warheads through the SALT 2 agreement.**

The Cold War appears to be just around the corner again with growing tensions over Ukraine and growing military assertiveness from China. New first strike capabilities are being aggressively pursued using hypersonic missiles, cruise missiles, nuclear submarines. Meanwhile the acceptance of India, Pakistan, North Korea and Israel, as "de facto" nuclear weapons states, combined with the superpowers investing trillions of dollars in Modernizing their nuclear arsenals, and the kerfuffle over Iran's uranium enrichment facilities, will encourage other nations to "join the nuclear club". If current trends continue, we will be approaching a

condition where any conflict anywhere in the world could quickly become a nuclear war. The use of Small Modular Reactors with their emphasis on greater degrees of uranium enrichment and the recovery of plutonium for use as a fuel will provide a convenient cover for would-be proliferators by further blurring the lines between civilian use and military use. The words of the Flowers Report, written many many years ago, and just as pertinent today as they were then:

"Our conclusion [is] that the spread of nuclear power will inevitably facilitate the spread of the ability to make nuclear weapons, and, we fear, the construction of these weapons. In reality, total agreement on a comprehensive international control system for the products of civilian nuclear power that are relevant to the construction of nuclear weapons would be possible only in a climate of general disarmament, and the prospects for this are receding rather than improving. It has been argued that the possession of these weapons by the USA and the USSR has been a powerful force for mutual toleration, but however true this is it would be folly to suppose that proliferation would necessarily lead to a similar balance and restraint in relations between other nations. Indeed, we see no reason to trust in the stability of any nation of any political persuasion for centuries ahead. The proliferation problem is very serious, and it will not go away by refusing to acknowledge it."