De : fafard [mailto:fafard.marc@gmail.com]
Envoyé : 18 septembre 2014 18:42
À : Leblanc, Rita (BAPE)
Objet : Document a déposé 18 sept, source d'information qui accompagne la Question de Marc Fafard concernant la prise en compte de la toxicité des émetteur alpha dans les rejets de ventilation de mine d'uranium

Info about Radon daughters in cigarette smoke

Radon is a gas. Really a gas. Not smoke, which is made up of particles.

Radon gas is 7 times heavier than air, so in the absence of winds it tends to stay close to the ground. It will even flow downhill….

Radon is also a "noble" gas, like helium or neon or argon. These gases do not undergo any chemical reactions, and do not form any chemical compounds. Therefore radon gas can migrate freely over very long distances without being "interrupted" by being chemically absorbed.

But radon has an 8-day half-life, and when radon atoms disintegrate they turn into atoms of solid elements -- isotopes of bismuth, lead and polonium. These substances are created one atom at a time, and when they are created they are electrically charged -- they are

ions. Extremely tiny therefore; as tiny as you can possibly get!

Because of electrostatic attraction these radon byproducts tend to attach themselves to tiny particles that are floating in the air, such as grains of pollen or dust particles. In fact when studying the radioactive dose to the lungs of people who inhale a mix of radon and radon byproducts, scientists always try to quantify the "attached" fraction as opposed to the "unattached" fraction.

If radon is allowed to stagnate through a lack of air circulation, such as in an unventilated basement, the radioactivity goes up substantially as the much more radioactive short-lived byproducts appear -- the radon mix becomes about 5 times more radioactive in the space of a few hours. That's why indoor radon is generally considered to be much more biologically damaging than outdoor radon, because the solid radon by-products lodge in the lungs. About 85% of the radiation dose to the lung is actually due to the two short-lived polonium isotopes, Po-218 and Po-214, rather than the radon itself.

In the case of tobacco, the radon gas builds up under the heavy canopy of the tobacco leaves, the radon byproducts build up and attach themselves to small particles that are airborne, these particles "stick" to the tiny resinous hairs on the underside of the tobacco leaves, and so when the tobacco is harvested these radioactive byproducts are

harvested as well. By the time the tobacco has been cured, shredded, rolled into cigarettes and sold in stores, the main radioactive isotopes that are left in the tobacco are lead-210 (with a half-life of 22 years) and its only radioactive byproduct, polonium-210.

When smokers inhale the tobacco smoke, they are also inhaling very minute quantities of lead-210 and polonium-210. Polonium-210 is much more damaging than lead-210 alone,
because it is a very powerful alpha emitter, whereas lead-210 is a beta emitter. Polonium-210 in the lungs of smokers not only contributes to the induction of lung cancer, but also to the incidence of heart attacks and strokes, because polonium-210 readily enters the blood stream and accumulates in the plaque that clogs up the arteries of smokers. Since alpha radiation causes "fibrosis" of the sensitive cells this contributes to accelerated plaque accumulation in the arteries of smokers. The American Health Physics society has published a fact sheet in which they say that up to 90% of deaths attributed to cigarette smoking are likely due to polonium-210. The Los Alamos Nuclear Laboratory states on its web site that polonium-210 is 250 billion times more toxic than cyanide. There is no disagreement among scientists that polonium is the most toxic (radiotoxic) naturally occurring element known to science.

Yes, the airborne radioactive byproducts of radon gas generally occur as aerosols.

Gordon Edwards
Nuclear Specialist

On 2014-09-16, at 3:27 PM, fafard <fafard.marc@gmail.com> wrote:

Gordon Thank you very much for thé beutiful answer.

One question comes up to m'y mind. The size of particals, very small in smoke and Hot burning réaction of the DU armement.

Does the Radon filiations have the same small size? My question to the bape will be. Why the goverment baned so hardly the cigarette secondary smoke from everywhere while the U mine's ventilation systems are deploying similar contaminants out of U mines whit no restrictions or préoccupations.

Would you know exactly what the government is protecting us from by banning secondary smoke. U oxydes, polonium or led particals.?

I was surprised you talked about cigarette smoke in my question on DU armements.

With that question I want the commission to look at health studies of impacts on population or\and soldiers affected by those radionucleides because there seems to be more done about that compares to the health effects of U mines.

MF

Thanks again for your time.

Envoyé de mon smartphone BlackBerry 10 sur le réseau TELUS.

De: Gordon Edwards
Envoyé: mardi 16 septembre 2014 00:31
À: Michel A. Duguay
Cc: fafard
Objet: Re: Question pour toi.

Bonjour Marc et Michel:

For military purposes, uranium is used in the form of a silvery-white metal, about twice as heavy as lead. DU weapons use depleted uranium (uranium appauvri) metal in the form of a sharp pointed tip called a "penetrator".

When the shell hits its target, it not only PUNCHES its way through but also BURNS its way through, as uranium metal is pyrophoric and burns with a very intense heat. This punctures and melts the wall of the target and it also releases radioactive smoke into the air made up of aerosol particles of uranium dioxide. Like cigarette smoke, these aerosols can be inhaled into the deepest parts of the lungs; coarser particles are prevented from doing so by the whiplike action of the cilia – those little hairs that trap and remove and prevent coarser particles from reaching the most sensitive parts of the lung.

When aerosol particles of any kind are inhaled, they can pass through the membrane that is used by the lungs to oxygenate the blood, and so those particles that do not get lodged in the lung tissue can get carried by the blood up to the brain and also throughout the entire body.

This is an important point because uranium is an alpha-emitter, and alpha radiation is harmless outside the body because it cannot penetrate through a piece of paper or the dead layer of skin on the exterior of our body. But when in direct contact with living cells, alpha radiation is far more damaging per becquerel than either beta or gamma radiation, often 100 to 200 times more damaging per becquerel. Radon gas, polonium, radium, plutonium, and uranium are all alpha emitters, and the first four mentioned are among the deadliest radionuclides known to science at chronic low levels of exposure.

Moreover, just as cigarette smoke can cling to clothing and other surfaces, so this uranium smoke does the same. Thus a child handling a stone on which the uranium dioxide has been deposited will get it on his or her fingers and then into his or her mouth when they eat. In this war, by inhalation and ingestion, very fine particles of uranium dioxide can enter people's bodies. Inside the body, the alpha radiation given off by the uranium can do a lot of damage to the living cells it comes in contact with. As uranium dioxide is highly insoluble, it tends to stay there a long time before the body can find a way to eliminate it.

When uranium is found in nature it is combined with other elements.

At the uranium mill, the ore (minerai) is crushed and turned into "yellowcake", a bright yellow powder that is at least 75% uranium oxide (U_3O_8, where three uranium atoms are combined with 8 oxygen atoms) and other compounds of uranium. Those men who work in the mine and the mill are exposed to uranium dust, but for the most part that dust is coarser than the aerosol particles created by the high temperature combustion of uranium metal. Thus the situation is not exactly the same. Such coarser particle, when inhaled, don't reach the inner recesses of the lung, and when ingested, are often excreted again without being absorbed through the gut. But the very fine particles behave differently.

When the yellowcake (U_3O_8) goes to the Blind River refinery it is chemically treated to produce uranium trioxide (UO_3), where each uranium atom is combined with three oxygen atoms); the industry calls UO_3 "OK liquor".

The uranium trioxide is then shipped to Port Hope where it is converted into uranium dioxide (UO_2) for domestic use in CANDU reactors, or uranium hexafluoride (UF_6) for export. Over 85% of Canada's uranium is exported as hexafluoride. The uranium dioxide powder is for domestic use, it is made into ceramic pellets that are loaded into the tubes of CANDU fuel bundles that are then used to fuel CANDU reactors.

At Port Hope, where UO_3 is converted into UO_2 and UF_6, the particles that escape from the HEPA filters into the atmosphere are often in the aerosol range, and health studies carried out at Port Hope have in fact shown an excess of brain cancer which the nuclear people such as Patsy Thompson of CNSC disregard as insignificant.

Uranium hexafluoride is one of the very few compounds of uranium that can be turned into a gas at a relatively low temperature. The gaseous form of uranium is needed for the purpose of uranium enrichment, a process that seeks to separate true lighter uranium-235 atoms from the heavier uranium-238 atoms. This can be done by drifting the uranium gas through tens of thousands of successive filters (in the form of very fine membranes) or by spinning the gas very fast so the heavier atoms gravitate to the outside while the lighter atoms stay on the inside, or by using lasers to "ionize" (put an electrical charge on) one variety of uranium but not the other variety. Uranium enrichment is needed for almost all non-CANDU reactors because a sustainable chain reaction is not possible to achieve in such reactors using unenriched uranium.

In order to enrich uranium, that is, increase the concentration of U-235

as compared to U-238, there's only one way to go about it: large amounts of U-238 have to be separated out and discarded. In fact for every seven kilograms of uranium (in the form of UF6) that is sent to an enrichment plant, less than ONE pound of low-enriched reactor fuel emerges. The other six kilograms are left behind, consisting mainly of U-238. This cast-off uranium is called "depleted uranium". It contains a higher percentage of uranium-238 than natural uranium, and a lower percentage of U-235. Natural uranium is 0.7 percent U-235 and 99.3 percent U-238, while the cast-off depleted uranium has less than 0.3 percent U-235 and more than 99.7 percent U-238.

It is a curious fact that, although DU is chemically almost identical to natural uranium, it is only about 60% as radioactive. That's because there is another isotope of uranium found in natural uranium, called U-234. If the ore has been undisturbed for billions of years, the total radioactivity of U-234 in the ore is almost exactly equal to the total radioactivity of U-238. If the U-234 were to be completely removed, the total radioactivity of the uranium would be almost cut in half. Well, since U-234 is even lighter than U-235, the enrichment process removes BOTH U-235 and U-234, but not completely. The net result is that DU is about 60% as radioactive as natural uranium.

I have to go to bed now, but if you have any questions about what I have said here please do not hesitate to ask. There is a lot more to be said, buit not right now.

Gordon.

On 2014-09-15, at 10:31 AM, "Michel A. Duguay" <michel.duguay@gel.ulaval.ca> wrote:

Bonjour Marc,

Presque tous les métaux de la croûte terrestre, sauf l’or, sont sous forme d’oxyde. Prends l’aluminium, il est dans la terre sous forme de Al2O3. C’est la formule chimique du saphir (va en voir dans une bijouterie !).

L’uranium appauvri, donc l’U-238, est un métal à forte densité, 19 fois celle de l’eau, ce

qui en fait un obus très pénétrant qui vient à bout des chars d'assaut. Les réacteurs nucléaires utilisent UO2, un oxyde de l'uranium-235 et U-238, à cause de sa haute température de fusion.

Le site http://en.wikipedia.org/wiki/Depleted_uranium mentionne que l'uranium est un métal chimiquement toxique.

Je mets Gordon Edwards en copie. Il pourra en rajouter au besoin.

Best,

Michel

From: fafard [mailto:fafard.marc@gmail.com]
Sent: 15 septembre 2014 08:50
To: Michel A. Duguay; Michel A. Duguay
Subject: Question pour toi.

Sous quel forme(alliage, forme chimique,?) se trouve l'uranium dans les armes, blindage ou autres utilisation, des armes à uranium appauvrit?

J'essais de leur faire comprendre que les études sur les impacts sur la santé de l'uranium dans les pays ou ont a utilise des depleted uranium weapons!

La CCSN, a repondu du tac au tac qu'on ne pouvait le faire car il se retrouvais sous une autre forme. Ou plutot, pas sous la même forme que l'u qu'on retrouve autour des mines d'u.

Si tu pouvais m'aider je reviendrais la dessus durtant les prochain Jr's

MF

Envoyé de mon smartphone BlackBerry 10 sur le réseau TELUS.

<PastedGraphic-2.pdf>