

# 10 Things You Should Know about Uranium Mining



1. “Exploration crews searching for uranium will receive radiation exposure from uranium and its associated radioactive decay products in the drill core and cuttings.” (Radiation Protection Guidelines for Uranium Exploration. Saskatchewan Labour Department, Occupational Health and Safety Division: <http://www.labour.gov.sk.ca/safety>)

2. “Whether or not [uranium] mining is conducted in open pits or underground, there are environmental health hazards and impacts to workers and the general public that need to be considered. These include radiation hazards from radon gas, radium, thorium, and non-radioactive contamination from dust and heavy metals such as arsenic, lead, and nickel.” (Health Canada, Environment and Workplace Health. Canadian Handbook on Health Impact Assessment. Volume 4, Chapter 5.4 Uranium Mining. <http://hc-sc.gc.ca/ewh-semt>)

3. Uranium mining creates risks to workers and the community in several ways: through radioactive dust and radon released from exploring, milling and tailing piles (Stephens and Ahern 2001. Institute for Environment and Development. World Business Council for Sustainable Development)

4. Uranium enters the body by ingestion or inhaling airborne uranium-contain dust particles or aerosols. Uranium is absorbed from the intestine or lungs, enters the bloodstream, and is rapidly deposited in the tissues, predominately kidney and bone or excreted in the urine. Taylor and Taylor 1997

5.. “Inhalation of radon and radon progeny [daughter products] lead to radiation exposure of the bronchial tissue of the lung with a resultant risk of cancer.” (Health Canada: Environmental and Workplace Health. Exposure Guidelines for Residential Indoor Air Quality Section 4.B.2 Radon). Risks of lung cancer in uranium workers who have been exposed to higher levels of radon or to longer periods of low exposure is 2 to 5 times higher than unexposed workers. (Stephens and Ahern 2001. Institute for Environment and Development. World Business Council for Sustainable Development)

6. Effect of uranium mining on human health are not immediate and take several years or decades before health effects are observed. (Stephens and Ahern 2001. Institute for Environment and Development. World Business Council for Sustainable Development)

7. Residents living near uranium mining operation have a higher risk of genetic damage than people living further away. (Au et al 1998)

8. Miners exposed to uranium are at increased risk of various degrees of genetic damage. (Stephens and Ahern 2001. Institute for Environment and Development. World Business Council for Sustainable Development)

9. Radiation is one of the few exposures for which the cause-effect relationship with childhood leukemia has been established (Belson et al. 2007). Children are 20% more sensitive to radioactivity because their cells are actively dividing.

10. Uranium mining is a federal responsibility under section 71 of the *Nuclear Safety and Control Act*. Before any mine, ore processing or milling facility is built, the project will have to undergo a federal environmental assessment.

## Terms and Definitions

**Genotoxic** is a term used to describe toxic agents that can cause mutations in genes (DNA). Known genotoxins include X-rays and other forms of radiation, some synthetic chemicals and viruses. Since genes are passed down to the next generation, the damage induced by genotoxins can be inherited.

**Mutations** are sudden changes in the genetic material of a cell. Mutations occur naturally at a low rate but may increase as a result of radiation, some chemicals and viruses. Some mutations are beneficial but the majority of mutations are harmful.

**Radiation** is a stream of particles, alpha, beta and/or gamma particles, from a radioactive source like X-rays or uranium.

**Uranium** is a radioactive element and is the major element in the mineral uraninite which also contains radium, thorium, polonium, lead and helium.

**Plutonium-239, Radium-224, Radium-226, Radium-228, Radon-222 and Thorium-232 and their decay products** are classified as known carcinogens by the International Agency for Research on Cancer (IARC). X-rays and gamma radiation are also classed as known carcinogens b the IARC.

**Half-life** is the time it takes for half of the original radioactive material to transform into daughter products which may or may not be radioactive.

**Radium-226** has a half life of 1602 years.

**Radon-222** (half life of 3.8 days) is a radioactive gas. It is one of the decay products of radium 226. Radon occurs naturally, particularly in areas underlain by granite. In 2007, Health Canada changed the exposure action level for radon in “normal occupancy areas” from 800 Bq/m<sup>3</sup> to 200 Bq/m<sup>3</sup>