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## FREQUENTLY ASKED QUESTIONS ABOUT URANIUM

### **What is uranium?**

Uranium is a naturally occurring, radioactive metal, which is widespread in nature. It is present in certain types of soils, rocks, water, plants, and animals. Uranium levels vary in different areas of the world, and are higher where the underlying rock is predominantly granite. Uranium is also released into the environment from various activities such as mining and combustion from coal and other fuels. Uranium breaks down (decays) very slowly into radium and radon gas.

### **How might I be exposed to uranium?**

Most exposure to natural uranium is from food and water, and to a certain extent from air. People ingest about 1–2 micrograms (one microgram is one millionth of a gram) of natural uranium every day through food, and take in about 1.5 micrograms for every liter of water they drink. Microgram amounts of uranium are also present in beef, poultry, eggs, fish, shellfish, and milk. Root vegetables, such as beets and potatoes, tend to have more uranium than other foods.

### **How does uranium get into and leave the body?**

Uranium can enter the body when it is inhaled or ingested. Ninety-nine percent (99%) of the uranium leaves the body in the feces. A very small portion gets into the blood and leaves through urine within a few days. A tiny fraction stays in bones for many years.

### **How can uranium affect my health?**

Because natural uranium produces very little radioactivity, the health effects from exposure are usually attributed to the chemical properties of uranium.

Based on experimental animal studies, the most likely adverse health effect on humans from ingesting large amounts of uranium is on the kidneys. Studies of humans exposed to abnormally high levels of uranium in drinking water (averaging 100-600 micrograms per liter) for many years suggest that there may be minor damage to kidney tissue. The effects are a very mild decrease in the kidney's ability to hold onto proteins, sugar, and other compounds. However, this damage does not cause major effects on kidney function and is reversible after the exposure to uranium stops. There are no specific symptoms after long-term consumption of drinking water containing high levels of uranium. Studies of workers with occupational exposure to uranium have not shown any evidence of serious kidney disease or other health effects.

### **How can uranium affect the health of children?**

There is no conclusive evidence that uranium causes birth defects. Children are exposed to uranium in the same ways that adults are exposed. It is possible that if children are exposed to very high amounts of uranium, they might have some effects on their kidneys like that seen in adults. These effects are most likely reversible after the exposure to uranium stops.

### **How likely is uranium to cause cancer?**

Humans and animals exposed to high levels of uranium for long periods of time have not shown higher than expected cancer rates. Some studies have reported lung and other cancers in uranium miners. However, the miners also smoked and were exposed to other substances that cause cancer, such as radon, silica dust, and organic solvents. Therefore, they were exposed to other, more likely, cancer causing agents than uranium. Based on theoretical models, the U.S. Environmental Protection Agency (EPA) has estimated that uranium in drinking water at the current standard of 30 micrograms per liter may increase the lifetime cancer risk of less than one additional case of cancer in a population of ten thousand.

### **Are there any reproductive or developmental effects from uranium?**

It is not known if exposure to uranium causes reproductive effects in people or effects on the development of the fetus. Most studies in experimental animals have not shown such effects. Very high doses of uranium have caused reproductive problems (reduced sperm counts) and some effect on the development of the fetus in some experiments with laboratory animals. It is uncertain whether the same effects occur in humans. Because of the chemical properties of uranium, it is unlikely that it would concentrate in breast milk.

### **Is there a medical test to determine if I have been exposed to uranium?**

Urine analysis for uranium is the best test to determine whether you have been exposed to large amounts of uranium. The levels of uranium in the urine decrease gradually after exposure has stopped. Urine can also be tested for any evidence of kidney damage. However, since kidney damage is also caused by several common diseases, such as diabetes, it would not tell if the damage was caused by uranium in your body.

### **What is the drinking water standard for uranium?**

EPA sets the standards for public drinking water. These standards or limits are known as Maximum Contaminant Levels or MCLs. The MCL for uranium in public drinking water is 30 micrograms per liter (mg/l). The drinking water standard was developed based on the assumption that a person drinks 2 liters of water a day for 70 years. Additionally, a safety margin of 100-fold was built into the standard to protect children and those who consume significantly more water. Consuming water with levels of uranium consistently above the MCL over a long period of time (many years) may increase the risk of adverse health effects.

**Where can I get more information?**

If you need further information regarding the health effects of uranium, please contact the Virginia Department of Health, Division of Environmental Epidemiology, 109 Governor Street, 4th Floor, Richmond, VA 23219, or call (804) 864-8182.

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