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TECHNICAL BULLETIN

HEALTH EFFECTS INFORMATION

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URANIUM

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WHAT IS URANIUM

Uranium is a natural element that is found everywhere on earth, in rocks, air, water, animals, plants and soils. Typically uranium is a mixture of three radioactive isotopes called U-234, U235 and U-238 (most common isotope). These isotopes all have different radiological properties. Naturally occurring uranium is mildly radioactive, given the extremely long half-lives of the isotopes and little gamma (penetrating) radiation.

USES OF URANIUM

Uranium has both civilian and military uses. The isotopes in uranium can be altered for various purposes. If the level of U-235 is decreased, the uranium is considered depleted. If the level of U-235 is increased, the uranium is considered enriched. The main civilian use for uranium is in nuclear power plants, helicopters and airplanes. Very small amounts are used to make some ceramic ornament glazes, light bulbs, photographic chemicals and household products. In the military, depleted uranium is used as shielding to protect some vehicles, as part of bullets, bombs and missiles. Enriched uranium is used in nuclear weapons.

WHAT HAPPENS TO URANIUM IN THE ENVIRONMENT?

Very small amounts of uranium are found in mineral forms in almost everything in the environment. The U-238 isotope of uranium is very long-lived, with a half-life of 4.5 billion years. U-234, the most radioactive isotope, has a half-life of about 244,000 years and U-235 has a half-life of 710 million years. These isotopes give off radiation and form decay products including radium, thorium and radon. U-238, the most common isotope, will generate U-234 and other decay products until a stable, non-radioactive substance is made (this element is lead). In the air, uranium exists as dust, which will ultimately fall back into soil or waters. Uranium in water comes mainly from rocks and soil as water passes over them. Some accumulation of uranium occurs in plants, but not much can accumulate in fish or livestock.

HOW CAN URANIUM AFFECT MY HEALTH?

Uranium can have chemical and radiological effects on the body. To date, scientists have not been able to detect radiation effects from natural levels of uranium. People who have ingested large amount of uranium have developed

symptoms of kidney disease. Animals treated with large amounts of uranium have also developed kidney disease. Since uranium can decay into other radionuclides, cancer risk is possible if one is exposed to decay products for long periods of time. Enriched uranium, which does not occur naturally, has a higher cancer risk because it emits more radioactive material. It is uncertain whether or not naturally occurring uranium causes reproductive effects in people. While most animal studies show no effects, some experiments have demonstrated reduced sperm counts when animals were exposed at very high concentrations.

HOW CAN URANIUM ENTER AND LEAVE MY BODY?

Most foods and water contain very low levels of uranium and our bodies are able to regularly cope with it. When you eat foods or drink water that contains uranium, most leaves within a few days through the fecal route. A small portion will enter your bloodstream and be eliminated through the urine. The remaining uranium can stay in your bones, kidneys and soft tissue. All or most people have a tiny amount of uranium in their bones. The radiation emitted from natural uranium found in the environment cannot penetrate your body. It has to be ingested or inhaled.

CAN URANIUM BE REMOVED FROM WATER?

Although the National Sanitation Foundation (NSF) does not currently certify any products for reduction of uranium, reverse osmosis, distillation, or anion exchange resins may be helpful. The United States Environmental Protection Agency has established a maximum contaminant level of 30 ug/L (parts per billion) for uranium in drinking water. Exposure to uranium above this level does not mean an adverse health effect will occur.