



Military Base

Depleted Uranium

Depleted uranium (DU) is the material left after most of the highly radioactive uranium-235 is removed from uranium ore for nuclear power and weapons.

- DU is used for tank armor, armor-piercing bullets and as weights to help balance aircraft.
- DU is both a toxic chemical and radiation health hazard when inside the body.

About Depleted Uranium

If someone asked you what uranium is used for, you would probably think of reactor fuel and nuclear weapons. However, uranium has other uses. Some of these other uses happen after the most radioactive parts of uranium ore have been extracted for nuclear reactor fuel and nuclear weapons. The left over part of the ore is called depleted uranium, or simply DU.

Uranium ore is a radioactive mineral that is abundant in nature. It is dense (1.7 times denser than lead) and actually contains several forms of uranium. Uranium-235 (U-235) is the most radioactive form and makes up only a small part of the ore. U-235 is removed from the ore for use in nuclear reactor fuel and nuclear weapons. The DU that is left is 40 percent less radioactive than the original uranium ore. The high density of DU makes it valuable for both industrial and military uses.

In the 1970s, the U.S. Department of Defense (DoD) began to search for a very dense metal that could penetrate the strong armor of tanks. The metals tungsten and DU were the top two choices. At the time, the U.S. Department of Energy was operating facilities that produced DU as a waste product. This meant DU was plentiful and cheap and therefore, it was chosen. DoD used DU to make bullets and mortar shells, very strong armor for tanks and weights to balance aircraft.

DU mainly emits alpha particle radiation. As a result, exposure to the outside of the body is not considered a serious hazard. However, inside the body, DU is a health hazard. Inside the body, the radiation it emits (alpha particles) directly affects living cells, and its chemical toxicity can cause kidney damage.

The first major use of DU in the battlefield was during the Persian Gulf War in 1991. During the war, approximately 20 U.S. soldiers were hit with DU fragments that became permanently embedded in their bodies. To date, studies have shown that these soldiers have not experienced health problems related to DU. In addition, their children, who were born after the war, have not shown any DU-related health problems, such as birth or developmental defects. There continues to be veterans with imbedded DU fragments under their skin, but health surveillance by the Department of Veterans Affairs Medical Center shows no medically significant health effects so far.

DU contamination of spent shells and shell fragments is a problem at some military firing ranges. However, due to its density, DU is only found as fine particles near facilities that manufacture or process uranium. DU's high melting point and high density help to ensure that it is not very mobile in air. However, fine DU particles can contaminate soil and water.

Rules and Guidance

U.S. DEPARTMENT OF DEFENSE (DOD)

DoD monitors soldiers who have or may have been exposed to DU. They provide DU education programs as part of soldier's training. DoD also cleans up many firing ranges where DU projectiles have been scattered.

U.S. DEPARTMENT OF ENERGY (DOE)

DOE has a Depleted UF₆ (uranium hexafluoride) Management Program to ensure that its DU supply is handled in a way that protects workers, the public and the environment.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

It is unlikely that the average person would come into contact with DU. However, EPA has taken steps to protect people from exposure. EPA sets Maximum Contamination Levels (MCLs) for uranium in drinking water. These MCLs apply to DU as well. EPA also sets limits for exposure by inhalation of DU around production plants. EPA has provided cleanup managers with recommendations that help keep their workers safe during the cleanup of sites contaminated with hazardous materials, including radioactive materials. EPA also collected a list of methods for testing soil and other samples for DU. This list helps people who clean up contaminated sites understand the special requirements for testing radioactive samples.

What you can do

It is highly unlikely for most people to come into contact with large amounts of DU. All people have uranium present in their environment and body at all times, from food, water and air. Because most DU is stored at government facilities away from the public, the chance of coming in contact with it is extremely low.

Where to learn more

You can learn more about depleted uranium by visiting the resources available on the following webpage: <http://www3.epa.gov/radtown/depleted-uranium.html#learn-more>.