# Depleted Uranium Information for Service Members and Their Families

*A Collaborative Effort of DHCC, USACHPPM, AFIOH, & NEHC*

**Revised: September 17, 2004**

Depleted Uranium, or DU, is a very dense metal used by the military to strengthen special armor on tanks and other equipment. It is also used to make weapons and ammunition that are strong enough to pierce through heavy armor. DU munitions were first used by the United States in combat in Operation Desert Storm. DU is currently the most effective metal to use in armor to protect service members or to use in armor-piercing weapons. It is also used as counterweights for some aircraft, to focus radiation in medical machines, and in containers used to transport radioactive materials safely. Some people may be concerned about exposure to radiation from DU. From a medical perspective, however, the level of radiation from DU is so low that it poses little if any hazard. Because DU is a heavy metal similar to lead, the potential exists for short-term kidney effects to people who are exposed to high levels of the substance. Few, if any, service members would come into contact with enough DU to incur this risk, however.

## FACTS ABOUT DU

DU is a remaining product of the naturally occurring heavy metal, uranium when it is enriched to make nuclear reactor fuel or nuclear weapons. Uranium is found in soil and water virtually everywhere, and we are exposed to small amounts of it everyday. We breathe it in dust, eat it with our food, and drink it in our water. It is not a rare or unusual exposure. Other daily sources of natural radiation include cosmic rays and some metals, such as potassium, that are found naturally in the ground and water. The Agency for Toxic Substances and Disease Registry estimates that there is an average of four tons of naturally occurring uranium in every square mile of earth one foot deep.

DU is produced during the process to enrich uranium. Enriched uranium contains far more of the isotopes of uranium than DU. DU is actually a remaining product from the enrichment process. Because DU has had much of its radioactive component removed, it is weakly radioactive and is 40 percent less radioactive than naturally occurring uranium.

## SCIENTIFIC CONCLUSIONS ABOUT THE RADIATION RISK FROM DEPLETED URANIUM

You may find DOD's perspective on DU unconvincing. Others have examined DU for many purposes, however, and their conclusions are shown below.

**RAND, 1999**. "(N)o evidence is documented in the literature of cancer or any other negative health effect related to the radiation received from exposure to natural uranium, whether inhaled or ingested, even at very high doses." Since DU is 40 percent less radioactive than naturally occurring uranium, it poses less of a radioactive risk.

**Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR) in 1999 Toxicological Profile for Uranium.** "No human cancer of any type has ever been seen as a result of exposure to natural or depleted uranium."

**United Kingdom Royal Society, May 2001**. "Even if the estimates of risk are one hundred times too low, it is unlikely that any excess of fatal cancer would be detected within a group of 10,000 soldiers followed over 50 years."

**European Commission, March, 2001 report.** "Taking into account the pathways and realistic scenarios of human exposure, radiological exposure to depleted uranium could not cause a detectable effect on human health (e.g. cancer)."

**World Health Organization, April, 2001 report.** "The radiological hazard is likely to be very small. No increase of leukemia or other cancers has been established following exposure to uranium or DU."

**European Parliament, April, 2001 report.** "The fact that there is no evidence of an association between exposures – sometimes high and lasting since the beginning of the uranium industry – and health damages such as bone cancer, lymphatic or other forms of leukemia shows that these diseases as a consequence of an uranium exposure are either not present or very exceptional."

## SAFE HANDLING AND USE OF DU

Because DU is a heavy metal and weakly radioactive, it has the potential to cause harm if you are exposed to large enough amounts. The Department of Defense has taken precautions to protect human health against this potential risk. DU used in

## Where can I get more information?

**DU Library**
http://www.deploymentlink.osd.mil/du_library/

**Depleted Uranium - FAQ Sheet**
http://www.va.gov/gulfwar/docs/DepletedUraniumFAQSheet.doc

**Environmental Exposure Report**
http://www.gulflink.osd.mil/du_ii/TAB%20P%20–%20DoD%20and%20VA%20Medical%20Surveillance

**Deployment Health Clinical Center**
www.pdhealth.mil

**USACHPPM Fact Sheet, Depleted Uranium – Individual**
http://chppm-www.apgea.army.mil/documents/FACT/65-050-0503.pdf

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weapons and armor is typically encased which makes it very difficult for people to come into direct contact with it. While both unfired DU munitions and intact DU armor emit very low levels of radiation, individual service members' exposure will vary depending on assigned tasks, the time spent near DU, the distance from DU, and the shielding that the DU had. In any case, service members' exposure would remain well below standards for workers set by U.S. regulatory agencies and are considered safe. For these reasons, the safe handling requirements for DU munitions are the same as non-radioactive ammunition. There are no special precautions needed because it is weakly radioactive.

### INTERNAL EXPOSURE TO DU

The most serious exposure to DU occurs when a large amount is taken into the body, absorbed by the blood, and then carried to tissues and organs where it can do damage. There are three primary ways that DU can enter your body. They are by ingestion (drinking or eating), inhalation (breathing dust), and through wound contamination or DU fragments embedded in the body. Skin contact or being near intact DU munitions or armored tanks will not cause this type of exposure or bring DU into your body.

US ground troops have the highest risk of exposure to DU if they are close to DU impacts or fires. DU dust can be inhaled during and immediately after DU munitions have struck a vehicle or if DU munitions are involved in a fire on the battlefield. DU dust can also be inhaled by people in or around armored vehicles after they are damaged by DU munitions. People near the crash of some aircraft may also be exposed to DU dusts from burning counterweights if the DU is exposed to prolonged intense heat. Even so, only those service members who were inside an unventilated tank struck by DU munitions would come into contact with enough of the substance to warrant medical testing.

### POSSIBLE HEALTH EFFECTS

Health effects from DU are similar to those from other heavy metals. Heavy metals like uranium, lead, and cadmium have the potential to cause harm when taken into your body at high enough doses. Most of the uranium that gets into your blood stream is filtered by your kidneys and removed from your body in your urine. Very high amounts of heavy metals like uranium are known to damage the kidneys.

### MEDICAL FOLLOW-UP AND FINDINGS

Since kidneys remove uranium, urine tests can identify when people have been exposed to higher than normal amounts of uranium, including depleted uranium. Since 1993 the Department of Veterans Affairs has evaluated 70 veterans of the 1991Gulf War who are survivors of friendly fire incidents involving depleted uranium munitions. About half of these veterans had or currently have documented embedded fragments still in their bodies and urine samples with elevated uranium.

Even though some participants in this group still show higher than normal levels of uranium in their urine, there have been no reports of kidney damage, leukemia, bone, or lung cancer, or

other health effects from uranium. Babies born to this group have had no birth defects.

Veterans of Operation Iraqi Freedom with confirmed elevated DU levels will also be followed medically. If they wish to participate in the VA program, they will be referred to the DU Follow-Up Program in Baltimore, MD. This program offers long term medical monitoring and follow-up.