Depleted Uranium - Individual

FACT SHEET 26-003-1116

GENERAL INFORMATION	Uranium is an element found naturally in soil, water, and mineral deposits. It is a slightly radioactive substance composed of three naturally occurring forms: U-238, U-235, and U-234. All three forms are found together in uranium ore. Depleted uranium (DU) is what remains after the more radioactive forms, U-234 and U-235, are removed from uranium ore when enriching uranium. Enriched uranium, which contains the more radioactive forms, is primarily used as fuel in nuclear reactors. All uranium, not just DU, is mostly U-238. Natural uranium and DU differ only in the amounts of each form. Depleted uranium is less than half (60%) as radioactive as natural uranium because there is less of the more radioactive forms (U-234 and U-235). Its chemical properties, which are the same for all forms of uranium, are responsible for many of the health effects of concern. Depleted uranium might also contain trace amounts of U-236 and other substances, such as plutonium, americium, and technetium. The amount of these other substances are so small that they have no effect on health or the environment and are very difficult to measure. Everyone has some uranium in their diet, and this uranium can be measured in the urine.
ROUTINE USES IN THE DEPLOYED SETTING	The United States Armed Forces have used DU in the manufacture of munitions, armor, and armor-piercing projectiles. Depleted uranium projectiles are capable of readily penetrating armor. Armor constructed with DU provides a high degree of shielding and resistance to penetration. During the 1991 Gulf War (GW), DU containing munitions were used on a large scale for the first time.
EXPOSURE SCENARIOS	When a vehicle is hit by a DU projectile, dust, smoke, fumes, and particles are formed. The inside of the damaged vehicle will therefore be contaminated with DU. This material can be found in many particle sizes, including those that can be easily inhaled or ingested. There is also the possibility that the occupants of the vehicle can be injured by DU fragments. In the event of a vehicle fire, the heat of the fire can cause any onboard DU ammunition to burn and spread additional DU contamination. Personnel in, on, or near (less than 50 meters) an armored vehicle when the vehicle is hit by a DU munition may be exposed to DU and are categorized as Level I. Other Soldiers may be exposed to DU while salvaging combat vehicles that have been disabled by DU rounds or fighting fires involving DU. These Soldiers are categorized as Level II. Level II personnel are expected to have lower exposures to DU than personnel in Level I. Personnel with incidental exposures, such as driving through smoke from a fire, are categorized as Level III. Simply riding in a vehicle with intact DU munitions or DU shielding will not result in an intake of DU.

U.S. Army Public Health Center
Health Physics Program
5158 Blackhawk Road
Aberdeen Proving Ground, Maryland 21010-5403
410-436-3502 or DSN 584-3502
http:/phc.amedd.army.mil

SIGNS AND SYMPTOMS OF ACUTE AND CHRONIC EXPOSURE	The clearest sign of exposure to DU is the presence of DU in the urine and feces, particularly the urine. The kidneys filter the blood, and waste products from the blood are passed to the urine. Depleted uranium is a heavy metal, like lead, and when there are large amounts in the body, DU can damage the kidneys. In all but very rare cases where there are substantial intakes, there will be no immediate noticeable effects from DU. However over time, filtering the DU could damage the kidneys. The major health concern related to DU exposure is kidney damage. Cancer is of secondary concern because the radiation dose from DU is typically quite small.
MEDICAL TREATMENT	If you are wounded with a DU or DU-containing fragment, the treatment will be based on removal of the fragment, just as if the wound was from a bullet. Some bullets are hard to remove, and the surgeons decide to leave them in place rather than damage tissue trying to remove them. If the fragments are left in the body, the amount of DU in the urine can be monitored to decide if the kidneys should be watched closely. Someone with a retained DU or DU-containing fragment is not “radioactive” and does not pose a risk to others. Individuals whose exposures are categorized as Level I or Level II are required to submit a urine specimen for DU analysis. For personnel in Level III, submitting a urine specimen for analysis is optional based on health care provider and patient concerns. If you are in this category and have concerns, please discuss them with your health care provider. If you have a chronic DU exposure, your health care provider will refer you to the Department of Veterans Affairs (VA) for additional follow up.
LONG TERM MEDICAL SURVEILLANCE REQUIREMENTS OF HEALTH EFFECTS MONITORING	Since 1993, the VA has been following a number of Gulf War veterans who were seriously injured in fratricide incidents involving DU. This cohort of Gulf War veterans contains about 80 individuals. These veterans are being monitored at the Baltimore VA Medical Center. In the 2013 surveillance project, 14 veterans were found to have higher than normal levels of uranium in their urine. These veterans are being followed very carefully and numerous medical tests are being done to determine if the DU fragments are causing any health problems. For all veterans in the program (including those with retained DU fragments), all tests for kidney function have been normal (though small differences in some urinary biomarkers have been detected in the higher urinary DU group). In addition, the reproductive health of this group appears to be normal in that all babies fathered by these veterans between 1991 and 1997 had no birth defects.
SPECIAL RISK COMMUNICATION INFORMATION	Exposure to DU (as an aerosol or as part of an embedded fragment) is only one of many potentially hazardous substances that Soldiers may be exposed to during deployment and combat operations. There are two potential hazards when large amounts of DU are taken in to the body. The first concern is the effect associated with heavy metal toxicity on the kidney. The second area of concern is the possible long-term effect related to DU’s low-level radioactivity. Follow up of individuals with retained DU fragments has not shown evidence of adverse health effects. Those individuals who show elevated DU in the screening urine bioassay are being followed as described in the previous section.