Brian Tomasik June 6, 2003
Position Paper on Depleted Uranium

Depleted uranium (DU), a form of the element uranium, is the subject of controversy because of its potential health and environmental impacts. Beginning in the 1950s, the U.S. Department of Defense began researching the use of DU in weapons because it was dense, pyrophoric (capable of igniting spontaneously in the air), and highly cheap and abundant. Today, in fact, it is given away almost free to the U.S. military and weapons manufacturers. DU is utilized in tank armor and "depleted uranium penetrators," which break through armor ("What"); it is also used in missiles and projectiles, in which its high melting point and density are ideal ("Depleted Uranium." January 2001). First widely used during the 1991 Gulf War, DU munitions were again employed in the Bosnian military intervention of 1995 and in the Balkans war in 1999 ("What"). The U.S. used over three hundred tons of DU ammunition in the Gulf War, while NATO used eleven tons in the Balkans in 1999 ("Depleted Uranium Weapons"). Of the U.S. tanks in the Gulf War, one-third were protected with DU armor ("Scientists"). The U.S. has also tested DU weapons in Vieques, Puerto Rico, as well as South Korea and Okinawa (Colligan). Apart from military functions, DU is used in hospitals as radiation shields, for transportation of radioactive substances, and as ballast in airplanes ("Depleted Uranium." January 2001). Low-level waste may also be "recycled" into consumer goods ("What").

Natural uranium occurs in trace amounts all over the earth (Johnson); 99.3 percent of it is the isotope U-238, 0.7 percent is U-235, and 0.006 percent is U-234. The length of an isotope's half-life is inversely related to the intensity of its radioactivity, so U-238, with a half-life of 4.5 billion years, is the least radioactive. U-235 has a half-life of 710 million years, while 250,000 years are required for half of U-234 to decay. As a comparison, the half-life of plutonium, which

can be mortiferous in minute amounts, is 24,000 years ("Depleted Uranium Weapons"). In order to increase the concentration of fissionable U-235, which is used in nuclear power plants, the process of uranium enrichment removes from natural uranium all of the U-234 and two-thirds of the U-235 ("Depleted Uranium." January 2001); the result is depleted uranium, which is 99.8 percent U-238 ("What"). DU is about 60 percent as radioactive as natural uranium ("Depleted Uranium." January 2001). Upon impact, about 20 percent of DU ignites to form uranium oxide particles in a fine aerosol smoke that can be inhaled ("Depleted Uranium Weapons"). These particles, which emit alpha, beta, and gamma radiation, often travel long distances in the atmosphere and may present a long-term risk to health and the environment ("What").

Internal exposure to DU, which would occur by inhalation or ingestion of these particles or exposure of dust and shrapnel to open wounds on the battlefield, could have chemical impacts on the body ("Depleted Uranium." January 2001), because DU, like lead, is a toxic heavy metal ("What"). Experimental animals exposed to uranium sometimes develop kidney damage, and according to the International Agency for Research on Cancer (IARC), a part of the World Health Organization, "some studies indicate that long-term exposure may result in damage to kidney function in humans. The types of damage that have been observed are nodular changes to the surface of the kidney, lesions to the tubular epithelium, and increased levels of glucose and protein in the urine" ("Depleted Uranium." January 2001). A 2002 report detailed the possibility that the soldiers most exposed to DU, such as those within tanks hit by DU or those responsible for cleaning contaminated vehicles, could suffer kidney damage (Reaney).

The metal may also have neurotoxic impacts, as dissolved DU often reaches the brain. Some have suggested that respiratory irritation from sand storms and oil fire smoke during the Gulf War could have weakened the nose/brain barrier in soldiers, enabling DU to more easily

reach and impair the central nervous system. Investigations into the records of 29 Gulf war veterans demonstrate a statistical correlation between DU levels and reduced performance on computerized tests ("Scientists").

Radiological effects, which are the only type of risk for external DU exposure, are also a concern ("Depleted Uranium." January 2001). However, since 95 percent of DU radiation is alpha ("Depleted Uranium Weapons"), which does not penetrate the skin but may cause damage inside the body, internal exposure is more likely to cause pernicious impacts ("Depleted Uranium." January 2001). Inhaled ceramic DU aerosols may remain in the lungs and nearby lymph nodes for a long time ("Depleted Uranium Weapons"), emitting alpha and beta radiation that can damage lung tissue and elevate the probability of lung cancer. If DU is absorbed into blood, it can travel to other areas, like bones, and may increase the cancer risk there, although the degree of danger depends on the level of exposure ("Depleted Uranium." January 2001).

In addition to potential chemical and radiological risks of uranium, DU may also pose a health hazard because it can, and in the Gulf War and Balkans was suspected to, contain traces of other detrimental substances, such as plutonium, actinides, and U-236, which is highly radioactive ("Depleted Uranium Weapons").

Environmental consequences of DU occur when the uranium dust is spread through the air; in arid regions, it is likely to remain near the surface of the soil, while it tends to travel deeper in areas with greater rainfall ("Depleted Uranium." January 2001). It may enter the food chain after being taken in by plants and animals (Johnson). Water contamination is also possible, and though tests in areas with DU dust have been negative, it may take years for the pollution to occur (Reaney). Any deleterious impacts of DU contamination would likely be chemical, rather than radiological, and would put children at greatest risk because their hand-to-

mouth propensity would allow for ingestion of DU from soil ("Depleted Uranium." January 2001).

Many researchers believe that DU may be a factor in "Gulf War Syndrome," which affects hundreds of thousands of veterans of that war (Johnson), as well as the multiplicity of diseases, including leukemia, that formerly healthy U.S. and NATO soldiers returning from the Balkans have developed (Colligan) ---mention reasons no in s. 6??--. A study in the medical journal, *Military Medicine,* reported that out of 27 American, British, and Canadian veterans with Gulf War Syndrome, fourteen still had DU in their urine nine years after the war, and a dead Gulf War veteran had DU in his lung and bone tissue (Johnson). Gulf War Syndrome is probably the result of a combination of many factors, such as the stress involved in and environmental exposures during the war, but because many of the symptoms are not exhibited by veterans of other wars, there must have existed novel causes, which may include the unprecedented levels of respiratory irritation from smoke and sand, as well as DU ("Scientists").

Several doctors in Iraq and the Balkans attribute a marked increase in health problems to DU. Aws Albaiti, an Iraqi doctor who worked in Baghdad from 1990 to 1999, believes that DU was responsible for an increase of leukemia and lymphomas twelve times in children and five to six times in adults (Colligan). In southern Iraq, birth defects occurred eleven times out of 100,000 in 1989, but by 2001, the frequency had increased to 116 per 100,000 (Johnson). The deputy director of the Hospital for Maternity and Children in Basra, Abdel Karim Hassan Sabr, explained that in 1993, congenital birth defects occurred with 1.8 percent frequency, but by 2000, the figure was over four percent, although the hospital hasn't looked at statistics from years before or in between and those numbers don't account for other factors. According to Sabr, "Couples here are afraid of getting pregnant. They are afraid of the birth defects"

(Schneider). Dr. Dragutin Ilic, who works in a hospital in Sarajevo, Bosnia, reports that lymphomas, leukemia, and other cancers have increased many times since the 1995 military intervention (Colligan).

--Military precautions

--law

The IARC fact sheet repeatedly acknowledged the inadequacy of the DU research performed so far: "The World Heath Organization (WHO) does not have enough information… to make firm conclusions [about the relationship of DU to greater incidence of leukemia in soldiers]….There are many gaps in knowledge about DU that need further research" ("Depleted Uranium." January 2001). Likewise, International Physicians for the Prevention of Nuclear War averred: "We cannot emphasize strongly enough…that an absence of evidence about health effects is not evidence that there are no health effects" ("Depleted Uranium Weapons"). Given the assortment of potential health and environmental effects of DU, ranging from kidney and neurological damage and elevated cancer risk to environmental contamination and a possible connection to Gulf War Syndrome and Iraqi birth defects, it would be egregiously irresponsible to continue the use of DU until several complete, independent, and peer-reviewed studies of all of the potential dangers of the metal, both short and long term, are conducted and evaluated. The precautionary principle, which states that if a substance is not proven safe beyond any doubt, it must be assumed to be harmful, should be applied to DU in establishing a worldwide moratorium on its use that would only be rescinded were DU demonstrated through independent and reliable studies to be nearly harmless, although this possibility seems, at best, highly unlikely.

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