



Depleted Uranium

What is Depleted Uranium?

Depleted uranium (DU) is a toxic heavy metal and the main by-product of uranium enrichment. Uranium left over from the enrichment process is called “depleted” because it has only about one-third as much U-235 as natural uranium. DU is not usable for nuclear weapons as it does not contain enough fissile material to sustain a nuclear chain reaction.

What is Depleted Uranium Used For?

DU has [several uses](#), both civilian and military. Due to its high density — almost 1.7 times denser than lead — the main civilian uses of DU include counterweights in aircraft and as stabilizers in maritime vessels. Because materials with high density are excellent at shielding gamma rays, DU is also used to make shielded containers for the transport of other radioactive materials that emit gamma radiation, as well as protective vests such as those encountered at the dentist and other medical settings. DU is also routinely recycled as part of the nuclear fuel cycle. For this, DU is mixed with plutonium to produce mixed oxide (MOX) fuel that is then run back through the reactor.

In the military realm, DU is used for armor-piercing munitions and penetrators because of its high density, its ability to self-sharpen as it penetrates its target, and its propensity to ignite on impact. Upon ignition, its temperature can exceed 600 degrees centigrade. The use of DU as ammunition has been strictly limited since the initial invasion of Iraq in 2003, with a few exceptions throughout Operation Iraqi Freedom and Operation Enduring Freedom. It is also used as a reinforcing armor plate on combat vehicles to defend against high velocity anti-tank rounds.

How Radioactive is Depleted Uranium?

DU is roughly 200,000 times less radioactive than enriched uranium. In comparison to other radioactive materials, neither natural uranium nor DU are particularly highly [radioactive](#). Only when uranium is enriched to produce material for nuclear reactors is the radiation level hazardous, requiring very careful handling and storage.

What are the Health Effects from Depleted Uranium?

[Health effects](#) from DU depend on the type of exposure, route of exposure, and where the exposure occurred. Effects due to external exposure only (but not from ingestion or inhalation) would be limited to ionizing radiation and generally do not pose a health threat. When DU enters the body through embedded fragments, wounds, inhalation, or ingestion, it can pose a chemical hazard to the kidneys. In general, DU is not considered a radiation hazard unless tiny insoluble particles — those incapable of being dissolved — are inhaled and lodged in the lungs. Long-term exposure has been shown to result in damage to kidney function, but at low doses risks of cancer are minimal. Generally, soldiers and those working in industrial and nuclear enterprises are the only ones exposed to DU.

Does Depleted Uranium Pose a Proliferation Concern?

On its own, DU does not contain enough fissile U-235 to pose a proliferation concern. DU is primarily composed of non-fissile U-238 and is not capable of sustaining the chain reaction necessary to power a nuclear reactor or result in a nuclear explosion.



Why are People Concerned About Depleted Uranium?

Public concern over DU stems from two residual fears. One, that it has lasting health effects on individuals deployed to war zones, and two, that it has long-term environmental impacts in post-conflict zones. While some [studies](#) have shown protracted health effects in veterans, the severity and duration of these effects has been dependent upon the specific exposure they encountered. Moreover, scientists have observed these effects to be reversible in some cases. With regard to environmental contamination, the World Health Organization has [found](#) localized effects in areas of conflict where large volumes of DU were stored or processed, but these effects were not found to have extensive toxicological impacts.