DU is a toxic heavy metal

- DU is chemically toxic, as is naturally occurring uranium,
- it is a heavy metal,
- the toxic effect depends on the amount taken into the body,
- the kidney is the most sensitive organ to uranium poisoning,
- the chemical toxicity of uranium leads to strong effects (poisoning) within hours or days after body contamination,
- radiological effects may occur after years.

DU is radioactive

DU emits three types of ionising radiation: alpha, beta and gamma. Exposure to radiation from DU:

- can be external (mainly by close contact of DU to the skin),
- can be internal (by inhalation or ingestion) and
- may result in increased risk of cancer. The magnitude of risk depends on the part of the body exposed (particularly the lungs through inhalation) and on the radiation dose.

The radiological toxicity comes from DU radioactive decay, mainly through emission of alpha particles. These particles do not have the ability to penetrate the skin. However, if ingested or inhaled DU dust may irradiate the lungs or gut (epithelium), thereby causing a radiation dose. The dose is most often very small from inhaled and ingested DU because of low air concentration or low oral intake.

At low levels of exposure, as expected in most post-conflict situations, the additional risk of cancer is thought to be very low. Importantly, any radiation effects based on DU occur only in the long-term, requiring typically 10-20 years before symptoms appear - if ever.

In those penetrators measured by UNEP, minute traces of plutonium exist, but on such low levels that this doesn't increase the overall health risks.

Risk of DU exposure in targeted areas

- by touching corroded penetrators and not washing hands afterwards,
- by picking up penetrators or fragments, and keeping them in a pocket for days/weeks
- via inhalation of DU dust, especially in the early stage (hours, days, weeks) after attack had taken place,
- via ingestion of DU debris and impacted soils, contaminated food (fruit, vegetables, meat, etc.) and drinking water.

Precautionary steps

- **Do not enter known DU targeted sites prior to site decontamination.**
- **If entry is necessary, wear personal protective equipment (PPE) including rubber boots, gloves and as a minimum a dust mask.**

- **Additional caution should be taken as DU is frequently used in combination with cluster bombs during an attack. Not all cluster bombs detonate during an attack and a few may still be present on such sites.**
- **Attacks may have also taken place in mined areas.**
- **If DU munitions are found or suspected, do not touch or pick it up.**
- **Mark the exact location with a flag and/or a circle of paint and leave it on site.**
- **Contact and inform the relevant authority about the finding.**
- **Only authorized personnel with PPE are permitted to handle DU.**
- **Authorized personnel will take the necessary health and safety precautions before removal and proper storage of DU.**
- **Effects of DU can be long-term with the resuspension of paricles and groundwater contamination. Therefore, local authorities should monitor the site on a regular basis.**

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Additional reading:

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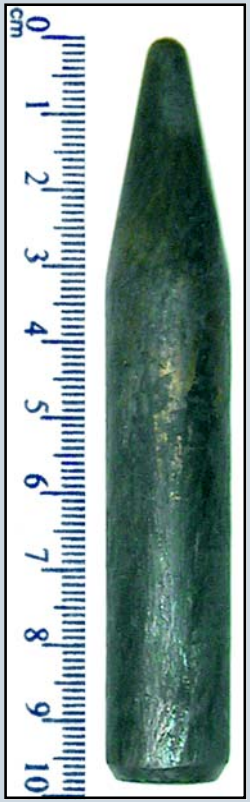
Depleted Uranium Awareness

Depleted uranium (DU) is a dense metal used in munitions for its penetrating ability and as a protective material in armoured vehicles. It is a toxic and radioactive heavy metal. The United Nations Environment Programme (UNEP) has been conducting environmental measurements on targeted DU sites in Kosovo in 2000, Serbia and Montenegro in 2001, and Bosnia and Herzegovina in 2002. In addition, UNEP was involved in the IAEA DU assessment to Kuwait in the spring of 2002. All these studies confirm that DU has environmental impacts. Health risks primarily depend on the awareness of people coming into contact with DU. Radiological and chemical effects of DU are likely to occur only under worst-case scenarios. UNEP DU reports always recommend precautionary action such as, measurements, signing, fencing and clean-up of the targeted sites to avoid possible health risks.



DU Penetrator in its original size

What is Depleted Uranium?

30mm DU munition: jacket and penetrator

Depleted uranium (DU) is a by-product from the process that enriches natural uranium ore for use as fuel in nuclear reactors and nuclear weapons. It is:

- highly dense,
- radioactive,
- a heavy metal with both offensive and defensive military applications.

Non-explosive radioactive metallic core bullets

- DU munitions are made of a non-explosive, solid metallic core bullet (called a penetrator).
- Tanks fire larger calibre rounds (105 and 120mm).
- Aircraft fire smaller calibre rounds (20 - 30 mm).
- DU is not confirmed to be used in bombs or missiles.

Anti-armour munition

Depleted uranium is used in anti-armour munitions because of its high density (19.0 g/cm^3; 50% higher than lead) and has several properties that make it ideal for this purpose.

Tank hit by DU munition

- When a DU penetrator hits armour or a hard surface, the rod begins to self-sharpen, thereby enhancing its ability to pierce the object. Casings/jackets do not penetrate.
- DU forms a cloud of finely dispersed particles in air (called "aerosol") during penetration. This may cause a dust explosion, since DU ignites spontaneously in contact with air (also called "pyrophoric").

A 30 mm GAU8 Gatling Gun

The amount of depleted uranium which is transformed into dust will depend upon the type of munition, the nature of the impact, and the type of target. The number of penetrators hitting a target depends upon many factors, including the type and size of the target. On average, not more than 10% of the penetrators fired by planes equipped with large machine guns hit the target (20 - 30 mm rounds). DU munitions which do not hit hard targets will penetrate into the soft ground or remain more or less intact on the surface. These will corrode over time, as metalic DU is not stable under environmental conditions.

What does it look like?

The intact DU munitions have the appearance of a greyish-black, non-metallic surface. Over time, DU reacts with air and moisture and forms a yellowish green surface. Lemon yellow uranium oxide particles are therefore often found around target areas.

The type of DU munition that aircraft use:

- has a cylindrical DU penetrator rod with a conical tip (25 and 30 mm ammunition),
- is approximately 95 mm in length and 16 mm in diameter at the base,
- weighs approximately 300 grams,
- has the penetrator fixed in an aluminium 'jacket' (also called 'casing'), with a 30 mm diameter and 60 mm length.

The type of munition that tanks use:

- Has an "arrow" consisting of a metallic DU rod about 300 mm in length,
- weighs between 3,9 and 4,9 kg depending on the calibre shot (105 mm /120 mm),
- is used in tank-to-tank battles.

A 120mm DU tank round opening in flight

Corroded penetrator (left) and 30 mm DU munition profile

When was it used?

DU munitions were confirmed to have been used for the first time in the 1991 Gulf War, followed by 1994-95 in Bosnia and Herzegovina, then 1999 in the Kosovo conflict, and finally 2003 in Iraq.

Where can you find it?

DU penetrators, penetrator fragments and jackets/casings can be found:

- lying on the surface,
- buried within shallow ground around targeted areas,
- in areas where tanks came into combat.

Most of the penetrators that impact on soft ground (e.g. sand or clay) will probably penetrate intact more than 50 cm into the ground and remain there for a long time. Only a small percentage of penetrators will give off DU dust or ricochet when hitting armoured vehicles or other hard surfaces (e.g. concrete).

Marked location of a DU penetrator

Casings/jackets:

- do not usually penetrate,
- can easily be found on the surface,

A full DU round found on a surface (penetrator already corroded)

- they are a further indicationthat DU was used,
- they are not radioactive in themselves, but are slightly contaminated where the DU round came into contact with the jacket.

Localized ground contamination
(i.e. a couple of grams of DU on the surface):

- occurs through dispersion and deposition (aerosolization) of fine DU particles immediately following an attack,
- occurs through weathering of metallic DU pieces with time,
- the area that is contaminated is most often very limited,
- over time, penetrators, smaller fragments and dust can gradually be dispersed on the soil surface mainly by rain water and thereby at the same time be diluted,
- wind can cause further redistribution, flowing water may also move smaller fragments and DU dust into the ground,
- the inner and outer surface of armoured vehicles that were destroyed by DU ammunition will often be heavily contaminated by DU dust.

Penetrator lying exposed on the surface

- **Even though DU has a relatively low radioactivity, as a matter a fact lower than that of natural uranium, it is prudent to undertake some precautionary steps prior to entering known targeted areas and vehicles. The following health risks should be taken into account.**

Health risks

Health effects depend on:

- the route and magnitude of exposure (ingestion, inhalation, skin contact or wounds),
- the characteristics of the DU (such as particle size, chemical form and solubility).