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Environmental Effects and Exposures

Exposure of Service members near impact of DU munitions:

The U.S. Army has studied the potential environmental effect of aerosols created when DU munitions hit an armored target. In 2004, the U.S. Army reported the results of the "Capstone Study", which was conducted by a team from the [U.S. Army](#), [Battelle Memorial Institute](#), [Pacific Northwest National Laboratory](#), [Los Alamos National Laboratory](#), and [Lovelace Respiratory Research Institute](#). This was a 2-part study composed of the [Capstone DU Aerosols Study](#), which analyzed DU aerosols produced in the [Abrams tank](#) and [Bradley Fighting Vehicle](#) struck by large-caliber DU munitions, and the [Capstone DU Human Health Risk Assessment](#), which used data from the first phase to calculate radiation doses and possible DU concentrations in the body. This estimated the health effect to Service members from DU exposure through contact with tanks and vehicles struck with DU munitions. These studies demonstrated that vehicle ventilation systems are very effective in reducing potential DU exposures of personnel inside vehicles. The risk assessment predicted little or no impact on health of Service members who breathe in DU dust particles while inside tanks or other vehicles hit by DU munitions. A summary of the findings and conclusions are contained in the [U.S. Army Capstone Depleted Uranium Aerosols Study & Human Health Risk Assessment Fact Sheet](#).

Exposure of civilians to DU in the environment:

Any civilian exposures to DU in the environment would in nearly every case be lower than the amount of DU inhaled by Service members in a vehicle struck by DU. Based on the projection of military exposures and risks, these civilian exposures would result in little or no risk to health.

Based on measurements made by outside organizations, including the United Nations Environment Programme, observable health effects are not expected from depleted uranium in the environment. The most likely mechanisms through which depleted uranium could be taken into the body of a civilian visiting or living in an area where DU had been used in combat include:

- **Inhalation:**

A potential exposure pathway for those visiting or living in DU affected areas after the aerosols have settled is the inhalation of DU particles in the soil that have been re-suspended through the action of wind or human activities. The risk will be lower because the re-suspended uranium particles combine with other material and increase in size and, therefore, a smaller fraction of the uranium inhaled will reach the deeper parts of the lungs.

- **Ingestion:**

Another possible route of exposure is through the ingestion of DU contaminated soil. For example, farmers working in a field where DU ammunitions were fired could inadvertently ingest small quantities of soil, while children sometimes deliberately eat soil.

In the long term, small amounts of DU may gain access to ground water and the food chain through migration from the soil or direct deposition on vegetation. Over time, chemical weathering may cause the DU in munitions left in the ground to corrode. Some of the DU in the soil will be soluble and migrate to surface and ground water from where it eventually may be incorporated into the food chain, or consumed directly. It is difficult to predict how long it would take before increased levels of DU could be measured in water and food. The associated risk from ingestion of food is generally low, because uranium is not effectively transported in the food chain.

Publications by other organizations on this subject include the following:



[International Atomic Energy Agency](#)

The International Atomic Energy Agency, in Vienna, Austria, an agency of the United Nations, has addressed the potential environmental risks to the public and citizens of countries where depleted uranium has been used, and has published a [pamphlet](#) describing its findings. It noted that the only remediation that might be necessary, depending on the circumstances, would be removal of munitions and, perhaps, tanks or vehicles struck with DU munitions.

The Agency also noted that DU munitions do not present a significant radiological risk. More of its opinions about the effects on the environment are included [here](#).

In February 2002, at the request of the Kuwait Government, the IAEA sent a team of senior international experts to assess possible long-term radiological impacts of DU residues at 11 locations in Kuwait. An [IAEA investigation](#) in Kuwait has found that depleted uranium (DU) from munitions used in the 1991 Gulf War does not pose a radiological hazard to the people of Kuwait.



[Properties, use and health effects of depleted uranium \(DU\): a general overview, Bleise, Denesi and Burkart, Journal of Environmental Radioactivity: 64:93-112 \(2003\)](#)





[Depleted Uranium in Serbia and Montenegro, Post-Conflict Environmental Assessment in the Federal Republic of Yugoslavia, United Nations Environment Programme \(2002\).](#)

[Depleted Uranium in osovo, Post -Conflict Environmental Assessment, United Nations Environment Programme \(2001\).](#)

[Depleted Uranium in Bosnia and Heregovina, Post-Conflict Environmental Assessment, United Nations Environment Programme \(2003\).](#)



[International Committee of the Red Cross](#)

The International Committee of the Red Cross [tested ICRC workers](#) in areas of western Kosovo involved in combat, and found no evidence of increased uranium exposure. Currently available scientific information provides evidence that the increase in levels of uranium is marginal in areas where depleted uranium munitions have been used, except at the points of impact of depleted uranium penetrators.

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