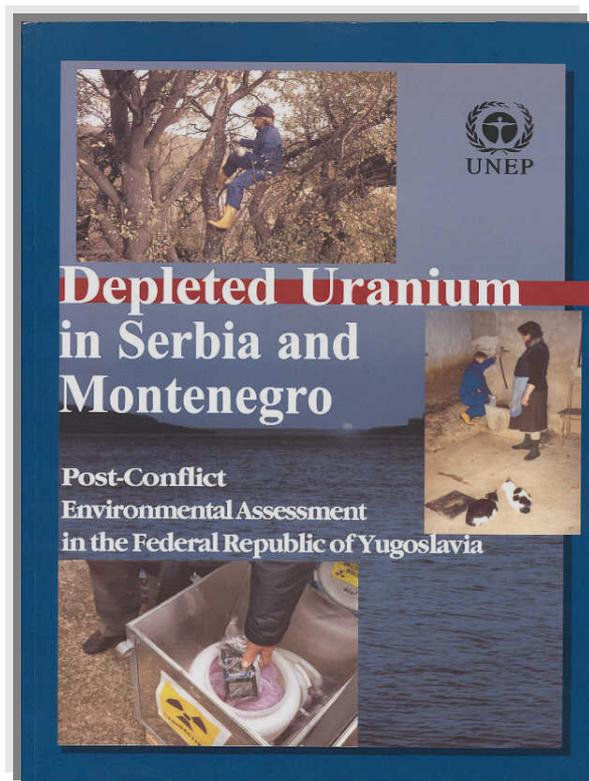


## Is depleted uranium a threat to health and the environment?

This issue has come to the fore in recent years now that Norwegian military personnel have been sent to regions of the world where ammunition made of depleted uranium has been used. A number of surveys have been conducted in the Balkans, so far indicating no health hazards to people present in these areas. However, the latest international surveys show that contamination may be long-lasting. Tonje Sekse represented the Norwegian Radiation Protection Authority at the United Nations Environment Programme's (UNEP) inspection tour to Serbia and Montenegro in the autumn of 2001. The report, entitled "Depleted uranium in Serbia and Montenegro - Post-Conflict Environmental Assessment in the Federal Republic of Yugoslavia" was published by UNEP in March 2002.



There has been much talk in recent years of the use of ammunition containing depleted uranium, and the potential health hazards. Depleted uranium was used in the Gulf war in 1991 and in the war in the Balkans in the spring of 1999.

A number of international and national institutions have studied and assessed the consequences of using ammunition containing depleted uranium, and have published their conclusions. They include the World Health Organisation (WHO), the United Nations Environment Programme (UNEP), the EU and Britain's much respected Royal Society.

### Utilisation of depleted uranium

Depleted uranium is a waste product of the process of enriching natural uranium for use in nuclear reactors or nuclear weapons. Hence the metal is very cheap to procure. Its high density (considerably higher than lead) combined with high heat tolerance mean that projectiles made of depleted uranium are highly penetrative. These characteristics also contribute to depleted uranium's immense versatility. It is used in yacht keels and as balancing weights in commercial aircraft. Above all it is used as shielding in containers for transporting radioactive material. Depleted uranium has long been subject to stringent control thanks to the International Atomic Energy Agency's (IAEA) endeavours to prevent countries with nuclear weapons programmes from obtaining materials

needed to make their own nuclear weapons. The use of ammunition containing depleted uranium may cause difficulties for the IAEA ensuring that the metal is not used for the wrong purposes.

## Projectiles made of depleted uranium



*Projectile made of depleted uranium*

It is not only the health aspect that is controversial; the origin of the depleted uranium used in ammunition is equally contentious. Analyses of projectiles made of depleted uranium shows traces of uranium and plutonium isotopes that are not found in natural uranium, indicating that the uranium has been irradiated in a reactor. Not only waste material from the production of nuclear fuel has been used, but also waste products of fuel burnt-out in nuclear power stations.

## UNEP inspection in Kosovo, autumn 2000

In the autumn of 2000, UNEP conducted an inspection in Kosovo where sites attacked with ammunition containing depleted uranium were examined. Samples were taken of soil, biological material such as lichen, bark and moss, water and milk. In addition, field investigations were carried out to search for beta and gamma radiation that could indicate extensive contamination by depleted uranium. Depleted uranium projectiles that were found were also analysed. The survey showed that soil contamination was confined to spots where projectiles had hit the ground or been found. No radioactive contamination was found in water or

milk, although traces of depleted uranium were found in biological material.

## UNEP inspection in Serbia and Montenegro, autumn 2001

In the autumn of 2001, UNEP conducted a new investigation in Serbia and Montenegro. The sites examined were selected by UNEP on the basis of NATO's list of sites where ammunition containing depleted uranium had been used.

The following criteria were employed: The number of projectiles fired, various environmental factors, and the safety of mines and other explosives.

This investigation differed essentially from the one in Kosovo the previous year. All the sites had been thoroughly searched shortly after the attack, cleared, fenced and marked by the Yugoslav authorities. In other words, all projectiles and other items lying on the ground had been removed by the time UNEP examined the sites.

The fenced areas were examined thoroughly using field instruments. Each area was covered by persons proceeding in a line, metre by metre. Contaminated points were marked, and in some cases digging was carried out to locate projectiles.



*NRPA representative with instruments for measuring gamma and beta radiation*



*Examining a fenced area using field instruments*

The Yugoslav authorities subsequently decontaminated the marked spots. In addition samples of soil, water, air and biological material were taken. Biological material was taken to ascertain air concentrations of uranium during the attack. Soil samples from some sites revealed dispersed radioactive contamination of soil within a radius up to 100 metres from the presumed target. This suggests that projectiles hitting the ground had disintegrated, and that airborne small particles had spread over a wide area. No radioactivity in excess of normal levels was found in the water samples, whereas analyses of air filters showed in some cases a somewhat higher-than-natural occurrence of radioactivity. This may be due to normal variations, but could also be caused by digging for projectiles in the immediate vicinity of the air sampling device causing small uranium particles to swirl up into the air.

A tank hit by a depleted uranium projectile was also examined. Contamination was revealed at the point of impact, but the conclusion was that provided the tank was properly decontaminated it could be put back into service without risk.



*Soil sampling while digging for projectiles*

## **Health hazards associated with the use of depleted uranium**

So far no indications have been found that depleted uranium used in projectiles represents a health hazard for people present in areas where ammunition containing depleted uranium has been used. For people present in the locality during the actual attack, there is insufficient data available to draw a definite conclusion about possible damage to health. Most projectiles containing depleted uranium are probably in the ground. These cannot be detected using field instruments since the range of such instruments extends only 10-20 cm into the ground. In the course of the next 20 years or so, the projectiles will probably have corroded and the depleted uranium may then constitute a risk to people using the groundwater. Continual sample-taking of the groundwater is recommended in areas hit by ammunition containing depleted uranium. This is to ensure that the local population is not exposed to quantities of uranium higher than normal levels, i.e. higher than the guideline set by the World Health Organisation (2 micrograms of uranium per litre).



*Sampling groundwater in Serbia*

The use of depleted uranium in ammunition has been contentious, and the term "radiation" is ominous to most people. The conclusion drawn from our investigations is that providing that areas where depleted uranium has been used are properly cleaned, there does not appear to be any "acute" threat to human health, either to military personnel or the local population. To our knowledge, Norwegian soldiers serving in the Balkans during the war in the spring of 1999 were not present in areas where ammunition containing depleted uranium was used. Recent international investigations concur with UNEP's latest report that while depleted uranium is of little consequence for health, contamination of the environment may be long-lasting.

## Relevant publications

**StrålevernRapport 2001:7:** "Helseeffekter ved bruk av utarmet uran i Kosovo-konflikten"

**UNEP 2002:** "Depleted uranium in Kosovo - Post-Conflict Environmental Assessment"

**UNEP 2002:** "Depleted uranium in Serbia and Montenegro - Post-Conflict Environmental Assessment in the Federal Republic of Yugoslavia"  
<http://postconflict.unep.ch/publications/dureports/ermont.html>.