



Depleted Uranium in Serbia and Montenegro

Post-Conflict
Environmental Assessment
in the Federal Republic of Yugoslavia



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Post-Conflict Environmental Assessment

Table Of Contents

Foreword	6
by UNEP Executive Director	
① Introduction	8
② Background	11
2.1 UNEP's role in post-conflict environmental assessment	12
2.2 Depleted uranium	13
2.3 Assessing the risks	15
③ UNEP Mission	18
3.1 Mission objectives	18
3.2 Composition of the team	20
3.3 Selection of sites	21
3.4 Fieldwork, sampling and laboratory analysis	22
④ Findings	24
⑤ Conclusions	32
⑥ Recommendations	36
⑦ Site-by-site findings	38
7.1 Pljackovica	38
7.2 Vranje garrison-investigation of a DU-targeted military vehicle	46
7.3 Borovac	48
7.4 Bratoselce	55
7.5 Bukurevac	61
7.6 Reljan	65
7.7 Cape Arza	70

Appendixes

A	Risk Assessment	79
B	Prerequisites and Limitations	91
C	Methodology and Quality Control	94
D	Military use of DU	116
E	Military vehicle (APC) at Vranje Garrison	118
F	Storage of DU at the Vinca Institute of Nuclear Sciences	120
G	DU in Soil	124
H	DU in Water	130
I	DU in Air	134
J	Bio-indicators of DU	140
K	Analysis of DU Penetrators and Fragments	152
L	Theoretical assessments of external radiation from DU	157
M	Project proposal	166
N	List of NATO Coordinates	168
O	Formulas and Data	169
P	Discussion of Health issues	179
Q	Units	184
R	Glossary	186
S	References	191
T	List of Contributors	198



Foreword

This report by the United Nations Environment Programme (UNEP) on the environmental impacts of depleted uranium (DU) is a direct follow-up to last year's report, *Depleted Uranium in Kosovo - A Post-Conflict Assessment* (2001), and once more brings additional scientific information on DU.

UNEP's work on DU started in the summer of 1999, when we carried out an assessment of the impacts of the Kosovo conflict on the environment and human settlements. As part of that review, UNEP conducted a Desk Assessment study of the potential effects of the possible use of DU during the conflict. In 2000, the North Atlantic Treaty Organisation (NATO) provided UNEP with new information concerning the use of DU during the Kosovo conflict. This information included maps, amount of DU ammunition used and coordinates of the targeted areas. It enabled UNEP to carry out the first-ever international assessment on the environmental behaviour of DU following its use in a real conflict situation.

Following the publication of the report, the work on DU in the Balkans was, however, not closed. During the Kosovo conflict, a small number of sites outside Kosovo, in Serbia and Montenegro, had also been targeted with ordnance containing DU. To reduce uncertainties about the environmental impacts of DU, it was evident that a second phase of scientific work would be needed.

This second phase has now been carried out in Serbia and Montenegro, starting with a field mission in October 2001 to collect samples, followed by laboratory work during the winter and the early spring.

Our new study provides additional information and reveals important new discoveries on the environmental behaviour of DU. We learn that still, more than two years after the end of the conflict, particles of DU dust can be detected from soil samples and from sensitive bio-indicators like lichen. However, as the levels were extremely low, it was only through the use of state-of-the-art laboratory analyses that detection could be achieved. Based on our findings, UNEP can confirm that contamination at the targeted sites is widespread, though no significant level of radioactivity can be measured.

Furthermore, during this assessment the UNEP team used modern air sampling techniques and detected airborne DU particles at two sites. While all levels detected are still below international safety limits, these results add valuable new information to the scientific body of knowledge concerning the behaviour of DU and have important implications for site decontamination and construction works.

During the mission to Serbia and Montenegro, a serious health concern potentially related to DU was presented to UNEP. This information was forwarded to WHO, as the competent United Nations agency on health issues. The original claim and the formal WHO response

are included in this report.

Based on our findings, our recommendations remain the same as those we outlined in the previous Kosovo DU study. Future monitoring is clearly needed, as well as awareness-raising for the local population. Clean-up and decontamination has already started in both Serbia and Montenegro, and detailed recommendations on these issues are given in this report.

Once more, I would like to reiterate the precautionary words already used in our Desk Assessment in 1999 and repeated in the Kosovo report of 2001. The guiding principle for UNEP on the issue of DU is the protection of the environment and human health. Therefore I believe that the information gathered by our team of scientists during this latest assessment will be most useful in further advancing the analysis and understanding of the dimensions and complexity of DU.

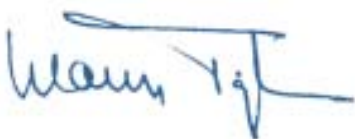
During this challenging work, our cooperation with both civil and military authorities, as well as with scientific institutions representing the Federal Republic of Yugoslavia and the republics of Serbia and Montenegro, has been excellent. Their preparations and support during the mission have helped this work in many ways.

UNEP has also been in the fortunate position to cooperate with several excellent research institutes when addressing the challenging task of understanding the environmental impacts of DU. The close cooperation with our colleagues from the International Atomic Energy Agency (IAEA) and the World Health Organization (WHO) has been an important factor throughout the process. Without the professional work by the national institutes of Greece, Italy, Norway, Russia, Sweden, Switzerland and the United States, this work could not have been conducted in such an efficient manner, ensuring the highest quality results.

I also have the pleasure of expressing my sincere appreciation to Mr. Pekka Haavisto, who again accepted the demanding task of leading the mission and directing UNEP's work on DU.

Several governments, including those of Greece, Italy, Norway, Russia and the United States, have provided in-kind contributions to this assessment. Above all, my gratitude goes to the government of Switzerland that provided us with both laboratory expertise and generous financial support.

In addition to the recommendations provided in this report, UNEP strongly encourages further assessments to be undertaken in other regions where DU has been used in earlier conflicts in order to reduce uncertainties about its potential environmental impacts in the longer term.



Klaus Töpfer
United Nations Under-Secretary-General
Executive Director of the United Nations Environment Programme



Introduction

In March 2001, UNEP published the first-ever assessment of the environmental risks associated with the use of depleted uranium weapons in a real combat situation.

The publication, entitled *Depleted Uranium in Kosovo - A Post-Conflict Assessment (2001)*, was well received by stakeholders in Kosovo as well as by the international scientific community. The report helped alleviate some of the public concern about DU by scientifically demonstrating the low contamination levels and by providing recommendations to reduce risks at affected sites. The UNEP results were debated in the media and in numerous international seminars and workshops throughout 2001. During this time, five major studies were also published on medical issues and risks arising from DU. None of the studies contradicted the findings of the UNEP study.

Already in autumn 2000, UNEP was invited by Yugoslavian authorities to carry out similar

DU studies at targeted sites in Serbia and Montenegro. UNEP accepted the invitation and the results of the work in Serbia and Montenegro are contained in this report.

This study investigated five of the eleven sites that were struck with DU ordnance in Serbia, the single site that was hit in Montenegro and one targeted military vehicle. The sites were independently selected by UNEP experts based on the quantity of DU used, as well as on environmental and security considerations and population density. In addition, the mission considered safety issues regarding the storage of DU at the Vinca Institute of Nuclear Sciences in Belgrade. A scientific report made by the IAEA regarding the condition of this facility is included in this report.

The assessment team consisted of 14 international experts and the mission was conducted from 27 October to 5 November 2001. During the mission, a total of 161 samples were collected, including 69 vegetation, 54 soil, 17 air, 11 water, and 4 smear samples. Three penetrators and three penetrator fragments were also collected. Sample analyses were conducted by the Spiez laboratory in Switzerland and the ANPA laboratory in Italy.

In terms of improving our understanding of the environmental behaviour of DU, this report contains five new and significant findings.

First, detailed laboratory analyses of soil samples revealed low levels of widespread DU contamination at five of the six study sites. This indicates that during the conflict, DU dust was widely dispersed into the environment following the explosion of DU rounds. No DU was detected at the sixth sample site in Bukurevac.

Second, the penetrators recovered by the UNEP team had decreased in mass by 10-15 % due to corrosion. This has important implications for decontamination approaches as well as for future risks of groundwater contamination and monitoring needs.

Third, the military vehicle investigated during the mission was targeted by DU, but only low levels of contamination were detected. In this specific case, decontamination can be conducted by removing the remaining DU fragments and wet cleaning the interior and exterior

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