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The use of depleted uranium ammunition during NATO aggression against the Federal Republic of Yugoslavia

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INTRODUCTION

It is well known that DU (depleted uranium) weaponry was extensively used during the "Desert Storm" operation in Iraq. There is no doubt that NATO used DU ammunition in Bosnia in 1994 and 1995. It is also common knowledge that many NATO armies are equipped with DU ammunition in various calibres (from 20 up to 155 mm) as a standard part of certain weapon systems. These facts, as a result of literature research, as well as Yugoslav Army (YA) intelligence data on the eve of the aggression clearly showed that NATO most probably would use DU ammunition.

PREPARATIONS

It was estimated that if the aggression happened NATO would definitely fire 30mm DU rounds from seven barrels gun on the A-10 "Thunderbolt" aircraft. If it came to the deployment of NATO ground forces, all other calibres of DU ammunition would be used as well. Fortunately, NATO ground forces were not deployed and only 30 mm DU rounds were fired during the aggression.

Literature research showed that the "Tomahawk" Cruise Missiles contained DU in their tips to provide weight and stability. It caused a great concern that DU contamination and its affection on human health and environment in Federal Republic of Yugoslavia (FRY) might be similar to the situation in Iraq after the Persian Gulf War. According to the above mentioned conclusions appropriate preparations were ordered and carried out. They included specific protective measures for individuals and units, as well as instructions for chemical and radiological survey and investigation of target sites.

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FACTS AND FINDINGS

Evidences of DU ammunition usage are:

1. Solid pieces of 30 mm API PGU 14/B DU rounds found at the sites attacked by the A-10 aircraft;
2. Presence of U-238 above normal local levels and radioactive contamination of soil at the target sites;
3. UN Secretary General's official statement on the locations of DU usage during aggression on FRY, as well as a list of NATO coordinates (data concerning the possible locations of depleted uranium ordnance expended in Kosovo);
4. UNEP Investigation Report (Depleted Uranium in Kosovo - Post-Conflict Environment Assessment)

During the aggression special NBCD (Nuclear-Biological-Chemical Defense) and other YA units recorded the locations that were attacked by A-10 aircraft. In that way, YA managed to keep pretty good records on the locations of the use of DU[1]. Some of these locations were investigated according to the combat situation in the field. Besides military, many civilian institutions were engaged, especially in investigation the sites that were hit by cruise missiles in order to check the presence of DU.

Immediately after the aggression NBCD units started to investigate locations outside Kosovo and Metohija Province (KMP) (Table 1).

Table 1. Table of sites investigated by UNEP (in Kosovo and Metohija Province)

Site No.	Targeted site		NUMBER OF DU ROUNDS		
	NATO sources	YA sources	Fired	Found	% found
1	Gjakove/Đakovica	Confirmed	300	2*+30***	10.6
2	Vranoc/Vranovac	Nonconfirmed	**2.300**	**0 ?**	**0**
3	Radoniq/Radonjić	**Nonconfirmed**	655	1*+1**+9***	1.7
4	Irzniq/Rznić	Confirmed	532	5***	0.9
5	Pozhare/Pozar	Confirmed	**945**	**0 ?**	**0**
6	Rikavac	**Nonconfirmed**	400	2***	0.5
7	Ceja	Confirmed	290	2*+4**+1***	2.4
8	Planeje/Planeja	Confirmed	970	2*+1**+1***	0.4
9	Bellobrade/Belobrod	**Nonconfirmed**	**1000**	**0 ?**	**0**
10	Kuke/Kukovce	Confirmed	500	1*	0.2
11	Buzesh/Buzec	**Nonconfirmed**	**200**	**0 ?**	**0**
Totals			**8.112**	**8*+6**+48*****	**0.76**

* - penetrators
** - jackets
*** - contamination points
? - no comment

It was done by field measurements of beta and gamma radiation ("line-up-survey") as well as field sampling. Soil samples and remains of DU ammunition (penetrators, jackets and fragments) were analysed by "Vinča" Institute for Nuclear Sciences, Institute for Workers Medical Protection in Niš, Faculty of Mathematics an Natural Sciences in Novi Sad, Military-Technical Institute in Belgrade, Military Medical Academy in Belgrade and Public Institution Centre for Eco-toxicological Research in Podgorica. Results proved the existence of radioactive contamination[2] on six locations (excluding Kosovo and Metohija Province). Five of them are in Serbia (close to Vranje, Bujanovac and Presevo) and one is in the Republic of Montenegro. Basic characteristics of these locations (Figure 1) are:

1. Borovac, 2 locations - 10 km south of Bujanovac. Attacked on May 26th 1999. DU radioactivity level measured in soil samples is 1 to 87 times above normal (250 -17490Bq/kg).
2. Bratoselce - 10 km northeast of Preševo. Attacked on May 27th 1999. DU radioactivity level is 9 to 116 times above normal (1800 to 23400 Bq/kg).

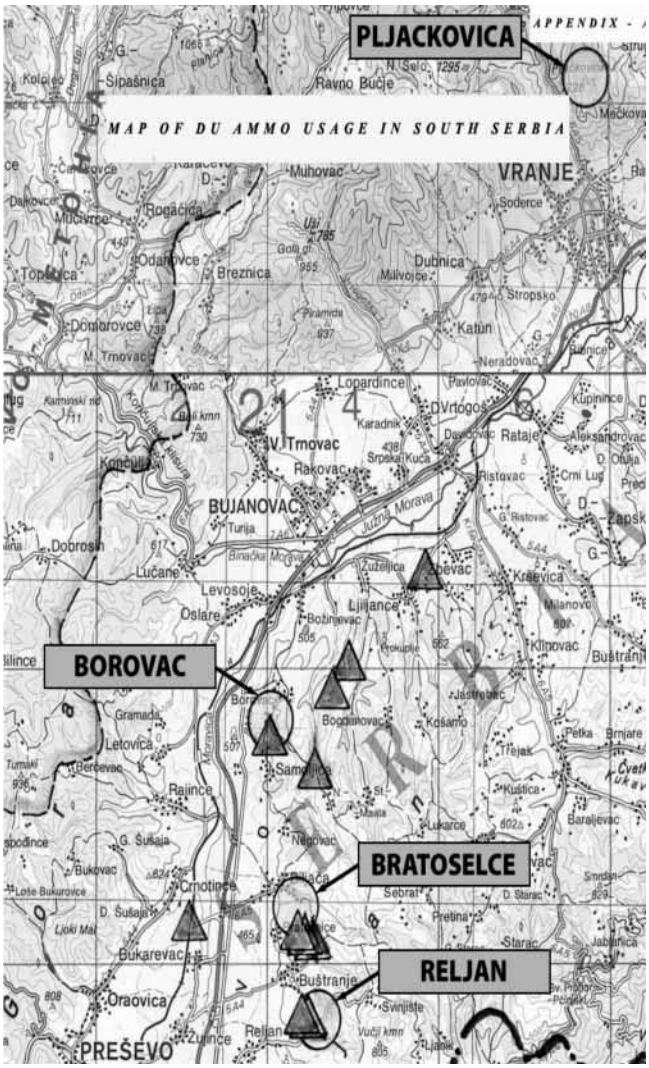

Figure 1. Map of DU AMMO usage in South Serbia

3. Reljan - 10 km east of Preševo. Attacked on May 28th 1999. DU radioactivity level is several times above normal.
4. Pljačkovica - RTS TV repeater, 4 km north of Vranje. Attacked on May 29th 1999. DU radioactivity level is 230 to 1100 times above normal (5580 to 235000 Bq/kg).
5. Cape Arza, citadel area on Lustica peninsula, Republic of Montenegro. Attacked on May 30th 1999. DU radioactivity level is 7 to 350 times above normal (1450 to 7000 Bq/kg).

Total contaminated area outside Kosovo and Metohija Province consisting of the above-mentioned locations is 3.1 hectares. Approximately 3000 to 5000 DU 30 mm rounds were fired on these locations. Since a round contains 297 g of DU, it makes a contamination with 1 to 1.5 tons of DU.

Based on the field work experience and on the results of laboratory analysis following should be outlined:

- Investigation started when the traces of DU rounds were easily noticeable on the ground;
- Specific radioactivity of penetrators were above 10 MBq/kg;
- Specific radioactivity of jackets was 20 kBq/kg;
- Penetrators were found both lying on the surface and buried in the ground (up to 1m in depth);
- Penetrators which are buried more than 20 cm in the ground can not be detected by monitoring instruments and the radioactivity level on the ground surface above them is on natural level;
- No traces of burning of penetrators were found;
- Detectable ground surface contamination was in the vicinity of the holes caused by DU penetrators impact;
- No widespread contamination of the ground surface was found and the nature of DU contamination on each of the locations investigated is of the "spot type";
- All the sites that were hit by cruise missiles were investigated and no traces of DU were found.

It is very important to know exact locations of DU usage. More than a year after the aggression NATO provided a list of coordinates of 91 sites on which in 121 strikes 31000 DU rounds were fired.

According to YA records NATO fired about 50000 DU rounds on 90 locations. The differences can be illustrated on the map of southern Serbia (Appendix-A). we were not able to investigate target sites in Kosovo and Metohija Province. UNEP conducted field investigation in Kosovo and Metohija Province. An expert team made environmental assessment with assessing the risks and recommendations. With no intention at all to challenge any part of the UNEP report it should be mentioned that it is not so clear weather conclusions are fully correct.

With no intention at all to challenge any part of the UNEP report it should be mentioned that a small number of penetrators, jackets and contamination points (see table - Appendix-B) found in the

field gives a reason to discuss validity of the conclusions.

CURRENT AND FUTURE ACTIVITIES

Complex actions aimed on reducing any hazardous effects of DU started even before the aggression. The first step was anticipation that DU weaponry would be used. Precise recording of the target sites was the next step, followed by the investigation of target sites outside Kosovo and Metohija Province. So far following activities have been done:

- Radiological survey of six contaminated locations outside KMP (it has been done three times, periodic control has been planned); area and assessment of its influence on the environment;
- Fencing off contaminated locations and the placement of warning signs ;
- Decontamination of ground on Cape Arza, Republic of Montenegro (a part of the location is still to be decontaminated);
- Medical examination of about 1800 people, which were in or very close to target sites (Various methods were used and final examination of critical group of potentially contaminated persons is in progress, any contamination with DU has not yet been found);
- Removal of remains of DU ammunition found and radioactive contaminated soil (more than 100 penetrators, a large number of fragments and several hundreds kilos of radioactive soil have been collected and stored). Main activities in the future should comprise: Cleaning up of contaminated locations; Disposal and storage of radioactive waste; Developing long term monitoring system in affected areas.

As a country we are the most interested that this problem is properly defined, and we have the possibilities for such activities. Initiatives for forming independent international commissions, which would work in cooperation with our authorities, are worth considering.

1 In a letter dated Feb 7,2000, NATO Secretary General confirmed to UN Secretary General that. "DU rounds were used whenever the A-10 engaged armour during Operation Allied Force".

2 Nuclear-Biological-Chemical Defense Department of Yugoslav Army, in cooperation with " Vinca " Institute for Nuclear Science and several other relevant institutions in FRY, determined radioactivity U-238 in a soil sample of 200 Bq/kg as a lower limit of contaminated area. In the areas of investigation the highest radioactivity caused by natural ura nium is 50 Bq/kg