Uranium Weapons Cover-ups - a Crime against Humankind

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...They are no more
All powerful.
As their secrets
Are unfolded... -- Afon Claerwen, 28 November 2002

Abstract

Key words: radiological weapons, humanitarian law, crimes against humanity, information warfare

Munitions that contain low-grade uranium 235 – insufficient to trigger nuclear explosion – are chemical-radiological weapons. They contain other toxic-radioactive elements and have indiscriminate effects. They are illegal by virtue of international conventions, laws and customs of war. When used in populated areas or in the presence of numerous troops (enemy or friendly), they become weapons of delayed but mass destruction (WMD). Fatal consequences of depleted uranium (DU) armour-piercing ammunition emerged in veterans and civilians after wars in the Persian Gulf and the Balkans. While the victims remain neglected, hundreds of tons of uranium from weapons developed in recent years against hard and buried targets have polluted Afghanistan. Up-coming war scenarios involve larger chemical-radiological contamination potential.

The military, governments, and nuclear and weapon industries fail to or inadequately disclose the effects of uranium weapons, and manipulate inquiries of international health organizations. The media act as a propaganda outlet for these groups. The purpose of Information Operations behind the propaganda is to influence perceptions and actions of foreign and domestic public, governments, and intelligence. A spiraling group self-deception perpetuates the propaganda for fear of liability and criminal responsibility. Covering up information on war crimes and crimes against humanity, and military and foreign policy based on such information, are crimes themselves.

Independent researchers urge priority actions to reverse the cycle of deception and human suffering ecause of deception on uranium weapons: (i) weapon inspections to determine which ones contain uranium, (ii) target inspection to identify those hit and contaminated by uranium weapons, (iii) health monitoring and support for target communities in uranium-contaminated areas, and (v) fundamental review of all research that was so far restricted to DU instead of uranium weaponry in general.

The weapons clearly violate humanitarian law, even in the absence of a specific treaty barring their use. The violations related to the use of the weapons are sufficiently grave to be classified war crimes or crimes against humanity, which would impose legal liability and criminal sanctions on the users as well as fair compensation and other remedies for the victims of these weapons. A treaty banning uranium weaponry is not necessary, but preparations for one could be exploited to duck responsibility. Even beginning the process to draft a treaty could be used by the US to argue that any ban on uranium weaponry in light of existing customary law is null and void. The US uses public pressure for an anti-DU treaty to bolster its position and to argue against the existing ban. Unsuspecting activists play into the US position and seriously undermine all anti-uranium initiatives.

Introduction

The concept of toxic-radioactive warfare dates back to World War II when air attacks with uranium oxide aerosols were considered a realistic threat. Since then, the US has developed depleted uranium (DU) ammunition (for example, the bibliography of Loewenstein [1992]). Depleted uranium (DU) became a contentious political-environmental issue after US, UK and other countries' involvement in wars in the Persian Gulf and the Balkans. Leading scientists in the area of radiation and its consequences have joined with an increasing number of victims of DU weaponry (including former combatants and civilians), and have squared off against the governments that have developed and used, or sanctioned the use of, these weapons.

The "Kosovo" DU scandal in 2000/2001 saw tools of information warfare employed to cover-up use of uranium non-atomic weapons, including intimidation of vocal victims of DU, independent researchers, and activists in

the West and former Soviet block countries. A consequential information warfare and the politics regarding DU is tracked by the growing number of concerned groups, including, for example, DU-Watch (www.du-watch.org). Contributed to by many individuals, this material precipitated propaganda analyses presented to international conferences in Manchester in November 2000 [Bein] and in Prague a year later [Bein and Zorić]. A recent article describes information warfare in the context of war propaganda constructed around the "Osama-WMD" theme [Chossudovsky, 2003].

UK researcher Dai Williams, who substantially expanded the understanding of uranium weapons and their political cover-up, has posted a number of essential materials at www.eoslifework.co.uk. For example, in 1997, a US Air Force mission plan indicated a new generation of hard target guided weapons with warheads from 120 kg to 10 t that would use "dense metal" to double their penetration effect. Misinformation and cover-ups of these weapons exhibit patterns similar to those employed for DU armour-piercers. Williams writes: "The principle that uranium (depleted or not) is used in some guided weapons, as well as anti-tank penetrators, is now established by statements from Jane's, [US secretary of defense] Donald Rumsfeld and the UK Ministry of Defence. The question now is not 'Has Uranium been used in guided weapons?' but 'Which ones, how many, when and where?'"

The findings of research into the effects or DU and other weaponry containing radiation but not causing nuclear explosions (which as a whole can be referred to as **radiological weaponry**) are indisputable. Even a cursory review of existing norms of the laws and customs of war (humanitarian law) supports the conclusion that uranium weaponry of any type is so patently illegal that the discussion should really focus on bringing to justice those who have used it and redirecting action towards the victims of these weapons. But the international community still confronts the "denial and deflect" policies of the users.

Why this quest to cover-up uranium weapons and misrepresent their health and environmental effects? The paper seeks to answer the question step-by-step. Part 1 briefly sets out the science of radiological weapons, and summarizes their hazards. It then sets out a digest of official documents proving that the authorities responsible for uranium contamination knew about the risks involved – the principal reason they suppressed the evidence. Part 2 overviews humanitarian law relating to weaponry and the consequences of violations, including the duty to condemn such weaponry, the duty to compensate victims (redress), and the duty to clean up. Understanding of this clearly shows why those responsible think they have to cover-up that they knowingly developed and used "illegal" weapons. Rather than face those consequences, they misstate, mislead, and misinform. Part 3 analyses the details of the cover-ups with a view on exposing the methods and tactics and providing a way to counter the damage caused by the cover-ups.

Part 1: Uranium weapons and their hazards

Uranium properties and military non-nuclear applications

Counting only uranium isotopes, uranium ore contains 99.3% U-238, 0.7% U-235 and traces of U-234. DU metal is depleted of U-235 down to about 0.2%, hence the name. The rest is U-238 and traces of U-234. The combined radioactivity of DU is about 40% less than in the natural mix of uranium isotopes. References on DU weapons describe physical properties of the metal as if other metallic forms of uranium differed. This is true for uranium alloyed with other metals that can significantly alter the original properties, but not for the uranium isotopes. For example, a mix of 99.3% U-238, 0.7% U-235 and trace quantity of U-234 would have the same physical properties as DU, but would be difficult to detect, since the ratio of uranium isotopes, the prime detection parameter for DU, would be similar to that in nature.

At 19.1 g/cm^3, uranium has an advantage over slightly denser tungsten, which is not as abundant and very expensive. The nuclear industry has hundreds of thousands tons of waste DU to dispose of after U-235 has been extracted. For the US arms makers, who obtain enrichment byproduct uranium free of charge, DU opened an opportunity. The first non-atomic weapon that employed DU was the "silver bullet". At a high speed of impact, bullet's density, hardness and flammability enable penetration into heavily armoured targets. Tungsten does not ignite as easily and is 1.75 times harder, which together with a much higher melting point, makes it more difficult to work with, compared to DU. Alloying with 0.75% titanium increases hardness of DU anti-tank penetrators. Manufacturing processes e.g. heat treatment and forging, determine DU's strength and fragmentation qualities.

The applications of armour-piercers range from 20 mm Phalanx gun in the navy for piercing attacking missiles, through 30 mm gun in A-10 aircraft, to 105 mm and larger tank barrels. Tank armour and removable armour of combat vehicles are hardened with DU plate. Many countries, industrialized and poor, make and use the DU bullets and armour.

Significantly more uranium than in DU bullets would be used in weapons developed under a Hard or Deeply Buried Target Defeat Capability (HDBTDC) programme launched by the US military in the mid 1990s [www.fas.org/man/dod-101/sys/smart/hdbtdc.htm]. The weapons must be able to penetrate targets in hardened buildings, or underground. This can be accomplished with a high density penetrating warheads with smart fuses that delay detonation until the weapon is in the desired space, for example, on the lowest level of a multi-level concrete building. The weapons also need to neutralize chemical and biological agents before they escape into the environment, by using incendiary warheads.

Owing to its density, uranium – depleted or not – can double the penetration power relative to older weapons. Currently, over 20 weapon systems against hard and buried targets, stocked for imminent “wars on terror”, are most likely made of uranium. New versions are under development and testing. The biggest of them, Big BLU, contains several tons of a “dense metal” in the penetrator alone. The mysterious metal must be uranium, since as dense and harder tungsten would be prohibitively expensive, less workable and not readily ignitable. Dr. Asaf Durakovic measured very significantly higher levels of uranium in Afghanis near targets hit by penetrating bombs and missiles. His team noticed the weapons punched through several concrete floors and walls, then buried 3 to 4 meters in the earth before exploding. [www.umrc.net]. Were they used in foreseeable war scenarios, the weapons would produce contamination levels significantly higher than from DU bullets in the Gulf War.

For its pyrophoric properties, i.e. spontaneous burning in air when in fine form (swarfs, metallic dust), uranium in an incendiary warhead could be effective in neutralizing biological or chemical weapons facilities hidden underground or in concrete structures. Powdered uranium could be the incendiary agent in the last stage of a warhead in a penetrating weapon cased or ballasted with uranium. The incendiary warhead would add its mass to the weapon’s penetrating impact.

The shaped charge technology also employs uranium. By focusing explosives in one direction e.g. by containing them with a conical or concave hemisphere metal liner, detonation compresses and squeezes the liner forward, forming a jet of molten metal traveling as fast as 10 km/s. Jane's website indicated some time ago that DU was used as "liners in shaped charge warheads". Guided weapons ranging from Maverick and Hellfire missiles to torpedoes, sub-munitions in cluster bombs and the first stage of BROACH MWS warheads use this technology. At his website Williams provides an in-depth, up-to-date review of both the HDBTDC and shaped charge weaponry.

DU is used in counterweights of military aircraft. Civilian aircraft gradually abandon the use of DU weights in favour of safer tungsten, after a number of crashes in which DU weights burned in the fire and contaminated populated areas. Some helicopters have DU weights in the rotor blades, for example, Apache A64 has 100 kg. DU weights would be logical in guided missiles and in other weapons that employ, like aircraft, flight control surfaces. Small quantities of uranium may be in navigational equipment in aircraft, vessels and land vehicles.

During the “Kosovo DU” scandal, U-236, plutonium, americum and other transuranic elements turned out to be in DU, contrary to industry specifications. Although these extremely toxic and radioactive substances were present only in trace quantities, their high power significantly increases the toxicity and radioactivity of the 30 mm DU bullets shot in Operation Allied Force. The substances are spent nuclear fuels and nuclear waste recycled into DU stock. Uranium alloy in weapons has a composition and toxic-radioactive properties depending on what other materials in what quantities have been blended in.

It is, of course, convenient to dispose of very hazardous nuclear waste far away from the producer’s country. Much testing of DU weaponry took place outside the national territory of the United States: Okinawa, Puerto Rico (Vieques), Panama (whose government found out about it after the fact) and on lands legally considered to be the lands of Indigenous Peoples in the United States. According to Williams’s compilation of industry and military sources, other radiological weapons were most likely tested in Iraq (Operation Desert Storm 1991, Desert Fox 1998), in air raids in Iraq’s no-fly zone since 1992) and the Balkans (Bosnia 1994-1995, Kosovo 1999). Most recently in Afghanistan, the use of these weapons was confirmed by high contamination of residents near sites hit by hard-target weapons. Use outside a states’ territory brings in a whole body of international prohibitions related to “exporting” hazardous materials. As will be set out in Part II, responsible authorities are liable under a wide range of international law beyond humanitarian law.

Fate of uranium in radiological weapons

Upon impact, the high kinetic energy of an **armour-piercing DU** projectile ignites it and helps it penetrate the armour, self-sharpening fashion. Part of DU metal vaporizes into a very fine dust (aerosol) of uranium oxides. About two-thirds are dark brown and black insoluble particles,. Those oxygen-rich are soluble in water, and yellow and orange in colour. The dust covers the target area, is readily re-suspended, and can travel with wind for at least tens of km. Fire consuming DU ammunition and DU armour also turns the metal into oxide particles.

Depleted uranium rounds that miss the target may corrode in soil or water, producing fine material that disperses with air movements and washes away.

Uranium oxide residue includes unnatural, sharp-edged ceramic particles that pose a special hazard inside the body. About 50 - 70% of the particles in the dust are respirable, i.e. less than 10 μm in size. Soldiers who survive an attack by DU ammunition may have DU metal and dust in the wounds. They will likely have inhaled or ingested far more DU dust than recommended limits on intake. Civilians may also inhale or ingest DU dust or collect fragments of DU metal.

Several US Bradley fighting vehicles were buried in Saudi Arabia due to "substantial non-removable depleted uranium contamination." The remaining vehicles and tanks were shipped to a decontamination facility in the USA, where workers in protective suits cleaned up some vehicles, but the more heavily contaminated equipment was buried in a radioactive waste dump The Kuwaiti government hired foreign contractors to gather destroyed Iraqi equipment in its territory, including vehicles contaminated with DU [US Army Medical Research Institute of Infectious Diseases, 1995]. A 1995 article in the US Army magazine *Armor* gave advice on minimizing exposure to DU: "**If you find radioactive DU contamination on a vehicle, move the vehicle to a site away from water sources, food storage or eating areas, and occupied bivouac sites [...] always keep personnel away from contaminated equipment or terrain** unless required to complete the mission."

DU particles still fly around DU battlefields and beyond. With a half-life of 4.5 billion years, U-238 particles contaminate practically forever. Elevated radioactivity levels (from U-235 and decay products of U-238 in DU, from transuranics, and U-236 contained in "dirty" DU, or from other uranium non-nuclear weapons used in the Gulf War) were measured in Bulgaria, when the wind blew from the Persian Gulf. A decade after the Gulf War, Dr. Chris Busby measured α-activity on the battlefields in southern Iraq at 20 times higher level than in Baghdad, and in the populated Basrah region adjacent to the battlefields – at 10 times higher level.

In November 2002, UN Environmental Program (UNEP) investigators of the fate of DU ammunition used in 1994-1995 in Bosnia recommended evacuation and cleanups of contaminated buildings and grounds in Hadžići (Sarajevo) and Han Pijesak (Republika Srpska). Hadžići refugees in Bratunac and elsewhere have died of radiation exposure, but a report from a local health professional Dr. Slavica Jovanović has not been published yet. In Kosovo, Montenegro and Southern Serbia, DU-sites were previously marked, fenced off, and contaminated soil was removed to storage at the Yugoslav nuclear institute in Vinča.

Soldiers bring DU particles home on clothing and on "souvenirs" collected from the battlefields. Many of non-combat military, civilians at the ports receiving Gulf War soldiers and equipment, as well as families of the combatants contracted Gulf War syndrome, without ever being near DU battlefields, and without receiving vaccinations that were administered to the combatants. In October 2002, vice chairman of the US veterans coalition Denise Nichols stated in her critique of the government's analysis of Gulf War casualties: "Civilians – meaning service personnel wives and children – have reported in ill but no data has been provided on that! These service personnel sent home items from the Gulf and then returned, themselves and more equipment after the war. Members of the same units, who did not go to the war but dealt with returning equipment from the Gulf have reported ill. Civilians at the port sites that work with the equipment returning from the Gulf have reported in ill. Their families have also experienced health problems."

The combat fate of **uranium in the other munitions** is similar to that in DU bullets and armour. The energy of impact of uranium penetrators might ignite the metal, or else uranium would burn in the explosion. If uranium remained as fragments, it would eventually corrode. Uranium lining of shaped charges likely turns partially into uranium oxide dust with a high proportion of ceramic particles. Production, testing, and disposal of uranium weapons create similar hazards as combat use. To date, most of the states in the US have hosted these activities. Data is scarce on similar problems in over 30 other countries that produce and use uranium non-nuclear weapons. Many people exposed in uranium mining, nuclear industry processes, DU weapons manufacturing, testing ranges and disposal sites show significant increases in slow onset cancers, compared to less exposed communities and occupations See reports of the Military Toxics Project [www.miltoxproj.org].

The cleanup bill for DU fine particles, shrapnel and unexploded ammunition at just one of many such places around the world, the Jefferson Proving Ground in Indiana, would be $7.8 billion, so the area was not cleaned up but closed. Disposal of expired uranium weapons can release an order of magnitude more contamination than uranium battles. The Sierra Army Depot in Northern California has burned tens of times more DU munitions than all DU wars have used [*The Chugoku Shimbun*, May 19, 2000].

In a fire at a DU munitions plant near New York in the 1970s, DU dust was carried downwind 41 km from the site of the fire. More recent fires at the UK Royal Ordnance factory in Featherstone in 1996 and 1999 sent plumes tens of km away from the source. In 1999, a plume of smoke reached 50 km out, exposing thousands

of local residents to uranium dust for at least several weeks. The fire released 200-500 kg of DU, the mass of uranium in a medium-sized penetrating bomb. The fallout fell down on unknown locations.

A 1991 fire at the US Army base in Doha, Kuwait, destroyed 300 high caliber DU tank rounds, an unknown number of small caliber DU rounds, and four tanks with DU armour and 111 rounds of 120 mm ammunition. Thousands of soldiers were exposed to airborne uranium oxide. The amount of uranium released would be a few tons – as much as in the largest hard-target guided weapon. This information was leaked to the media from the US Army's CHPPM report that has not been released to the Presidential Advisory Committee on Gulf War Illnesses. US troops are still stationed at Doha.

Smaller-scale incidents are also hazardous. One involving pulverization of metallic DU occurred at the Robins Air Force Base, Georgia. The following note was sent to the Nuclear Regulatory Commission on July 27, 1999: "A technician was found using a hammer and chisel to remove installed depleted uranium counterweights from the aileron. This process produced dust and debris that was scattered by a nearby fan. The technician using a hammer and chisel on the depleted uranium was in violation of several rules [...] **The area has been secured and decontamination procedures initiated**."

Hazards of uranium

The main hazards of uranium are fire, toxicity, and radioactivity. Uranium in larger chunks ignites at 500 deg C, while in finer form it self-ignites and burns spontaneously in the air. Heavy metal uranium forms oxides that are as toxic as arsenic compounds, particularly affecting the renal system. Inhaling and swallowing a high dose of uranium oxides entering nose and throat could pose a serious risk, as could happen in an acute exposure to explosion dust and debris from a uranium weapon. Prolonged exposure in a contaminated environment would lead to similar effects.

As in the toxic hazard, radioactive risks arise by inhaling uranium dust in the air and ingesting it from dust in the mouth, water, or food. Inhaled particles under 2.5 μm enter deep into the lungs. The body removes insoluble uranium oxides very slowly, halving their amount in 10 to 20 years. Some particles may move from the lung to the lymph nodes and bone. U-238 emits mainly α-particles - high energy but ranging only a few millimeters in the air, and β-particles and γ-rays from its products of decay. Hence the radiological insult from a microscopic speck of U-238 oxide inside the body is focused on the surrounding tissue within a radius of about 30 microns. “Impurities” added to DU in the recycling process add other “hot “ micro-particles to the hazards of pure DU.

Uranium radiation hazards are covered-up and misrepresented. The total radiological dose inside a person over years severely exceeds safe limits. Limits set by the International Commission on Radiological Protection (ICRP) derive from empirically invalid assumptions due to secrecy and distortions around the effects of Hiroshima and Nagasaki bombs, then around Cold War developments of nuclear power and weapons. The ICRP risk model was based on studies of bomb survivors, which overlooked the effects from an internal radiation source and ignored cancers that take decades to appear. Physicists instead of biologists developed the ICRP model before DNA was known, yet it purports to represent cell damage processes. ICRP model spreads a dose over a large mass of tissue instead of considering biophysical and biochemical damage mechanisms at the cellular level. A critique was just published by the European Committee on Radiation Risk (ECRR). It shows **ICRP models of risk from internal particles underestimate empirical mortality and morbidity by a factor of 100 to 1000**.

Long before the ECRR critique, standard textbooks on radioactivity have been stating that **if α-particles enter the body with inhalation, food or through open wounds, they become exceptionally dangerous, since they emit much energy to each cell**. The standard texts are also clear that long-term effects of accumulated small exposures transfer to future generations. **Every dose is harmful and can cause cancer or genetic changes after years**, therefore one must always avoid unnecessary exposure and maintain doses in smallest quantities possible.

The hazard of α-particles is large despite their short range in a tissue, for example, 30 microns in the lungs. Although β-particles penetrate tissue to the depth of several centimeters, the resulting biological damage is significantly smaller compared to that of α-particles. The tissue weakens γ- and X-rays only to a small degree. The biological effect of one absorbed quantum of γ- and X-ray radiation in the tissue is the same as from one quantum of β-radiation. External exposure by contact with DU metal can be hazardous; over less than a few hours one can get annual allowable dose. DU contaminated by nuclear waste blended into it is more risky. Many military and civilians got sick from wearing “DU jewellery” or keeping DU fragments in the pockets.

One mg of U-238 emits per year the equivalent of over one billion high energy, ionizing particles and rays that can produce extensive biological damage. The mass of inhalable particles is typically a few nanograms (one billionth of a gram), so a typical one may emit about a thousand particles per year, or one every few hours. The energy of each α-particle exceeds the damage threshold of vital cell-building molecules. Novel chemical reactions take place, which alter or destroy the shape, organisation and function of these molecules. A particle of uranium oxide lodged in the tissue damages a cell beyond repair [www.llrc.org/health/healthpage.htm]. The radiological insult triggers biological damage mechanisms, which extend the initial damage. ECRR attributes a 1000 more damaging power to a U-238 particle lodged in the tissue, compared to other forms of ingested and inhaled U-238.

Health effects of uranium exposure

The health effects depend on the quantity of uranium oxide dust inhaled or ingested, frequency, and duration of exposure. A high initial dose can cause acute respiratory failure and poisoning, leading to death within a few days. Smaller doses cause hair loss, reduced regeneration of skin and nails, physical weakness, fatigue, flu-like symptoms, diarrhea, and immune and peripheral nervous system damage manifested up to a few months after the initial exposure. After a year and longer, medium to high doses may cause birth defects in infants of pregnant women, leukemia, and rapid-onset cancers, followed later by slower cancers. Smaller initial doses longer-term may produce multiple physical and mental symptoms, and nervous debilitation.

Damage of immune system in exposed population could be a major mortality factor in Afghanistan, where several hundred tons of uranium was released from hard-target weapons. Plagued by winter cold and starvation, uranium casualties with reduced immunity would have greatly reduced chances of surviving common diseases. Many could have died without being diagnosed with uranium exposure. The same factor could increase morbidity and mortality in Iraq and Yugoslavia – both countries under international embargo, and consequent impoverishment of the population coupled with reduced ability of local authorities to care for the sick. A team from the Uranium Medical Research Center (UMRC) reported after a visit to hard-target bomb sites in Afghanistan [www.umrc.net]: "The UMRC field team was shocked by the breadth of public health impacts coincident with the bombing. **Without exception, at every bombsite investigated, people are ill**. A significant portion of the civilian population presents symptoms consistent with internal contamination by Uranium."

The acute symptoms above have been reported by Gulf War veterans, including post-conflict military personnel exposed to targets contaminated by DU. The slower onset illness and disorders have been reported by Gulf veterans, and doctors and health researchers who have worked with civilians exposed to DU in Iraq. Leukemia, cancers and birth deformities are on an increase among international soldiers and policemen who served in Bosnia, and among local population exposed to DU ammunition. The rates of all cancers in Sarajevo between 1995 and 2000 increased from 46 to 264 per 100,000 according to a Sarajevo registry report of January 2001 [www.llrc.org].

As the contaminants spread over the years, so will the health problems. Low but chronic exposure risks may arise from air, water or food contamination in areas surrounding a population. The contaminants could build up and bio-accumulate over years from the initial fallout. Local terrain, ecosystem, meteorological conditions, agricultural practice and food habits are some of the factors that would determine the secondary exposures and doses.

Most DU research to date has assumed healthy, young male soldiers and low-dose initial exposure from 30 to 120 mm armour-piercers (mass of DU 0.3 to 4.5 kg per bullet). If uranium is used in warheads having a mass of up to several tons, then humans surviving the explosion will suffer acute health effects from much higher doses. Being unprecedented, these exposures require a new analysis of uranium fate-effect relationships. The closest analogy would be fires of DU ammunition as at the Doha base, UK Royal Ordnance factory fires, or the burning of DU counterweights in jet crashes, but no medical reports are available. Wider area residents are vulnerable to initial small doses from the fallout from large uranium weapons, and to ongoing, indirect exposure to contamination of air, water and food. Exposures in Iraq's Basrah region could be analogous.

Government and industry documents on uranium hazards

The hazards of DU are similar to those from other uranium metals suspected in new non-nuclear weapons. Official US and UK government documents have been warning about toxic-radioactive risks of DU as follows.

A 1983 literature study by the Batelle Pacific Nothwest Laboratory for the US Department of the Army, clearly discerns the two types of DU hazards: "**The chemical toxicity is the critical limit for soluble uranium compounds, and the critical organ is the kidney. Insoluble compounds present a [radiological] hazard**

primarily to the lungs […] The exposure limits for toxicity are more conservative than most of the radiological limits and thus protect from either type of insult." [Mishima et al., 1983] A 1984 US Federal Aviation Agency document cautions the investigators of aircraft crashes against the hazard from DU in counterweights of civilian airplanes: **particles inhaled or ingested are toxic and can cause long-term irradiation of the internal tissue**.

Six months before the Gulf War, a Science Applications International Corporation report wrote, "**Short-term effects of high doses can result in death**, while **long-term effects of low doses have been implicated in cancer**." Shortly after the Gulf War in March 1991, a memo from the US Defence Nuclear Agency stated that **alpha particles emitted from DU dust created from exploded DU ammunition pose a health risk, but beta particles from DU shrapnel and from intact DU bullets are a serious hazard to health**. In the early nineties, the UK Atomic Energy Authority warned that if all of the DU fired by tanks in the Gulf War was inhaled, "there could be **half a million deaths as a result by 2000**." Tanks fired only about 8% of all DU used in that war.

A 1993 US General Accounting Office report GAO/NSIAD-93-90 stated, "**Inhaled insoluble [DU] oxides stay in the lungs longer and pose a potential cancer risk due to radiation. Ingested DU dust can also pose both a radioactive and toxicity risk**." A 1995 US Army Environmental Policy Institute report warned, "**Toxicologically, DU poses a health risk when internalized. Radiologically, the radiation emitted by DU results in health risks from both external and internal exposures [...] If DU enters the body, it has the potential to generate significant medical consequences.**"

A January 2001 leak revealed that the **UK Ministry of Defense was secretly testing for radiation poisoning among British soldiers just months before it sent troops to Kosovo**. At the time the ministry was refusing screening for Gulf War veterans. The disclosure went much further than an earlier leak that showed only that officers knew 4 years earlier about the risk of developing lung, lymph and brain cancers from DU shells.

The industry is also well aware of the risks from airborne contamination by DU. Paul Loewenstein, vice president of Nuclear Metals Inc. (now Starmet Corporation, the prime US supplier of DU metal and related products) wrote: "The main hazard to health occurs in those fabrication steps where finely divided particles (dust or oxides) can become airborne. In operations such as melting and casting, machining, grinding, pickling and heating without using a protective atmosphere or vacuum, **it is essential to provide extensive ventilation and to monitor worker's breathing zones**. Vents and fume hoods that protect workers are exhausted through carefully monitored filter systems. **Workers must change footwear and clothing when leaving areas where finely divided uranium is present**." [Loewenstein, 1992]

The Boeing Corporation safety guide for DU counterweights in aircraft and missiles advises: "Most **heavy metals, such as uranium, are toxic to humans depending on the amount introduced into the body**. For short-term (acute) exposures, the toxicological effects are the primary concern, and acute exposures to significant amounts of uranium may result in kidney damage."[Section 4.1.2]. Section 4.1.3 spells out the radiological hazard: "**The principal radiological hazard associated with uranium is due to high linear energy transfer of the alpha particles its radionuclides and daughters emit. A chronic exposure to these radionuclides result in an increased risk of cancer, typically in the bones, kidney, and lungs, since these are the organs where uranium is deposited**." Section 6.2.5 concerns airborne contamination with uranium fine particles: "**Failure to control airborne contamination could result in inhalation of the contamination and spread of contamination to other areas**." To this end, Section 12.2.3 commands: "**Wear a respirator […] whenever entering areas with airborne DU dust particles**." [Boeing, 2001]

Part 2: Humanitarian law relating to weaponry and the consequences of violations of this law

A weapon may be determined to be illegal two ways: (i) by adoption of a specific treaty banning it; and (ii) because its use would necessarily violate existing law and customs of war (humanitarian law). A weapon made illegal only because there is a specific treaty banning it is only illegal for countries that ratify such a treaty. A weapon that is illegal by operation of existing law is illegal for all countries. This is true even if there is also a treaty on this weapon and a country has not ratified that treaty. Evaluating whether DU weaponry (or any other type of weaponry) is legal or illegal, requires analysis under this law.

Humanitarian law: the basics

The laws and customs of war (humanitarian law) includes all treaties governing military operations, weapons and protection of victims of war as well as all customary international law on these subjects. The main treaties relating to **military operations** are The Hague Convention of 1899 (186 Parry's T.S. 429) and The Hague Convention (IV) and Regulations of 1907 (1 Bevans 631), providing a legal framework governing war. Yet

some of the most basic rules of war are not found in existing treaties, in part because they were considered widely known and part of the universally understood customary rules of war. One of these basic rules is the obligation to carry out military operations only in the field of battle – understood to be operations against enemy combatants who are not *hors de combat* and against territory and objects of the enemy that are deemed legal targets. Article 25 of The Hague 1907 (Regulations) partially addresses this by prohibiting operations by any means against "undefended towns, villages, dwellings or buildings."

Another basic rule requires that all military operations must cease upon cessation of hostilities. Still other customary international rules includes the duty to warn of dangerous materials or weapons and its corollary rule the duty to clean up such material. The duty to warn rule was set out clearly by the International Court of Justice in its famous Corfu Channel case (1949 International court of Justice Reports, 4). The Court in Corfu Channel emphasized the concept of "elementary considerations of humanity" -- echoing the language of the Martens Clause, set out below. As will be seen below, certain provisions of humanitarian law relating to **victims** of armed conflict also contain limitations on military operations.

The 1899 The Hague Convention banned all weapons and material that cause superfluous injury. Article 23 of the 1907 The Hague Convention, Regulations, specifically recognizes that not all weapons are subject to a "banning" treaty but may be nonetheless banned by operation of existing humanitarian law. The International Court of Justice recognizes this rule in its decision Legality of the Threat or Use of Nuclear Weapons (1996 International Court of Justice Reports). In paragraph 87 of that Decision, the Court found that the principles and rules of humanitarian law apply to all weapons, including nuclear ones. In other parts of the opinion the Court stresses the duty to evaluate legality or illegality **prior to use** in military operations.

Article 23 of the 1907 The Hague Regulations sets out further prohibitions of certain types of weapons and materials to add to those found in existing treaties, especially use of poison or poisoned weapons or weapons or materials causing "unnecessary suffering". Both the 1899 and 1907 conventions set out what is universally called the Martens Clause (the 8th preambular paragraph in The Hague 1907) which states that in situations not addressed in the Conventions or Regulations, combatants and civilians are protected by "the principles of the law of nations, as they result from the usages established among civilized peoples, from the laws of humanity and the dictates of the public conscience." This rule is repeated in the subsequent treaties relating to victims of armed conflict, and clearly establishes that civil society alone can, by its own initiative, effectively ban a weapon if there is no specific treaty banning it.

Other treaties and instruments prohibiting specific weapons date from the 1868 St. Petersburg Declaration Renouncing the Use, in time of War, of Explosive Projectiles under 400 Grammes Weight. The 1899 The Hague conference issued declarations prohibiting projectiles launched from balloons, projectiles diffusing poisons and "dum-dum" bullets. Since that time there have been many treaties relating to specific weapons or types of weapons such as those containing hazardous chemicals, bacteriological material and the like. A recent addition has been the banning of any type of military action that would result in undue **environmental damage**. In addition to a treaty on this issue, the United Nations General Assembly, in its resolution 47/37 of 25 November 1992, affirmed that "destruction of the environment, not justified by military necessity and carried out wantonly, is clearly contrary to existing international law." The United Nations Centre for Disarmament Affairs has compiled a list of all weapons-banning treaties and it was annexed to United Nations Document E/CN.4/Sub.2/1997/27.

Humanitarian law relating to **victims** of armed conflict is generally called "Geneva law", the name taken from the Geneva Conventions since 1864 on this topic. The current Geneva Conventions include the four Geneva Conventions of 1949 (75 UNTS 31, 75 UNTS 85, 75 UNTS 135 and 75 UNTS 267), Protocol Additional I (1125 UNTS 3) and Protocol Additional II (1125 UNTS 609). The overriding principles of humanitarian law from Geneva law is that sick and wounded combatants, prisoners of war and the civilian population, as well as material essential to the survival of them may not be targets of military operations. The two protocols strongly set out prohibitions of military operations that would unleash hazardous forces (such as an attack on a nuclear power facility or a dam) or would damage the natural environment or water supply.

Consulting all of humanitarian law -- both treaty-based and customary -- four fundamental rules are clearly discernable regarding weapons:

(1) Weapons may only be used in the legal field of battle, defined as legal military targets of the enemy in the war. Weapons may not have an adverse effect off the legal field of battle. (The "territorial" test).

(2) Weapons can only be used for the duration of an armed conflict. A weapon that is used or continues to act after the war is over violates this criterion. (The "temporal" test).

(3) Weapons may not be unduly inhumane. This rule incorporates the “causing superfluous injury”, “unnecessary suffering” and Martens Clause limitations of The Hague conventions and regulations as well as the “elementary considerations of humanity” from the Corfu Channel case. (The "humaneness" test).

(4) Weapons may not have an unduly negative effect on the natural environment. (The "environmental" test).

Humanitarian law violations and UN action on radiation weaponry

Evaluating the effects of radiation (DU) weaponry set out in Part I of this paper, it is clear that this weaponry fail all four tests of humanitarian law:

(1) It cannot be "contained" to legal fields of battle and thus fails the **territorial test**. Evidence is overwhelming that uranium particles in dust or smoke can travel far afield from a legal military target. The particles can reach bordering countries that are not part of the armed conflict. Winds can blow particles into places that are near battlefields, but off-limits of legal military operations. In fact, DU can injure far more due to airborne travel than it does against legal targets. DU can also be transported by surface and underground water, carrying damage far beyond the legal field of battle. DU dust can adhere to military personnel and vehicles and travel as vehicles and personnel move about.

(2) The weaponry continues to act after hostilities are over and thus fails the **temporal test**. More than a decade after the cessation of hostilities in the Persian Gulf war, uranium from DU weaponry is still excreted from the bodies of contaminated veterans, and will continue to injure their bodies. The bodies of local residents and other persons within the reach of the spreading contamination will continue to be injured for many years to come. The effects of these weapons cannot be turned off when the war is over;

(3) Radiation weaponry is inhumane and thus fails the **humaneness test**, not only because of how it can kill -- by cancer, kidney disease, and other serious conditions -- but also because these injuries can occur long after the hostilities are over and to persons that are not the “enemy”. Uranium from these weapons is also inhumane because it damages the immune system of those exposed, who then suffer from miscellaneous diseases, which, aggravated by harsh war and after-war conditions may lead to death. DU is also inhumane because it causes birth and genetic defects, thus effecting children (who must never be a military target) and who are born years after the war is over. In this sense, the use of DU weapons may be characterized as **genocidal** because it burdens gene pools of future generations. DU can also be considered “poison” and thus banned by The Hague Convention.

(4) Radiation weapons cannot be used without unduly damaging the natural environment, thus failing the **environment test**. This aspect of the effects of DU was conceded by several international agencies looking into the DU crisis.

The issue of the incompatibility of DU weapons with existing international norms has been taken up at both the United Nations Commission on Human Rights and its Sub-Commission on Promotion and Protection of Human Rights since 1996. While the Commission has not yet issued a resolution on the matter, the Sub-Commission, in its resolution 1996/16 of 29 August 1996, found that use of such weaponry is “incompatible” with existing humanitarian and human rights law. In the same resolution the Sub-Commission began a process to further elaborate on these weapons in light of existing norms by requesting the Secretary-General to look into the issue and report back to the Sub-Commission in 1997. In reply, the Secretary-General issued his report (UN Doc. E/CN.4/Sub.2/1997/27 and Add.1) containing a number of replies from governments, specialized agencies and non-governmental organizations – all supporting the view of the Sub-Commission on the illegality of these weapons. In its resolution 1997/36 the Sub-Commission continued its investigation of these weapons and appointed one of its members to prepare a paper on the topic. In 2001, following the failure of the first appointed person to submit a paper, the Sub-Commission authorized Justice Y.K.J. Yeung Sik Yuen (Mauritius) to prepare the paper, submitted as UN Document E/CN.4/Sub.2/2002/38.

The Sik Yuen paper gives a comprehensive overview of the law and facts of a number of troubling weapons. DU weaponry is addressed separately, but Sik Yuen states that all the weapons addressed in the paper can be classified as weaponry of a nature to cause superfluous injury (WSI) and weaponry causing unnecessary suffering (WUS). (Sik Yuen also discusses fission/fusion nuclear weapons, “mini-nukes” such as the B61-11 “bunker busters”, fuel-air bombs (“daisy cutters”), cluster bombs, and chemical and biological weapons, and indicates that the current generation of fuel-air bombs use uranium powder). The present authors maintain that DU and other radiation weaponry can be proven to be weaponry of mass destruction (WMD) when used in populated areas or in the presence of large numbers of enemy or friendly troops, a position supported by the fact that an unacceptable percentage the US veterans of the Gulf War have some serious health complication

that can be attributed to DU weaponry. In any case, uranium (depleted or not) weaponry is “poison” in terms of The Hague Convention and even that definition is sufficient.

Justice Sik Yuen points out a number of issues surrounding the DU controversy that we take up in this paper: the issue of what Sik Yuen refers to as “secrets”, the issue of seriously compromised “research” and the issue of the public outcry against DU in light of the Martens Clause. Regarding secrecy he points out two claims made by critics: (1) that the US purposely tries to cover up the true nature and effects of DU weapons because it does not want to be held liable; and (2) that the US knew of the serious consequences of DU before it was used, but for purposes of military expediency it deliberately sent its own troops into DU-corrupted battlefields (and, of course, injured countless Iraqi soldiers and civilians). Regarding compromised studies, he presents a Rand Corporation report and a report by the Royal Society (UK). The Royal Society was subsequently forced into revising its position on the safety of DU. Regarding the invocation of the Martens Clause, Sik Yuen comments that he was surprised by the number of anti-DU groups and that their actions are an aspect of the Martens Clause.

The 2002 Sub-Commission authorized a second paper by Sik Yuen that is being prepared to submit to the Sub-Commission at its August 2003 session. The fact that the Sub-Commission agrees with the analysis here and has made such a commitment to review of the issue indicates both its understanding that weapons may be banned by operation of existing law, that DU weaponry is that type of weaponry, and that the use of these weapons is very grave. The Sub-Commission also acknowledges that the issue of weapons in light of existing human rights and humanitarian law is an appropriate subject for the UN human rights bodies. It did this because the United States tried to argue that weapons may only be discussed in the "disarmament" forums, where, of course, the focus is on "treaty-drafting" rather than on confirmation that existing law may condemn a weapon.

Arguments against seeking a DU-banning treaty

Some opponents of DU weaponry have proposed work on an anti-DU treaty. This can be very risky because a new “trick” of the US (and a few other governments) is to use treaty processes to try to weaken, if not completely undermine, existing customary law. The United States tries to assert that if there is a treaty on a subject, then any pre-existing customary international law on the subject is terminated. Thus**, even beginning the process to draft a treaty would be used by the US to argue that any ban on uranium weaponry in light of existing customary law is terminated**. This would be devastating in the US because Courts in the US are likely to be persuaded on this point even though the International Court of Justice categorically rejects this line of reasoning in the Nicaragua case (Military and Paramilitary Activity In and Against Nicaragua, 1986 International Court of Justice Reports). Note the US also "declined jurisdiction" of the Court in the Nicaragua case although the US is not legally allowed to do so. Neither the US Congress nor its Courts took up this matter. The United States then, uses public pressure for an anti-DU treaty to bolster its position and to argue against the existing ban under customary law and The Hague Conventions. **Thus, unsuspecting activists can actually play into the US position and seriously undermine all anti-uranium initiatives**.

Even if an anti-DU treaty were drafted, neither the US nor the UK would be likely to ratify it regardless of the language of the treaty -- which for sure the US would seek to control. However, the US would still argue that the existence of the treaty subsumes the customary international law banning DU. This would clearly make it more difficult for Gulf War veterans to take their issues directly to the Veteran's Administration as the VA would be taking the position that no illegality was involved. So we must emphasize most strongly, **a treaty banning uranium weapons is not necessary**, but preparations for one **could be exploited to duck responsibility**. Further, any treaty could be broken anyway, especially by US and other NATO countries, as history has proven.

Consequences of uranium weapons use

As uranium weaponry is already illegal under existing humanitarian law, countries that have used them are responsible for **military and civilian victims** and for **environmental pollution throughout the life cycle of the weapons, from development to disposal of unused munitions**. The Geneva Conventions require all Parties to “search for persons alleged to have committed, or to have ordered to be committed […] grave breaches, and shall bring such persons, regardless of their nationality, before its own courts.” (Article 49 in the First Geneva Convention. There is an identical provision in the other three conventions of 1949). Thus uses of DU weaponry place their own military and commanders at serious legal risk.

Hopefully, wider understanding of this will constrain the nearly 30 other countries that have or plan to develop, produce and stock radiological munitions. The US has exported known and suspected uranium weapons to over 20 countries. It does this in part to militate against the “customary” prohibition of these weapons,

presumably to be able to argue that if a large number of countries have DU and other radiological weaponry in their arsenals, it weighs against a ban by operation of customary humanitarian law. However, it is likely that many of the countries having DU weaponry supplied by the US in their arsenals did not know what it was. And it appears that most of these countries have not used these weapons in military operations. And further, these countries in aggregate cannot re-write The Hague Conventions, the Geneva Conventions and all other instruments or customary rules of humanitarian law. To do so would require large-scale denunciation of the treaties – which no country is prepared to do. Further, governments that manufacture or have purchased uranium weapons are likely to be compromised into maintaining US secrecy over the extent of non-nuclear uranium weapons proliferation, and may face serious legal and political consequences of chronic illnesses or deaths on former and future battlefields due to uranium contamination.

The duty to **compensate victims** of humanitarian law violations has long been a rule of customary humanitarian law. In treaty-based humanitarian law this rule is found in Article 3 of the 1907The Hague Convention. Evolution of the right to compensation of victims and the duty to compensate by violators has been a prominent feature of human rights law, beginning with the Universal Declaration of Human Rights of 1948, whose Article 8 requires an effective remedy for victims of violations. Other human rights instruments have comparable provisions for compensation for violations. The UN human rights forum's prolific studies of this issue began with the "van Boven" study: van Boven's final paper on the right to restitution, compensation and rehabilitation for victims of gross violations of human rights and fundamental freedoms (UN Doc. E/CN.4/Sub.2/1993/8) culminates work that began in 1989. The Commission on Human Rights carried on with the appointment of Cherif Bassiouni as first an independent expert and then a Special Rapporteur. The van Boven "Guidelines" for remedies, derived from long-existing treaty-based and customary laws were included, with modifications, in Bassiouni's final report, UN Doc. E/CN.4/2000/62, Annex.

A minimum requirement of the duty to remedy from use of illegal weaponry is compensation for all victims. This can include, for example, military and civilian victims from uranium wars and civilian victims of uranium weapon use at military ranges. Part of the minimum remedy is the duty to fully disclose all facts about the weapons and their development and deployment. Regarding environmental damages, users of these weapons are obligated to carry out an effective clean-up. When lands and water resources cannot be effectively cleaned up, the State causing the damage must pay damages equal to the loss of those lands and waters from the national patrimony. In US dollars, the cost of legal claims and environmental cleanup for the Gulf War alone would be staggering.

The chief prosecutor of the **International Tribunal for the Former Yugoslavia**, Carla del Ponte, initially refused to prosecute NATO for contaminating Bosnia and Kosovo with uranium due to use of DU weaponry in the Balkans. But on January 14, 2001, she said her tribunal would act "if coherent results emerge directly linking the use of DU ammunition with health problems." This statement of a theoretical willingness to open the tribunal to prosecution and potential damage claims is a key factor in the continued "artificial" controversy about what DU and other radiation weapons actually do. As more and more evidence surfaces that the developers of the weaponry **knew** how lethal it was, even before the Gulf War, it will become more and more difficult for the Tribunal to keep this issue out. Compensation and clean-up costs in Bosnia-Hercegovina and the Federal Republic of Yugoslavia would also be staggering, more so if hard-target weapons, cluster bombs and other weaponry made with uranium were deployed in substantial numbers. Taking on the issue of consequences of the use of DU weaponry and fashioning adequate remedies for the victims of these weapons would go a long way to dispelling increased international consternation over the appearance of bias in the operation of the tribunal – with to date not one warrant for a member of the NATO forces and relatively few for non-Serbian participants.

In addition to the elaboration of remedies under humanitarian law and for gross violations of human rights, there has been a necessary evolution in the concept of **international environmental** law, especially arising from the Sub-Commission's incorporation of a right to a healthy environment as part of its mandate. The seminal work was done by the Sub-Commission's Special Rapporteur Fatma-Zohra Ksentini (now Fatma-Zohra Ouhachi-Vesely), culminating in final report UN Doc. E/CN.4/Sub.2/1994/9. Ouhachi-Vesely was subsequently appointed as Special Rapporteur of the Commission on Human Rights to address the issue of **toxics and toxic dumping** – a mandate that continues today. Her work involves investigating allegations of damage due to toxic materials (such as DU) and trying to work out appropriate remedies. This mandate may prove a fruitful vehicle to heighten international concern over uranium weapons and to elaborate the legal consequences and obligations of users.

Part 3: Anatomy of cover-ups

Group-think

The US and UK governments claim they deploy DU ammunition because for a lower cost compared to tungsten, it can havean advantage over enemy armour, reduce their own casualties and utilize industrial waste. The claims are not justified. The additional expense on tungsten would be negligible in the total military spending. The DU weapons are not effective compared to alternatives [Venik's Aviation, 2001]. DU ammunition and armour do not utilize significant quantities of the total nuclear waste. As to protecting own soldiers, the victims of "friendly fire" suffer from acute poisoning and radiation sickness, instead of ordinary wounds, while longer-term casualties are substantial. A US study of 10,000 Gulf War Veterans indicated that 80% could have been exposed to DU, i.e. more than half a million. Of the tens of thousands of coalition soldiers serving after the war's end, only about 30 specialists knew how to identify equipment contaminated by DU and were aware of the need to wear protective clothing. September 2002 Gulf War report on US veterans shows 0.1% casualty rate in combat, but a 36% post-combat rate. Uranium is one of several major causes of the syndrome, so a casualty rate of several percent would be attributable to DU.

Official reports in the West ignore civilian casualties of uranium weapons in Iraq, the Balkans, and recently in Afghanistan. Iraqis and Serbs were subject to economic sanctions when they most needed medical supplies, fuel and food. Sick Afghanis with weakened immune resistance due to uranium contamination died of cold and starvation, without being recorded as victims of uranium weapons. Given that the US and other NATO governments knew about the consequences for civilians, it seems likely that the severe imposition of sanctions against the Federal Republic of Yugoslavia and Iraq is meant to cover-up damage due to radiological weaponry. Ignoring military and civilian casualties, placing serious obstacles on humanitarian aid, and failing to disclose the truth about uranium effects is a serious violation of humanitarian law. For this reason alone, the sanctions regime against Iraq could be characterized as a crime against humanity. Yet the US has indicated that it would militarily attack any country that tries to bring American military to the International Criminal Court or to courts in their own countries, notwithstanding the provision of the Geneva Conventions set out above.

Pro-uranium propaganda has seriously compromised scientific reports, even by international organizations, all subject to military-government funding and control. It was also verbalized in statements from government, military and arms and nuclear industry. It is of great concern that political representatives were unable to obtain information from alternative sources. That the propaganda was accepted by decision makers despite unverifiable contents points to a fundamental flaw in how these countries address military issues and weapons. Countless journalists, researchers, professors and persons in responsible positions help in NATO deception and misinformation. Those individuals break professional ethics of primary allegiance to public good, and have willingly or unwillingly, knowingly or unknowingly, colluded in the crimes by spreading lies and distortions about fatal effects of uranium. The propaganda has led to an absurd situation where national leaders and parliaments justify attacking Iraq because it **might** have potential in the future to deploy WMD – but plan themselves to use equally lethal uranium weapons of indiscriminate or mass effect against Iraq.

Uranium weapons likely persist due to institutional pressures that, once started to defend an effective DU bullet, escalated to a point of no return. Switching to other types of weapons would indirectly admit the hazards, while ample evidence incriminates those responsible because they knew the potential dangers from the beginning. In an extreme case scenario, war-mongers and ethnic-haters in high positions may have discovered an effective toxic-radioactive terrorist tool in uranium weapons. With it, they can damage present and future generations of the "enemy" without public stigma of WMD, though with some 'collateral damage" to own civilians and troops over the lifecycle of the weapons.

Williams [2002] considered that civilian and military decision makers responsible for propagation and use of uranium weapons may be caught up in a "group think" – a self-justifying logic that generates illusory morality, demands conformity, accepts high risk strategies and demonizes enemies and dissenters. The phenomenon led to the Bay of Pigs fiasco. Some Western governments seem to be following the group-think in the US wars with "Saddam", "Milosevic" and recently the "Wars on Terrorism". Group-think in authoritarian organizations would explain why the health risks of uranium weapons have been downplayed or outright ignored by the military, and why those responsible chose to cover up their criminal position, rather than relinquish uranium weapons.

Indirect evidence exists that cover-up was desired. In 1947 a secret memo from the US Atomic Energy Commission had this self-incriminating statement about medical experiments on human subjects: "It is desired that no document be released which refers to experiments with humans and might have adverse affects on public opinion or result in legal suits. Documents covering such work field should be classified 'secret.'" Following the Gulf War's "full scale low-radiation experiment with DU bullets, a memo dated March 1, 1991, from Lt. Col. Ziehmn of Los Alamos National Laboratory apparently defined future US military policy regarding DU weapons: "It is believed that du penetrators were very effective against Iraqi armor; however, assessments of such will have to be made. There has been and continues to be a concern regarding the impact of du on the environment. Therefore, if no one makes a case for the effectiveness of du on the battlefield, du rounds may become politically unacceptable and thus, be deleted from the arsenal. **If du penetrators proved their worth**

during our recent combat activities, then we should assure their future existence (until something better is developed) through Service/DoD proponency. If proponency is not garnered, it is possible that we stand to lose a valuable combat capability. I believe we should keep this sensitive issue at mind when after action reports are written."

A few years later, as hard-target weapons came on the development, testing and combat use stream, the philosophy must have been extended to the newer military applications of uranium waste. Logically, similar cover-up approach would govern next weapons that leave low-level radiation behind, for many future generations to deal with.

Information warfare

Information warfare is one of the instruments of power, beside combat, diplomacy, and economic sanctions. PsyOp (Psychological Operations) are among its most conspicuous tools. Information warfare is effective and inexpensive compared to combat, and would fit the needs of “Service/DoD proponency” named in Ziehmn’s memo above. The military specifies the structure and methods of Information Operations that engage behavioural science, mass media and high technology [Joint Chiefs of Staff, 1987; Headquarters, Department of the Army, 1996]. US Department of Defense (DoD) targets foreign nations and groups, including foreign governments. DoD actions "convey and/or deny selected information and indicators to **foreign audiences** to **influence their emotions, motives, and objective reasoning;** and **to intelligence systems and leaders at all levels**." DoD management of the foreign perceptions, "combines **truth projection**, operation security, **cover and deception**, and **psychological operations**."

According to NATO [Office of the Chairman of the Joint Chiefs of Staff, 1996], their PsyOp target "enemy, friendly and neutral audiences in order to **influence attitudes and behavior** affecting the achievement of political and military objectives." NATO countries’ military and media act like clones of Pentagon. Critique comes mainly from outside the Pact. It seems that the only audiences that yielded to Pentagon and NATO DU propaganda were allies in the North Atlantic Pact.

Information Warfare integrates several types of special services when needed. A joint command of US Special Operations is then engaged to assemble teams of experts in different fields and services to suit a mission. Attacks on anti-DU activist, Dr. Doug Rokke, former Pentagon expert on DU, were likely steered by US Special Operations in a broader campaign of "fighting" the truth about DU. The military and government authorities forged death certificates of Balkan DU military victims. In March 2001, “unknown criminals” broke into the home of Mrs. Riordan, the widow of a Canadian veteran of the Gulf War, destroyed her computer and stole medical certificates of uranium presence in the body of her husband. Police refused to investigate, because the criminals “did not leave any traces.”

With the emergence of uranium weapon issues into the public arena, the propaganda applies simple, often ridiculous, ideas and phrases that nevertheless have public appeal. The process exploits two rules: (i) a repeated lie becomes accepted truth; (ii) the public accepts outrageous lies more readily. Propaganda plays with words bred in PsyOp bureaus. The words, phrases and contexts are then uttered by authoritative persons, proving the speakers and their controllers are either criminally negligent or are consciously contravening humanitarian and war laws. Former NATO political chief Javier Solana perhaps broke a record of DU nonsense. While heading an ad hoc “investigation” to prove Kosovo DU was no danger, he stated, “The evidence points in the other direction.” “Is DU a health benefit?", wondered a reader in a January 22, 2001, letter to *Washington Times*. Lord Robertson, supposedly an educated man, defended the "proven [DU] technology that has been independently tested […] We cannot possibly act on the perceptions of people or on the view of a word such as 'uranium'.” Bein and Zorić [2001] assembled other statements, deceptive nomenclature and phrases concerning DU and uranium.

Some countries exploited NATO DU propaganda for their own agendas. For example, Switzerland has played a role in suppressing information about DU. Operation Allied Force brought many Albanians from Kosovo to a sizable community of compatriots in Switzerland, at a time when Swiss immigration policy tightened up. Swiss scientific contractor AC Laboratorium-Spiez (ACLS), a firm known to work for NATO, was sent to probe Kosovo and southern Serbia with the best equipment, and found, to no surprise, hazardous radioactivity. Fearing that detection of uranium contamination in Kosovo would deter immigrants from returning home, the Swiss government suppressed reports about unsafe radioactivity levels in Kosovo and instead declared it would fund additional studies by international organizations – perhaps in order to control the results. ACLS became a research contractor in all DU studies in the Balkans. In another cynical move the Swiss government offered money to Albanian émigrés if they would return to Kosovo.

David and Goliath

The scale, tools employed and pervasiveness of information warfare regarding radiation weaponry indicate substantial resources invested. Doubtless, the funds come from tax revenues. Debunking the propaganda feels like a struggle with a Goliath, yet great strides have been achieved with relatively infinitesimal resources, as can be gauged by the growing multitude of anti-DU groups, the quality of their publications, and steadily rising public sensitivity to the issue. Dissemination and campaigning is usually done by volunteers, many of whom have been marginalized, if not intimidated, as being a threat to the establishment.

Predictably (but not for the perpetrators), intimidation had the opposite effect, and further eroded the trust of the public, particularly the sick veterans, spilling over onto recruits and staff soldiers .being prepared for next wars. Upon seeing how NATO disrespected their health in Kosovo, many KFOR troops mutinied, while volunteers stepped back. Several countries withdrew from their NATO obligation in Kosovo because of contamination. Post-war aid organizations are reluctant to go to Afghanistan for the radiation-toxicity risk.

With the arrival of dates for statutory disclosures of secrets from the atomic era, coincidental with surfacing of predictably ever more numerous victims of recent “safe” radiation weapons, the public suspicion, mistrust and mutiny would grow, creating an additional major stressor in already unstable Western societies. Abroad, the rising public conscience about the aftermath of uranium weapons would contribute to general animosity and terrorism against the West, particularly the US and UK. Propagandizing uranium weapons – that terrorize innocents – against “terrorism” (however naïve the approach seems in case of an enemy who is best taken out covertly) or “evil states” (as if neutralization of secret WMD with like weapons justified the end), looks counterproductive on all counts.

Two scenarios are plausible from now on: either the perpetrators step up intimidation of the discoverers of the truth (which proved futile so far), or they start backing away from their criminal activity. Because the US and UK are in the focus of proliferation and use of radiation weapons, it is up to the governments of these countries to take a lead. Continuation on the destructive course must inevitably lead to a major confrontation between society and those at power, if not to international conflicts. Since radiation issues are emotionally charged regardless of nationality, religion and ethnicity (rightly so, for at stake is a human’s continuation in the gene pool), those in power and their information warfare are playing with fire.

Despite large resources expended, PsyOp are easily identified by amateurs. In 1999, Bein predicted in a Polish article [www.eco.pl/zb/147/] the following techniques for cover-up of Balkan DU, based on post-Gulf War experience:

- Deny information and delay its release; understate the quantity of DU weapons used.
- Belittle harmful effects of DU, change emphasis and dilute scientific information.
- Manipulate reports and scientific evidence, including those from previous DU wars.
- Censor DU information in mass media.
- Blame other causes, such as pre-war or general pollution.
- Coerce old and new Yugoslav government to withhold the truth.
- Blame "Milosevic’s” secret weapons, and DU deployed by Yugoslav forces.

All of the above points came true. Evidently, NATO coerced old and new Yugoslav governments to suppress DU casualty information. Yugoslav de-contamination units operated during NATO bombing, while the government likely concealed DU casualties in military hospitals. After a new Yugoslav foreign minister visited Lord Robertson in the beginning of 2001, the Western media reported that Yugoslavia tested soldiers for DU “negative,” as in all NATO member and candidate countries. Were Yugoslav decoys in Kosovo so effective that no DU bullets ignited against armour, rock and concrete?

Implemented by a military-bureaucratic machine, information warfare inadvertently produces mistakes and blunders. PsyOp then attempt to cover the blunders up with more blunders. An imperative to hide the truth drives the perpetrators and their operatives – Special Operations, PsyOp, spokesmen, official media, pseudo-scientists – into thought contraptions and staged events designed to convince the audience. The Kosovo DU case had several obvious blunders. Those responsible failed to warn and protect NATO and UN forces, foreign workers, and local civilians (for whom they supposedly bombed “Milosevic”), including no warning about dirty DU. Stalinist-like special operations to silence those with evidence were objectionable to the public. The cover-ups further clouded the risks of civilian applications of uranium (for example, in aircraft counterweights), increasing the risks to NATO country populations.

Behind the scenes

Public Affairs (PA) of Information Warfare "provides objective reporting without intent to propagandize" and **disseminates information internationally**. PA involves press releases, media briefings and statements by the military that "are based on **projection of truths** and credible message [that serve to discredit] adversary propaganda or misinformation against the operations of US/coalition forces [which] is critical to **maintaining favorable public opinion**." PA use propaganda - white (telling the truth), gray (ambiguous) or black (lying) - often through Public Relations (PR). NATO spokesman Jamie Shea said "he won the war" in Kosovo by carrying out daily briefings in a PR style. A deep control of the global media by Information Operations to demonize the Serbs was perhaps the most “successful” aspect of that war.

Public Affairs units prepare information for news brokers, who send it to TV, radio, and the press. Independent journalists do not have a chance to publish in mainstream media, since NATO information operations subtly control chief editors. The structures of media seem corrupted top to bottom. The former president of CBS News Richard Salent said, "Our job is to give people not what they want, but what we decide they ought to have." John Swinton, the former *New York Times* Chief of Staff, whom colleagues named "The Dean of His Profession", confessed candidly before the New York Press Club: "I am paid weekly for keeping my honest opinions out of the paper I am connected with. Others of you are paid similar salaries for similar things, and any of you who would be so foolish as to write honest opinions would be out on the streets looking for another job […] We are the tools and vassals of the rich men behind the scenes."

The media, reduced to a handful of conglomerates by deregulation, mold public’s minds, profoundly affecting interpretation of reality. The largest conglomerates are growing even bigger by consuming competition, almost tripling in size during the 1990s. With the consolidation of the media empires, TV stations, newspapers and radio broadcasting are no longer independent. Only a handful are large enough to maintain independent reporters. The rest must depend on the chains for all of national and international news. It is also unsettling that one ethnic group dominates North American media ownership and staff, without reflecting the ethnic profiles of big business owners, officers and employees. The group refutes criticisms by intimidating the critic, based on historical prosecution of a radical part of the ethnic group [*The National Alliance*, 2002].

TV, radio, newspapers, magazines, books, motion pictures speak with a single voice, reinforcing each other. Despite apparent diversity, there are no alternative sources of information. The most prestigious and influential newspapers in the USA, *New York Times*, *Wall Street Journal*, and *Washington Post* illustrate the ability of the media masters to use the press as an unopposed instrument of policy. The papers set the trends and the guidelines for nearly all the others, and originate the news for the others to copy. In a joint venture with the *New York Times*, the *Post* publishes the *International Herald Tribune*, the most widely distributed English-language daily in the world.

The *Washington Post* has an inside track on news involving the federal government. Reference to “military sources”, “senior administration officials”, or “Pentagon analysts” reveal relations between media outlets and the military. Another clue of a single source of information for international press agencies are standard phrases, beginnings and endings in all reports, in accord with Pentagon position. A November 10, 2002, *Washington Post* article provided an insight into media–Pentagon relations: “This article was discussed extensively in recent days with several senior civilian and military Defense Department officials.” Military censors at PA vetted the article, then the supposedly independent newspaper as a propaganda conduit published it. Major news corporations manufacture opinion polls to meet government specifications, which usually combine plans of the administration, the Pentagon and the business. The media lend themselves to what White House aides themselves have described as a campaign to “sell” the war to the American people, as was seen during 2002 preparations for war with Iraq.

Military control of the media extends to the battlefields, based on lessons from the Vietnam War, when coverage of atrocities against civilians and of US soldiers in body bags contributed to anti-war protests. A “pool system” would select daily a few out of hundreds of journalists, and would escort them to scenes deemed fit for the public. The coverage would then be “pooled” with their colleagues, so that the same controlled story comes from every major news outlet. Under this system an objective reporting from the scene about victims of acute exposure to uranium weapons would not be possible. Any incriminating leaks from independent war correspondents would be blacked out or distorted by Pentagon press briefings that blame any carnage on the “enemy”. Should independent media sources fail to observe this imposed censorship (as was the case with the Serb TV in 1999) their facilities are targeted with US precision-guided munitions, consistent with Special Operations integration of services to suit Information Warfare needs.

Cover-ups of chronic exposure and effects of uranium would be managed by a different set of information operations, including pressures on the executives of international organizations conducting studies of contaminated sites and victims.

Deny, delay, deceive

Covering up the effects of controversial weapons by the governments has a history. For example, US Newswire reported on October 30, 2002, that former defense secretary Robert S. McNamara and 10 others were defendants named in two first-of-their-kind class action lawsuits for allegedly covering up medical records without which several hundred thousands of veterans of atomic, biological and chemical warfare testing, and families of deceased, cannot receive benefit for the long-term health effects. Selected organizations play a key role in covering up the radiological risk. ICRP is responsible for prevalence of invalid models of risk to human health from internal, low-level radiation sources like uranium fine particles. Since 1959, IAEA, the only UN agency serving a private sector (nuclear industry) has a monopoly on dealing with radiation aspects of uranium health effects, leaving to WHO the toxic aspect. This is a deliberate institutional tool of control and cover-up of irradiation issues around the world.

DU propaganda tactics follow 3 d's: **deny, delay, deceive**. Neither a NATO country nor the World Health Organization (WHO) have carried out any epidemiological studies of either soldiers or civilians exposed in uranium wars. This guarantees no confirmation or discovery of the health effects of uranium weapons. Several governments in the UN must have joined to prevent a post-Gulf War DU study in Iraq. The Iraqi government formally invited WHO to investigate uranium contamination and health effects, but the US put serious pressure on the WHO to cancel a full-fledged study. When a draft resolution passed through a committee at the General Assembly that would have mandated a specific investigation, the US secured enough (but barely enough) "no" votes to cancel the initiative. A planned visit by Justice Sik Yuen in 2002 was delayed by a heavy increase in bombings in the southern "no fly" zone.

Attempts by the UN Balkans Task Force to include DU in its post-conflict assessments were also subverted by delay and deception before the UNEP study could start, and reports were manipulated by the director, Klaus Töpfer, on instructions from his Pentagon handlers [Parsons, 2001]. A WHO health study in Bosnia began concurrently with a UNEP DU-site study in 2002, i.e. 8 years after DU weapons were first used there. As in previous uranium wars, the risk of DU in "Kosovo" was absolutely denied at first, although in July 1999 a NATO document warned KFOR countries about the **toxicity** of DU weapons. Even that warning was late, as KFOR and UN personnel entered Kosovo 2nd week of June 1999. Efforts by the UN deputy high commissioner for refugees, Frederick Barton, to make the civilian population aware of the risks of contamination met with resistance from Kosovo Albanian politicians, NATO and the UN Mission in Kosovo.

NATO released Operation Allied Force DU-site data well over a year late, understating the tonnage of DU. NATO delayed for 16 months the necessary target information and access for monitors of the "Kosovo" sites (which included Montenegro and southern Serbia). Still, there were typing mistakes and ambiguities for several locations in the NATO data [Bein and Zorić, 2001]. For Bosnia, NATO DU-site data, also incomplete, appeared 5 to 6 years after the fact. UNEP measured radioactivity at 14 sites in Bosnia, but only at 2 of the 8 sites around Sarajevo marked "unknown" on NATO list. Sarajevo medical professional Dr.Trifko Guzina revealed the domicile of hundreds of Bosnian patients – those already dead and those fighting cancer seven years after the bombing [*Patriot*, July 22, 2002]. Was there a correlation with the "unknown" locations. Dr. Guzina said that Sarajevo suburbs were bombed in NATO exercises. UNEP could determine the locations, if they wanted to.

NATO did not let UNEP visit some sites in Kosovo and Bosnia. UNEP teams only went to NATO-approved sites and were banned from some important sites.. The sites may be in drop areas of cluster bombs and other weapons that contained uranium. Pentagon admitted that their specialists visited the approved sites a number of times before UNEP was let in. It is plausible that UNEP discovered only low contamination levels because Pentagon carried out some cleanups in advance. Observers believe that uranium hard-target weapons were dropped against deeply buried Yugoslav defenses in Kosovo [Parsons, 2001]. Despite a warning from Williams, UNEP did not test bomb or missile targets in their second study in Serbia and Montenegro in the fall of 2001. At one "DU" site in Montenegro NATO indicated shelling an old bunker with 30 mm rounds twice. The bunker was demolished in one of the attacks. UNEP discovered widespread, high-level radioactive contamination, unlike at any other DU site. DU shells alone would not be able to ruin a concrete bunker. A trial of a uranium bunker-buster is suspected. Yugoslav authorities excavated the soil and shipped it to nuclear waste storage at Vinča.

After NATO finally admitted the use of DU munitions in Kosovo, a barrage of lies, half-truths and nonsense attempted to defend the toxic-radioactive substance. Similar phases could be traced on the issue of U236, plutonium, and other extremely hazardous, illegal contents in DU. However, very few independent observers

and NGO's knew about different uranium weapons under continuous development and use since the Gulf War, if not earlier.

We observe the "deny" phase regarding radiological uranium weapons other than DU armour-piercers. Access for investigators in Afghanistan has been delayed for 10 months, and then it was limited, as on DU battlefields. The UNEP started planning environmental surveys in Afghanistan in December 2001. Despite earlier reports from Williams, on August 28, 2002, survey co-ordinator Peter Zahler (who joined UNEP in May from the USA) said UNEP had no specific plans to investigate uranium contamination. Bomb and missile targets are conspicuously absent from both UNEP Balkans DU studies. Formal queries in the UK parliament returned a denial. No monitoring of US and UK weapons dropped on Iraq's no-fly zone was done, while at the same time, under US pressure, the "international community" demanded access for weapons inspectors to Iraq. The integrity of UNEP environmental monitoring for uranium contamination appears to be compromised by external pressures.

The US military, on the other hand, hinted discovery of "some uranium warheads" in al-Qaeda caves, but without indicating the source of the weapons. It seems that a campaign of denials regarding uranium non-nuclear weapons is underway within a broader campaign for acceptability of weapons that contaminate with low-level radiation. Statements by US government about plans to develop nuclear penetrating bombs, threats of terrorist radiological bombs, and recent warning of potential first strike nuclear attacks by the US and UK play down potential hazards of "conventional" uranium weapons. The rhetoric may be aimed at altering the threshold of acceptability for radiological weapons systems, since nuclear "bunker busters" (the B61-11's) were tested in 1997. A nuclear strike makes little sense when existing systems can destroy deeply buried WMD, unless the goal is to shake underground installations with a nuclear blast.

Service to humankind

Official "investigations" suppress evidence of uranium-induced illness and death. In those "studies" Pentagon and other military authorities co-opt research institutes, universities, and international health and safety organizations: UNEP, ICRP, World Health Organization (WHO), International Atomic Energy Authority (IAEA), and other. From the precautionary principle of environmental and health sciences, uncertain but potentially harmful effects should be prevented. Even if there were "no proofs" of a link from DU to illness and death, it behooved the decision makers to discontinue the use of any uranium weapons out of the precautionary principle, given Gulf veteran complaints and scientific uncertainty. Normally, scientific assessment of the effects of DU and other uranium metals follows a standard risk analysis chain:

> **Products of combat or accidental use of uranium → Fate in a place over time → Exposure to people and environment → Dose received → Morbidity and mortality effects of uranium.**

NATO "scientists" manipulate every step of the analysis. To criticisms, pseudo-science replies, "No evidence exists". Sufficient evidence does exist, as published by independent researchers. The precautionary principle should govern in cases of ambiguous evidence. In summary, the reports have numerous serious flaws because they:

- Fail to mention that the concentration of uranium metals used in munitions is orders of magnitude more hazardous than "**naturally occurring**" uranium that is mixed with other minerals in the ground in a chemical and radiological equilibrium. Dr. Busby counters such argument from the UK Ministry of Defense: "MoD's argument is like saying it's OK to throw pellets of arsenic around for children to play with, just because trace quantities of arsenic arise commonly and naturally in soil, vegetation and drinking water."
- Excuse "natural" uranium as harmless. Even "natural" uranium metal (an alloy of 99.8% U-238, 0.2% U-235 and traces of U-234) turns into deadly fine particles under combat use conditions and in fires.
- Concentrate on the **toxic** aspects of DU and on the "**clean**" DU while actual DU comprises extremely toxic-radioactive U-236, plutonium, and other transuranics.
- Lack early identification and medical monitoring of uranium casualties, and ignore illness due to eroded immunity following exposure, and acute to chronic effects from long-term exposure to small amounts of uranium contamination.
- Focus on "healthy soldiers" and relatively weak external radiation from DU metal or the effects of uranium shrapnel in the body, instead of ingested or inhaled particles of soluble uranium oxides (short-term toxic agents) and insoluble ones (long-term toxic and radioactive), also in ceramic form alien to nature.
- Calculate the exposure to DU over areas much larger than actually contaminated, while doses -- over volume of internal organs, instead of affected cells.

- Adopt the optimistic picture of DU passing from the body and ignore an activity in the lungs, which moves particles into the lymph glands.
- Ignore the fact that elimination of soluble uranium overwhelms the kidneys. Insoluble uranium oxide and ceramic uranium oxide may move through the kidney slowly and not cause serious renal toxicity.
- Do not emphasize that just one dose on a DU battlefield is bad for the lymph nodes, but a veteran may be present at many such events.
- Project morbidity and mortality from ICRP curves that are invalid for internal doses of radiation and insoluble uranium oxide particles.
- Conceal the fact that in addition to direct cancers, internal uranium radiation promotes cancers from other factors (the early Balkan cancers could be radiation-promoted).

Prudent scientists do not make mistakes and omissions on known facts. “Epidemiological study” deceptions are plentiful, more so that epidemiology, like statistical analysis, can be manipulated to prove desired results. Apologists of uranium effects compare erroneously estimated incidence of cancers among veterans to statistics for general population. The latter is an incomparable group. Besides, official epidemiological statistics are biased downwards, since “background” radiation includes gradual accumulation of global radioactive pollution. As another example, WHO expeditiously compared DU-like illness incidence in Kosovo before and after NATO bombing. Statistics are incomparable, because of different population base: 300 or 400 thousand opponents of Albanian extremism left Kosovo, but many more immigrants came from Albania. Pre-1999 Kosovo Albanians boycotted the Yugoslav state health care system, so the statistics quoted by WHO are fragmentary at best.

US government has admitted that 50 years of uranium fuel manufacturing has not led to serious epidemiological studies. Previous studies focused on cancer death as a biological endpoint, while ignoring chronic illnesses, deformed children, and other medical problems. Internal radiation dose was never calculated in the A-bomb studies, hence it cannot inform on the biochemical pathways of a particle in the body. Yet, ICRP analytical apparatus relies solely on the false data. NATO “scientists” apply ICRP estimates concerning uranium dust from nuclear industrial processes, and not from aerosols (including ceramic) produced from uranium weapons. Analogies of uranium particles from military use to nuclear industry situations encoded into official data are invalid, because of cover-ups in the industry. Inhalation of uranium dust in nuclear processing is not biochemically equivalent to inhalation of ceramic uranium particles.

The other factor

NATO “science” emphasizes the “other factor” of Gulf and Balkan syndromes. A 1999 RAND "report" released concurrently with *Operation Allied Force* absolved DU and blamed drugs that Gulf War soldiers received against chemical weapons. In the “Kosovo DU” scandal, NATO cited chemicals in wood handled by the soldiers, and benzene with which they supposedly cleaned guns. Soldiers denied the use of benzene. The media also cited natural asbestos deposits and lead contamination of Kosovo to divert attention from DU. Amidst the Balkan DU debate, Associated Press dispatch from Kosovo named lead, untreated sewage, dust from a cement plant, and toxins from neglected factories.

US Army Col. David Lam announced, "I think we need to look at all possible causes, such as other pollutants and hazards, and not focus only on DU." Dr. Milan Orlić, president of the Nuclear Sciences Society at Vinča Institute, said at a January 2001conference in Athens that Balkan syndrome was more likely correlated with other agents than DU. One article blamed kidney diseases in the Balkans on well water contamination by toxins from coal deposits.

After the Gulf War, which saw a cocktail of poisons used and released – from destroyed stocks of Iraqi chemical-biological weapons, to DU ammunition – the "other factor" was adopted in DU cover-ups. It would likely be pursued for the Balkans and other areas, once cancers from the use of uranium weapon take a higher toll. Vaccines given to the soldiers could not be a cause of the syndrome among residents, neither there was smoke from burning oil wells in the Balkans, nor chemical weapons used by “Milosevic” against his own people. Apologists of Gulf War syndrome in Iraqi population cited the two latter factors, though no independent epidemiological study was done.

After reporting in April 2002 of a claim about a direct link between DU shells and a 20-fold increase in child cancer in southern Iraq, BBC was accused of peddling Hussein’s propaganda. Dr. Richard Guthrie, an expert in chemical warfare at Sussex University, said that it was far more likely that any childhood cancers were caused by Saddam's use of mustard gas against his own people in 1986. Prof. Brian Spratt, who chaired the UK Royal Society inquiry into DU said: "Claims that there is an increase in birth defects and childhood cancers

in Iraq are impossible to measure as there is no comparable data from before the war." Dr Michael Clark, a spokesman for the National Radiology Protection Board in London (connected to ICRP), thought the report was "not exactly objective," since it was difficult to get proper information from Iraq.

Those who look, however, do find the information. Dr. Chris Busby (www.llrc.org) found leukemia clusters in Iraqi children born after the Gulf War (i.e. aged 5 to 9 years) while normally the disease dwells in 0 to 4 years olds. The "Hussein's mustard gas" theory and other counter-arguments of the authorities quoted above thus don't hold water. Busby also found a correlation between the increases in child leukemia and the districts where DU ammunition was used. He measured a 20-fold increase in α-activity in the air around the Desert Storm battlefields, compared to the air in Baghdad. In Basra, it was 10 times higher than in Baghdad. [*Al Ahram*, October 3-9, 2002].

Captive science

Radiation at DU sites is measured with the Geiger counter, which is insensitive to α-particles. Portugal science minister Dr. Mariano Gago told reporters DU was a "false problem." His team did not find "the smallest shred of radioactivity in any part of Kosovo." Dr. Fernando Carvalho, waving a Geiger counter, told the reporters that no radiation at all was found. The politicians spoke before scientific results were in. First UNEP study was unable to detect any wider area of contamination because the team was not adequately equipped to measure α-radiation. NATO "experts" in a study for European Commission were "unable to observe" the health effects below 100 mSv, a low-level, but dangerous effect of a DU particle in the tissue. Dr Bertell commented, "It should be obvious that one changes instruments as measurements become more fine [...] One uses a micrometer to measure the width of a piece of paper, not a metre stick."

The NATO website [www.nato.int/kosovo/010110du.htm] indicates corruption at international organizations, research and strategic studies institutes, and universities that were enlisted by Pentagon and NATO to misinform about DU. The Pentagon's "objective" reports are found on many websites that are linked to from independent websites, but looking for them at the NATO website is futile. NATO "research" fails to promptly test the exposed military and civilians. When "testing" is instituted, it is controlled by the military. Former secretary-general of NATO, later EU foreign and security policy chief, Javier Solana was heading NATO ad hoc investigation to prove that DU was safe. Before investigating began, Solana stated there was "no evidence of a link between the illnesses reported by NATO personnel and the use of DU ammunition." A meeting of the ad hoc committee comprising top medical experts could not identify "any increase in disease or mortality in soldiers who have deployed to the Balkans as compared to those soldiers who have not been deployed." With a lightning speed, the committee "examined" thousands of soldiers who served in IFOR, SFOR and KFOR, and not a trivial number of policemen sent to the Balkans.

The European Commission asked a "group of independent experts" whether "hundreds, if not thousands" of EU personnel and contract employees who have worked in the Balkans might face health risks from exposure to DU "slight radioactivity". The report was published on March 6, 2001. The "experts" turned out to be theoretical physicists who knew how to apply recommendations of ICRP, but little about toxicology or biophysiology. The "experts" concluded that "radiological exposure to DU could not result in a detectable effect on human health," and "there was no evidence to support" a hypothesis that exposure to toxic and carcinogenic chemicals could combine with radiation. Scientists S. Kaiser and R. Bertell assessed the EU "expert" opinion to be "useless for the protection of either the veterans or the public, contrary to the expressed intent" and concluded that it "added little to the concerned dialogue about DU."

At the same time, results of independent tests are concealed. The Portuguese defense ministry refused to hand over Hugo Paulino's body who died from leukemia. The ministry deliberately camouflaged his death, citing "herpes of the brain" and refused to allow his family to commission a post-mortem examination. This practice brings to mind cover-ups of Gulf syndrome among US, UK, and allied troops. The veterans have self-organized to defend their rights. Out of about 750 000 Gulf War veterans in the US and UK, reportedly over 200 thousand suffer of the syndrome and over 10 thousand have died. The authorities push the sick veterans around, deny them proper medical care and compensation. The military doctors diagnose "post-combat" stress. Sick and disabled, they are left without means to survive. Desperation drives many to suicide and assaults on the bureaucracy.

A 1990 revision by the ICRP cut the permitted low-level radiation dose by a factor of five. The US has not accepted that revision, so they claim their soldiers received "safe" doses during the Gulf War. In the US, the Atomic Energy Commission (AEC), a civilian agency headed up by the military. with no interest in exploring the hazards, control the subject of ionising radiation. Each of the four most distinguished scientists who worked for the AEC, John Gofman, Karl Morgan, Thomas Mancuse and Alice Stewart, was intimidated for proving that low-level radiation causes cancer.

A US study of Gulf War veterans has examined just 60 persons since 1993. At least two veterans had cancer. One veteran, believed to have had a heavy exposure to DU, fathered two children born with health problems since the war, but was excluded from the study. Pentagon's website confirms cancer among the study group, but, in an effort to downplay public concerns, military spokesman, Dr. Michael Kilpatrick have lied to North Atlantic Council ambassadors and NATO press corps in January 2001: "We have seen no cancers or leukemia in this group, which has been followed since 1993." In June 2001, Col. Francis O'Donnell told scientists from European governments that there have been no cancers among the 60 veterans examined.

In October 2002, vice chairman of US Gulf War veterans Denise Nichols criticized the US administration and the Congress for "lack of accountability" and for a failure "to apply lessons learned" to improve medical care of veterans. Nichols pointed out that the civilians are also unprepared because lessons from the military are ignored: "Doctors and researchers that have seen the reality of Gulf War Illness have desperately tried to help but have been ignored and attacked professionally." Nichols also referred to Pentagon's documented practice to sabotage veterans records to hide the real effect of Gulf War, and charged that the government's control of research funding prevents dissemination of knowledge. At the same time Pentagon do not educate their physicians on Gulf War illness, nor participate in true research, nor provide true treatment options to sick veterans.

In 2002, US veterans protested that samples of their blood and tissue are kept by the military authorities out of reach of independent testing. Testing of veterans authorized by NATO does not measure the right things. DU can be detected in urine - some soluble form of DU always accompany insoluble one, but somehow government tests cannot detect it. Normal levels of uranium in urine do not mean absence of danger and disease, either. Chemical analysis of lymph nodes from dead victims could confirm the lymphatic cause, but there are no government reports of such autopsies.

On October 30, 2001, the Pentagon released a paper on Balkan DU [http://deploymentlink.osd.mil/du_balkans/index.html], after Italian and Spanish soldiers fell to leukemia and lymphoma. As if posed to fend critics of possible use of uranium weapons in Afghanistan, the paper has "not found any connections between DU exposure in the Balkans and negative health effects." Dr. Busby found invalid reference groups in the Italian statistics. His re-analysis indicated 11 times the expected rate. The Pentagon paper cited "work" of the UK Royal Society, WHO, UNEP and ACLS. The second Royal Society report (2002) recognized lethal toxicity following an acute exposure to uranium oxide, but remained oblivious to low doses and radiological consequences. Hard target bombs and missiles were most likely used in Western Kosovo – the sector of Italian, Portuguese and Spanish troops. A new survey should investigate targets omitted in UNEP Balkan studies.

Conclusion

Pro-uranium weapons propaganda operates within the cover-up system of the nuclear complex. At its core is a basically flawed model of the International Commission on Radiological Protection, according to which low-level internal radiation from fine uranium particles is not a hazard. Proponents of uranium power and weapons use the model instead of empirical evidence, which they suppress with a sophisticated misinformation and fact-distortion web reaching as far as international organizations responsible for public health.

Recognizing the harm done, Williams, for example, urges priority actions to reverse the cycle of deception and human suffering because of uranium weaponry: (i) weapon inspections to determine which ones contain uranium, (ii) target inspection to identify those hit and contaminated by uranium weapons, (iii) health monitoring and support for target communities in uranium-contaminated areas, and (v) fundamental review of all research that was so far restricted to DU instead of uranium weaponry in general.

Observers believe that DU cover-ups serve to ease public acceptability of present non-nuclear uranium weapons against hard targets, present small nuclear warheads, and future pure fusion nuclear weapons. All of these weapons contaminate with low level radiation. A future combat scenario using fusion micro-weapons translates into a low-level radioactive input comparable to that on DU battlefields [Gsponer et al., 2002]. Elimination of uranium radiological and fission weapons in the 21st century would not terminate the health and environmental problems of low-level radiation battles.

Unless the legal thresholds of acceptability of so-called low-level radiation are removed, the perpetrators of non-nuclear but still radiological uranium weapons would continue to contravene humanitarian law and place increasing parts of the planet at risk. Ultimately, massive long-term human catastrophe might result, far beyond the borders of radioactive wars. Thus, the authors see the only solution is a complete and universal termination of the development, testing, production and use of these weapons of indiscriminate effect and delayed mass destruction. A beginning of that termination is H. R. 3155, introduced at the US Congress.

References

Piotr Bein and Peđa Zorić, Propaganda for Depleted Uranium - a Crime against Humankind, International Conference *Facts on Depleted Uranium*, Praha, November 24-25, 2001, http://groups.yahoo.com/group/du-watch/files/DUPraha.doc

Michel Chossudovsky, War Propaganda, Centre for Research on Globalisation, 16 January 2003, http://globalresearch.ca/articles/CHO301A.html

Boeing Corporation, Safety, Health and Environmental Affairs (SHEA) Guide RJ-028G: Depleted Uranium Counterweights, September 18, 2001

Asaf Durakovic, New Concepts in CBRN Warfare in the Light of the Gulf War Experience and Current Reality of Global Terrorism, Uranium Medical Research Centre, Proc. The Third GCC Conference of Military Medicine and Protection Against Weapons of Mass Destruction, Doha, Qatar, October 20th-23rd, 2002 www.umrc.net

European Committee on Radiation Risk, Recommendations of the ECRR: Health Effects of Ionising Radiation Exposure at Low Doses for Radiation Protection Purposes, Green Audit, Brussels, 2003

A. Gsponer, J. Hurni and B. Vitale, A comparison of delayed radiobiological effects of depleted-uranium munitions versus fourth-generation nuclear weapons, Proceedings 4th International Conference of the Yugoslav Nuclear Society, 2002, http://arXiv.org/abs/physics/0210071

Headquarters, Department of the Army, Field Manual 100-6: Information Operations, USGPO, Washington DC, 27 August 1996

Joint Chiefs of Staff, Department of Defense, JCS Publication 1, Glossary Department of Defense Military and Associated Terms, 1987

Paul Loewenstein, Industrial Uses of Depleted Uranium, American Society for Metals, 1992

J. Mishima, M.A. Parkhurst, R.I. Sherpelz and D.E. Hadlock, Potential Behaviour of Depleted Uranium Penetrators under Shipping and Bulk Storage Accident Conditions, Batelle Pacific Northwest Laboratory for the US Department of the Army, Richland, Washington 99352, March 1983

The National Alliance, Who Rules America? The Alien Grip on Our News and Entertainment Media Must Be Broken, National Vanguard Books, P.O. Box 330, Hillsboro, West Virginia 24946, USA, www.natall.com/who-rules-america/ [posted to the Internet in November 2002]

Office of the Chairman of the Joint Chiefs of Staff, Joint Publication 3-53, Joint Doctrine for Psychological Operations, USGPO, Washington DC, 10 July 1996

Karen Parker, Depleted Uranium at the United Nations, proceedings CADU international conference in Manchester, November 2000

Karen Parker, Written statements at UN Human Rights forums on behalf of IED/HLP: UN Docs. E/CN.4/1997/NGO/49; E/CN.4/Sub.2/1997/NGO/19; E/CN.4/Sub.2/1998/NGO/25; E/CN.4/1999/NGO/119

Karen Parker, Memorandum on Weapons and the Laws and Customs of War, International Educational Development/Humanitarian Law Project (IED/HLP), 1997, excerpted in Report of the Secretary-General, UN Doc. E/CN.4/Sub.2/1997/27

Robert J. Parsons, UN-backed Cover Up: Deafening silence on depleted uranium, *Le Monde Diplomatique*, February 2001

US Army Environmental Policy Institute, Health and Environmental Consequences of Depleted Uranium Use by the US Army, Atlanta, 1995

US Army Medical Research Institute of Infectious Diseases, Fort Detrick, MD, 8 May 1995

Venik's Aviation, Health Risks of Using Depleted Uranium, Philadelphia, November 03, 2001, www.aeronautics.ru/venik.way.to

Dai Williams, Depleted Uranium weapons in 2001-2002: Mystery Metal Nightmare in Afghanistan? www.eoslifework.co.uk/du2012.htm

Dai Williams, US Patents confirm Uranium warheads, www.eoslifework.co.uk/u23.htm#USpatreport

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