

Hazards of Uranium weapons in the proposed war on Iraq

Updating *Depleted Uranium weapons 2001-2002, Mystery metal nightmare in Afghanistan, Jan 2002*

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Summary

Most public debate about US war plans for Iraq has been led by US allegations about Iraqi **weapons of mass destruction** justifying "regime change" by military action. UK and other governments appear caught up in the **group think** of the Bush Administration's "War on Terrorism". Group think involves self-justifying logic that generates an illusion of morality, demands unquestioning conformity, accepts dangerously high risk strategies and demonises enemies and dissenters (1). It explained strategic errors that led to the Bay of Pigs fiasco.

In time of war vital combat and aftermath data that may alter public perception, government decisions or arms procurement is classified, concealed or distorted on the pretext of state security. It is vital to separate facts from propaganda about terrorist threats and Iraqi or allied weapons. Since September 11th US and UK Government agendas have excluded any debate about **the weapon systems used by US and allied forces (2)**. **Their potentially devastating effects on the Iraqi population and allied ground forces may far exceed hazards from weapons that Iraq may have developed.**

Most of the guided weapons that will be used in new air attacks on Iraq - **smart bombs and cruise missiles** - will be the same as those used in Afghanistan (3). No independent assessment has been made of post-war health & environmental conditions there. It is feared that these weapons have already started widespread and irreversible health problems for civilians and troops - a potential Afghan War Syndrome.

Most of these "hard target" guided weapons contain **a mystery and highly secret "dense metal"**- over twice the density of steel and pyrophoric, creating intense heat inside their targets (see [Figure 1](#)). **The only metal that meets both requirements is Uranium, depleted or non-depleted.**

If Uranium is used in large, explosive "hard target" warheads (up to 1500 kg) it will create **levels of radioactive contamination 100 times higher and more widespread than the depleted uranium anti-tank penetrators used in the Gulf War**. After bomb attacks in the Balkans in 1999 increased levels of airborne Uranium dust were detected in Greece and Hungary. **Any warheads containing Uranium will cause permanent Alpha, Beta and Gamma radiation hazards in target areas. They are radiological bombs - weapons of indiscriminate effect in terms of the 1st Protocol additional to the Geneva Conventions.** 23 systems are suspect.

All Parliaments that have been asked to support a new war on Iraq are strongly advised to ask these two basic questions:

- A. What is the secret, high density metal used in the new generation of hard target guided bombs and cruise missiles produced in the USA and other countries?**
- B. If this mystery metal is Uranium how will national leaders and parliaments justify attacking unconfirmed weapons of mass destruction with weapons of indiscriminate effect ?**

Weapons of mass destruction cause sudden death or destruction in target areas, some with long term or widespread effects. **Weapons of indiscriminate effect** cause widespread or long lasting contamination liable to cause injury, chronic illness, slow death or severe birth defects. **Both** are outlawed in the 1st Protocol of the Geneva Conventions.

Action needed by Parliaments and media (summary of section 13)

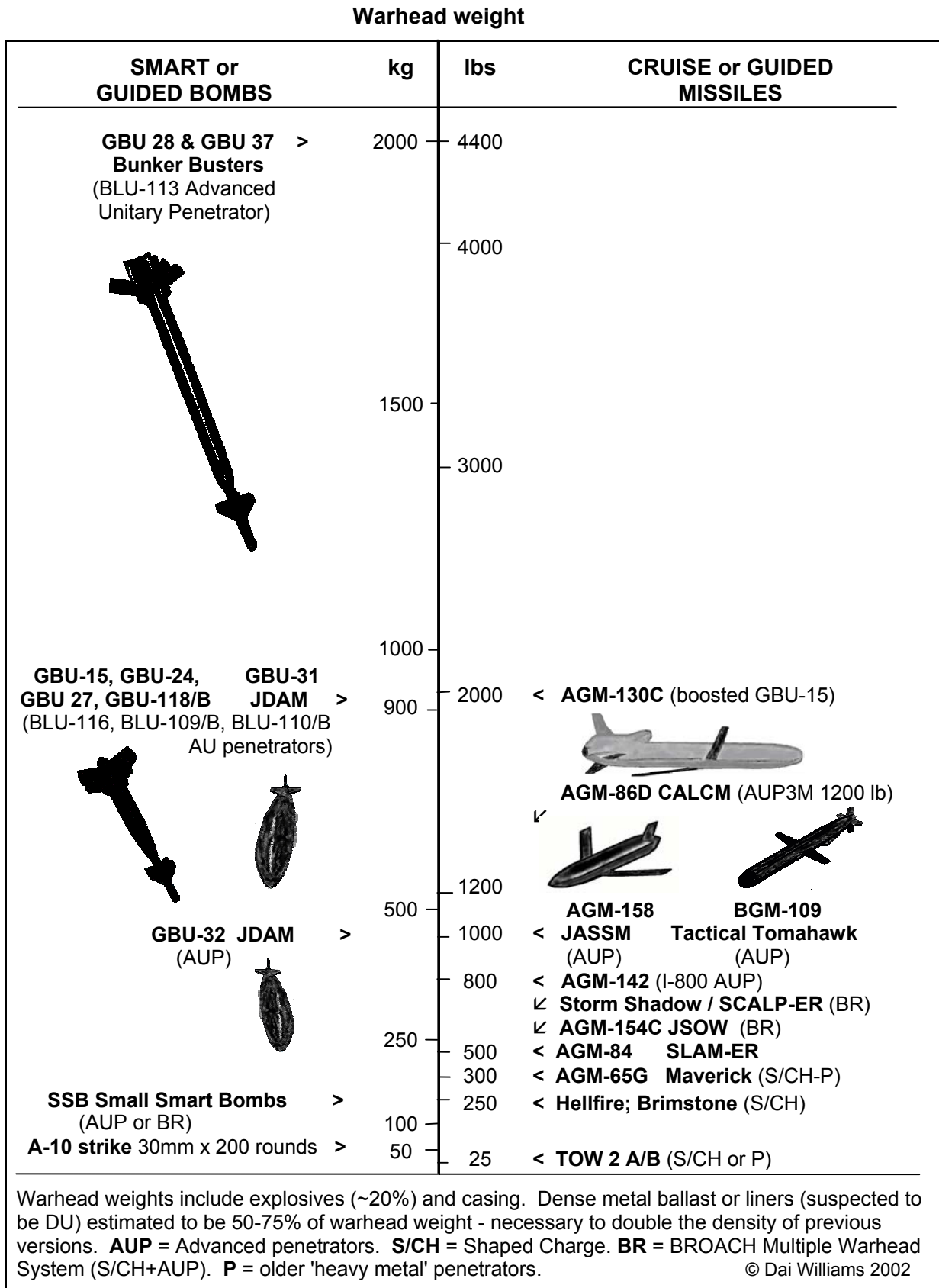
The "heavy metals" used in hard target guided weapons have been a closely guarded military secret since 1990. They can only be Tungsten or Uranium. Why classify the use of Tungsten?

To establish the truth about suspected "conventional" Uranium weapons and their effects Parliaments and media across the world are urged to demand the following actions **before** sanctioning any new military action by the USA in Iraq or other countries:

- 1. Immediate, independent investigations by UN inspectors and Parliamentary representatives to verify the materials used in all the suspected Uranium weapons identified in this analysis (Table 1).** These to include current weapon stocks and manufacturing facilities in all countries, and full disclosure of combat use since 1990.
- 2. Rigorous environmental monitoring for Uranium contamination in Afghanistan and re-survey of other recent combat zones.** Both UNEP studies (2001, 2002) of Depleted Uranium in the Balkans excluded guided bomb, missile and cluster bomb targets.
- 3. Independent and ongoing health monitoring of troops and civilians (local residents, refugees and expatriates) exposed to suspected Uranium weapons in Afghanistan, the Balkans and Iraq.**
- 4. Medical aid and environmental protection for all civilian communities at risk of Uranium contamination.**
- 5. Review of past medical research, hazard assessments and policy advice concerning Depleted Uranium (DU) weapons based on Uranium exposure from small penetrator warheads (less than 6 kg), or overlooking widely varying levels of U235, U 236 and Plutonium contamination (Dirty DU).**

Figure 1

Hard target guided weapons in 2002: smart bombs & cruise missiles with "dense metal" warheads (updated September 2002)



1. Prime targets in Iraq

President Bush's main justification for an attack on Iraq is the proposition that Saddam Hussein has developed a new arsenal of "weapons of mass destruction" since UN arms inspectors were withdrawn from Iraq in 1998.

The US and UK Governments express concern that Iraq has developed new stocks of **chemical, biological and possibly nuclear weapons**. In view of extensive satellite surveillance of Iraq since 1991 some facilities are likely to be in underground caves or bunkers, or hidden beneath large buildings e.g. offices, factories or hospitals.

2. New generation of hard target guided weapons

In order to counter such threats the US military launched a new weapons programme - **Hard or Deeply Buried Target Defeat Capability (HDBTDC)** - in the mid 1990's. See the **FAS** website (Federation of American Scientists) at <http://www.fas.org/man/dod-101/sys/smart/hdbtdc.htm>

HDBTDC weapons require two main features:

- a) the ability to penetrate underground targets - in caves, reinforced concrete bunkers or below multi-storey buildings. This requires high density penetrating warheads with delayed action "hard target smart fuzes".
- b) to neutralise chemical or biological agents before they are released into the atmosphere ("Agent Defeat" capability). This is to be achieved by using warheads with powerful incendiary capabilities.

3. Investigations into mystery metal warheads since 1999

The possibility that Uranium has been used in bombs and missiles was first investigated by **Dr Theodore Liolios** in Greece in November 1999 (8). Anomalies in early reports from the UNEP (United Nations Environment Programme) study in Kosovo in January 2001 led me to research suspected use of Uranium in guided bombs and cruise missiles through primary public domain websites e.g. US and UK military, FAS, Jane's Defence, CDI, Boeing, Raytheon, MTP, LLRC.

Extracts from **the USAF Mission Plan, 1997** on the FAS website indicated **a new generation of hard target guided weapons with warheads from 250 - 20,000 lbs.** that would use **"dense metal"** to double their penetration effect. The Jane's website reported that DU had been used to increase the penetration effect of guided weapons and in shaped charge warheads.

In **March 2001** I sent copies of this data to **UNEP** asking if they had monitored hard target bomb and missile targets as well as anti-tank targets for Uranium contamination. They had not, or were not allowed to by NATO. Despite this warning they did not include bomb or missile targets in their second study of DU in Serbia and Montenegro conducted in Autumn 2001.

In **October 2001** first reports of the Afghan bombing campaign referred to use of **GBU 28 Bunker Buster** guided bombs. These used "dense metal" warheads like other weapons in the USAF 1997 mission plan. On 16 October I sent a warning that these may be Uranium weapons to the UK Government via my MP. A reply from UK Minister for Veterans Affairs & DU, Dr Moonie, dismissed this possibility and said that DU was "too soft" for hard targets and presented "minimal" health hazards. This year the MoD acknowledged that DU alloys (used in armour plating and high velocity anti-tank penetrators) can be extremely hard.

Throughout the Afghan war I monitored bombing reports from the Center for Defense Information <http://www.cdi.org>, investigated other potential uranium weapons systems and monitored statements by the US and UK Governments. The results with sources were published in **Depleted Uranium weapons 2001-2002, Mystery metal nightmare in Afghanistan?** published 31 January 2002 (3), available from Politicos bookshop in London (<http://www.politicos.co.uk>) and online at <http://www.eoslifework.co.uk/du2012.htm>

The report identified **7 scenarios for Uranium contamination in Afghanistan** (page 95) and **21 suspected DU weapon systems** (page 131). Part 5 lists **27 conclusions** identifying the need to inspect the weapons concerned, the environment in areas where they had been used, to initiate health and safety precautions for all civilians and troops exposed to hard target bombing and to set up urgent health monitoring for Afghan and expatriate civilians, refugees and allied troops. These conclusions provide the basis for action priorities in section 13 below.

The report was sent to several **UN agencies** including **WHO, UNEP** and **UNIDIR**, to **NGO's** ICRC, MSF and a de-mining network, and to the **UK Government** and media. It was reported in **Le Monde Diplomatique in March 2002** (<http://mondediplo.com/2002/03/03uranium>) leading to a **question in the EU Parliament in Strasbourg by MEP Paul Lannoye on 9th April (2)**.

Several **UK MPs** submitted written questions to the UK Government regarding these concerns from October 2001 onwards (quoted in Part 2 of the report). There appears to be a cross-party consensus (or veto) not to question Uranium weapons in open debate in the UK Parliament.

All enquiries in the UK and EU Parliament have received very brief denials from Defence ministers that any DU weapons have been used in Afghanistan. On 5 Nov 2001 Defence Minister Geoff Hoon said that DU safety guidelines would be issued if necessary for troops or civilians. On 16 January **Donald Rumsfeld** reported an elevated level of radioactivity in one area in Afghanistan due to "depleted uranium on some warheads", allegedly missiles captured from Al Qaeda in December (report page 120). But no DU warning was published in UK.

The Pentagon did not report the type of missiles found or which country made them. However the risk of Al Qaeda using radiological "dirty bombs" was a major theme in Pentagon statements from 5th December 2001 to May 2002. This proposition may be raised again by the US Government if serious Uranium contamination is discovered in Afghanistan in the near future.

Apart from the Jane's Defence website no guided weapon system (excepting nuclear) in any country has been officially acknowledged to use Uranium warheads. However in March 2002 the UK MoD website, DU Research Proposal Appendix A (9) disclosed "**Anglo-French research on a tandem warhead with depleted uranium lined rear charge**" in January 1999, first studied in 1995 and later tested at Aldermarston and Eskmeals (10). This may have been for the TRIGAT project, or the BAE-RO BROACH warhead (see section 5 below). On 6 December 2001 UK Defence spokesman Mr Ingram gave a written reply about the BROACH warhead: "The only dense metal contained in the BROACH MWS is a tungsten-based alloy. No other dense metal is or has been used in its development or testing". This needs independent verification - the high melting point of Tungsten would seem unsuitable for the shaped charge.

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, Donald Rumsfeld and the UK MoD. The question now is not "Has Uranium been used in guided weapons?" but "Which ones, how many, when and where?"

The UNEP PCAU (Post Conflict Assessment Unit) started planning environmental surveys in Afghanistan in December 2001. However, despite my warnings about the risk of DU warheads in bombs and missiles sent to them in March 2001 and in February 2002, **no UNEP environmental monitoring for Uranium contamination has been reported from Afghanistan since the bombing started 11 months ago.**

NATO delayed the UNEP Kosovo DU study until 16 months after the Balkans War, and after at least 10 NATO survey teams had been allowed to "inspect" (clean-up?) DU target zones (source: US DoD). The latest report is that **UNEP PCAU will start a project in Afghanistan this month** (September 2002). See <http://postconflict.unep.ch/actafghassessment.htm>

However, on 28 August Afghanistan PCAU Project Co-ordinator Peter Zahler (who joined UNEP in May from the USA) said **UNEP has no specific plans to investigate Uranium contamination risks in Afghanistan**. He seemed unaware of my report though he had been shown a copy and thoroughly briefed about it in May. Bomb and missile targets are conspicuously absent from both UNEP Balkans DU studies. Despite its valuable expertise and detailed reports the integrity of UNEP environmental monitoring for Uranium contamination in the Balkans, and for its new studies in Afghanistan, Bosnia and Palestine, appears to be compromised by external pressures.

The first UK Press report on suspected use of Uranium in bombs and missiles was published by David Hambling in the Guardian on 5th September 2002 - **The heavy metal logic bomb (7)**. He checked available dimensions of advanced penetrators and concluded that "the AUP-116 has around a quarter of a ton of dense metal ballast. This ballast might not be DU at all; tungsten is similarly heavy. But DU is the military's usual choice."

<http://www.guardian.co.uk/science/story/0,3605,785897,00.html> .

Will other UK editors or MP's risk breaking the silence surrounding these secret warheads before the UK Government commits to supporting their use again in Iraq?

4. Guided bombs to be used in Iraq

The following **hard target guided bombs** are operational and have been used in bombing caves, bunkers and other strategic targets in Afghanistan. Most were also tested in the Balkans in 1999. These versions all contain "dense metal" **advanced penetrator warheads** (see also [Figure 1](#) and [Table 1](#) updated from *DU weapons 2001-2002* and Part 3 of the report).

- **GBU-28 & GBU-37 Bunker Busters** - 2 tons with BLU-113 "dense metal" warhead. The secret "dense metal" ballast is estimated to be 50-75% of warhead weight - up to 1500 kg. (For comparison 1450 kg of DU was released when nearly 300 DU anti-tank shells were destroyed in the Doha ammunition dump fire in the Gulf in 1991).
- **GBU-15, 24, 27 and 31 JDAM** hard target guided bombs - 2000 lbs. The upgraded BLU-109 warhead uses an Advanced Unitary Penetrator designated AUP or BLU-116 with "heavy metal" ballast (500+ kg). GBU 24's or 31's were involved in the friendly fire bombing accidents in Afghanistan and in the bombed Afghan wedding incident this year.
- **GBU-32 JDAM** hard target 1000 bomb with BLU 110B "dense metal" warhead (250+ kg). Possibly involved in the Canadian friendly fire bombing incident.
- **GBU-118B thermobaric bomb** - 2000 lbs uses the BLU 109 upgraded "dense metal warhead" casing (BLU/AUP-116 for high penetration) and a modified explosive.

The latest addition to the US hard target guided bomb inventory, reported in March 2002, is the **"Big BLU" Bunker Buster**. This is a **20,000 lb. guided bomb**, scaled up from the GBU-28 Bunker Buster. It also has a warhead with "dense metal ballast" - **potentially 5+ tons of uranium per weapon**. <http://www.globalsecurity.org/military/systems/munitions/dshtw.htm>

This 20,000 lb bomb was first proposed in the 1997 USAF mission plan - see original USAF specification on page 15 of the DU weapons report, or on the FAS website at: http://fas.org/man/dod-101/usaf/docs/mast/annex_f/part26.htm project WPNS 104.

5. Cruise missiles to be used in Iraq

The following are the hard target versions of cruise or air-to-ground (AGM) missiles, some with advanced penetrators, others with shaped charges, some with both. See Figure 1 for sizes, Table 1 for combat use, and **DU weapons** Part 3 for specifications and links. Combat use in Afghanistan confirmed by CDI and other reports:

- **AGM 130C** - 2000 lbs, rocket propelled version of the GBU-15 with AUP-116 "dense metal" warhead.
- **AGM-86D - CALCM** - the biggest, long range cruise missile converted from nuclear to "dense metal" warheads since 1998. Uses a Lockheed Martin AUP3M advanced penetrator warhead, reported 1200 lbs. BAE-RO developed their BROACH warhead for the CALCM in 1998. Both were under competitive evaluation (combat testing?) during the Balkans War. 30+ were used in Afghanistan until stocks ran low in December.
- **AGM-142 Raptor/Hav Nap** (Israeli design) cruise missile with 800 lb penetrator warhead. Developed in the early 1990's. Used in Afghanistan when 86D stocks ran low.

Several smaller AGM missiles (**Maverick, Hellfire / Brimstone**) and the most widely used cluster bomb BLU-97B all have "shaped charge" warheads, suspected of using DU liners. All were operational during the Afghan War and would be used against surface targets in Iraq.

The following **new hard target missiles** were officially still under development in 2001 but pre-production prototypes should have been ready for combat testing in Afghanistan. They are likely to be included for further testing or ready for full operational use in an attack on Iraq this year:

- **AGM-154C JSOW** BROACH warhead, 500 lbs. 154A version combat tested in the Iraq no-fly zone in 1999. C version tested May 2002, initial production 2002-3.
- **AGM 84 SLAM-ER** - high-explosive blast "Titanium" warhead (488 pounds) with double the penetration effect of its previous Tomahawk penetrator warhead. Suspected to use a DU/Titanium shaped charge warhead.
- **AGM 158 JSSAM** - AUP warhead
- **BGU-109 Tactical Tomahawk Penetrator Variant** with 1000 lb "dense metal" penetrator warhead.
- **UK Storm Shadow / French SCALP-ER** cruise missile (originally due for operations December 2001) BROACH Multiple Warhead System (shaped charge plus dense metal rear penetrator warhead) - either 500 (as for AGM-154C) or 1200 lbs (option for AGM-86D).

US and allied forces used over 6000 guided weapons (smart bombs and missiles) in bombing raids in Afghanistan. Their heaviest use was against caves in Tora Bora and Gardez but many were used in initial air attacks on command centres and other strategic targets in towns, air fields, Taliban training centres and the underground Karez water supply systems. **If only 1 in 3 of these used hard target warheads then the campaign may have dumped over 1000 tons of toxic, radioactive Uranium Oxide dust into the Afghan environment.** If so this will have spread over wider areas during summer heat and high winds.

These weapons would require a variety of different Uranium alloy mixes (with Titanium, Niobium or Molybdenum) to achieve different mechanical properties, and varying isotopic mixes (ratios of U238, 235, 236 etc) depending on source of production or to make widespread contamination hard to differentiate from natural uranium. The Taliban and Al Qaeda were unlikely to have the resources to make or deliver large uranium bombs or missiles but may have acquired small ground launched anti-tank missiles with Uranium warheads, or supplies of Uranium to manufacture static dirty bombs from other countries. Medical and environmental testing laboratories will need to consider all these possibilities.

Table 1: Combat use of known and suspected conventional Uranium weapon systems with dense metal penetrators or shaped charge warhead technology (updated September 2002)

Weapon	Gulf War 1991	Bosnia 1995	Desert Fox 1998	Balkans War 1999	Iraq no-fly zone 1992>	Afghanistan 2001-2	Iraq 2002 /2003
Guided Bombs (AUP upgraded versions)							Big BLU
GBU-15	e	P	?	Y	?	Y	?
GBU-24	e	P	?	Y	?	Y	?
GBU-27	e	P	?	?	?	Y	?
GBU-28 B/B	P	P	Y	Y	?	Y	?
GBU-31 JDAM	e	e	P	Y	?	Y	?
GBU-32 JDAM	e	e	P	Y	?	Y	?
GBU-37 B/B			?	Y	?	Y	?
GBU-118/B Thermobaric						Y	?
SSB					P	P	D
Guided missiles							
TOW 2 A/B A/tank	Y	?					?
AGM-65 G Maverick	Y	?	?	?	?	?	?
Hellfire II / Brimstone	e	e	e	?	?	?	?
AGM-84 SLAM-ER			?	?	?	?	?
AGM-86D CALCM			P	P		Y	?
AGM-130C				?	?	Y	?
AGM-142 Hav Nap		?	?	Y	?	Y	?
AGM-154C JSOW					154 A	P	D
AGM-158 JASSM						P	D
BGM-109 Tactical Tomahawk	e		e	e		P	D
Storm Shadow / SCALP ER						P	D
Sub-munitions							
BLU-108/B A/Tank cb				?		?	?
BLU-97B cluster bomb				Y		Y	?
Armor-piercing ammunition (DU confirmed)							
20mm Phalanx sea-to air							
25mm M791						?	?
30mm PGU-14/B	Y	Y		Y		?	?
120mm-US & Charm-UK	Y	?					?
<p>Key: Y = reported use. ? = operational, not reported. P = prototype testing expected. D = due delivery Blank = not operational, not appropriate to combat situation. e = earlier versions not suspected of DU</p> <p>Note: Data on warhead technology, operational status and combat use taken from: Federation of American Scientists; Jane's Defence; Center for Defense Information; Hansard.</p>							

6. Widespread health hazards of large Uranium weapons

In the 1991 Gulf War Allied forces admit to using 300+ tons of depleted uranium. These are strongly suspected by independent researchers of being a prime factor in the epidemic of birth defects, leukaemias and cancers in Iraq over the last 10 years with tens of thousands of victims. Over 200,000 US and allied troops were exposed to DU contaminated battlefields.

The US Government, supported by some 40 countries including the UK, voted to cancel a WHO study into the effects of DU on civilians in Iraq in November 2001. There have been no thorough studies of the health effects of DU contamination in civilian populations by NATO countries or WHO. Women and children are more susceptible to the hazards of low level radiation than fit soldiers. Studies by doctors in Iraq are limited by minimal medical resources, none sufficient for detailed medical analysis of uranium contamination.

7. International proliferation of Uranium weapons

The US have already exported known and suspected DU weapons to over 20 countries in Europe, the Middle East and Commonwealth. These may involve several \$ billions of existing inventory and new orders. Other Governments that manufacture or have purchased Uranium weapons are likely to be compromised into maintaining US secrecy over the extent of conventional Uranium weapons proliferation. They may face serious legal and political consequences if chronic illnesses or deaths in Iraq, the Balkans and Afghanistan are proved to be due to Uranium contamination. The stakes are very high for all countries concerned.

The potential variety and sources of Uranium weapons may go well beyond the 21 systems identified in the Appendix plus the 2 latest guided bombs. The UK MoD is currently evaluating options to import 5,000 **SPIKE** anti-tank missiles from Israel, against the equivalent JAVELIN missiles from the US, to replace the aborted Anglo-French TRIGAT project.

SPIKE and JAVELIN both use small but powerful tandem warheads capable of penetrating 600+ mm of armour. In view of the MoD's research these systems are likely to use a DU shaped rear charge. If so these tests raise fresh environmental concerns for residents in MoD testing and training areas e.g. Eskmeals. Though small they may be used in large numbers, potentially adding significantly to battlefield Uranium contamination. Parliament must question the precise construction of both systems and veto use of Uranium warheads of any size as a violation of the principles of the Geneva conventions - weapons of indiscriminate effect.

8. Conspiracy of silence over Uranium health effects?

Several countries that have purchased or developed Uranium weapons, including the US and UK, have already repressed prompt and comprehensive health and environmental research by UN agencies (UNEP, WHO). Target information and access necessary for monitoring the worst contaminated areas was delayed for 16 months by NATO in the Balkans.

Access for Uranium monitoring in Afghanistan has been delayed for 10 months. If large Uranium weapons were used casualties caught in the explosion plume may have died soon after. Taliban doctors reported several undiagnosed deaths within 2-3 days of bombing incidents that they suspected were due to chemical or uranium weapons. (Reuters 29 October 2001, see DU weapons report page 35).

Allied Governments may already be well aware of the hazards of Uranium weapons. The Bulgarian contribution to the ISAF force in Afghanistan included a team of 20 radiation decontamination personnel. (Bulgarian News 9 January 2002, <http://www.news.bg>).

In 2000 rising death rates among Spanish and Italian Balkans veterans from lymphomas and leukaemias caused alarm and led to a health survey of Balkans veterans in several NATO countries. Results published by the US DoD in October 2001 (DU report page 116) indicated no significant DU-related health problems. The UK has not surveyed its Balkans veterans.

Fortunately most NATO troops may not have been at risk in the Balkans except those deployed to most heavily bombed regions. The use of hard target bombs and missiles was most intense in the western region, where Italian and Spanish troops were assigned, and in Serbia.

When low level radiation epidemiologist Chris Busby re-analysed the Italian statistics he found they had used invalid reference groups. His corrected analysis indicated 11 times the expected rate of Leukaemias and Lymphomas. Health statistics for Spanish and Portuguese veterans may need similar recalculation. They were also deployed in western Kosovo in 1999.

Allied governments may already be aware of unusual health problems for troops assigned to Afghanistan. Initial influenza type symptoms were reported by US troops soon after service in the Gulf War in 1991. Significant Uranium exposure may lead to an increase in birth defects or miscarriages for veterans families and civilians 9+ months after the bombing started i.e. from now onwards. Special forces troops assigned to inspect heavily bombed targets are at highest risk unless they had full NBC protection. Cancer rates may increase progressively over 5-10 years - based on experience in Iraq since 1991 and a WHO survey of low level radiation exposure in Russia following the Chernobyl nuclear power station fire.

If US war plans for Iraq use hard target weapons with uranium warheads similar grim health prospects may await allied troops deployed in ground operations.

The UNEP PCAU post-conflict environmental assessment project in Afghanistan is vital to identifying potential hazards from suspected Uranium weapons for troops and civilians. Its findings may be essential to identify priority areas for health monitoring. All **seven DU scenarios** in the DU weapons report (page 95) should be considered. Uranium monitoring is needed in areas hit by allied bombs or missiles, cluster bombs and landmines. They may also detect Uranium from Al Qaeda weapons or from the war with Russia.

The speed and integrity of the PCAU Afghan study needs the highest priority and support from UN member states.

9. Other health effects of Uranium weapons

Most medical studies of uranium contamination for veterans have been carried out years after initial exposure, far too late to allow de-contamination treatment. There seems to be no systematic study of the early onset effects of Uranium oxide exposure. Early symptoms have been identified by personal reports from veterans in media interviews. It is now 10+ months since local citizens and some allied troops may have been exposed to Uranium weapons.

There has been an urgent need for Uranium monitoring (in the environment and for troops and civilians suffering respiratory or intestinal problems) in Afghanistan ever since the first suspicions and warnings that Uranium weapons may have been used (16 October 2001).

Afghanistan has many endemic health problems. During the early stages of the war, effects of mild DU contamination may have been hard to recognise. Medical teams faced with severe trauma casualties would have had minimal time, and (unlike the Balkans) no briefing to be alert for potential Uranium contamination. Extensive bombing caused a lot of atmospheric pollution - "the haze over Kabul" noted by one reporter. This may have caused the persistent cough noted by another journalist among media and aid workers in bombed areas. Has anyone documented personal health problems despite more immediate hazards like mines and bombs?

A range of Uranium health effects are possible depending on dose (how much is inhaled or ingested), duration of exposure (brief or ongoing), age, gender and the type of material involved (refer High exposure DU health risks, Part 4, section 3 and Figure 2 in the DU weapons report). Over a longer period there may be several phases from early onset medical conditions (e.g. birth defects) to slower onset conditions like cancers. Uranium oxide is a toxic heavy metal. Toxic effects may be most significant soon after exposure e.g. on the renal system (refer Royal Society report, March 2002). Internal radiation hazards may take months or years to become evident.

Toxic and radiation effects on the immune and nervous system may develop in weeks depending on level and duration of exposure. Some Gulf Veterans reported temporary loss of feeling in hands and feet - potentially important diagnostic clues to Uranium exposure for medical personnel with limited facilities.

I have not seen any follow-up health reports on the 4 SAS troops evacuated sick, presumed wounded, for the US or Canadian troops caught near fratricide (friendly fire) bombing incidents or for the Marines based at Bagram airport who suffered a mystery vomiting illness in May http://news.independent.co.uk/world/middle_east/story.jsp?story=296255, <http://news.bbc.co.uk/1/hi/uk/1989777.stm>. After several days of uncertainty this was officially attributed to common "winter vomiting sickness". But Bagram was heavily bombed last autumn and is a potential Uranium risk area. Similar health problems were unofficially reported for many local civilians.

Uranium screening (urine testing) would seem prudent for all expatriate personnel exposed to bombing incidents or heavily bombed areas if this has not already been done, especially those who experience unusual medical problems.

In June-July family doctors in UK were advised to expect flu or malaria-like symptoms among UK troops returning from Afghanistan. "All practitioners should consider malaria if consulted by UK service personnel who have served in Afghanistan complaining of fever, a flu-like illness, or other unexplained symptoms." (11). This is prudent for individuals returning from a country with minimal public health facilities and a number of infectious diseases. But co-ordinated health monitoring is important to identify unusual collective health problems.

Earlier this year there were outbreaks of a more severe gastric illness initially reported as CCHF (**Crimean Congo Haemorrhagic Fever**). CCHF is endemic in parts of Afghanistan in the summer. But see the Action Against Hunger report about the village of Tajwara in February at: <http://www.msnbc.com/news/721381.asp#BODY>. This report is not on WHO epidemic reports but the UN was aware according to <http://www.ph.ucla.edu/epi/bioter/outbreakkills28afgan.html>.

A specialist was concerned because February was the wrong season for CCFH and that laboratory tests failed to confirm CCHF, as in Bosnia several months after bombing there (<http://www.who.int/disease-outbreak-news/n1996/feb/n5feb1996.html>), and in south western Kosovo in 2001 (<http://www.who.int/disease-outbreak-news/n2001/june/8june2001.html>). In 1995 Professor Siegwart Horst Gunther listed symptoms associated with DU exposure in Iraq (DU report page 107). Severe vomiting, diarrhoea and internal bleeding are potential symptoms of significant exposure to toxic or radioactive materials.

Dr Asaf Durakovic, professor of radiology and nuclear medicine, started research with DU casualties in the Pentagon and now heads the independent UMRC (Uranium Medical Research Center) in Canada. (see <http://www.umrc.net> for research papers). He has pioneered independent research with US, Canadian and UK Gulf veterans to identify levels of internal Uranium contamination. He works closely with Leonard Dietz and Pat Horan. Their latest veterans study was published in the **Journal of Military Medicine**, August 2002;167(8):620-7, summary at <http://www.xs4all.nl/~stgvisie/quant-du.html> [and see [update](#) 20 October, ref 12]

Several of the warnings and questions I raised in October-November 2001 (first report pages 27, 37, 41, 46, 49) were followed up rapidly by several UK MP's in written questions to the Government from October onwards. They received very little investigation by the media in the UK or other countries except for reports in France and Australia. Whether this was due to security restrictions on the media since the War on Terrorism is not known.

10. Grim outlook for Iraq

US guided weapons stocks should be back to September 2001 levels by early October according to recent media reports in New York. **This implies that another 1000 tons of suspected Uranium based, hard target guided weapons will soon be ready for use in Iraq if President Bush's war plans go ahead.**

On 16th September Donald Rumsfeld said he wanted to reduce the risk to pilots patrolling the Iraqi no-fly zones. This suggests that **US and UK forces may increase the use of medium range missiles as well as smart bombs in Iraq soon - without declaring war or waiting for UN consent.** Use of guided weapons in the no-fly zones needs investigation. At least one of the suspected DU missile delivery systems - the AGM 154 Joint Stand Off Weapon - was first combat tested in the Iraq no-fly zones in 1999 according to US military reports. Many other hard target weapons may have been tested there in recent years. Additional uranium contamination and its health effects on civilians could be hard to identify in areas first attacked in 1991.

Uranium warheads, depleted or not, are radiological bombs - weapons of indiscriminate effect that will permanently contaminate target environments. The half life of U238 radiation is 4.5 billion years. Several areas of Iraq are now permanently contaminated.

The prospect of allied forces and governments knowingly increasing Uranium contamination in Iraq from 300 to 1300+ tons seems tantamount to genocide. Every politician and military planner associated with this decision - in the US, UK or other allied countries - should be aware of this moral and potential legal responsibility.

11. Nuclear versus conventional radiological bombs

The potential hazards of "conventional" Uranium weapons have been skilfully played down by US Government statements. These have included plans to develop nuclear penetrating bombs earlier this year, threats of radiological bombs being used by terrorists and the latest warning of potential first strike nuclear attacks by the US and UK Governments. Rhetoric about developing and using nuclear weapons, or exotic radiological bombs by terrorists, seems calculated to alter the threshold of "acceptable" weapons systems used in defence or in retaliation for attacks on September 11, 2001.

Talk of developing "nuclear bunker busters" earlier this year was not news to weapons researchers. The B-61 nuclear bunker buster bomb was tested in 1997. It might be useful to start earthquakes in fault zones but would create more surface contamination than the biological or chemical weapons target it hits. Use of extreme (nuclear) force to achieve "regime change" in Iraq would also alter the thresholds of acceptable force for terrorists. Tactically and strategically a nuclear strike makes no sense when existing systems can already achieve the same "agent defeat" effects in deeply buried targets.

Politicians and media analysts need to be aware of the systematic dis-information and secrecy used to minimise public vigilance about the hazards of Uranium weapons. (Refer **Don't Look Don't Find** by Dan Fahey <http://www.miltoxproj.org/DU/IOM-cover.htm> and other sources in Part 4, page 115-124 of the DU weapons report). The care taken to keep the mystery "dense metal" in hard target warheads secret suggests that its disclosure could be seriously compromising to manufacturers and the military. It is not a secret to weapons manufacturers in several countries who are using similar warhead technology. When extensive information is available about the general specifications of these weapons why should the warheads be secret - unless they are "conventional" Uranium weapons?

Uranium weapons - whether fission or non-fission - are all radiological bombs, equally outlawed by the Geneva Conventions. If the snowballing epidemic of cancer and birth defects in Iraq is due to long term uranium contamination from the Gulf War then similar public health disasters may be expected in the Balkans and Afghanistan. The potential scale of human suffering and long term fatalities is awesome. The permanent environmental contamination and hazards of using thousands of "conventional" radiological guided weapons in many locations in Iraq could be as high as that caused by several tactical nuclear weapons.

The threat of using tactical nuclear weapons does not reduce the grave risks of using conventional uranium weapons. But most politicians and media analysts are probably completely unaware of this conventional weapons threat. Both strategic options need full analysis and public debate.

12. Urgent action needed on conventional Uranium weapons

This update continues a quest to establish the truth about suspected "conventional" Uranium weapons and their effects in target communities. Parliaments and media across the world are urged to demand the following actions **before** sanctioning any new military action by the USA in Iraq or other countries:

1) Independent inspection of suspected uranium weapons

Immediate, independent investigations by UN inspectors and Parliamentary representatives are needed to verify the materials used in all the suspected Uranium weapons identified in this analysis. These must include current weapon stocks and manufacturing facilities in all countries, and full disclosure of combat use since 1990.

These inspections are needed to verify the exact nature of the "mystery" metal or metal alloys used in all hard target guided weapons. The first priority are those systems already used in Afghanistan, the Balkans, Iraq or any other combat zone since 1990, and all those intended for use against Iraq.

A list of suspected Uranium weapon systems is given on page 131 of **Depleted Uranium weapons 2001-2002** plus BLU-118/B and Big BLU (see [Table 1](#)). This should be extended to include any weapon systems in other countries using similar hard target warhead technologies (explosive penetrators or shaped charges) e.g. SPKIE, JAVELIN and several similar tandem warhead anti-tank missiles.

Weapons inspections need to include **disclosure of all training and combat locations** where suspected Uranium weapons have been used since 1990 so that these can be tested for environmental contamination and potential hazards to local communities, troops or other civilians exposed to them.

2) Independent environmental monitoring for Uranium contamination in Afghanistan and other recent combat zones

Rigorous environmental monitoring for Uranium contamination is needed in Afghanistan and re-survey of other recent combat zones. Both UNEP studies (2001, 2002) of Depleted Uranium in the Balkans excluded guided bomb, missile and cluster bomb targets. Surveys need to include soil, water, air, plants and animals for uranium contamination within 10 kilometres of all bombed areas in Afghanistan, the Balkans and Iraq. National parliaments and UN member countries need greater vigilance to assure the independence of monitoring teams and laboratories and to confront any political or military interference.

All environmental monitoring samples and data acquired by military inspection teams operating in Afghanistan should be disclosed for comparison with new surveys.

A new survey of Uranium contamination in the Balkans is needed to investigate targets hit by guided bombs, cruise missiles or cluster bombs - omitted in UNEP studies of Kosova, Serbia and Montenegro. New UNEP studies in Bosnia-Herzegovina and Palestine must include bomb, missile and cluster bomb targets and targets hit by armoured vehicles or helicopters equipped to fire anti-tank Uranium ammunition or tandem warhead missiles. A major survey in Iraq should be planned as soon as diplomatic conditions permit.

These environmental surveys need to be correlated with suspected combat use, target locations and the weapon systems used, as requested in (1) above and identified in [Table 1](#).

3) Independent health monitoring of troops and civilians exposed to suspected Uranium weapons

Independent and ongoing health monitoring is needed for troops and civilians (local residents, refugees and expatriates) exposed to suspected Uranium weapons in Afghanistan, the Balkans and Iraq. This should include local citizens, aid workers, troops and refugees or civilians now in other countries who were within 10 kilometres of guided weapon targets in Afghanistan or the Balkans. Highest priority is needed for Uranium screening of medical patients suffering respiratory, stomach or kidney disorders, birth defects, lymphomas or leukaemias, and patients who die from these conditions.

Medical groups (local medical staff, NGO's and occupational health teams in home countries) need to be briefed on identification of potential Uranium related illnesses. The geographic location of potential exposures needs to be included where possible. Survey data should be co-ordinated by the WHO, preferably in co-operation with other independent medical research organisations.

The International Atomic Energy Authority (IAEA) has a crucial role to play in identifying sources of radiation in suspected Uranium weapons. Its terms of reference include investigation and advice on health effects of radiation, overlapping with WHO interests in international health and illnesses. It also has the most sophisticated resources to analyse suspected Uranium contamination, and potentially databases on the isotopic profiles of Uranium from different countries and manufacturing processes.

Unfortunately the IAEA's obvious links with the nuclear industry around the world are treated with suspicion by independent radiation researchers. Its impartiality needs to be assured if UN member states are to trust its findings and recommendations on the use of conventional Uranium weapons to date.

At a radioecology conference in Monaco in September 2002 physical chemist Pier Roberto Danesi, former director of the International Atomic Energy Agency's (IAEA's) laboratory in Siebersdorf, Austria said "There is a consensus now that DU does not represent a health threat" (Report in Science Mag, 13/9/02 at: <http://www.sciencemag.org/cgi/content/summary/297/5588/1801>).

Each country that has sent troops or civilians to suspected Uranium combat zones since 1990 needs to set up independent health monitoring programmes for personnel involved, or to review those already established. These to include assessments of uranium contamination for all personnel at risk i.e. who have been in or near hard target bombing locations and related water catchment areas. Best practice standards of epidemiological analysis are essential to avoid repeating errors in NATO data for Italian Balkans veterans.

Health monitoring programmes need to include early Uranium screening and regular follow-up health checks by employers (military, NGO's, media etc.) of all personnel returning from suspected Uranium combat zones (currently Iraq, the Balkans and Afghanistan). Personnel found to have significant internal Uranium contamination may be helped with kelation treatment if detected early. Ongoing monitoring may enable early treatment of slow onset disorders.

Results of Uranium health screening and general health monitoring need to be published regularly (at least annually) for the next 5 years to enable national and international health statistics to be compared. This should include data on Special Forces personnel that would usually be classified secret.

Parliaments, professional medical associations, universities and other medical or environmental research organisations, and the media need to be highly vigilant for any military, political or commercial interference with the speed and reliability of Uranium screening and health survey results.

4) Aid and protection to communities at risk of Uranium contamination

Medical aid and environmental protection is needed for all civilian communities at risk of Uranium contamination. The greatest urgency is needed to **identify areas of potentially high Uranium contamination** so that civilians can be relocated to safe areas, and to avoid repatriation of refugees to Uranium contaminated environments.

Communities living in areas contaminated by large Uranium weapons are at risk of chronic and cumulative exposure via soil, water or air and food contamination. They may have already experienced early onset Uranium-related health problems and face a grim outlook requiring high levels of medical support - as seen in Iraq. Financial liability for medical support stands morally and possibly legally with any government that has deployed Uranium weapons in combat or training in their own country or overseas. This includes locations within the USA or US jurisdiction e.g. Vieques, in the UK and probably in all other countries that manufacture or purchase Uranium weapons.

Where possible environmental clean-up should be done, at least to contain existing contamination and protect water supplies. Full clean-up for heavily contaminated target areas is currently uneconomic. Plans to clean-up of the US Jefferson Proving Ground have been stopped due to an estimated cost of \$7.8 billion.

5) Review of Uranium medical research

Past medical research, hazard assessments and policy advice concerning Depleted Uranium (DU) weapons need to be reviewed if they were based on Uranium exposure from small penetrator warheads (less than 6 kg), or if they overlooked widely varying levels of U235, U 236 and Plutonium contamination (Dirty DU).

Most existing medical research on the health effects of Uranium weapons, and environmental hazard research has been based on the use of relatively small anti-tank penetrators (weight from 0.27 to 5 kg) with low rates of conversion to oxide dust.

Most studies have assumed fully depleted Uranium as a source hazard. They have also been based on military personnel exposed to contaminated environments for a short period of time - days or weeks.

Assumptions about radiation and toxic health hazards from such studies - mostly assuming "minimal" health risks - are not likely to be valid in combat zones where **high load** (large warhead) Uranium weapons have been used. These may have dispersed from 10 to 1500 kg of Uranium per weapon, mostly as oxide dust generated in large, very high temperature explosions with high oxidation rates and powerful convection effects for atmospheric contamination. Underground explosions may lead to heavy Uranium contamination of ground water or underground supplies (e.g. the Karez in Afghanistan).

The second Royal Society DU report (2002) recognised the potentially lethal toxic effects (death in 3 days from renal failure) of acute exposure to large quantities of Uranium oxide. Early DU health studies and advice e.g. by RAND and WHO require radical review of potential health hazards.

Special priority is needed for researching the health effects of Uranium weapons contamination on civilians - especially women and children, who are most vulnerable to internal radiation and chromosome damage owing to higher rates of cell division. These studies need to include communities with chronic exposure to Uranium contaminated environments, to contrast with existing data based on short term exposure risks for troops.

The proposed WHO Uranium study in Iraq could provide the most comprehensive evidence on these issues. It was vetoed by UN member states under pressure from the US in November 2001 but should now be re-commissioned.

Most previous studies have assumed the use of depleted forms of Uranium in weapons (U239 99.7% U235 less than 0.3%. But in the last 18 months varying levels of transuranic contamination from reprocessed nuclear fuel and different isotopic mixes (U235 / 238 ratios) have been identified by independent laboratories. These variations may lead to faster, more diverse and severe medical effects from new Uranium weapons than from those known of in the 1991 Gulf War.

Laboratories, researchers and scientific advisers to governments need to take these new factors into account when considering potential health effects of suspected Uranium weapons in Afghanistan and in a new attack on Iraq.

Conclusions: need for urgent public debate about weapons to be used against Iraq

There has been very little media coverage and no public debate about the new generation of hard target guided weapons used in the Afghan war. Over 2,000 were used. **If the secret metal they use is Uranium then 1000+ tons of fine oxide dust will have contaminated many areas. Thousands of Afghans, and many expatriates, may have been exposed to moderate or severe levels of uranium contamination with grave implications for their long term health, similar to those in Iraq since the Gulf War.**

Hundreds or thousands of civilians in Afghanistan may already have died from acute Uranium exposure, their symptoms compounded by, or misdiagnosed as, common causes of death during the Afghan winter e.g. pneumonia, acute gastric infections and malnutrition. There are very few independent laboratory facilities for medical or environmental analysis of Uranium contamination in the world and none in Afghanistan.

International proliferation of known and suspected Uranium weapons - to over 20 countries since 1991 - is a major arms control problem. The **5 action points** identified above indicate **the complexity and scale of responding to Uranium weapons contamination and the public health disasters they may cause**. These effects can be seen already in Iraq and for Gulf War veterans since 1991. They represent a grave risk not yet assessed in Afghanistan.

To launch another military campaign in Iraq on the scale of the Afghan war - with the same suspected armada of Uranium weapons - and without attempting to evaluate their health and environmental impacts in Afghanistan and on allied troops and expatriates seems irresponsible beyond belief, verging on genocide.

Until these questions are raised in the national and international media, **most politicians will be unaware of the hazards and scale of problems of Uranium contamination that may now exist in Afghanistan and parts of the Balkans caused by allied bombs and missiles**. If politicians and governments have been deceived about these hazards they may inadvertently support US action in Iraq with the same Uranium weapon systems - a grim responsibility.

The military are employed to conduct wars effectively by any means authorised by their governments. The legal, moral and ethical consequences of war are the ultimate responsibility of governments, not the military. **If the perceived threat from Iraq is considered serious enough to justify using weapons of indiscriminate effect - nuclear, chemical or radiological - this should be a decision for parliaments and the UN General Assembly, not the Pentagon or heads of state that rely totally on military briefings.**

In the absence of public questions and debate about Uranium weapons, political representatives have had to rely on cumulative pro-Uranium propaganda since 1991. This includes statements from government, military and commercial sources (arms and nuclear industry) and several compromised scientific reports, even by UN agencies, that have relied on government or military funding and co-operation. Refer Part 4 of Depleted Uranium weapons 2001-2002.

Is Uranium the mystery metal in any hard target guided weapons? If so there may only be a few weeks left to prevent a new public health disaster in Iraq, larger than the one that already exists owing to 300 tons of Uranium weapons and the effects of sanctions.

This briefing will be sent to the UK Government, selected MPs and media contacts for consideration in the **Iraq War debate** in Westminster on Tuesday, **24th September**.

These questions and actions need to be raised in all countries that are expected to support a US led attack on Iraq, whether with troops, logistic facilities or by voting in the UN General Assembly. The USA, UK, France, Israel, Russia, Pakistan and any other country manufacturing suspected Uranium weapons must be called to account for their weapon systems by the UN General Assembly before their use is sanctioned in future military action. This includes weapons now being used by the US and UK in the Iraq no-fly zones. To widen this debate this updated analysis will be offered in the public domain via the Internet.

Any politician, leader or government that supports a new military offensive against Iraq before the identity and effects of suspected Uranium weapons used in Afghanistan are fully investigated would be wise to read Articles 35 and 55 of the First Protocol additional to the Geneva Conventions of 1949 very carefully.

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UPDATES

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Internet searches of US Patent Office records have verified the use of Uranium warheads as design options in 8 of the weapon systems listed in Table 1. See **US Patents confirm Uranium warheads** at: <http://www.eoslifework.co.uk/u23.htm#USpatreport> and summary of relevant Patent records at <http://www.eoslifework.co.uk/pdfs/USpats.pdf>.

27 October 2002

Additional Internet references have been added to some items in the text, particularly in Section 9, and to the reference list below.

On 20 October Dr Asaf Durakovic reported first results of Uranium testing on samples from Afghan civilians in his keynote address to the **3rd Gulf Countries Conference on Military Medicine and Protection against weapons of mass destruction** in Qatar (12):

"Our current data of biological samples from Kandahar, Kabul, and Jalalabad obtained by state of the art mass spectrometry analysis confirm over 100 times higher concentration of uranium isotopes in the biological specimens as compared with the control group. The several thousand hard target guided weapons used in Afghanistan and in the Iraq "no fly zones" should be addressed by the UN general assembly before any further use in future military conflicts."

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- (2) Written questions and answers in the UK Parliament are available in Hansard online. The only debating question in any parliament about **DU in Afghanistan** this year that I have found was asked by MEP P. Lannoye in the European Parliament, Strasbourg, 9 April 2002 <http://www.xs4all.nl/~stgvisie/VISIE/europ-parliament-afghanDU.html>
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