

THE EMERGENCE AND DECLINE OF THE DEBATE OVER DEPLETED URANIUM MUNITIONS 1991-2004

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1. INTRODUCTION

Since 1991, depleted uranium (DU) ammunition has emerged from near total obscurity to become one of the most controversial weapons of modern warfare. Armor-piercing DU ammunition has been called everything from the “silver bullet” that saved the lives of thousands of American soldiers during the 1991 Gulf War, to a genocidal weapon used to intentionally cause cancer and birth defects among civilian populations. Public interest in

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DU munitions has led to increased scientific inquiry of their effects, but the debate about DU's environmental and health impacts persists, at least in part because the positions of both extremes dominating the debate are dictated more by politics and ideology than by science and common sense.

Depleted uranium first emerged as a social, political, and scientific issue after the 1991 Gulf War. Initially, interest in DU focused on its relationship to the myriad health problems reported by veterans from the United States and United Kingdom, but during the 1990s, the possible effects on civilians in Iraq gained increasing visibility. The emergence of the DU issue, which lasted from 1991 to 1999, can be accounted for by the U.S. government's failure to honestly assess the effects of DU; scientific uncertainty about DU's effects; the credibility of activists, who largely used the U.S. government's own information to expose flawed policies and misguided practices; and media attention. These factors worked independently and cooperatively to make the debate over DU legitimate, credible, and salient.

The decline of rational discourse about DU can be traced to the 1999 Kosovo conflict. At that time, the DU issue took on a more overtly political role. The Yugoslav government under Sloboban Milosevic suggested the use of DU in the Balkans would have genocidal effects, and when the U.S. government refused to release information about its use of DU following the war, activists and propagandists alike suggested that the United States was responsible for causing widespread and severe effects from its use of DU munitions. Saddam Hussein similarly blamed the United States (and DU) for a sharp increase in cancers and birth defects, and Yasser Arafat joined the chorus by accusing Israel of using DU in Palestinian territories. In the years since 1999, politicians, propagandists, and activists have intoxicated each other with heart-wrenching but extremely misleading and unsubstantiated claims about the effects of DU munitions, radicalizing the issue in a way that has had a chilling effect upon serious debate.

During the history of the DU issue, U.S. government officials and extremist activists alike have invented or distorted facts to support their positions about DU's safety or harm. The scientific debate is now bogged down in confusion over the extent and severity of DU exposures, but many of the statements made by both extremes have become a muddled mixture of verifiable facts, speculative assertions, and politically motivated falsehoods. The decline of intellectually honest discussion about DU can be accounted for by the emergence of extremist activists, who (like some government officials) employ divisive tactics and make unsupported claims; the rise of the Internet as a form of mass communication; persisting scientific uncertainty; and the U.S. government's failure to honestly assess the effects of DU. These factors have worked independently and cooperatively to undermine reasonable discussion and discredit valid concerns about DU's effects.

Although the debate over DU is in a steady state of decline, ongoing scientific assessments by credible individuals and organizations may lead to new policy initiatives that address the health and environmental effects of DU munitions. A comprehensive study of U.S. veterans exposed to DU appears unlikely to happen due to the political nature of the issue, but health and environmental assessments will hopefully take place in Iraq in the near future. Investigations of DU need to expand, however, to include

potential former and current uses by other nations possessing DU munitions, including Pakistan and Russia.

This paper provides an overview of depleted uranium and its use in munitions (2.). It then traces the emergence of the DU issue (3.), and the decline of rational discourse about the use and effects of DU munitions (4.). The paper concludes with some final thoughts and reflections about the DU issue (5.).

2. BACKGROUND

2.1 WHAT IS DEPLETED URANIUM?

Uranium is a naturally occurring heavy metal found in the earth's soil, rocks, and oceans, but usually only in very low concentrations. Natural uranium consists of a mixture of three isotopes identified by the mass numbers U238, U235 and U234.² Trace amounts of natural uranium are found in drinking water and food, and the average daily human intake of uranium in food and water is about 1 microgram per day.³

Natural uranium is mined and processed to create highly radioactive 'enriched' uranium⁴ for use in nuclear fuel and nuclear weapons. The waste product of the uranium enrichment process is called 'depleted' uranium because it contains less U235 and U234 (but marginally more U238) than natural uranium. DU is about 60 percent as radioactive as natural uranium, and it is chemically toxic like lead, nickel and other heavy metals. DU is 65 percent more dense than lead,⁵ has a high melting point,⁶ is highly pyrophoric (it ignites when it fragments), has a tensile strength comparable to most steels, and is chemically reactive.⁷ DU remains radioactive throughout its decay chain, which lasts 4.5 billion years.

In the United States, the waste product of reprocessing spent fuel from civilian nuclear power reactors was for several decades added to DU stockpiles.⁸ The DU from this source contains another uranium isotope, U236, along with small amounts of the transuranic elements⁹ plutonium, americium and neptunium and the fission product technetium-99. There is uncertainty in the US about the extent and levels of contamination of DU stockpiles by plutonium and other radioactive materials, but the

² 99.27, 0.72 and 0.0054 percent by mass, respectively. World Health Organization, Depleted Uranium: Sources, Exposure and Health Effects (Geneva 2001) p. 3.

³ The Royal Society, The Health Hazards of Depleted Uranium Munitions, Part I (London 2001) p. 2.

⁴ Enriched uranium is uranium in which the U235 content has been increased from 0.7 percent to 90 percent.

⁵ 18.9 g/cm³ and 11.3 g/cm³, respectively.

⁶ 1132°C, 2070°F.

⁷ US Institute of Medicine, Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) p. 91.

⁸ US Department of Energy, 'Commercial Recycling of Uranium and Plutonium from Spent Fuel', undated. <http://www.eia.doe.gov/cneaf/nuclear/special/comrecyc.html>.

⁹ That is, elements having a higher atomic number than uranium (i.e., 93 or over).

Department of Energy is carrying out investigations and testing to clarify the ambiguities.¹⁰

2.2 USE OF DU IN MUNITIONS

The development of DU munitions began around 1959 in the United States,¹¹ and in the early 1960s in the United Kingdom.¹² At that time, both militaries used a tungsten alloy in armor piercing ammunition, known as *kinetic energy penetrators*, but the large quantities of readily available and highly dense DU attracted the interest of weapons developers. A kinetic energy penetrator is simply a solid rod of dense metal; there is no explosive charge. The large energy of motion (kinetic energy) of the rod, traveling at speeds between 1 and 1.8 kilometers per second (from tank guns), is sufficient to punch a hole in tank armor.¹³ These penetrators generally have greater success in piercing heavily armored targets, such as the turrets on tanks, than traditional high explosive tank rounds.

In the early 1970s, concerns about the high cost of tungsten alloy,¹⁴ combined with improved performance of DU munitions,¹⁵ prompted the US Department of Defense (DoD) to replace tungsten alloy with DU in kinetic energy penetrators. Depleted uranium also has an edge over tungsten alloy because its pyrophoricity produces burning fragments upon impact with a target, which can ignite flammable materials and cause secondary damage.¹⁶ The energy of the impact combined with the burning of the round as it passes through armor creates a fine, respirable size dust that contaminates an impact site and presents a hazard to combat troops and civilians. Seventeen years before the United States military used DU ammunition for the first time in combat, a military reported noted: “In combat situations involving the widespread use of DU munitions, the potential for inhalation, ingestion, or implantation of DU compounds may be locally significant.”¹⁷ Despite the potential for unintended health and environmental effects of using DU munitions, by the late 1970s, DU munitions were available for use by aircraft, tanks, and the Navy’s Phalanx gun.

¹⁰ J.R. Hightower, et al, ‘Strategy for Characterizing Transuranics and Technicium Contamination in Depleted UF₆ Cylinders’, ORNL/TM-2000/242, (Oak Ridge National Laboratory, October 2000) p. 1.

¹¹ See J.D. Edmands *et al*, ‘Uptake and mobility of uranium in black oaks: implications for biomonitoring depleted uranium-contaminated groundwater’, 44 *Chemosphere* (2001) pp. 790-791.

¹² Dr. Tony Carter, Comparison of Kirkcudbright and Eskmeals Environmental Monitoring Data for Generalized Derived Limits for Uranium (London: Ministry of Defence, June 2002) vii.

¹³ The Royal Society, The Health Hazards of Depleted Uranium Munitions, Part I (London 2001) p. 2; R. Pongelley, ‘The DU Debate: what are the risks’, *Jane’s Defence Weekly*, 15 January 2001.

¹⁴ J. Middleton, “Elimination of Toxic/Hazardous Materials from Small Caliber Ammunition – An Overview,” International Tungsten Industry Association, December 2000 Newsletter, p. 5. <http://www.itia.org.uk>.

¹⁵ P. Bolté, “The Tank Killers – Tungsten v. Depleted Uranium”, *National Defense* (May-June 1983) 44.

¹⁶ Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME), Ad Hoc Working Group for Depleted Uranium, Special Report: Medical and Environmental Evaluation of Depleted Uranium, Volume 1 (1974) 1, 2.

¹⁷ Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME), Ad Hoc Working Group for Depleted Uranium, Special Report: Medical and Environmental Evaluation of Depleted Uranium, Volume 1 (1974) p. 96.

Starting in 1989, slabs of DU armor were placed on the front turrets of US tanks to provide additional protection; all Abrams tanks now have DU armor. DU is also used for balance weights in some aircraft and helicopters,¹⁸ and about 0.1 g is used as a catalyst in certain anti-personnel mines.¹⁹ The U.S. Department of Defense uses a DU casing in the bunker-busting B61-11 nuclear weapon to enable the nuclear warhead to penetrate the ground before detonating.²⁰ Although other U.S. missiles may contain DU counterweights,²¹ DU is apparently not used in operational cruise missiles.²² Activists frequently advance claims that large quantities of DU are used in conventional bunker busting munitions, fuel air explosives, and cluster bombs,²³ but these activists offer no convincing supporting evidence to back up their assertions.

Since the 1980s, the list of countries possessing and manufacturing DU munitions has steadily grown. Following is a non-exhaustive list of countries possessing DU rounds in their arsenals:

- Bahrain – 105 mm (M60 tank)²⁴
- China – 100 mm (Type 69 tank), 105 mm (Type 59-II tank, Type 59D tank, Type 63A-1 amphibious tank, Type 80 tank), 125 mm (Type 85, Type 98 tanks)²⁵
- Egypt – 120 mm (Abrams tank)²⁶
- France – 120 mm (Leclerc tank), 105 mm (AMX-30B2 tank)²⁷

¹⁸ Reed C. Magness, “Environmental Overview for Depleted Uranium,” CRDC-TR-85030 (Aberdeen Proving Ground, MD, October 1985) 10-12; In a response to Mr. Duncan Smith in the UK Parliament on 2 February 2001, Mr. John Spellar, UK Minister of Transport, stated that DU is used in balance weights in the Tristar helicopter, Wessex helicopter, and C-130 aircraft.

¹⁹ US Army Center for Health Promotion and Preventive Medicine, Radiological Sources of Potential Exposure and/or Contamination, (Aberdeen Proving Ground, 10 December 1999) pp. 114 – 120.

²⁰ P. Richter, ‘Old-Fashioned Hide-Outs Fuel High-Tech Weaponry’, The Los Angeles Times, 17 March 2002, p. A1; M. L. Wald, ‘U.S. Refits a Nuclear Bomb To Destroy Enemy Bunkers’, 31 New York Times 31 May 1997, p. A1.

²¹ US Army Environmental Policy Institute, Health and Environmental Consequences of Depleted Uranium Use by the U.S. Army. Technical Report (Atlanta, AEPI 1995) p. 25.

²² ME Kilpatrick, “No depleted uranium in cruise missiles or Apache helicopter munitions – comment on an article by Durante and Publiese,” Health Physics, June 2002; 82(6): 905; Chief of the Radiation Protection Division, Air Force Medical Operations Agency, e-mail message, Subject: “Cruise Missiles,” May 6, 1999; Head of Radiological Controls and Health Branch, Chief of Navy Operations, e-mail message, Subject: “NO DU in Navy Cruise Missiles,” August 4, 1999.

²³ See e.g., Piotr Bein and Karen Parker, “Uranium Weapons Cover-Ups – A Crime Against Humankind,” presented at the World Uranium Weapons Conference 2003, Hamburg, Germany, 16-19 October 2003.

²⁴ US Presidential Determination 94-37 of July 19, 1994, “Military Sales of Depleted Uranium Ammunition,” Federal Register Vol. 59, No. 145, 19 July 1994. This is the M833 round purchased from the United States.

²⁵ US Army, “Worldwide Equipment Guide,” (Leavenworth, KS: US Army Training and Doctrine Command) 7 November 2000, 5-6, p. 4-25; Richard D. Fischer, Jr. “Evolving Ground Force Threat to Taiwan,” The Jamestown Foundation (Washington, 11 March 2003); “Type 59 Main Battle Tank,” China Defence Today, last updated 6 May 2003, www.sinodefence.com/army/tank/type59.asp; Jim Warford, “The New Chinese Type 98 MBT: A Second Look Reveals More Details,” ChinaDefense.com, undated.

²⁶ Arie O’Sullivan, “Egypt – The New Enemy?” The Jerusalem Post, 25 August 1999. Egypt has approximately 755 M1A1 tanks. Kim Burger, “More M1A1 Abrams MBTs for Egypt,” Jane’s Defence Weekly, 10 August 2001.

²⁷ T. Gander and C. Cutshaw, Eds., Jane’s Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane’s Information Group Limited, 2000) 226-227; “DU ammunition types taken into service (non-exhaustive),”

- Israel – unknown²⁸
- Kuwait – 120 mm (M1A2 tank)²⁹
- Oman – 120 mm (Challenger II tank)³⁰
- Pakistan – 105 mm, 125 mm (Al-Khalid, T-85, T80-UD tanks)³¹
- Russia – 30 mm (probably Su-25 “Frogfoot” jet, possibly Mi-25 “Hind” and Mi-28 “Havoc” helicopters), 100 mm (T-55 tank), 115 mm (T-62 tank), 125 mm (T-90, T-84, T-80, T-72, T-64B tanks), K-60 missile³²
- Saudi Arabia – 105 mm (M60A3 tank), 120 mm (M1A2 tank)³³

Jane's Defence Weekly, 11 January 2001. Giat Industries manufactures two 120 mm rounds – the OFL 120 F2 APFSDS-T and PROCIPAC APFSDS-T. It also manufactures the 105 mm OFL 105 F2 round.

²⁸ US Army Environmental Policy Institute, Health and Environmental Consequences of Depleted Uranium Use by the U.S. Army, Technical Report (Atlanta: AEPI, 1995) A-11. Although Israel has deployed and used 20mm DU rounds for its ship-borne Phalanx guns, it is not clear if Israel currently uses DU or tungsten alloy ammunition.

²⁹ US Presidential Determination 94-37 of July 19, 1994, “Military Sales of Depleted Uranium Ammunition,” Federal Register Vol. 59, No. 145, 19 July 1994. This is the M829 round purchased from the United States. Kuwait has 218 M1A2 Abrams tanks. Kim Burger, “More M1A1 Abrams MBTs for Egypt,” Jane's Defence Weekly, 10 August 2001.

³⁰ Anthony H. Cordesman, “The Military Balance in the Middle East – The Southern Gulf by Country: Part XII,” Center for Strategic and International Studies, 30 December 1998, 14. This is the L26A1 (CHARM 1) round, purchased from the United Kingdom.

³¹ Pakistan joins DU producer nations’, Jane's Land Forces, 9 May 2001, http://www.janes.com/defence/land_forces/news/; “Pakistan Ordnance Factories Launches Rs 4 Billion Upgrade Plan,” South-Asian Defence News, December 2002. The 125 mm round is called NAIZA.

³² There are two 125mm rounds designated 3BM32 and 3BM42. C. Foss, ed., Jane's Armour and Artillery, 2000-2001, 21st edn. (Surrey, Jane's Information Group Limited 2000) p. 76; T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 231-232; “Improved Guns and Ammo,” www.armada.ch/97-6/page6-97_30.htm. The Sprut-B 125mm anti-tank gun shoots the BM-42M APFSDS-T round, although the author was not able to determine if this is a DU round. US Army, “Worldwide Equipment Guide,” (Leavenworth, KS: US Army Training and Doctrine Command) 7 November 2000, 5-6, <http://bctp.leavenworth.army.mil/opsgrpc/OPFOR%20Files/WEG%20with%20chgs%20thru1-2001/Ch%2005%20Antitank.pdf>. The Su-25 “Frogfoot” family of aircraft (GSh-30 cannon), Mi-24P “Hind” (GSh-30 cannon), and Mi-28 “Havoc” helicopters (2A42 cannon) are thought to be capable of shooting 30 mm DU rounds. See “CIS (Soviet) Aircraft Guns,” undated, http://saffire8291.blowsearch.ws/sov_guns.htm, site visited 13 June 2004; “New Sovietskiy Modified Mil Mi-28 Havoc Attack Helicopter,” undated, http://www.kitsune.addr.com/Rifts/Rifts-Earth-Vehicles/Soviet/NS_Mi-28_Havoc_Helicopter.htm, site visited 13 June 2004; “GSH-30 (GSH-30K),” V.A. Degtyarev Plant, undated, <http://www.zid.ru/en/products/military/gsh30.html>, site visited 13 June 2004; www.aviation.ru/Su/25/Su-25.html; www.airforce-technology.com/projects/hind/; www.slavweb.com/eng/Russia/avia-e0.html. In 1975, the Soviet Union deployed an infrared missile for use by aircraft that reportedly contained 1.6 kg of “uranium”. See “AA-8 APHID, K-60 (R-60, Object 62), Specifications,” Global Security.org, undated, <http://www.globalsecurity.org/military/world/russia/aa-8-specs.htm>, site visited 13 June 2004; <http://www.softwar.net/iraq.html>.

³³ US Presidential Determination 94-37 of July 19, 1994, “Military Sales of Depleted Uranium Ammunition,” Federal Register Vol. 59, No. 145, 19 July 1994. The 105mm round is the M833, and the 120 mm round is the M829, both purchased from the United States. Saudi Arabia has 150 M-60A3 and 315 M1A2 Abrams tanks. See also, President George H.W. Bush, Address before the United Nations General Assembly, 1 October 1990; Anthony H. Cordesman, “Trends in the Military Balance and Arms Sales in the Southern Gulf States After the Gulf War: 1990-1993,” Center for Strategic and International Studies (Washington, 26 January 1998) 38; Kim Burger, “More M1A1 Abrams MBTs for Egypt,” Jane's Defence Weekly, 10 August 2001.

- Taiwan – 105 mm (M60A3 tank)³⁴
- Thailand – caliber unknown³⁵
- Turkey – 105 mm (M60A1, M60A3 tanks)³⁶
- Ukraine – caliber unknown (possibly 30 mm rounds)³⁷
- United Arab Emirates – 120 mm (Leclerc tanks)³⁸
- United Kingdom – 20 mm (Phalanx gun), 120 mm (Challenger II tank)³⁹
- United States – 20 mm (Phalanx gun), 25 mm (AV-8B aircraft, Light Armored Vehicle, Bradley Fighting Vehicle), 30 mm (A-10 aircraft), 105 mm (M60A3 tank), 120 mm (M1A1, M1A2 tanks)⁴⁰

In addition, India is reportedly developing DU ammunition.⁴¹ In 2001, DU ammunition was discovered among captured al Qaeda munitions in Afghanistan.⁴² The Iraqi government under Saddam Hussein started a program for the development of DU ammunition; however, this program did not result in large-scale production or any combat use of DU munitions.⁴³

³⁴ T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 190. The US sold 1,000 rounds of M774 ammunition to Taiwan, but Taiwan has also recently sought to purchase M833 rounds. Commerce Business Daily Issue of February 27, 1995, PSA #1291, [http://www.fbodaily.com/cbd/archive/1995/02\(February\)/27-Feb-1995/13sol003.htm](http://www.fbodaily.com/cbd/archive/1995/02(February)/27-Feb-1995/13sol003.htm). Taiwan may also have domestic production capability.

³⁵ US Army Environmental Policy Institute, Health and Environmental Consequences of Depleted Uranium Use by the U.S. Army, Technical Report (Atlanta: AEPI, 1995) A-11.

³⁶ T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 190. Turkey purchased 85,451 M774 rounds from the United States.

³⁷ Dr. William S. Andrews, "Depleted Uranium on the Battlefield: Part 1 – Ballistic Considerations," Canadian Military Journal (Spring 2003) 44. A 2001 interview with Ukrainian Col. Ihor Mazor indicates Ukraine inherited DU rounds after the breakup of the Soviet Union 'that were made back in the sixties and are now very obsolete....According to documents, our troops have used such ammunition, and this is beyond a shadow of a doubt.' Interestingly, the Colonel stated the rounds were 'small caliber air-to-surface projectiles.' Dymtro Tymchuk, "Ukraine has uranium projectiles, but not in the Army," The Day (Ukraine), 23 January 2001.

³⁸ T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 226. The United Arab Emirates purchased 388 Leclerc tanks from France in 1993, and was allowed to purchase the OFL F2 round as well.

³⁹ T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 230. Royal Ordnance Defence manufactures two 120 mm rounds – the L27A1 (CHARM 3) and L26A1 (CHARM 1).

⁴⁰ Primex Technologies manufactures the 105 mm M900 round, and the 120 mm M829A2 round. Alliant Techsystems manufactures the M829E3 round. T. Gander and C. Cutshaw, Eds., Jane's Ammunition Handbook, 9th Edition, 2000-2001 (Surrey: Jane's Information Group Limited, 2000) 191, 218-219; Primex Technologies, *1999 Annual Report* (St. Petersburg, Florida 1999) p. 1. Under §620G of the Foreign Assistance Act of 1961 (as amended), the US is prohibited from selling DU munitions to all countries except NATO members, major non-NATO allies (incl. Argentina, Australia, Bahrain, Egypt, Israel, Japan, Jordan, Pakistan, Thailand, Republic of Korea, Morocco, and New Zealand), Taiwan, and other countries declared by Presidential Directive.

⁴¹ "Depleted Uranium (DU) Hazards in Post-Conflict Environments," Geneva International Centre for Humanitarian Demining, GICHD Advisory Note, 25 February 2003.

⁴² U.S. Department of Defense News Briefing, "Sec. Rumsfeld and Gen. Myers," (16 January 2002) http://www.defenselink.mil/news/Jan2002/t01162002_t0116sd.html.

⁴³ Melissa Fleming, Senior Information Officer, International Atomic Energy Agency, email to Dan Fahey, 28 July 2003. Iraq produced about 10 DU rounds, two or three of which were test fired. See also,

2.3 USE IN ARMED CONFLICT

Table 1. Known and Suspected Uses of DU Munitions in Warfare

Location	Armed Force Shooting DU	Year(s)	Number of Rounds	Quantity of DU (kg)
At sea off the Israeli coast	Israeli Navy ⁴⁴	1985	Unknown	Unknown
Iraq, Kuwait	US Air Force US Army US Marine Corps UK Royal Army ⁴⁵	1991	Tanks: >9,640 Jets: 850,950	Tanks: >39,631 Jets: 246,602 Total: >286,233
Bosnia	US Air Force ⁴⁶	1994-1995	Jets: 10,800	Jets: 3,260
Kosovo, Serbia, Montenegro	US Air Force ⁴⁷	1999	Jets: 31,300	Jets: 9,450
Afghanistan	US ⁴⁸ - use not confirmed	2001-	Unknown	Unknown
Iraq	US Air Force US Army US Marine Corps UK Royal Army ⁴⁹	2003-	Tanks: >2,650 Bradleys: ~121,000 Jets: ~309,000	Tanks: >12,000 Bradleys: ~10,300 Jets: ~93,400 Total (estimated): 118,000 to 136,000

International Atomic Energy Agency, Iraq Nuclear Verification Office, "Fact Sheet: Iraq's Nuclear Weapon Programme," 27 December 2002, www.iaea.org/worldatom/Programmes/ActionTeam/nwp2.html.

⁴⁴ An Israeli Shar class gunboat with a Phalanx gun reportedly "intercepted and sank a boat carrying a Palestinian commando group heading for Israel." The 20mm rounds shot by the Phalanx gun each have a DU penetrator weighing 70 grams. "Israel military used depleted uranium shells: newspaper," Agence France Presse, 11 January 2001; Nuclear Age Peace Foundation, "IDF confirms possession of DU ammunition," *The Sunflower*, No. 45, February 2001.

⁴⁵ The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, *Depleted Uranium in the Gulf (II)* (Washington, DC, 2000) 102-106. M1 tanks shot the M900 model DU round (3.83 kg); M1A1 tanks shot 6,700 M829 rounds (3.94 kg/DU), and 2,348 M829A1 rounds (4.64 kg/DU); Each 30 mm GAU-8 (PGU-14) round shot by an A-10 contains 302 grams of depleted uranium. The U.S. Marine Corps has not yet publicly announced how much ammunition its tanks shot during the war.

⁴⁶ U.S. Department of Defense, news briefing by Mr. Kenneth Bacon, 4 January 2001; United Nations Environment Programme, *Depleted Uranium in Bosnia and Herzegovina*, (Geneva, 25 March 2003) 264. On seven occasions between August 1994 and September 1995, A-10 aircraft shot 30mm DU munitions either within the 20km exclusion zone around Sarajevo or near Han Pijesak, which was the headquarters of the Bosnian Serb army.

⁴⁷ Angela Ashton-Kelley, U.S. Air Force 11th Wing, letter to Dan Fahey (31 January 2000). A-10s conducted 112 strikes with DU rounds against 85 targets in Kosovo, ten targets in Serbia, and one target in Montenegro. United Nations Environment Programme, Post-Conflict Assessment Unit, *Depleted Uranium in Serbia and Montenegro: Post Conflict Environmental Assessment in the Federal Republic of Yugoslavia* (Geneva, 27 March 2002) 168.

⁴⁸ According to news reports, the A-10 and AV-8B aircraft, which shoot DU rounds, on numerous occasions shot small caliber ammunition during combat in Afghanistan. In addition, on three occasions, US Secretary of Defense Donald Rumsfeld confirmed that DU munitions were found in December 2001 among captured al Qaeda weapons near Kandahar. See WISE Uranium Project, "Current Issues – Depleted Uranium Weapons in Afghanistan", www.antenna.nl/wise/uranium/dissaf.html.

⁴⁹ See Dan Fahey, "Unresolved Issues Regarding Depleted Uranium and Veterans of Operation Iraqi Freedom and Operation Enduring Freedom," 24 March 2004, <http://www.antenna.nl/wise/uranium/dissgw.html>.

Prior to the use of DU munitions in combat, large quantities – probably on the order of thousands of tons of DU – were shot at testing ranges in the United States, United Kingdom, and as well as in the former Soviet Union and other countries. In addition to the United States, United Kingdom, and Israel, it is possible and even probable that other countries or armed forces have used DU munitions in combat. If the Soviet Union had deployed DU munitions in the 1970s, did it use them during combat in the 1980s in Afghanistan? More recently, has Russia used DU munitions in Chechnya or other territories?

Some anti-DU activists have claimed the quantities of DU shot by U.S. forces are orders of magnitude higher than the figures released by militaries and governments. While such deception is not outside the realm of possibility, the figures released by some activists, such as the claim that the U.S. released 900,000 kg (2,000,000 lbs) of DU in Afghanistan,⁵⁰ lack any supporting data, and in some cases are complete fabrications.

2.4 HEALTH AND ENVIRONMENTAL EFFECTS

There are still more questions than answers about the health and environmental effects of DU munitions. Nonetheless, it appears that the effects of DU are more serious than Pentagon officials would like to admit, but less harmful than asserted by hyperbolic activists. Based on the body of publicly available scientific evidence, several tentative conclusions can be drawn that chart a middle course between the extremists' claims:

- DU has caused cancer, central nervous system damage, reproductive effects, and other health problems in laboratory rats;⁵¹
- Evidence of human health effects caused by DU is inconclusive, due largely to the fact that the health status of only a few dozen people with verified exposures has been assessed,⁵² and
- After DU munitions have been used in combat, the presence of DU in soil and water, or on equipment and in buildings, may – depending on a variety of factors – present short- and long-term hazards to the health of local populations.⁵³

⁵⁰ Dai Williams, "Hazards of Uranium weapons in the proposed war on Iraq," 22 September 2002, <http://www.eoslifework.co.uk/u231.htm>.

⁵¹ See e.g., D.E. McClain, et al, "Biological effects of embedded depleted uranium (DU): summary of Armed Forces Radiobiology Research Institute research," The Science of the Total Environment (2001) 274: 117; Fletcher F. Hahn, Raymond A. Guilmette, and Mark D. Hoover, "Implanted Depleted Uranium Fragments Cause Soft Tissue Sarcomas in the Muscles of Rats," Environmental Health Perspectives (2002) 110: 51; D.E. McClain, "Project Briefing: Health Effects of Depleted Uranium," U.S. Armed Forces Radiobiology Research Institute (Bethesda, MD, 1999).

⁵² See e.g., Dan Fahey, "Unresolved Issues Regarding Depleted Uranium and the Health of Veterans of Operation Iraqi Freedom and Operation Enduring Freedom," 24 March 2004, <http://www.antenna.nl/wise/uranium/dissgw.html>; Dan Fahey, "The Use of Depleted Uranium in the 2003 Iraq War: An Initial Assessment of Information and Policies," posted at <http://www.antenna.nl/wise/uranium/dissgw.html#DFIQ03>, 24 June 2003.

⁵³ See e.g., United Nations Environment Programme, Post-Conflict Assessment Unit, Depleted Uranium in Serbia and Montenegro: Post Conflict Environmental Assessment (Geneva, 27 March 2002); United Nations Environment Programme, Post-Conflict Assessment Unit, Depleted Uranium in Kosovo, Post-Conflict Environmental Assessment, (Geneva, March 2001); J.P. McLaughlin et al, "Actinide analysis of a depleted uranium penetrator from a 1999 target site in southern Serbia," Journal of Environmental Radioactivity 64 (2003) 155. The factors that determine the risk include, but are not limited to: local

Laboratory research on DU is ongoing, but the many uncertainties about the use and effects of DU munitions are unlikely to be resolved in the near future. The uncertainties will persist partly due to the lack of comprehensive health and environmental assessments, and partly because decline of rational debate about DU limits the likelihood of new studies and policy initiatives.

3. EMERGENCE OF THE DU ISSUE, 1991-1999

The emergence of the DU issue during the 1990s is rooted in the use of DU munitions in the 1991 Gulf War. Prior to 1991, there was little knowledge among servicemembers or the public about the use of DU munitions. The use of DU in 1994-95 in Bosnia was scarcely noted, but by 1999 the issue had matured to the point that the use of DU munitions was part of the international debate over the Kosovo conflict. The factors in the emergence of the DU issue, ranked in relative order of importance by opinion of the author, are the following: U.S. government negligence (3.1), scientific uncertainty (3.2), the credibility of activists (3.3), and the media (3.4).

3.1 U.S. GOVERNMENT NEGLIGENCE

The failure of the Department of Defense to honestly assess and openly address the health and environmental effects of its use of DU munitions during the 1991 Gulf War is probably the single most important factor in the emergence of DU as a social, political, and scientific issue. During the 1990s (and continuing today), U.S. military officials repeatedly lied and misled the public about the scope and severity of exposures to U.S. veterans, and as each misdeed was exposed by activists and publicized through the media, the DU issue gained credibility and visibility. Without a clear pattern of demonstrated negligence on the part of the U.S. government, the DU issue would have been unable to establish legitimacy, credibility, and saliency.

Information slowly emerged in the years after 1991 that shed light on US government negligence prior to, during, and after the war.⁵⁴ Army regulations released while soldiers were deploying to Saudi Arabia in 1990 had an unmistakable, common sense message: soldiers wounded by or otherwise exposed to DU should be medically tested.⁵⁵ Yet, inexplicably, the Army failed to test even the Abrams and Bradley crews wounded by DU fragments in friendly fire incidents until over one year after the war.⁵⁶

The first hint of the depth of DoD's negligence came in January 1993, when a congressional investigation conducted by the US General Accounting Office (GAO) resulted in a report aptly titled "Army Not Adequately Prepared to Deal with Depleted

environmental conditions, the quantity of DU munitions shot, the number of hard targets hit by DU munitions, the proximity to water and food supplies, and the proximity to human populations.

⁵⁴ See Dan Fahey, "Don't Look, Don't Find: Gulf War Veterans, the U.S. Government, and Depleted Uranium, 1990-2000," (Military Toxics Project: 30 March 2000).

⁵⁵ U.S. Army Regulation 40-5, Preventive Medicine (Department of the Army: October 15, 1990); Headquarters, Department of the Army, Washington, DC, *Guidelines for Safe Response to Handling, Storage, and Transportation Accidents Involving Army Tank Munitions and Armor Which Contain Depleted Uranium*, TB 9-1300-278, September 1990.

⁵⁶ See Dan Fahey, "Don't Look, Don't Find: Gulf War Veterans, the U.S. Government, and Depleted Uranium, 1990-2000," (Military Toxics Project: 30 March 2000).

Uranium Contamination.” In several instances, congressional investigators were the first to inform recovery and maintenance soldiers that they had been spent hours or days working on contaminated equipment.⁵⁷ The congressional report bluntly criticized the Army for neglecting to inform servicemen and women about the battlefield hazards of DU, and for failing to monitor the health of veterans wounded by or otherwise exposed to DU on the battlefield.⁵⁸ The report recommended “the testing of all crew members inside vehicles penetrated by DU munitions,” and the Army agreed to begin testing “all crew members” in July 1993.⁵⁹

For reasons that have never been explained, someone within the Army Surgeon General’s Office decided that not “all” surviving crewmembers would in fact be tested. The Surgeon General’s Office inexplicably told the GAO investigators there were only 35 such veterans, 22 of whom may have been wounded by DU fragments.⁶⁰ Thirty three out of these 35 veterans were then enrolled in a study at the Baltimore, MD VA Medical Center known as the “DU Program”. Over the next five years, the Surgeon General’s Office told four additional federal investigations that there were fewer than three dozen friendly fire veterans, plus only about two dozen other veterans exposed to DU during recovery operations.⁶¹ These statements created the impression that DU was a problem affecting only several dozen veterans, and this prevented larger epidemiological studies of exposed veterans from being conducted or even considered.

Seven years after the war, DoD finally started to acknowledge the extent of its negligence. In January 1998, a DoD report admitted “the failure to properly disseminate [DU warnings] to troops at all levels may have resulted in thousands of unnecessary exposures.”⁶² This was remarkable: after seven years of telling federal investigations and the public that only a few dozen veterans had been exposed, suddenly the estimate was raised into the thousands. Also in January 1998, I obtained a May 1991 Army document through the Freedom of Information Act that made it clear there were more than 100 friendly fire veterans – roughly three times greater than the number acknowledged by DoD to that point.⁶³ Three weeks after I released this information in a March 1998

⁵⁷ US General Accounting Office, “Army Not Adequately Prepared to Deal with Depleted Uranium Contamination,” GAO/NSIAD-93-90, January 1993: 15-16.

⁵⁸ U.S. General Accounting Office, “Army Not Adequately Prepared to Deal with Depleted Uranium Contamination,” GAO/NSIAD-93-90, January 1993; see also Col. Robert G. Claypool, U.S. Army Medical Corps, letter to Headquarters, U.S. Army Chemical School, “Subject: Depleted Uranium (DU) Safety Training,” 16 August 1993.

⁵⁹ U.S. General Accounting Office, “Army Not Adequately Prepared to Deal with Depleted Uranium Contamination,” GAO/NSIAD-93-90, January 1993: 7, 37.

⁶⁰ U.S. General Accounting Office, “Army Not Adequately Prepared to Deal with Depleted Uranium Contamination,” GAO/NSIAD-93-90, January 1993: 5.

⁶¹ See Dan Fahey, “Don’t Look, Don’t Find: Gulf War Veterans, the U.S. Government and Depleted Uranium, 1990-2000,” Military Toxics Project, 30 March 2000, p. 4, www.ngwrc.org/Dulink/dont_look_dont_find.htm.

⁶² The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, “Annual Report,” (Washington, DC: US Department of Defense, 8 January 1998) 30.

⁶³ U.S. Army Armament, Munitions and Chemical Command, memo from Depleted Uranium Recovery Team to Senior Command Representative AMCCOM-SWA, “Vehicle Assessment Report, Depleted Uranium Contamination” (14 May 1991).

report,⁶⁴ a DoD spokesman admitted the existence of 113 friendly fire veterans (this number has since been lowered to 104).⁶⁵

What makes this pattern of negligence harder to understand is that a US Army report released six months before the 1991 Gulf War anticipated the potential health, environmental, and political effects of using DU ammunition in combat. The report, which I obtained through a Freedom of Information Act request, stated that “aerosol DU exposures to soldiers on the battlefield could be significant with potential radiological and toxicological effects,” including cancer and kidney damage.⁶⁶ The report also predicted, “Following combat, the condition of the battlefield and the long-term health risks to natives and combat veterans may become issues in the acceptability of the continued use of DU kinetic energy penetrators for military applications,”⁶⁷ thereby calling for additional “public relations efforts” due to the “potential for adverse international reaction.”⁶⁸

DoD’s actions on DU in the years after the war were driven by politics and shaped by public relations, but by 1998, international reaction was outpacing DoD spin. Growing evidence of neglect of veterans also shed light on the potential effects of exposures among the inhabitants of southern Iraq. DoD failed to adequately address the environmental, health, and political effects of DU munitions even though military planners warned of these effects before shooting nearly 900,000 DU rounds during the 1991 Gulf War. There remains considerable uncertainty, however, about the relationship between the use of DU munitions in 1991 and actual extent of health and environmental effects. Indeed, the uncertainty over the scientific basis for concerns played a major role in the emergence of the DU issue.

3.2 SCIENTIFIC UNCERTAINTY

Prior to 1991, DoD did not conduct scientific research on the health and environmental effects of using DU munitions in combat. Potentially serious effects were predicted in several reports from 1974 to 1990, but serious health and environmental studies did not begin until around 1994. As interest grew during the 1990s in the effects of DU on the health of American and British veterans and Iraqi civilians, the dearth of relevant scientific studies left a cloud of doubt over the issue that raised public concern. Unfortunately, scientific uncertainty has also been exploited by irresponsible groups and

⁶⁴ Dan Fahey, *Case Narrative: Depleted Uranium Exposures*, Swords to Plowshares, National Gulf War Resource Center, the Military Toxics Project, 3rd Edition, September 20, 1998 (first edition March 2, 1998).

⁶⁵ The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, *Depleted Uranium in the Gulf (II)* (Washington, DC, 2000) p. 7; Rostker, Bernard; Remarks at the American Legion Washington Conference; Washington, DC; March 23, 1998, p. 3. See also Dan Fahey, *Case Narrative: Depleted Uranium Exposures*, Swords to Plowshares, National Gulf War Resource Center, the Military Toxics Project, 3rd Edition, September 20, 1998 (first edition March 2, 1998).

⁶⁶ M.E. Danesi, *Kinetic Energy Penetrator Long Term Strategy Study*, (Picatinny Arsenal, NJ: US Army Armament, Munitions, and Chemical Command, 1990) Appendix D, Vol. 1, pp. 2-2, 4-5.

⁶⁷ M.E. Danesi, *Kinetic Energy Penetrator Long Term Strategy Study*, (Picatinny Arsenal, NJ: US Army Armament, Munitions, and Chemical Command, 1990) Appendix D, Vol. 2, p. 3-4.

⁶⁸ M.E. Danesi, *Kinetic Energy Penetrator Long Term Strategy Study*, (Picatinny Arsenal, NJ: US Army Armament, Munitions, and Chemical Command, 1990) Appendix D, Vol. 1, p. 2-5.

individuals, whose cries of “wolf” in recent years have heralded the decline of rational discourse over the effects of DU.

The uncertainty over DU’s health and environmental effects is rooted in the lack of information about the scope and severity of DU exposures. Based on investigations that took place during the 1990s, it appears that between several hundred and several thousand U.S. servicemembers may have inhaled, been wounded by, or otherwise exposed to DU in Iraq, Kuwait, and Saudi Arabia.⁶⁹ Nonetheless, the actual levels of exposure are not known, and the nature of any health effects is virtually impossible to discern from the VA’s small study of veterans.

Ironically, DoD propaganda fueled the uncertainty surrounding the effects of DU munitions on Iraqis, which in turn facilitated the Saddam Hussein regime’s own propaganda.⁷⁰ A policy of “proponency” to prevent DU munitions from becoming “politically unacceptable” was recommended shortly as the war ended,⁷¹ and in the subsequent years, Pentagon spokesmen dismissed concerns about DU munitions in the same breath as they overstated its success in defeating the Iraqi tank corps. DoD’s hype helped create the impression that the battlefield was far more contaminated by DU dust than it probably was, thereby enabling the Iraqi government to effectively exploit an apparent rise in cancers and birth defects by blaming the effects on DU munitions and, more importantly, the United States.

In reality, only about one in seven Iraqi tanks destroyed in 1991 was hit by DU rounds; guided missiles (particularly the Maverick missile) were responsible for the vast majority of tank kills.⁷² In addition, it is likely that greater than 80 percent of the DU rounds shot during the war missed their targets and deposited relatively intact in the environment.⁷³ Nonetheless, during the 1990s, people motivated by humanitarian concerns, as well as those using DU to further other political agendas, raised legitimate questions about the effects of DU on the population of southern Iraq – questions that still need to be answered.

Preliminary studies on DU’s health effects conducted during the 1990s by the Armed Forces Radiology Research Institute raised new concerns and validated old ones. At a

⁶⁹ The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, Depleted Uranium in the Gulf (II) (Washington, DC, 2000) 7; Dan Fahey, “Don’t Look, Don’t Find: Gulf War Veterans, the U.S. Government and Depleted Uranium, 1990-2000,” Military Toxics Project, 30 March 2000, p. 4, www.ngwrc.org/Dulink/dont_look_dont_find.htm.

⁷⁰ See e.g. Republic of Iraq, Ministry of Higher Education and Scientific Research, “Conference on the Effects of the Use of Depleted Uranium Weaponry on Human and Environment [sic] in Iraq,” 26-27 March 2002, posted at the web site of the International Depleted Uranium Study Team, <http://www.idust.org/>. Read the Bush administration’s statement about the Iraqi claims at “Depleted Uranium Scare,” <http://www.whitehouse.gov/ogc/apparatus/suffering.html>.

⁷¹ M.V. Ziehm, “The Effectiveness of Depleted Uranium Penetrators,” Studies & Analysis Branch, Los Alamos National Laboratory, New Mexico, 1 March 1991.

⁷² See Dan Fahey, “Science or Science Fiction? Facts, Myths and Propaganda in the Debate Over Depleted Uranium Munitions,” 12 March 2003, www.danfahey.com.

⁷³ See Sir Hugh Beach, “The military hazards of depleted uranium,” ISIS Briefing Paper No. 78, January 2001, www.isisuk.demon.co.uk/0811/isis/uk/regpapers/no78long_paper.html#16.

July 1999 meeting of the Presidential Special Oversight Board for veterans' illnesses, AFRRRI scientists noted that "uranium accumulates in the placenta of implanted pregnant rats," and concluded that "strong evidence exists to support [a] detailed study of potential DU carcinogenicity."⁷⁴ AFRRRI scientists also called for further studies of the effects of DU on the nervous system and immune system function. There were still more questions than answers at that point, but in 1999 the debate shifted as voices blaming DU for widespread and severe effects DU gained legitimacy – even though their claims were often as dubious and unsupported as those made by the Pentagon.

3.3 CREDIBILITY OF ACTIVISTS

As questions emerged about DU after 1991, activists from towns in the United States where DU was manufactured and tested spoke out about their concerns, and veterans started to talk publicly about the military's absolute failure to inform servicemen and women about battlefield DU contamination. Early on, activists were able to obtain and use government-generated information to demonstrate flawed policies and negligent behavior. By 1999, however, the credibility of some prominent anti-DU activists was declining even as their visibility through the Internet and other means was increasing.

The first landmark DU report published by activists was "Uranium Battlefields Home & Abroad: Depleted Uranium Use by the U.S. Department of Defense," released in March 1993.⁷⁵ This report cited DU industry papers, scientific reports, and government documents in building its case that DU is more harmful than the government had publicly admitted, both on foreign battlefields and at manufacturing and testing sites in the United States. This report significantly raised the visibility and credibility of the DU issue, and it remains a solid resource even though some information in it is now outdated.

Two national groups deserve credit for the emergence of the DU issue in the United States. The Military Toxics Project (MTP) created a DU Network in 1995, which brought together veterans, workers who made DU rounds, activists from communities where DU rounds were test fired, and scientists to speak with a united voice.⁷⁶ MTP organized the first international DU conference in November 1997, and is today one of the few credible sources of information about DU. The National Gulf War Resource Center⁷⁷ (NGWRC) also raised the visibility of the DU issue by exposing government

⁷⁴ David E. McClain, Alexandra Miller, and Kimberly Benson, "Project Briefing: Health Effects of Depleted Uranium," Armed Forces Radiobiology Research Institute, presented to the Presidential Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents, 13 July 1999, Washington, DC. Unpublished; copy on file with author.

⁷⁵ Rural Alliance for Military Accountability, Citizen Alert, and Progressive Alliance for Community Empowerment, "Uranium Battlefields Home & Abroad: Depleted Uranium Use by the U.S. Department of Defense," March 1993.

⁷⁶ The Military Toxics Project (www.miltoxproj.org) has worked with a number of groups including Citizens Research and Environmental Watch (www.crewconcord.org/), Citizens for Safe Water Around Badger (www.cswab.com/), and Save the Valley (Jefferson Proving Ground, Indiana).

⁷⁷ www.ngwrc.org.

negligence and raising questions about the connection between DU (as well as other exposures) and health problems affecting tens of thousands of veterans.⁷⁸

Starting in 1997, however, opportunistic groups and unreliable activists began to get involved in the issue and take it in a more overtly political direction. In 1997, the New York-based International Action Center (aka International ANSWER, Depleted Uranium Education Project) entered the scene and exploited the DU issue to criticize the United States government's foreign policy. The center also accused the Israeli Defence Force of using DU munitions on Palestinian territories,⁷⁹ and this completely unfounded claim continues to be echoed by Yasser Arafat.⁸⁰ Some activists who earlier had been credible also started to advance claims based more on assertion than proof. These activists, including some with science backgrounds, started to exploit the scientific uncertainties and decry DU as a "crime against God and humanity." Cults of personality formed around activists who spread a dire gospel based on a blend of fact and fiction as they marched forward, every forward, in a messianic haze.

3.4 MEDIA

Government negligence and scientific uncertainty provided fertile ground for the media, which covered the DU issue with increasing frequency during the 1990s. The credibility of activists and the willingness of affected veterans to speak out made this a compelling story about injustice to veterans and indeterminate effects on civilians. The quality of the early journalism greatly increased and informed the DU debate.

Canadian doctor Eric Hoskins was one of the first to call significant attention to DU in a January 1993 op-ed in The New York Times,⁸¹ but the lack of evidence for some of his claims prompted a sharp retort from Bill Arkin in the *Bulletin of Atomic Scientists*.⁸² Additional stories appeared about veterans and workers exposed to DU at US industrial sites, but in recognition of the merits of the issue and the lack of broader coverage, DU was selected among the top ten most underreported stories for 1997 by "Project Censored" at California's Sonoma State University.⁸³ In 1997, the progressive magazine *The Nation* ran two cover stories on DU (though these stories included several dubious claims about DU's effects). In-depth, well-researched news coverage came from Kathleen Sullivan (then with the San Francisco Examiner), Dennie Williams (Hartford Courant), Dave Parks (Birmingham News), John Hanchette and Norm Brewer (USA Today), and Art Brice (Atlanta Journal-Constitution).

⁷⁸ Dan Fahey, *Case Narrative: Depleted Uranium Exposures*, Swords to Plowshares, National Gulf War Resource Center, the Military Toxics Project, 3rd Edition, September 20, 1998 (first edition March 2, 1998).

⁷⁹ See reports at www.iacenter.org/depleted/du.htm.

⁸⁰ See e.g. "President Arafat: Israel Used Depleted Uranium to Suppress the Palestinian People," Palestinian National Authority, 11 November 2003, www.pna.gov.ps/subject_details.asp?subject_id=993.

⁸¹ Eric Hoskins, "Making the Desert Glow," The New York Times, 21 January 1993.

⁸² Bill Arkin, "The Desert Glows with Propaganda," *The Bulletin of Atomic Scientists*, May 1993.

⁸³ Peter Phillips & Project Censored, Censored 1997: The News that Didn't Make the News; The Year's Top 25 Censored News Stories, (New York: Seven Stories Press, 1997) pp. 47-51.

The next surge of media coverage came in March 1998, following the release of the report, *Case Narrative: Depleted Uranium Exposures*, by Swords to Plowshares, the National Gulf War Resource Center, and the Military Toxics Project. CNN, the Associated Press, and USA Today all brought national attention to the report's finding that DoD had vastly understated the number of veterans potentially exposed to DU. This coverage prompted DoD to nearly triple its estimate of DU-friendly fire veterans, and provoked a lethargic VA to expand its study of veterans, albeit only slightly.⁸⁴

Media coverage during the 1990s also drew attention to the possible effects of DU on Iraqi civilians and veterans. The persistence during the 1990s of conflict in Iraq enabled questions, assertions, and doubts about DU to be expressed in international media, further contributing to the rise of the debate over DU. The humanitarian crisis in Iraq also provoked media attention and public concern, although slowly, over time, DU became the most popular explanation for apparent rises in cancers and birth defects in Iraq. In retrospect, it is clear that the regime of Saddam Hussein exploited the suffering of the Iraqi people, and blamed DU for serious effects in the absence of any credible scientific studies.⁸⁵

4. THE DECLINE OF RATIONAL DISCOURSE, 1999-2004

Since 1999, there has been a progressive decline in rational discourse about the use and effects of DU munitions. This decline has been characterized by exaggerated claims, falsehoods, propaganda, speculative assertions, and character assassinations of prominent activists. Signs of decay were evident even during the issue's emergence, but after the 1999 Kosovo conflict, the debate over DU became more polarized, and the claims about DU's effects became progressively more radical and unsupported by credible evidence. The factors in the decline of rational discourse, ranked in order of importance according to the opinion of the author, are the following: the (declining) credibility of activists (4.1), the Internet (4.2), scientific uncertainty (4.3), and U.S. government negligence (4.4).

4.1 CREDIBILITY OF ACTIVISTS

“Deadly radioactivity is drifting in the sands and fertile fields of Iraq, in rain falling in Europe, in breezes that toss palm trees in Vieques, Puerto Rico, in the water of South Korea--the toxic debris of exploded U.S. depleted uranium (DU) shells.”⁸⁶

While activists played a major role in the emergence of the debate over DU munitions, they have also greatly contributed to its decline. Awareness of DU continues to increase, but so too do misperceptions about the use and effects of DU munitions. DU has become

⁸⁴ See Dan Fahey, “Don’t Look, Don’t Find: Gulf War Veterans, the U.S. Government and Depleted Uranium, 1990-2000,” Military Toxics Project, 30 March 2000, www.ngwrc.org/Dulink/dont_look_dont_find.htm.

⁸⁵ See e.g. Scott Peterson, “Assistance to reporter imperiled key contact,” The Christian Science Monitor, 10 June 2003.

⁸⁶ Minnie Bruce Pratt, “Depleted uranium: Pentagon poison,” Worker’s World, 3 June 2004, <http://www.workers.org/ww/2004/dumtg0603.php>

a political tool with which activists berate the United States and U.S. foreign policy, but the lack of credibility of many of the activists' claims are having little to no effect on policy changes with respect to the use of DU munitions.

A new crop of self-proclaimed DU experts emerged in the wake of the Kosovo conflict. Some people were motivated by humanitarian concerns, some exploited the DU issue to raise money for their organizations, and others pointed to DU as a manifestation of the evils of the United States and NATO.⁸⁷ Some of these new activists joined forces with more seasoned experts to claim not only proof of widespread and severe effects from DU, but also to assert that these effects were an intentional consequence of DoD's use of DU munitions. A few marginal scientists marred their professional reputations by becoming scientist-activists who made claims and interpreted data to create misleading and sometimes intellectually dishonest assessments of DU's actual and potential effects.

When moderate activists raised concerns about the accuracy of the increasingly alarmist claims about DU, they became the target of character assassination campaigns. In fact, the debate over DU has declined to the point where the simple act of questioning a claim made by Doug Rokke, Asaf Durakovic, or other prominent activists is labeled a heresy by a small jury of vocal extremists who operate mainly through the Internet. Rational discourse about the use and effects of DU munitions has become increasingly difficult and rare.

Even before it was known if US aircraft were shooting DU rounds in Kosovo, activists advanced predictions of nightmare scenarios. As the US-led NATO force attacked Serb military forces in the Spring of 1999, the Yugoslav government complained to the International Court of Justice that NATO's use of DU munitions was not only having unspecified "far-reaching consequences for human life," but also was "deliberately creating conditions calculated at the physical destruction of an ethnic group, in whole or in part."⁸⁸ This suggestion of genocide was picked up by activists, and in July 1999, British biologist-activist Roger Coghill claimed that the use of DU munitions was likely to cause 10,000 cancer deaths in Kosovo and Serbia.⁸⁹ These claims were accepted at face value and promoted by activists against the war as well as supporters of Slobodan Milosevic.

From the claims of genocide and baseless predictions of 10,000 deaths, new myths grew and flourished. Activists capitalized upon fear and uncertainty to advance claims that were sometimes exaggerations and other times lies. Liberal media personalities such as Amy Goodman (*Democracy Now!*) and Robert Fisk (UK *Independent*) willingly promoted these claims, and as the myths grew larger, the capacity for rational public debate over the effects of DU steadily declined. Propagandists and charlatans grew in stature, and public discussions are now so permeated by misinformation that it is hard for an uninformed observer to assess the actual and potential effects of DU munitions.

⁸⁷ See e.g. "Depleted Uranium Watch – Stop NATO!", www.stopnato.org.uk/du-watch/.

⁸⁸ International Court of Justice, *Case Concerning the Legality of the Use of Force (Yugoslavia v. United States of America)* Judgment of 2 June 1999, ICJ Reports 1999, General List Number 114, Para. 3.

⁸⁹ Alex Kirby, "Depleted uranium 'threatens Balkan cancer epidemic'", BBC News, 30 July 1999, <http://news.bbc.co.uk/1/hi/sci/tech/408122.stm>.

The fantastic claims of well-known activists have grown progressively more extreme since 1999. Without any credible health or environmental studies in post-war Iraq on DU, activists have claimed the effects are comparable to those of the Chernobyl nuclear reactor explosion.⁹⁰ Some prominent activists have claimed that not only has the use of DU already caused genocidal effects in Iraq, but that the US uses DU munitions to intentionally inflict genocide on populations.⁹¹ In some cases, one lie leads to another, such as when one activist asserted – without supporting data – that U.S. missiles and bombs contain large quantities of DU,⁹² and then a publicity-seeking, fund-raising organization calling itself the Uranium Medical Research Centre used this claim to advance its own unsupported assertion that the U.S. had spread uranium contamination across Afghanistan, resulting in severe health effects.⁹³

The prize for the most outlandish claim about DU to date goes to activist Leuren Moret. Moret, who works closely with Doug Rokke and other anti-DU extremists, has uttered some of the most bizarre and uninformed statements about DU, including the following statement made in February 2004:

Anyone within 1,000 miles of Iraq; anyone within 1,000 miles of Afghanistan is potentially contaminated now. It's not just the people [living] in the country. Anyone going to Iraq or Afghanistan now will become contaminated. There's no way to escape it.⁹⁴

Such certainty is the hallmark of the DU extremists. However, Moret's most distinctive and substantial contribution to the decline of rational discourse about the effects of DU is her claim that the use of DU munitions has resulted in atmospheric pollution by radioactive dust equal to the detonation of 400,000 Nagasaki bombs.⁹⁵ Of course, there are differences of opinion even among the most irrational and uninformed extremists: another activist says the use of DU is equal to only 250,000 Nagasaki bombs.⁹⁶

⁹⁰ Leuren Moret, letter to The Honorable Jim McDermott, 21 February 2003, <http://traprockpeace.org/LettertoMcDermott.pdf>.

⁹¹ Dai Williams, "Last chance to question US dirty bombs for Iraq," 7 February 2003, <http://www.eoslifework.co.uk/Uhaz7feb03/index.htm>; Piotr Bein, "Depleted Intelligence of Depleted Uranium Apologists," 22 January 2001, <http://www.stopnato.org.uk/du-watch/bein/apologists.htm>; Leuren Moret, letter to The Honorable Jim McDermott, 21 February 2003, <http://traprockpeace.org/LettertoMcDermott.pdf>.

⁹² Dai Williams, "Hazards of suspected Uranium weapons in the proposed war in Iraq (Summary)," 24 September 2002, <http://www.eoslifework.co.uk/u23.htm>.

⁹³ Uranium Medical Research Centre, "Afghan Field Trip #2 Report," undated, www.umrc.net/downloads/destruction_effects.pdf; *Tehran Times*, "U.S. used more DU Weapons in Afghanistan than in Persian Gulf War: Durakvoic," 9 November 2002.

⁹⁴ Leuren Moret, interview with Don Nordin, "The Implications of the use of U.S. Depleted Uranium Weapons in Yugoslavia, Afghanistan, and Iraq," 23 February 2004, http://www.universalfriends.org/depleted_uranium.htm.

⁹⁵ Robert C. Koehler, "Silent Genocide," *Chicago Tribune*, 25 March 2004, <http://www.tms.tribune.com/htmlmail/commentators/articles/0325Koehler.htm>.

⁹⁶ Bob Nichols, "There Are No Words... Radiation in Iraq Equals 250,000 Nagasaki Bombs," *Dissident Voice*, <http://www.dissidentvoice.org/Mar04/Nichols0327.htm>.

Over time, activists have advanced countless other myths,⁹⁷ exaggerations,⁹⁸ and falsehoods,⁹⁹ but the aforementioned examples come from some of the activists most often quoted in international media reports about DU. When placed in the same article or speech with valid claims based on factual information, it becomes difficult for well-intentioned activists and concerned citizens to separate the good information from the bad. The increased activism on DU is a double edged sword: while the visibility of the issue has grown among the public, the inflated claims about DU's effects have made this issue a house of cards, ready to collapse in upon its own falsehoods. Further evidence of the decline of the DU issue can be found in the incorporation of false information about DU into parts of the U.S. peace movement,¹⁰⁰ the publication of picture books that purport to show the effects of DU in Iraq,¹⁰¹ and the organization of conferences where extremists promote falsehoods and alarmist claims about the use and effects of DU munitions.¹⁰²

4.2 THE INTERNET

The decline of rational debate about DU corresponds with the rise of the Internet as a form of mass communication. Although the Internet remains a tremendous source for credible information about DU, it has also become a conduit through which exaggerations, half-truths, and propaganda about DU are regularly disseminated by government officials and extremist activists alike. In this context, the elements of the

⁹⁷ E.g., the oft-repeated claim that DU is used in Tomahawk cruise missiles. Levi Hill, "Speaker lectures on hazards of U.S. uranium," *The Round Up* (New Mexico State University), 24 February 2003. See also <http://www.idust.net/>.

⁹⁸ E.g., one well-known veteran claims that 30 members of a 90-100 strong team he served with have "dropped dead" due to DU, even though he will not provide a list of names of the dead, and in reality the team he was a member of numbered at most 29 people. See Amy Worthington, "Death by Slow Burn – How America Nukes its own Troops," *The Idaho Observer*, April 2003, <http://proliberty.com/observer/20030401.htm>; William Thomas, "Nuking Iraq," 28 May 2003, <http://www.freepress.org/departments/display/13/2003/234>; News.com.au, "Troops Uranium Warning," 17 June 2003, www.news.com.au/common/story_page/0,4057,6611456%25E1702,00.html; The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, *Depleted Uranium in the Gulf (II)* (Washington, DC, 2000) 7; William Winkenwerder, "Depleted uranium poses no risk to troops," *The Miami Herald*, 14 April 2003, <http://www.macon.com/mld/miamiherald/news/editorial/letters/5627041.htm>.

⁹⁹ E.g., one international lawyer claims that DU is "already illegal" because it causes widespread, long-term and severe effects on health and the environment, even though there are no studies to support her claims, and she is virtually alone in her assessment. She is sometimes misleadingly identified as having gotten the United Nations to declare DU illegal, when in fact Parker only helped convince a UN sub-commission to include DU in a resolution that carries virtually no weight in international law. See Karen Parker, "The Illegality of DU Weaponry," paper presented at the International Uranium Weapons Conference, Hamburg, Germany, 16-19 October 2003, http://traprockpeace.org/karen_parker_du_illegality.pdf; Karen Parker and Catherine Euler, "Depleted Uranium Munitions: The Use of Radiological Weapons as a Violation of Human Rights" (August 1999) 4; Sir Hugh Beach, "The military hazards of depleted uranium," January 2001: http://www.isisuk.demon.co.uk/0811/isis/uk/regpapers/no78long_paper.html

¹⁰⁰ See e.g. Traprock Peace Center, <http://traprockpeace.org/>.

¹⁰¹ See e.g. Takashi Morizumi, "A Different Nuclear War: Children of the Gulf War," (Hiroshima-Nagasaki-Atlanta: Global Association for Banning Depleted Uranium Weapons, 1 August 2002). See also Siegwart-Horst Gunther, *Uranium Projectiles: Severely Maimed Soldiers, Deformed Babies, Dying Children* (Freiburg: Ahriman-Verlag, 1996).

¹⁰² See e.g. World Uranium Weapons Conference 2003, <http://www.uraniumweaponsconference.de/>.

Internet most involved with DU include media web sites, activist web sites, chat rooms, and list serves; these elements have become fertile ground for spin doctors on the right and the left to turn assertion into fact, and spin science into science fiction.

Through search engines and databases, a massive amount of information about DU is accessible, ranging from the most up-to-date scientific journal articles to official military records and reports. As one example of the value of the Internet, after Pentagon officials in 2001 denied the existence of cancer among veterans in the DU Program, I was able to expose this lie with a document I found through a link in a footnote to a Pentagon report.¹⁰³ The Internet also enables activists to communicate with scientists and government officials through email messaging, with near instantaneous sharing of new information about DU.

While the Internet provides great opportunities for activists, scientists, and policy makers to assess information about the effects of DU, it also presents many obstacles to productive discussion. On the far right and the far left, there seems to be a mechanism whereby people process information through a political filter, embracing information that supports their position about DU's effects and rejecting information that might undermine their perception of reality. The far right has promoted DU as a necessary weapon with no long-term effects, and labeled anti-DU activists as being unpatriotic and using the DU issue to further anti-nuclear or anti-military agendas.¹⁰⁴ The far left has embraced Iraqi propaganda (from Saddam Hussein's government) about the effects of DU, and accused government and military officials of being war criminals who defy the will of "god and humanity." The Internet now contains thousands of portals with information supporting the beliefs of both extremes.

The Uranium Medical Research Centre (UMRC) is one organization that has effectively used the Internet (through media stories and list serves) to raise funds and spin myths about DU. UMRC has successfully exploited scientific uncertainty and government negligence to promote its goals, which seem to be a mixture of ideology, publicity, and fundraising. UMRC's report about Afghanistan, mentioned in the previous section, offers no data or source to support its contention that the U.S. used hundreds of thousands of pounds of "non-depleted uranium" in its missiles and bombs,¹⁰⁵ yet by simply posting a paper with this claim on its Web site, UMRC was able to garner significant media

¹⁰³ See Dan Fahey, "Depleted Legitimacy: The U.S. Study of Gulf War Veterans Exposed to Depleted Uranium," presented at the National Gulf War Resource Center conference, Atlanta, Georgia, 4 May 2002. The document is posted at www.danfahey.com.

¹⁰⁴ See e.g., Jack Spencer and Mike Scardaville, "Dispelling the Myths About Military Use of Depleted Uranium," Heritage Foundation Executive Memorandum #721, 20 February 2001, <http://www.heritage.org/Research/NationalSecurity/EM721.cfm>; Robert Willisroft, "Depleted Uranium: The Myth That Won't Go Away," 12 April 2004, http://www.military.com/NewContent/0,13190,Defensewatch_041204_DU,00.html.

¹⁰⁵ Uranium Medical Research Centre, "Afghan Field Trip #2 Report," undated, http://www.umrc.net/downloads/destruction_effects.pdf. See also, Democracy Now!, "Dr. Asaf Durakovic Gives a Rare Interview about Depleted Uranium in Iraq: He Was the First Military Doctor to Test Gulf War Veterans for Radiation Exposure and Was Terminated for His Work (aired 30 January 2003), at www.democracynow.org.

coverage, mainly through irresponsible journalist-activists, such as Amy Goodman, host of the national (U.S.) radio show *Democracy Now!*

In addition, UMRC staffer Tedd Weyman has used the Internet to orchestrate character assassinations against activists who question the alarmist and unsubstantiated claims made by Dr. Durakovic and UMRC. In the late 1990s, Dr. Durakovic's gang organized a character assassination campaign against Canadian scientist Dr. Hari Sharma, but the intensity of the attacks coming from UMRC has increased since March 2003. In that month, Weyman began a concerted effort through Internet list serves to play the role of agent provocateur,¹⁰⁶ accusing moderate DU campaigners and curious scientists of secretly working for the CIA, the nuclear industry, the Pentagon, etc., while cynically promoting UMRC as the only "credible" organization working on DU. Weyman's vituperative claims are emblematic of the disarray of the anti-DU movement, where the forcefulness with which an assertion is advanced is misinterpreted as evidence of its veracity. Indeed, "despotic authority attaches great importance to being considered strong, and much less to being admired for its wisdom."¹⁰⁷

Most recently, in April 2004, Dr. Durakovic was the source for a series of articles by columnist-activist Juan Gonzalez in the New York Daily News which attributed health affects among a New York National Guard unit to the finding of DU in four veterans.¹⁰⁸ Without providing any data for scientists to review, and without releasing information about the levels of exposure, UMRC, Dr. Durakovic, and Gonzalez not only gained publicity (primarily through the Internet), but also once again made DU a political issue. New York Senators Hillary Clinton and Senator Chuck Schumer have rightly called for a review of DU testing and training for Iraqi veterans, but they are doing so based on an assertion in a tabloid newspaper that does not provide any information about veterans' exposure levels.

I contacted the German scientist who was paid by Dr. Durakovic to test the veterans' urine, and what he told me contradicted sharply with the public message promoted by Durakovic and Gonzalez. The scientists told me the levels of DU he measured were "low", yet Dr. Durakovic told four veterans that they had "high levels" of DU in their bodies.¹⁰⁹ This exploitive behavior has been the hallmark of UMRC and Dr. Durakovic, and it enables them to raise money to fund pseudo-scientific environmental and health assessments in Iraq and Afghanistan. Yet their actions have also prompted opportunistic politicians to push for greater assessments of Iraq war veterans. This raises a question about whether the end justifies the means, but it is too early to determine whether using scare tactics will result in better testing and treatment of veterans.

The Internet has enabled activists who work as journalists to advance the most fantastic claims with virtually no accountability for errors of fact or judgment. From Robert Fisk's

¹⁰⁶ Weyman has at times used the pseudonym "Amarie" on DU list serves.

¹⁰⁷ Ryszard Kapuściński, Shah of Shahs, (New York: Vintage International, 1992), translated from Polish, p. 115.

¹⁰⁸ Juan Gonzalez, "Soldiers demand to know health risks," New York Daily News, 3 April 2004.

¹⁰⁹ See e.g., Associated Press, "Vets: Health Problems Linked to Uranium," 9 April 2004.

claim about “football sized tomatoes and purple carrots” caused by DU,¹¹⁰ to the paranoid conspiracy theories often repeated on Amy Goodman’s radio show *Democracy Now!*,¹¹¹ there is a willingness, and even an eagerness among activist-journalists to promote exaggerated notions of DU’s risks and effects, as long as the claims fit within the anti-war or anti-U.S. government framework through which the journalist-activists and media outlets see the world; it doesn’t hurt that alarmist claims also sell papers and attract Web site visitors. It is a sad statement about the status of the debate over DU that you can literally make up a claim about DU, put it on the Internet, and people – including myopic journalists – will believe it and promote it as the gospel truth.

4.3 SCIENTIFIC UNCERTAINTY

Scientific uncertainty was an important factor in the emergence of the DU issue, but it has also played a significant role in the decline of rational debate about DU’s effects. On the far right, military officials have lied about the health of US veterans exposed to DU, and made sweeping assertions about the harmlessness of DU while ignoring their own data warning of its risks. On the far left, activists have exploited the uncertainties to blame widespread and severe effects on DU without any supporting data. Both extremes see the uncertainties as supporting their position, and both ignore scientific information that does not conform to their steadfast opinion.

Many of the uncertainties about the health and environmental effects of DU exist because there was little to no investigation of DU’s lasting effects during the weapon development and testing phase, which lasted roughly from 1959 to 1990 (in the United States). After 1991, the uncertainties could have been partly resolved if comprehensive battlefield assessments had been coupled with comprehensive health assessments of exposed soldiers and civilians. As DU emerged as a health, environmental, and political issue during the 1990s, it appears in hindsight that DoD and VA did not want to study exposed veterans so that they could plausibly deny any evidence of effects, and it appears that Saddam Hussein was more interested in exploiting the DU issue and the suffering of his people to build international sympathy than in allowing credible health and environmental studies in southern Iraq.

One example of the decline of the DU debate focused on scientific uncertainty is the claim that Israel has used and is using DU munitions in the Palestinian territories. For the last few years, Yasser Arafat has consistently accused the Israeli Defense Force of using DU munitions against Palestinians and in Palestinian territory, but he has offered no evidence to support his claim.¹¹² Israel denies any use of armor-piercing DU rounds

¹¹⁰ Patsy McGarry, “Iraqi child cancers link to Gulf War weapons,” *The Irish Times*, 30 November 1999.

¹¹¹ See *Democracy Now!*, “Former US Army Depleted Uranium Expert, Alleges Campaign of Harassment Against Him for Speaking Out” (aired 26 May and 30 May 2000); “Dr. Asaf Durakovic Gives a Rare Interview about Depleted Uranium in Iraq: He Was the First Military Doctor to Test Gulf War Veterans for Radiation Exposure and Was Terminated for His Work (aired 30 January 2003); “U.S. Reportedly Fires Du Shells in Basra: Despite Evidence of Health and Environmental Effects, Pentagon Denies Du is Dangerous” (aired 24 March 2003); accessible through www.democracynow.org.

¹¹² See e.g. Palestinian National Authority, “President Arafat: Israel Used Depleted Uranium to Suppress the Palestinian People,” 11 November 2003, www.pna.gov.ps/subject_details.asp?subject_id=993; Mark Lavie, “Palestinian killed in firefight near Jewish settlement,” Associated Press, 15 February 2001; and Environment News Service, “Environmental a weapon in the Israeli-Palestinian conflict,” 5 February 2001.

from tanks or aircraft in Palestinian areas.¹¹³ Nonetheless, the uncertainties about DU and its effects have enabled Arafat and anti-Israel groups, such as the International Action Center,¹¹⁴ to use DU as a political hammer against Israel and to build support for the Palestinian political cause.

As part of a comprehensive analysis of environmental conditions in Palestinian territories, the UNEP Post-Conflict Assessment Unit tried to resolve the uncertainty over the use of DU munitions in Palestinian territories. The assessment unit's final report states, in part:

During the UNEP mission, the [Palestinian] Environmental Quality Authority submitted to UNEP a report from a laboratory it had commissioned to carry out an analysis of ammunition thought to contain DU. UNEP transmitted this report and its accompanying spectrometer analysis for review to Spiez Laboratory AG, which had worked with UNEP on earlier DU assessments in the Balkans. This laboratory determined that the spectrum was consistent with a natural soil spectrum, and provided no indication of the presence of DU. Only naturally occurring radioactivity was identified.¹¹⁵

This evidence probably isn't enough to dispel the myth promoted by Arafat and anti-Israeli activists, and it is possible Israel's denials are themselves myths, but at present there remains no scientific evidence to support the oft repeated claim that Israel is using DU munitions in Palestinian territories.

In addition to the uncertainties about the effects of DU munitions, the decline of the debate over DU has been infused with misinformation about the military necessity of DU munitions. Extremist anti-DU activists have embraced Pentagon propaganda about the effectiveness and importance of DU munitions, creating the impression that virtually every destroyed vehicle on the battlefield is contaminated by DU. In reality, greater than 80 percent (by mass and number of rounds) of the DU known to have been shot in armed conflict is likely to have missed its target and deposited relatively intact in the local environment.¹¹⁶ Intact rounds may present a long-term hazard as they oxidize and migrate in soil and water, but they present less of a short-term hazard because large quantities of respirable size DU dust are created only by the impact of DU rounds against a hard target. By accepting the Pentagon's inflated claims about the importance of DU rounds (particularly *vis à vis* guided missiles and other precision weaponry), anti-DU extremists and journalist-activists continue to muddy the waters of the DU debate.

¹¹³ Nina Gilbert, "Sneh: No uranium bombs used against civilians," The Jerusalem Post, 22 February 2001.

¹¹⁴ See reports at www.iacenter.org/depleted/du.htm.

¹¹⁵ United Nations Environment Programme, Post Conflict Assessment Unit, Desk Study on the Environment in the Occupied Palestinian Territories, February 2003, p. 88-89, <http://www.unep.org/GoverningBodies/GC22/Document/INF-31-WebOPT.pdf>.

¹¹⁶ This is due to the fact that aircraft, which have shot approximately 85 percent of the DU, are inherently inaccurate firing their guns during strafing runs, with at typically only 5 to 10 percent of the rounds striking the intended target, and the rest depositing in the local environment over an area ranging from several hundred to several thousand meters. See Dan Fahey, "Science or Science Fiction? Facts, Myths and Propaganda in the Debate Over Depleted Uranium Munitions," 12 March 2003, www.antenna.nl/wise/uranium/diss.html; Sir Hugh Beach, "The military hazards of depleted uranium," January 2001, www.isisuk.demon.co.uk/0811/isis/uk/regpapers/no78long_paper.html.

DU munitions are neither the benign wonder weapons promoted by Pentagon propagandists nor the instruments of genocide decried by hyperbolic anti-DU activists. While the political effects of using DU munitions are perhaps more apparent than their health and environmental effects, science and common sense dictate it is unwise to use a weapon that distributes large quantities of a toxic waste in areas where people live, work, grow food, or draw water. There's no end in sight to the DU debate, but debunking the false claims from both extremes is an important first step in creating the conditions necessary for constructive dialogue and credible analysis.

4.4 U.S. GOVERNMENT NEGLIGENCE

The refusal of DoD and VA to address the DU issue in an honest and timely manner has also contributed to the decline of the DU debate. Since the Kosovo war, DoD has obstinately withheld information about the quantities and locations of DU expenditure, enabling the conspiracy theories of activists who exploit the uncertainties through the Internet to create progressively more alarmist claims. VA has acted more like the stepchild of the Pentagon than the agency tasked with taking care of disabled veterans: refusing to conduct a thorough study of veterans exposed to DU in 1991 and tolerating DoD lies about the health of the few dozen veterans who are being studied.

The U.S. government has failed to answer many fundamental questions about the use and effects of DU munitions:

- How many vehicles have been destroyed or disabled by DU rounds during conflicts in Iraq, Kuwait, the Balkans, and Afghanistan?
- How much DU has been shot in Afghanistan since 2001, and in Iraq since 2003?
- What steps have been taken in Iraq during the last year to identify contaminated equipment, warn local populations about DU contamination, and remediate DU dust and debris?
- How many veterans enrolled in the DU Program have developed tumors or cancers of any kind?

Although US government negligence raises more questions than it answers, extremist activists have exploited this negligence to cast DU munitions as both far more effective and vastly more hazardous than evidence indicates.

In 1998, DoD finally released information about the locations where it had shot DU rounds in the 1991 war, as well as detailed information about the quantities expended.¹¹⁷ But a year later, after the Kosovo conflict, DoD refused to release information about its use of DU in Serbia, Kosovo, and Montenegro, creating the uncertainty that was exploited in late 2000 when DU was blamed for cancer deaths among NATO peacekeepers.¹¹⁸ Indeed, it took the direct intervention of United Nations Secretary General Kofi Annan to obtain information about DU from NATO and the U.S.,¹¹⁹ and

¹¹⁷ See Bernard Rostker, letter to Dan Fahey, "Technical Response to FOIA Case Number 97-F-1524, Question Eleven," 11 February 1998; Dan Fahey, *Case Narrative: Depleted Uranium Exposures*, Swords to Plowshares, National Gulf War Resource Center, the Military Toxics Project, 3rd Edition, September 20, 1998 (first edition March 2, 1998).

¹¹⁸ See e.g., Tom Hundley, "Uranium Hysteria Sweeps Europe," *Chicago Tribune*, 28 January 2001.

¹¹⁹ Letter from The Rt. Hon. Lord Robertson, Secretary General of NATO to His Excellency Kofi Annan, Secretary General of the United Nations, 7 February 2000.

though this information enabled UNEP assessment teams to conduct battlefield studies starting in 2001, the seeds of uncertainty had by this time grown into myths and fantasies about the effects of DU in the Balkans. Although one study found that Balkan residents had been exposed to miniscule levels of DU,¹²⁰ several studies have found no evidence linking DU exposure with any adverse health effects among Balkans residents or NATO peacekeepers.¹²¹

Since 2001, DoD's refusal to either confirm or deny its use of DU munitions in Afghanistan has enabled extremist activists to claim widespread and severe effects. In October 2001, as soon as US forces started attacking Taliban and al Qaeda forces, claims of babies poisoned to death by DU appeared in the Pakistani press.¹²² Dr. Durakovic and others have irresponsibly suggested DU is responsible for a range of effects in Afghanistan: an increase in birth defects;¹²³ creation of "radioactive dust storms" and pollution of rivers;¹²⁴ and the sudden appearance of an array of serious, debilitating illnesses among civilians living near Jalalabad.¹²⁵ In January 2002, barely three months after the U.S. first attacked Taliban forces in Afghanistan, anti-DU activist Dai Williams wrote, "It is feared that these weapons have already started widespread and irreversible health problems for civilians and troops - a potential Afghan War Syndrome."¹²⁶ Thus, in the vacuum of information about DU in Afghanistan, extremists and propagandists have emerged to make assertions and spin myths without providing any supporting information or data.

Before and during the 2003 U.S. invasion of Iraq, anti-DU extremists and people using the DU issue for political goals and fundraising rather predictably made new, elaborate claims about DU. Although the "major refugee exodus" and "radioactive dust haze" with genocidal effects predicted before the war failed to materialize,¹²⁷ "the newly reported outbreak of 'Gulf War 2 syndrome'" has been blamed on DU.¹²⁸ Even more astonishing

¹²⁰ Nick D. Priest and M. Thirlwall, "Early results of studies on the levels of depleted uranium excreted by Balkan residents," Archive of Oncology 2001; 9(4): 240.

¹²¹ See P. Roth, E. Werner and H.G. Paretzke, "A study of uranium excreted in urine," GSF – National Research Center for Environment and Health, Institute for Radiation Protection, Neuherberg, Germany, January 2001: 32; Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, Medical Readiness, and Military Deployments, Information Paper: Depleted Uranium Environmental and Health Surveillance in the Balkans (Washington, DC: U.S. Department of Defense, 25 October 2001) http://www.deploymentlink.osd.mil/du_balkans/.

¹²² Sarmad Sufian, "U.S. used nuclear waste" Weekly Independent (Pakistan), Vol. 1, No. 23, 29 November – 5 December 2001, Front Page. See also, Agence France Presse, "The headlines around South Asia," 30 October 2001.

¹²³ "US used more DU weapons in Afghanistan than in Persian Gulf War: Drakovic," Tehran Times, 9 November 2002, <http://rawa.false.net/du2.htm>.

¹²⁴ Richard S. Ehrlich, "Depleted Uranium Toxicity in Afghanistan," Laissez Faire Times, vol. 5, no. 44, 29 October 2001, http://www.xs4all.nl/~stgvisie/VISIE/afghan_uranium.html.

¹²⁵ Uranium Medical Research Centre, "Afghan Field Trip #2 Report," undated, http://www.umrc.net/downloads/destruction_effects.pdf.

¹²⁶ Dai Williams, "Mystery Metal Nightmare in Afghanistan?" (January 2002), <http://www.eoslifework.co.uk/u231.htm>.

¹²⁷ Dai Williams, "Last chance to question US dirty bombs for Iraq?" 7 February 2003, <http://www.eoslifework.co.uk/Uhaz7feb03/sld012.htm>.

¹²⁸ UK Green Party, "'Gulf War 2 syndrome' probably caused by DU," 28 May 2003.

is the completely unsupported claim by Dr. Chris Busby – and promoted by the UK Green Party – that the US used “small nuclear weapons in Iraq as bunker-busting weapons”.¹²⁹

DoD’s refusal to provide a full accounting of weapons systems containing DU allows parasitic groups like UMRC to feed upon the uncertainties to gain publicity and raise money. Since 2003, UMRC has posted intellectually dishonest and scientifically questionable claims on its Web site, including its unsupported contention that so-called “non-depleted uranium” is being secretly used in “hard target, deep penetration, and DBHT (deeply buried hard target) weapons that combine uranium with high explosives.”¹³⁰ Citing unspecified “government reports and independent research,” UMRC claims these new warheads contain “100s to 1000s of kilograms” of uranium that is “extracted from the nuclear fuels and nuclear weapons production cycles prior to the uranium enrichment phase.” Not only is there no evidence to support this claim, but even if missiles or bombs contained some DU or natural uranium as a nose cone or counterweight, it is highly unlikely that any missile or bomb would contain “1000s of kilograms” of uranium, as UMRC asserts.

As the April 2004 controversy about DU test results for a New York National Guard unit have shown, the inability of DoD and VA to provide timely and accurate information about DU exposures among U.S. servicemembers has enabled activists to exploit the issue and sow fear among veterans and their families. This controversy could have been avoided if DoD and VA had provided DU tests for all returning veterans who requested them (this has apparently not taken place), and provided realistic assessments of the effects of DU on veterans of all conflicts, including the ongoing war in Iraq. DoD and VA inaction enables Dr. Durakovic and other opportunists to inflate facts and twist information by encouraging a direct connection, in the public’s mind, between DU and the veterans’ health problems. Such tactics have until recently also been employed the Bush administration in its efforts to draw a direct connection, in the public’s mind, between Saddam Hussein and the September 11 tragedy carried out by al Qaeda.

Since January 2003, I have tried to provoke DoD and VA to address the use of DU in Iraq in a timely and transparent manner.¹³¹ My efforts helped convince Representative Bob Filner (D-CA) in December 2003 to initiate a General Accounting Office investigation of testing and monitoring of Iraqi veterans for DU exposure.¹³² Also in December 2003, a briefing paper I wrote helped convince Senator Russ Feingold (D-WI) to take action to ensure that Iraqi veterans are properly tested and monitored for DU exposure.¹³³ In addition, I have recently released a report analyzing DoD policies and promoting policy initiatives that will assess the effects of DU on U.S. troops and facilitate

¹²⁹ Ibid.

¹³⁰ Uranium Medical Research Centre, “Understanding UMRC’s Research,” 14 April 2003, <http://www.umrc.net/UmrcResearch2.asp>.

¹³¹ Letter from Dan Fahey to Honorable Anthony Principi, 10 January 2003. Original in author’s files.

¹³² Letter from Honorable Bob Filner to Honorable David Walker, Comptroller General of the U.S. General Accounting Office, 3 December 2003.

¹³³ Letter from Honorable Russ Feingold to Honorable Arlen Specter and Honorable Bob Graham, 30 December 2003.

health and environmental studies in Iraq.¹³⁴ I have tried to convince DoD and VA that their negligence to objectively assess the effects of the use of DU munitions not only limits the delivery of health care and disability benefits to veterans, but also enables opportunistic extremists to promote myths about DU that feed the growing public perception that the United States government uses DU munitions to intentionally poison civilian populations in Iraq, Afghanistan, and elsewhere.

5. FINAL THOUGHTS

I first learned about DU munitions in October 1990 when I attended the Navy's Phalanx Close In Weapons System school. The instructor told us that depleted uranium is "depleted"; therefore it is not dangerous. As a young officer, I believed what I was told.

I did not think much about depleted uranium until several years later when I was working as a veterans' advocate. While helping veterans file claims for disability benefits through the veterans' group Sword to Plowshares, I discovered that almost none of the ailing Gulf War veterans I talked with had any idea what depleted uranium was, let alone how it was used in the war. As I unearthed pieces to the puzzle with information obtained through the Freedom of Information Act and from credible activists working with the Military Toxics Project and National Gulf War Resource Center, I helped to demonstrate the pattern of lies and deception about DU propagated by the Department of Defense and Department of Veterans Affairs. My first written statement, presented in November 1995 to an advisory committee to President Clinton, articulated the message I have been promoting ever since: "Depleted Uranium: Objective Research and Analysis Needed".¹³⁵

During the course of my work, I have been criticized and denounced by the both extremes in the DU debate. In 1997, an intelligence officer working for the Pentagon's Gulf War illness unit threatened me with a lawsuit and encouraged other veterans' advocates to stop working with me. In subsequent years, Pentagon officials tried to discredit me by labeling me a dupe of Iraqi propaganda, with a secret agenda of world disarmament. Ironically, extremist activists have also tried to discredit me by spreading rumors on the Internet and through word of mouth that I am secretly working for the CIA, the Pentagon, the nuclear industry, or other nefarious syndicates. In 2000, Iraqi government officials berated me at a conference in Spain because I questioned their claim that all the cancers and birth defects in southern Iraq were attributable to DU.

I have learned that liars and charlatans do not like to be exposed, and when exposed, they may lash out fiercely. The far left mirrors the far right with respect to DU, and the actions of some prominent anti-DU activists emulate those of the Bush administration during its drive to war in Iraq: first make alarmist claims based on flawed assessments that use fabricated evidence from unreliable sources, and then viciously attack anyone

¹³⁴ Dan Fahey, "Unresolved Issues Regarding Depleted Uranium and the Health of Veterans of Operation Iraqi Freedom and Operation Enduring Freedom," 24 March 2004, <http://www.antenna.nl/wise/uranium/dissgw.html>.

¹³⁵ Dan Fahey, "Depleted Uranium: Objective Research and Analysis Needed," presented to the Presidential Advisory Committee on Gulf War Veterans' Illnesses in San Francisco, CA, 7 November 1995.

who questions the claims and asks to see the supporting evidence. Indeed, extremists on both the left and the right are adept at exploiting people's fears and wrapping themselves in altruistic flags in order to achieve personal glory, political agendas, and financial gain.

Even as rational discourse about DU has declined, tremendous work has taken place. UNEP's Post Conflict Assessment Unit has conducted the first credible scientific studies of the environmental effects of DU in the Balkans, and hopefully it will soon be able to undertake assessments in Iraq. A few scientists, including Dr. Alexandra Miller at the U.S. Armed Forces Radiobiology Research Institute, continue to objectively investigate the health effects of DU on laboratory rats and human cells, although comprehensive studies of exposed veterans and civilians do not appear likely to take place. Scott Peterson from the Christian Science Monitor and a handful of other journalists have upheld the highest traditions of investigative journalism during their coverage of the DU issue, even as others in their profession lack discretion and integrity. A new coalition called the International Campaign to Ban Uranium Weapons has formed to work on the issue,¹³⁶ and the fact that the Uranium Medical Research Centre and other extremists criticize the coalition is a sign that it is on the right track.

There is no end in sight to the DU issue, for as long as the scientific uncertainties and government negligence continue, opportunistic extremists will exploit people's fears and use the Internet to assert the link between DU munitions and widespread, severe effects. It is likely that advances in technology rather than pressure from activists will lead the United States, United Kingdom, and perhaps other countries to abandon their use of DU munitions. However, many other nations have acquired or are developing DU munitions, and DU will probably be used (if it has not been already) in other conflicts less visible than the United States government's wars.

In the years ahead, advances in medical and environmental science will hopefully lead to greater assistance for exposed populations and remediation efforts in battle zones. Such progress will probably not dispel many of the claims about DU's effects; many of the most absurd and unsubstantiated claims have become myths and folklore that will persist for a generation or more. The middle ground in the DU debate has been lost, but I hope that future policy actions to address the health and environmental effects will emerge despite the politicization of the issue. It is possible that science and common sense will eventually win out over politics and ideology, but at this point, such a prospect seems increasingly unlikely. ■

¹³⁶ www.bandepleteduranium.org.