

Unresolved Issues Regarding Depleted Uranium And the Health of U.S. Veterans of Operation Iraqi Freedom and Operation Enduring Freedom

Dan Fahey¹
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Summary

The use of armor-piercing ammunition made from depleted uranium (DU) during Operation Iraqi Freedom has re-focused attention on policies to test and monitor veterans exposed to DU. Although the Department of Defense (DoD) was inexplicably negligent in identifying and testing veterans after the 1991 Gulf War, it has since initiated training programs about DU and improved its policies to identify and assess veterans with known or suspected DU exposures. Since 1993, the Department of Veterans Affairs (VA) has studied a few dozen veterans exposed to DU, but VA has failed to implement the Institute of Medicine's recommendation to expand its study and conduct long-term follow up of friendly fire veterans as well as those involved in cleanup operations or radiation control units.² Consequently, VA is neglecting its duty to evaluate the health of veterans who had Level I and II exposures in 1991, even as it prepares to start studying those with Level I and II exposures since 2001.

There are new and legitimate concerns about the adequacy and implementation of current DU policies. This paper examines current policies to identify, evaluate, test, and monitor veterans with known or suspected DU exposures, with a focus on veterans of Operation Iraqi Freedom and Operation Enduring Freedom. This paper also contains updated figures about the quantities of DU shot during combat in Iraq (p. 6), and new information about the results of DU testing of US and British veterans (p. 7).

The following questions serve as a starting point for federal efforts to assess the adequacy and implementation of policies to identify, test, and monitor veterans exposed to DU:

1. Is DoD identifying specific units for targeted DU testing, in addition to using the post-deployment questionnaire to identify troops potentially exposed to DU dust and debris? (p. 3)
2. Does the risk communication statement in DoD's DU testing policy (HA 04-004) provide a realistic and accurate appraisal of the risks of DU exposure? (p. 4)
3. When will DoD provide an accounting of the quantities and locations of DU munitions expended since the start of Operation Iraqi Freedom? (p. 6)

¹ Dan Fahey is an independent policy analyst who has written several reports and book chapters about the health, environmental, and political effects of depleted uranium munitions, as well as the adequacy of policies to identify, evaluate, and test veterans with known or suspected DU exposures. He lives in San Francisco, California, and can be contacted at duweapons@hotmail.com. Additional reports and information can be found at www.antenna.nl/wise/uranium/.

² U.S. Institute of Medicine, Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) p. 326.

4. Does it make sense to refer Operation Iraqi Freedom veterans to a VA program that has withheld information about the health of Operation Desert Storm veterans exposed to DU? (p. 8)
5. Have DU munitions been used during Operation Enduring Freedom, and have any veterans who served in Afghanistan been tested for exposure to DU? (p. 13)
6. Have U.S. troops who served at K-2 (Stronghold Freedom) in Uzbekistan been tested for exposure to DU? (p. 14)
7. Have government civilian employees, contractors, or others been tested for DU exposure, in accordance with HA 04-004? (p. 15)

Recommendations

Although there are still many more questions than answers about the policies and actions of both DoD and VA, the following recommendations should help resolve some of the uncertainties:

1. Federal investigators should ascertain, through review of relevant records and interviews, whether the services are properly implementing HA 04-004 by proactively identifying individuals and units for targeted DU bioassays.
2. The DU risk communication message in HA 04-004 should instruct health care providers to deliver one of three unique messages based on the exposure level (Level I, II, or III). Like the risk communication messages for lead exposure in HA 04-004, each DU message should provide a realistic appraisal of the potential for health effects as well as the need for continued monitoring.
3. DoD should publicly release an accounting of the amount of DU ammunition expended in Iraq during combat, as well as the amount released as a result of aircraft crashes, ammunition truck explosions, breaches of DU tank armor, tank or fighting vehicle fires, and all other causes and weapon uses. In addition, DoD should publicly describe its efforts to assess the health and environmental effects of the use of DU munitions in Iraq, including an explanation of the process to identify, transport, and dispose of contaminated equipment.
4. The DU Program should be restructured and expanded into a cohort study that assesses the health of the approximately 900 veterans identified by DoD as having had Level I and II exposures during and after the 1991 Gulf War. The VA should create a new DU study, under new leadership, that reports all relevant health effects in a timely and accurate way.
5. DoD should either confirm or deny that US forces have shot DU munitions in Afghanistan. If DU munitions have been used, DoD should release an accounting of the quantities and locations of expenditure, and make publicly available the results of self-reported exposures from DD 2796, information about proactive identification of troops exposed to DU, and the results of bioassays.
6. Federal investigators should ascertain whether US troops who served at K-2 in Uzbekistan have been tested for exposure to DU. Make publicly available the results of self-reported exposures from DD 2796 as well as the results of bioassays for DU exposure and any plans for future monitoring.
7. Verify that the process for selecting non-military personnel for DU testing is being properly followed, and publicly release information about the number of people tested as well as the test results and any future monitoring plans.

UNRESOLVED ISSUES

1. Is DoD identifying specific units and individuals for targeted DU testing, in addition to using the post-deployment questionnaire to identify troops potentially exposed to DU dust and debris?

After Operation Desert Storm in 1991, the Army Surgeon General's Office neglected to adhere to its own regulations requiring the testing of veterans with a known or suspected DU exposure.³ More than two years after the war, DoD and VA set up the Depleted Uranium Program at the Baltimore VA Medical Center to test and study veterans. However, less than one third of veterans exposed in friendly fire incidents were enrolled in the study, and fewer than two dozen of the "thousands" of other veterans who may have been exposed to DU were tested. In 1998, VA offered DU testing to any veteran who requested it, but this scattershot approach has confirmed only 15 positive exposures out of 446 veterans tested.⁴ Thirteen years after the 1991 Gulf War, VA and DoD refuse to assess the health of the approximately 900 veterans who had Level I and II exposures.

During Operation Iraqi Freedom, US servicemen and women may have been exposed to DU during combat (including friendly fire), medical treatment of wounded US and Iraqi troops, battle damage and recovery operations, and other scenarios. DoD is currently identifying servicemen and women to receive testing based on the results of the questionnaire "Post Deployment Health Assessment" (DD 2796).⁵ While this method has the advantage of allowing troops to self report an exposure, it also has the potential to miss those who were not aware of how or where they might have been exposed to DU contamination.

In addition to the scattershot approach of the questionnaire, it is prudent and responsible to automatically test all servicemen and women who served in units that had known or suspected exposures to DU.⁶ This would include, but by no means be limited to, men and women involved in the following incidents:

- On 23 March 2003, near Nasiriyah, an Air Force A-10 fired upon Marine Corps vehicles attached to 1st Battalion, 2nd Marine Regiment, 2nd Marine Expeditionary Brigade. At least one vehicle, an armored assault vehicle, was hit and penetrated

³ See e.g., U.S. General Accounting Office, Army Not Adequately Prepared to Deal with Depleted Uranium Contamination, GAO/NSIAD-93-90 (Washington, DC: January 1993); 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); U.S. Army Regulation 40-5, Preventive Medicine (Department of the Army: October 15, 1990).

⁴ Dr. Melissa McDiarmid, presentation to the VA Research Advisory Committee on Gulf War Veterans' Illnesses, Washington, DC, 24 February 2004, author's notes.

⁵ U.S. Undersecretary of Defense for Personnel and Readiness, "Post Deployment Health Assessment," DD 2796, April 2003. A positive response to questions 14, 17, or 18 triggers an evaluation and possible bioassay, according to the U.S. Department of Defense Deployment Health Clinical Center (DHCC), "Depleted Uranium Provider Reference Pocket Cards," Post Deployment Health Clinical Practice Guideline, Version 1.0, December 2003, Card 2.

⁶ See Dan Fahey, The Use of Depleted Uranium in the 2003 Iraq War: An Initial Assessment of Information and Policies, 24 June 2003, <http://www.antenna.nl/wise/uranium/dissgw.html#DFIQ03>.

- by A-10 fire, killing at least one Marine and possibly wounding others. A total of nine Marines and seven vehicles were destroyed in this incident.⁷
- On 26 March 2003 near An Najaf, a Bradley Fighting Vehicle shot 25 mm DU rounds into the engine compartment of an Abrams tank (B24) attached to 3rd Battalion, 7th Armored Cavalry Regiment, 3rd Infantry Division.⁸ “The 25mm [DU] rounds hit the Abrams’ ‘ready rack’ of 120mm main gun ammunition in the turret, igniting some main gun rounds. But the blast doors contained the explosion and the crew survived unscathed except for fume inhalation.”⁹
 - On 6 April 2003, at the Doura intersection along Highway 8 on the southern outskirts of Baghdad, Iraqi small arms fire and rocket propelled grenades hit two HEMMTs (large Army trucks hauling tank ammunition) attached to the 3rd Brigade, 3rd Infantry Division, igniting fuel and ammunition and causing catastrophic explosions and fires.¹⁰ Scott Peterson from the Christian Science Monitor subsequently found “black piles of pure DU ash” as well as exposed DU penetrators at the site.¹¹

Targeted testing of individuals and units with known or suspected exposures is in accordance with the February 2004 DoD policy for administering DU bioassays (HA 04-004),¹² which states:

a. The Services are responsible for identifying potentially exposed personnel through proactive identification methods and through post-deployment screening using the Post-deployment Health Assessment Form, DD Form 2796.

Recommendation: Federal investigators should ascertain, through review of relevant records and interviews, whether the services are properly implementing HA 04-004 by proactively identifying individuals and units for targeted DU bioassays.

2. Does the risk communication statement in HA 04-004 for exposed troops provide a realistic and accurate appraisal of the risks of DU exposure?

DoD’s policy for DU testing includes a risk communication message for health care providers to give to soldiers who test positive for exposure to DU. The message includes a one-size-fits-all statement that downplays any health risk: “Based upon what we

⁷ Peter Pae, “Friendly Fire Still a Problem,” *The Los Angeles Times*, 16 May 2003; Paul Wachter, “Fought for freedom with Marines he loved,” *The State* (South Carolina), 25 May 2003; Pamela Hess, “Iraq war-related U.S. deaths now 147,” *United Press International*, 12 May 2003.

⁸ US Army Tank Automotive and Armament Command, Abrams Program Manager Office, “Abrams Tank Systems: Lessons Learned, Operation Iraqi Freedom, 2003,” undated. *See also*, Tim Ripley, “Abrams tank showed ‘vulnerability’ in Iraq,” *Jane’s Defence Weekly*, 20 June 2003.

⁹ Sean D. Naylor, “Abrams destroyed by friendly, not Iraqi, fire,” *The Army Times*, 30 May 2003.

¹⁰ Michael R. Gordon, “A Soldier’s Story,” *The New York Times*, 9 May 2003.

¹¹ Scott Peterson, “Remains of toxic bullets litter Iraq,” *The Christian Science Monitor*, 15 May 2003.

¹² U.S. Undersecretary of Defense for Personnel and Readiness, “Department of Defense Deployment Biomonitoring Policy and Approved Bioassays for Depleted Uranium and Lead”, HA Policy 04-004, 6 February 2004, Att. 3, 5(a).

currently know, **we have no reason to believe your uranium levels will have any negative impacts on your health,**” (emphasis added). This statement appears to pre-judge the significance of test results, so that all veterans, regardless of level of exposure, would be told that their uranium levels are of no concern.

Moreover, the risk communication message states that DoD and VA will “continue to closely monitor the health of those previously exposed” during and after the 1991 Gulf War, when in fact the DU Program in 2003 examined just 32 of the approximately 900 Level I and II veterans identified by DoD. DoD and VA can not reasonably claim to be closely monitoring the health of those previously exposed if nothing is known about the health of 97 percent of the Level I and II veterans. DoD should either initiate a cohort study of all Level I and II veterans from the 1991 war, or change the risk communication message to state: “We will continue to monitor the health of approximately 3 percent of those we have identified as having been exposed to DU in 1991, and we might or might not tell you if any of these veterans develop cancers, tumors, or other effects possibly related to DU.”

The DU risk communication message is also remarkably different from the message provided for lead exposure in the same DoD policy (HA 04-004). Where the DU policy message implies that any level of DU exposure would have no impact on the veteran’s health, the lead policy provides for three different risk communication messages based on the exposure level (low, moderate, and high)¹³:

<p style="text-align: center;">APPENDIX 2 Health Risk Communication Messages (Lead Exposures)</p> <p>The exposure levels (low, moderate, and high) provided below are provided as reasonable guidelines to express magnitude of exposure. Sample risk communication messages associated with each exposure level are provided to use in conveying the bioassay results to the patients; they are intended as starting points for discussion. Consult www.pdhealth.mil for additional guidance.</p>

Recommendation: The DU risk communication message in HA 04-004 should instruct health care providers to deliver one of three unique messages based on the exposure level (Level I, II, or III). Like the lead risk communication messages, each DU message should provide a realistic appraisal, of the potential for short and long term health effects as well as the need for continued monitoring. In addition, each DU message should include a qualifying statement about the limitations of clinical findings from the study of 3 percent of the exposed 1991 veterans being monitored by VA.

¹³ U.S. Undersecretary of Defense for Personnel and Readiness, “Department of Defense Deployment Biomonitoring Policy and Approved Bioassays for Depleted Uranium and Lead”, HA Policy 04-004, 6 February 2004, Appendix 2.

3. When will DoD provide an accounting of the quantities and locations of DU munitions expended since the start of Operation Iraqi Freedom?

DoD has withheld information regarding the use of DU in Iraq, in notable contrast to the UK Ministry of Defence (MoD). One year after the start of Operation Iraqi Freedom, DoD has not publicly released information about the locations and exact quantities of DU munitions shot or otherwise released in Iraq. This raises the question of whether U.S. or allied servicemembers, as well as Iraqi civilians, might inhabit or work in areas contaminated by DU dust and debris. If DoD has information about where it shot DU, and it has conducted environmental assessments of these areas, it should demonstrate its proactive, responsible behavior by making this information publicly available.

A Pentagon spokesman released new information about the quantities of DU shot in Iraq during a 6 March 2004 conference on DU at the Massachusetts Institute of Technology.¹⁴ During the policy debate, Dr. Michael Kilpatrick from the Deployment Health Support Directorate stated that the U.S. Air Force has released approximately 103 tons of DU (93,400 kg), and the U.S. Army has released 24 tons of DU (21,800 kg).¹⁵ These new numbers indicate that Abrams tanks shot just over half of the Army's DU by weight – 12.6 tons in 2,466 rounds of 120mm ammunition (11,442 kg/DU)¹⁶ – while Bradley Fighting Vehicles shot approximately 11.4 tons of DU in approximately 121,000 rounds of 25mm ammunition (approximately 10,300 kg/DU).¹⁷ Based on these new numbers, which do not include the quantity shot by the Marine Corps, it reasonable to believe that US forces shot a total of between 130 and 150 tons of DU (118,000 and 136,000kg/DU). [The British Ministry of Defence has acknowledged that its Challenger II tanks shot approximately 1.9 tons of DU in 185 rounds of 120 mm ammunition (870 kg/DU) during combat.¹⁸]

¹⁴ “Depleted Uranium Weapons: Toxic Contaminant or Necessary Technology,” Massachusetts Institute of Technology, 6 March 2004, <http://web.mit.edu/pugwash/du/>.

¹⁵ See additional information and a link to an audio recording of the conference proceedings at: <http://www.antenna.nl/wise/uranium/dissgw.html#GULF03>. To obtain a video or dvd of the conference, contact the author.

¹⁶ Hon. J. Kyl, US Senate, letter to Mr. Jack Cohen-Joppa, 14 July 2003. The letter from Senator Kyl states that the tank rounds shot by Army tanks were M289A1, which may be inaccurate given that M829A2 rounds are currently in the US arsenal. The M829A1 has a DU penetrator weight of 4.64 kg; the M829A2 has a penetrator weight of 4.74 kg. A.H. Passarella, Director, Freedom of Information and Security Review, Office of the Assistant Secretary of Defense, letter to Mr. Dan Fahey, “Technical Response to FOIA Case Number 97-F-1524, Question Eleven,” 11 February 1998.

¹⁷ Bradley Fighting Vehicles shoot the 25 mm M919 round, which has a DU penetrator weight of 0.0855 kg. While the exact number of DU tanks rounds was previously reported, the exact number of 25mm DU rounds shot has not been released. The figures for the Bradley were calculated based on the total amount of DU shot by the Army, as reported by Dr. Kilpatrick, minus the quantity of DU shot by Abrams tanks, as reported in July 2003. Consequently, these numbers should be taken as approximations only, until DoD releases more accurate figures.

¹⁸ Lord Bach, Under Secretary of State and Minister for Defence Procurement, response to Baroness Miller of Chilthorne Domer, UK Parliament (London, 12 June 2003) www.publications.parliament.uk/pa/ld199900/ldhansrd/pdvn/lds03/text/30612w03.htm#30612w03_sbhd3. If each round is approximately 4.7 kg, this would equate to approximately 185 rounds shot in combat.

At the MIT conference, Kilpatrick stated the Marine Corps has not yet provided the quantity of DU its forces shot, but he did say that DoD is currently gathering information about the quantities and locations of DU expended in Iraq. In addition, he stated the US has been removing contaminated US vehicles from the battlefield and preparing them to be shipped “out of the country” – presumably back to the United States. It is important to note that Dr. Kilpatrick made these statements without providing any supporting data or documentation.

[Although urine testing is underway for Operation Iraqi Freedom veterans, the results of this testing have not been publicly released. More than 500 US veterans have reportedly been tested, and the results from the first 147 samples indicate that “several” veterans have been exposed to DU, including at least two veterans who retain DU fragments and have high uranium levels in their urine.¹⁹ Press reports suggest that “fewer than ten” British veterans have tested positive for DU exposure,²⁰ and as of 22 January 2004, 243 British veterans had been tested and found to have no detectable DU in their urine.²¹]

In contrast to DoD’s parsimony, the UK Ministry of Defence (MoD) in June 2003 “provided details of UK DU firing locations to the United Nations Environment Programme (UNEP) in support of its post-conflict environmental assessment, and directly to recognised non-government organisations, such as aid agencies, in response to ad hoc enquiries.”²² In addition, the MOD is cleaning up DU penetrators found lying on the ground and identifying contaminated vehicles so that risk assessments can be conducted to determine whether to decontaminate or dispose of contaminated equipment.²³ On 2 February 2004, the UK Secretary of State for Defence stated:

To date eight military vehicles have been identified as having been hit by depleted uranium (DU) munitions within the southern sector of Iraq under British military control. All these vehicles have been clearly marked. Arrangements are currently being negotiated with the US for a contractor to collect and securely store these military vehicles.²⁴

The MoD has also recently issued a card to its servicemen and women in Iraq that states: “You may have been exposed to dust containing DU during your deployment... You are eligible for a urine test to measure uranium.”²⁵ In addition, MoD provides a rather thorough description of its efforts to identify and assess DU in Iraq on its Web site,

¹⁹ Information gathered by the author, drawn partially from Dr. Melissa McDiarmid, presentation to the VA Research Advisory Committee on Gulf War Veterans’ Illnesses, Washington, DC, 24 February 2004, author’s notes. The information presented here should be considered preliminary and unofficial.

²⁰ Ian Bruce, “Fewer than 10 Gulf war troops had uranium poisoning,” *The Herald* (UK), 5 February 2004.

²¹ UK Ministry of Defence Depleted Uranium Biological Monitoring Programme, “Update of Results,” undated (likely March 2004).

²² UK Ministry of Defence, “Depleted Uranium – Middle East 2003,” 1 July 2003, www.mod.uk/issues/depleted_uranium/middle_east_2003.htm.

²³ UK Ministry of Defence, “Depleted Uranium – Middle East 2003,” 1 July 2003, www.mod.uk/issues/depleted_uranium/middle_east_2003.htm.

²⁴ UK Parliament, Question 150356, Mr. Ingram, Secretary of State for Defence, response to Mr. Hancock, 2 February 2004, Column 747W.

²⁵ Neil Mackay and Amy Wilson, “MoD ‘lied’ over depleted uranium,” *The Sunday Herald* (UK), 29 February 2004.

www.mod.uk/issues/depleted_uranium/index.htm, in contrast to the outdated DoD web site, www.deploymentlink.osd.mil/du_library/.

Is it too much to expect the U.S. Department of Defense to match the proactive efforts of the UK Ministry of Defence with respect to publicly describing its efforts to assess the health and environmental effects of DU munitions in Iraq?

Recommendation: DoD should publicly release an accounting of the amount of DU ammunition expended by weapon platform, as well as the amount released as a result of aircraft crashes, ammunition truck explosions, breaches of DU tank armor, tank or fighting vehicle fires, and all other causes and weapon uses. In addition, DoD should publicly describe its efforts to assess the health and environmental effects of the use of DU munitions, including an explanation of the process to identify, transport, and dispose of contaminated equipment.

4. Does it make sense to refer Operation Iraqi Freedom veterans to a VA program that has withheld information about the health of Operation Desert Storm veterans exposed to DU?

The shortcomings of the VA's DU Program are getting harder to ignore. In 2003, the study assessed the health of just 32 of the approximately 900 veterans with Level I and II exposures during and after Operation Desert Storm.²⁶ Among the 70 total veterans examined since 1993, at least one had developed a rare Hodgkin's lymphoma,²⁷ and at least one other had a bone tumor removed from his arm;²⁸ yet in 2001, Pentagon officials blatantly lied about the existence of the lymphoma,²⁹ and Dr. Melissa McDiarmid, director of the DU Program, has still not reported or publicly discussed the bone tumor.

These shortcomings make it difficult to assess the extent and severity of health effects possibly related to DU, but VA and DoD officials nonetheless invoke the findings from the study to downplay public concerns about DU. Through their errors of fact and omission, these VA and DoD officials influence policy decisions about future research and the extension of service connected health care and benefits to veterans. The DU Program is undersized and politicized, and someone needs to investigate whether all relevant health effects have been publicly reported, and to put an end to the practice of misrepresenting the health of veterans to achieve political ends.

²⁶ Dr. Melissa McDiarmid, presentation to the VA Research Advisory Committee on Gulf War Veterans' Illnesses, Washington, DC, 24 February 2004, author's notes.

²⁷ The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, "Meeting with Dr. Melissa McDiarmid and her staff on October 15, 1999 to discuss the Baltimore DU Follow-Up Program and the Extended Follow-Up Program," undated.

²⁸ See Dan Fahey, "Science or Science Fiction? Facts, Myths and Propaganda in the Debate Over Depleted Uranium Munitions," 12 March 2003, p. 22.

²⁹ M. Kilpatrick, Dr., statement at NATO press briefing, Brussels, 10 January 2001, <http://www.nato.int/docu/speech/2001/s010110b.htm>.

DoD currently refers men and women exposed to DU during Operation Iraqi Freedom and other military activities to the VA's DU Program, which "enrolls all patients with embedded DU fragments and others on a case-by-case basis."³⁰ However, it is not clear that the mistakes of the past, including DoD's failure to refer all exposed veterans to VA after Operation Desert Storm, have been corrected. History clearly demonstrates that we cannot simply accept the promises and declarations made by DoD regarding environmental health issues, including exposures to DU. In this context, it does not make sense to refer OIF veterans to an inadequate and politicized DU Program.

The Lymphoma and Bone Tumor Conundrum

The manner in which VA and DoD have ignored and manipulated the findings of a rare lymphoma and a bone tumor raises serious concerns about the purpose of the DU Program and whether all information about health effects among the veterans in the study have been reported. Pentagon officials have clearly lied about the existence of cancer among veterans in the DU Program, and Dr. McDiarmid has selectively presented information in a manner which calls to question her judgment and impartiality. It is essential to resolve the program's shortcomings epitomized by the flawed reporting of the lymphoma and bone tumor cases before adding new veterans to the DU Program.

Of the 50 veterans examined by the DU Program in 1999, one had developed Hodgkin's lymphoma. Hodgkin's lymphoma develops in the lymph nodes, and it is a rare form of cancer (2.58 cases per 100,000 people in more developed countries; 0.94 cases per 100,000 in less developed countries³¹) with no known risk factor.³² According to the Institute of Medicine:

The lymphatic system is an important potential target for uranium radiation because inhaled insoluble uranium oxides can remain up to several years in the hilar lymph nodes of the lung. Studying the effect of uranium exposure on lymphatic cancer is more difficult than studying lung cancer because lymphatic cancer is much less common.³³

³⁰ U.S. Department of Defense Deployment Health Clinical Center (DHCC), "Depleted Uranium Provider Reference Pocket Cards," Post Deployment Health Clinical Practice Guideline, Version 1.0, December 2003, Cards 1 and 6.

³¹ In 1999 the incidence of Hodgkin's lymphoma among U.S. residents was 2.8 per 100,000 people (3.0 for men, 2.5 for women). For men and women aged 25-29, the incidence was 5.4 per 100,000; for ages 30-34 the incidence was 4.1 per 100,000. LAG Ries, MP Eisner, CL Kosary, BF Hankey, BA Miller, L Clegg, BK Edwards, eds., *SEER Cancer Statistics Review, 1973-1999*, National Cancer Institute, Bethesda, MD, http://seer.cancer.gov/csr/1973_1999/, 2002. Incidence rates in other countries with forces that served in the Gulf War or Balkans are similar: Italy – 3.62; The Netherlands – 2.32; United Kingdom – 2.26; Saudi Arabia – 2.69; Kuwait – 4.33; Iraq – 2.10. J. Ferlay, F. Bray, P. Pisani and D.M. Parkin, *GLOBOCAN 2000: Cancer Incidence, Mortality and Prevalence Worldwide*, Version 1.0, IARC CancerBase No. 5, Lyon, IARC Press, 2001, Limited version available from: URL: <http://www-dep.iarc.fr/globocan/globocan.htm>, last updated on 03/02/2001.

³² National Cancer Institute (U.S.), 'Information about detection, symptoms, diagnosis, and treatment of Hodgkin's disease,' NIH Publication No. 99-1555, 16 September 2002.

³³ U.S. Institute of Medicine, Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) p. 142.

In general, Hodgkin's lymphoma occurs more often among men and in people aged 15-34 and over 55.

Of the 50 veterans examined by the DU Program in 1999, one had a bone tumor in his humerus (upper arm bone), which was later removed. This finding appears to have clinical significance because laboratory research conducted by the Armed Forces Radiobiology Research Institute has determined that DU may contribute to cellular changes that result in the initiation and promotion of tumors.³⁴ In addition, the US Institute of Medicine reports: "Like the lymphatic system, bone is an important potential target for the effects of uranium because uranium is distributed to the bone, replaces calcium in bone matrix, and may remain in bone for several years."³⁵

Inexplicably, the lymphoma and bone tumor have been lied about and misrepresented by both DoD officials and Dr. McDiarmid. During the 2000-2001 DU controversy in Europe, DoD officials blatantly lied about the existence of the lymphoma, and in 2003 an Army spokesman denied that any veterans in the DU Program have developed any tumors.³⁶ While DoD officials have attempted to justify their lies by claiming they were only reporting what was in the peer-reviewed published literature,³⁷ Dr. McDiarmid has offered little in the way of an explanation for her habit of withholding information about veterans' health.

Unlike DoD's errors of fact, Dr. McDiarmid has committed errors of omission which have resulted in an incomplete public disclosure about the health of veterans in the study. In an editorial that appeared in the *British Medical Journal* on 20 January 2001 – at the height of the European DU controversy – Dr. McDiarmid carefully chose her words, narrowly presenting cancer information about 15 veterans (those who retain DU shrapnel), and conspicuously omitting any mention of the lymphoma or bone tumor:

Other evidence [of health effects] comes from a small surveillance study of (then 30 and now 60) US Gulf war veterans who were victims of friendly fire with depleted uranium. About 15 of these veterans possess retained metal fragments of depleted uranium in soft tissue and are excreting raised uranium concentrations in their urine. None of these veterans has leukaemia, bone cancer, or lung cancer. Thus, the argument for uranium being the cause of leukaemia in peacekeeping forces is thin, notwithstanding the short latencies implied, even by the standards of haematological malignancies.³⁸

³⁴ A.C. Miller et al, "Depleted uranium-catalyzed oxidative DNA damage: absence of significant alpha particle decay," *Journal of Inorganic Biochemistry* (2002) pp. 246-252 at 251

³⁵ U.S. Institute of Medicine, *Gulf War and Health*, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) p. 143.

³⁶ Dennis Gray, "US military says depleted uranium shells in Iraq pose no health dangers," *Associated Press*, 6 May 2003.

³⁷ This defense was proffered by Dr. Michael Kilpatrick during the policy debate at the MIT conference, "Depleted Uranium: Toxic Contaminant or Necessary Technology," 6 March 2004. See link to audio at www.antenna.nl/wise/uranium/diss.html#MITDU04.

³⁸ Melissa McDiarmid, "Depleted uranium and public health," 322 *British Medical Journal* (20 January 2001) 123-124.

While European doctors and scientists looked in 2001 for information with which to assess the risks of DU, Dr. McDiarmid not only provided incomplete information about the health of veterans in her study, but she also did so in way that clearly supported DoD's efforts to downplay European concerns about the effects of DU exposure. Dr. McDiarmid's failure to mention the lymphoma or bone tumor is hard to overlook or dismiss as an oversight, given the extreme media interest and political debate at that time within NATO about the effects of DU on veterans who served in Bosnia and Kosovo.

Although Dr. McDiarmid has still not publicly acknowledged the bone tumor, she did address the lymphoma in a December 2001 journal article, in three sentences notable for their brevity and dismissiveness:

Of note, there was one report of Hodgkin's disease in a newly identified member of the low urine uranium group. First diagnosed approximately 4 years after his Gulf War service, neither his private physicians nor he believed it to be DU-related. Hodgkin's disease is not thought to have any known major risk factor, including radiation.³⁹

Here Dr. McDiarmid takes on an advocacy role, dismissing the significance of a rare lymphoma among the few dozen veterans in her study. In contrast to Dr. McDiarmid, the Institute of Medicine concluded there is inadequate or insufficient evidence to determine whether an association does or does not exist between DU exposure and lymphatic cancer (as well as bone and lung cancer).⁴⁰

The Political Sieve

The cases of the Hodgkin's lymphoma and bone tumor illustrate several problems with the DU Program. First, there appears to be a process within DoD and VA – or rather two separate processes – that filter information about the health of veterans in the DU Program through a political sieve, thereby providing veterans, the public, and policy makers with incomplete and inaccurate information about effects possibly related to DU. Second, although the study size is too small to permit conclusions to be drawn about the significance of cancers, tumors, or other effects possibly related to DU,⁴¹ DoD officials and Dr. McDiarmid often present their interpretations of clinical findings in policy contexts, drawing sweeping conclusions about all veterans and civilians exposed to DU.⁴²

³⁹ Melissa McDiarmid et al, "Surveillance of Depleted Uranium Exposed Gulf War Veterans: Health Effects Observed in an Enlarged "Friendly Fire" Cohort," 42(12) Journal of Occupational and Environmental Medicine (2001) 998.

⁴⁰ US Institute of Medicine, Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) 159-160.

⁴¹ U.S. Department of Veterans Affairs, Baltimore VAMC, Department of Veterans Affairs Program for the Follow-up and Monitoring of Gulf War Veterans with Imbedded Fragments of Depleted Uranium, Draft, (23 September 1993) 11.

⁴² See M. Kilpatrick, Dr., statement at NATO press briefing, Brussels, 10 January 2001, <http://www.nato.int/docu/speech/2001/s010110b.htm>; Dr. Melissa McDiarmid, "Health Effects of Depleted Uranium on Exposed Gulf War Veterans: A 10-Year Follow-Up," Journal of Toxicology and Environmental Health, Part A, 67: 277, 2004, Dr. Melissa McDiarmid, presentation to the VA Research Advisory Committee on Gulf War Veterans' Illnesses, Washington, DC, 24 February 2004, author's notes.

These actions are not only preventing an assessment of the health of the approximately 900 Level I and II veterans, but also preventing U.S. policy makers from assessing the possible impacts of DU on civilian populations, which is a controversial and politically charged issue in need of a thorough and objective analysis.

In her *British Medical Journal* editorial, Dr. McDiarmid also invoked studies of uranium industry workers to downplay public concerns about DU.⁴³ However, the Institute of Medicine noted that these studies have limited relevance to other uranium exposures, such as DU exposures among soldiers on a battlefield:

In general, animal studies have provided invaluable information on the pharmacokinetics of uranium, as well as qualitative insight into the toxicology of uranium. As discussed in this chapter, the majority of evidence on the health effects of exposure to uranium is from studies of workers in uranium processing mills and other facilities. Few studies of Gulf War veterans have specifically focused on the effects of uranium. Additionally, the literature on uranium miners is largely not relevant to the study of uranium per se because the primary exposure of this population was to radon progeny, which are known lung carcinogens. Although the studies of uranium processing workers are useful for drawing conclusions, the study settings have inherent weaknesses. First, even studies involving tens of thousands of workers are not large enough to identify small increases in the relative risk of uncommon cancers. Second, few studies had accurate information about individual exposure levels. Some authors estimated the cumulative dose by following an employee's path through various jobs whose average radiation exposure was known. Third, in these industrial settings, the populations could have been exposed to other radioisotopes (i.e. radium ore, thorium) and to a number of industrial chemicals that may confound health outcomes. Finally, no studies had reliable information about cigarette smoking, which may also confound outcomes of lung cancer. However, these cohorts or uranium processing workers are an important resource, and the committee encourages further studies that will provide progressively longer follow-up, improvements in exposure estimation, and more sophisticated statistical analyses.⁴⁴

The uncertainties regarding the presence or absence of health effects among veterans exposed to DU can only be resolved by an assessment of the health status of Level I and II veterans from the 1991 war, but DoD officials and Dr. McDiarmid appear eager to continue to misleadingly invoke the uranium industry studies as well as carefully selected findings of the undersized DU Program to prevent an assessment of veterans from taking place.

⁴³ Melissa McDiarmid, "Depleted uranium and public health," 322 *British Medical Journal* (20 January 2001) 123-124.

⁴⁴ U.S. Institute of Medicine, *Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines* (Washington, D.C., National Academy Press 2000) 159.

In its 2000 report, the Institute of Medicine recommended “long-term follow-up of veterans exposed to depleted uranium, including the Baltimore cohort [DU Program] and other veterans potentially exposed to depleted uranium (e.g., those involved in cleanup operations or radiation control units).”⁴⁵ This recommendation should apply equally to veterans exposed in 1991 and since 2001, and include veterans with Level I (friendly fire) and II (cleanup operations and radiation control units) exposures.

Recommendation: The DU Program should be restructured and expanded into a cohort study that assesses the health of the approximately 900 veterans identified by DoD as having had Level I and II exposures during the 1991 war. VA should create a new DU study – under new leadership – that reports all relevant health effects to policy makers and the public in a timely and accurate way.

5. Have DU munitions been used during Operation Enduring Freedom, and if so, have any veterans who served in Afghanistan been tested for exposure to DU?

The use of DU munitions in Afghanistan remains unclear. Claims about the use of DU munitions in Afghanistan have neither been confirmed by the US military, nor verified by independent investigations. Nonetheless, it appears likely that US forces may have used some DU munitions, and the Taliban and/or al Qaeda may have possessed DU rounds.

According to news reports, several US weapons that shoot DU rounds have been used in combat in Afghanistan. The Air Force A-10 aircraft shot 30mm ammunition while attacking ground targets in Afghanistan on at least eight occasions between March 2002 and April 2003.⁴⁶ The Marine Corps AV-8B aircraft, another DU shooter, reportedly fired its cannons at combatants in April 2003.⁴⁷ Several light armored vehicles (LAVs) were involved in a nighttime gunfight on 7 December 2001 near Kandahar,⁴⁸ but it is not clear whether DU rounds were used in this battle. There is no credible evidence to

⁴⁵ US Institute of Medicine, Gulf War and Health, Volume 1, Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines (Washington, D.C., National Academy Press 2000) 326.

⁴⁶ The reported dates of A-10 attacks are March 3-6, May 21, August 25, September 20, November 15, and December 20, 2002, and February 12, 2003. U.S. Department of Defense News Transcript, “DoD News Briefing – ASD PA Clarke and Brig. Gen. Rosa,” (5 March 2002) http://www.defenselink.mil/news/Mar2002/t03052002_t0305asd.html. Evan Thomas, “Leave No Man Behind,” Newsweek (18 March 2002) 26; Thom Shanker, “U.S. tells how rescue turned into fatal firefight,” The New York Times (6 March 2002) A1; Peter Baker, “Afghans Strengthen U.S. Force,” The Washington Post (8 March 2002) A1. Eric Schmitt, “American Planes Foil an Attack on an Airfield in Afghanistan,” The New York Times (22 May 2002) A9. Cesar G. Soriano, “U.S. to stay in Afghanistan indefinitely,” USA Today (25 August 2002). Associated Press, “U.S. base in Afghanistan attacked,” (20 September 2002). Associated Press, “U.S. Bases Under Fire,” (15 November 2002). Eric Schmitt, “Paratrooper from New Jersey dies in Afghan firefight near Pakistan border,” The New York Times (22 December 2002). Carlotta Gall, “Afghans report 17 civilian deaths in US-led bombing,” The New York Times (12 February 2003). Associated Press, “Green Berets, Allies Fight Afghan Taliban,” (2 April 2003). In the April 2, 2003 attack on Sikai Lashki, Afghanistan, “two A-10 fighter jets fired seven white phosphorus rockets and 520 30 mm rounds.”

⁴⁷ Carlotta Gall, “American air attack mistakenly kills 11 Afghans,” The New York Times (10 April 2003).

⁴⁸ See Jeanette Steele, “Red Platoon’s light armor passes the test,” The San Diego Union-Tribune (20 December 2001) A5.

substantiate claims that US forces have used missiles and/or bombs in Afghanistan that contain DU or natural uranium,⁴⁹ although these claims occasionally and inexplicably appear in press stories.

The use of DU munitions by Al Qaeda, Taliban, Northern Alliance or other Afghan forces is unknown given currently available public information, although DoD has stated that DU munitions were found in December 2001 among captured al Qaeda weapons near Kandahar. On three occasions, US Secretary of Defense Donald Rumsfeld confirmed the discovery of DU ammunition,⁵⁰ although the quantity, caliber, and origin of the rounds remain unclear.

Recommendation: DoD should either confirm or deny that US forces have shot DU munitions in Afghanistan. If DU munitions have been used, DoD should release an accounting of the quantities and locations of expenditure, and make publicly available the results of self-reported exposures from DD 2796, information about proactive identification of troops exposed to DU, and the results of bioassays.

6. Have U.S. troops who served at K-2 (Stronghold Freedom) in Uzbekistan been tested for exposure to DU?

Since October 2001, thousands of U.S. servicemen and women have served at Karshi Khanabad (K-2) in Uzbekistan, also known as Stronghold Freedom. In November 2001, an occupational and environmental baseline survey discovered several health hazards at K-2, including uranium⁵¹:

They also found smaller, localized areas of surface dirt contaminated with asbestos and low-level radioactive processed uranium, both from the destruction of Soviet missiles several years ago.

The “low-level radioactive processed uranium” may be DU, but the author was not able to obtain any additional information to clarify this point prior to the release of this report.

The areas of contaminated soil were covered with a thick layer of clean dirt, and declared off limits to everyday activity. Despite these proactive measures, post-deployment

⁴⁹ Uranium Medical Research Centre, “Afghan Field Trip #2 Report,” undated, p. 4, http://www.umrc.net/downloads/destruction_effects.pdf.

⁵⁰ U.S. Department of Defense News Briefing, “Sec. Rumsfeld and Gen. Myers,” (16 January 2002) http://www.defenselink.mil/news/Jan2002/t01162002_t0116sd.html; U.S. Department of Defense News Transcript, “Secretary Rumsfeld Roundtable with Radio Media,” (15 January 2002) http://www.defenselink.mil/news/Jan2002/t01152002_t0115sdr.html; U.S. Department of Defense News Transcript, “Secretary Rumsfeld Interview with Baltimore Sun,” (27 December 2001) http://www.defenselink.mil/news/Dec2001/t12282001_t1227sun.html; See also “Current Issues – Depleted Uranium Weapons in Afghanistan,” (10 February 2002) <http://www.antenna.nl/wise/uranium/dissaf.html>.

⁵¹ U.S. Deployment Health Clinical Center (DoD), “Environmental Conditions at Karshi Khanabad (K-2),” 9 September 2002.

surveys showed that some troops were concerned about their exposure to environmental health hazards, including depleted uranium⁵²:

What did post-deployment surveys show?

Service members are supposed to fill out a post-deployment survey (DD Form 2796) before leaving the theater. This is one of the ways the services monitor the conditions experienced by deployed troops. Of those surveys in which service members reported exposure concerns, the most common concerns were depleted uranium, petroleum products, tuberculosis, radio-frequency exposure, and general radiation exposure.

If survey results indicated that servicemen or women suspected they were exposed to DU, this should have triggered further assessment and possibly bioassays. Did it?

Recommendation: Federal investigators should ascertain whether US troops who served at K-2 in Uzbekistan have been tested for exposure to DU. Make publicly available the results of self-reported exposures from DD 2796 as well as the results of bioassays for DU exposure and any plans for future monitoring.

7. Have government civilian employees, contractors, or volunteers accompanying US forces been tested for DU exposure, in accordance with HA 04-004?

DoD estimates that during Operation Desert Storm, approximately 6-12 civilian logistics assistance representatives (LARs) may have worked around DU-contaminated vehicles.⁵³ Unlike frontline combat and medical troops, the LARs were warned to wear “protective coveralls, gloves, rubberized boots, and...[a] protective mask...” around contaminated equipment.⁵⁴ Nevertheless, some LARs apparently did not follow this guidance and may have been exposed to DU.⁵⁵ The author is not able to identify any other publicly available information that would indicate if any of the LARs were tested for exposure to DU or monitored by the government for health effects.

⁵² U.S. Deployment Health Clinical Center (DoD), “Environmental Conditions at Karshi Khanabad (K-2),” 9 September 2002.

⁵³ 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) 110-111.

⁵⁴ Memorandum from the Chief of the Logistics Operations Branch, “Safe Response to Incidences Involving Depleted Uranium Armor/Ammo,” 20 December 1990, p. 3.

⁵⁵ 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) 110-111.

HA 04-004 applies to LARs and other non-military personnel potentially exposed to DU:

<p style="text-align: center;">Guidance and Procedures for Depleted Uranium (DU) Bioassay DU Urine Analysis</p> <p>December 1, 2003</p> <p style="text-align: center;">This guidance will remain in effect until deleted or superseded</p> <p>1. <u>References.</u> See Appendix I</p> <p>2. <u>Purpose.</u> This guidance delineates the circumstances and the specific procedures the Military Services will follow to employ biomonitoring in assessing depleted uranium (DU) exposures to personnel during deployment and combat operations. It will ensure DU bioassays are performed consistent with an approved administrative protocol and with sound medical practices, maintaining the trust of our servicemembers, their families, and commanders.</p> <p>3. <u>Applicability.</u> This guidance applies during deployment and combat operations to all Department of Defense personnel, including the US Coast Guard when assigned to the Navy during times of conflict; to government civilian employees and volunteers accompanying US forces; and to contractors within the terms of their contracts and any provisions for medical care/clinical assessment.</p>

By providing for the assessment and testing of civilians exposed to DU, HA 04-004 is a sign that a lesson has been learned from 1991, but actions speak louder than words.

Recommendation: Verify that the process for selecting non-military personnel for DU testing is being properly followed, and publicly release information about the number of people tested as well as the test results and any future monitoring plans.

CONCLUSION

Too often in our nation's history, veterans have returned home from war only to be mistreated by the government. From Shays' Rebellion in 1787, to the Bonus March of 1932, to the ongoing struggles over exposure to atomic testing and Agent Orange, veterans have found that they sometimes must battle the same power structure they once served in order to obtain the benefits and rights they fought for on the field of battle. Since 1991, veterans have overcome Congressional inertia, VA denial, and Pentagon stonewalling to win recognition for the fact that Gulf War veterans were exposed to a range of environmental hazards, including sarin and depleted uranium.

Despite the heroic efforts of Gulf War veterans to expose outright lies and flawed practices, it is not clear that DoD, VA, or Congress have learned from the mistakes of the past even as a new generation of war veterans is created. The unresolved issues raised in this paper deserve to be answered, and after DoD and VA provide documentation to back up their answers, corrective action should be taken, as needed. Since 1991, the DU issue has seen its share of lies, myths, and propaganda from both government officials and hyperbolic, deluded extremists. It is time for science and fact-based research – not politics and mere assertion – to be the driving forces behind government policy and action to address the health and environmental effects of depleted uranium munitions. ■