

WHY FLORIDA SHOULD LEGISLATE DEPLETED URANIUM (DU) TESTING FOR THE FLORIDA NATIONAL GUARD

Robert H. Foley*

Florida International University
College of Law
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Faculty Adviser: Professor John Stack

ABSTRACT:

Florida National Guard troops deployed to Iraq and Afghanistan have incurred varying degrees of exposure to the weapon-form of nuclear waste, depleted uranium (DU). Since 2005, several states have enacted legislation to provide information and assure post-exposure testing on behalf of their citizens enlisted in the National Guard. While all depleted uranium exposure is not fatal or hazardous, situations existed where significant radioactive and toxic chemical contact with DU occurred. The environmental persistence of depleted uranium's heavy metal properties, and its long radioactive half-life allows for contemporary and future exposure of Florida National Guard service personnel to depleted uranium.

This note reviews the U.S. military's policy on the use of depleted uranium, Florida National Guard troop exposure to it, and proposes a rationale for enacting Florida legislation to safeguard Florida National Guard troops and veterans. An addendum is included that formats an example of legislation, homogenizing other states' legislative ideas and concepts.

* Juris Doctor candidate, May 2010, Florida International University College of Law; Veterinarian, graduate of Cornell University, special interest in tropical medicine and radiation induced immune suppression and cancer.

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INTRODUCTION

In 2005, a representative from New Orleans' Upper Ninth Ward proposed and coached through Louisiana's legislature the first state bill related to testing for depleted uranium exposure of a state's National Guard veterans.¹ This bill was specifically drafted to deal with the depleted uranium exposure of the Louisiana National Guard's veterans of the Persian Gulf War.²

Subsequently in 2006,³ in 2007,⁴ and in 2009,⁵ several other states, with varying levels of detail and breadth of testing, enacted similar legislation. The several States' enactments were typically driven by medical issues and health problems suffered by certain returning National Guard personnel. These enactments were locally popular, but their popularity did not assure a governor's signature.⁶

The note reviews the medical and scientific hazards of DU, the U.S. military's use of DU, and the DU exposure to Florida National Guard troops. Depleted uranium has immediate and direct effect as an inhalation respiratory and skin contact irritant. Depleted uranium is environmentally cumulative and persistent as a toxic heavy metal similar to lead or tungsten, and as an emitter of radioactive alpha, beta and gamma

¹ 2005 La. Acts 1021. Representative Juan LaFonta and co-sponsor Representative Jalila Jefferson-Bullock presented a modified version of a proposed Connecticut DU bill offered to them by retired Sergeant Major Bob Smith (chairman, Depleted Uranium Awareness Committee, Louisiana Activist Network) and Ward Reilly; www.gulfwarvets.com/du_statestakeaction.htm and www.cpeo.org/lists/military/2005/msg00518.html.

² 38 U.S.C. § 101(33) defines the Persian Gulf War of 1990.

³ In 2006: New York, N.Y. Exec. Law § 366 (McKinney 2009); California, Cal. Mil. & Vet. Code § 399 (Deering 2009).

⁴ In 2007: Texas, Tex. Gov't Code § 431.0185 (Vernon 2008); Hawaii, H.I. HB 2061; Illinois, 330 ILCS §§ 130/5, 130/10, 130/15, and 130/20(2008); Montana, Mont. Code Anno. § 10-2-102 (2009); Wisconsin, Wis. Stat. § 45.03(21) (West 2008).

⁵ In 2009: Missouri, S.B. 533, 95th Gen. Assem., 1st Reg. Sess. (Mo. 2009). Bill was proposed 3/2/2009, to be effective August 28, 2009.

⁶ Connecticut, Conn. Gen. Stat. § 27-140ii (West 2008). Connecticut's early DU enactment was synchronous with Louisiana's legislation. It was removed from the Connecticut budget by Governor Rell on June 24, 2008; Andy Bromage, *Cut and Run*, HARTFORD ADVOCATE, Feb. 5, 2009, available at http://www.hartfordadvocate.com/article_print.cfm?aid=11602.

particles.

Like a suspended Damoclean sword, a soldier's neurological deterioration, memory loss, blood, bone, lung or kidney cancer, genetic mutations and next-generational birth defects can escape prompt detection or delay onset of any symptom to a future, unknown time with catastrophic circumstances.

This writing proposes the enactment of appropriate Florida legislation to better safeguard Florida National Guard troops and veterans—the current state of legislation being wholly inadequate to protect FNG troops exposed to depleted uranium's hazards. An addendum is included that articulates an example of such possible legislation influenced by other states' legislative ideas, and concepts.

I. DEPLETED URANIUM (DU)

A. Radioactivity and half-lives.

Uranium is a radioactive trace mineral, dispersed throughout the natural environment, and present in water, plants and animals in variable amounts.⁷ Its natural radioactive components consist of three isotopes: U-238 in concentrations of 99.28%; U-235 in concentrations of 0.72%; and U-234 in concentrations of 0.0057%.⁸ The radioactive half life of these isotopes respectively is 4.5 billion years, 710 million years and 247,000 years.⁹ Uranium is enriched by a gaseous diffusion process in order to concentrate the U-235 fraction from its natural concentration of 0.72% to an increased range of 1.5-3% for nuclear reactor use, or up to 90% for nuclear weapon application.¹⁰

⁷ World Health Organization [WHO], Depleted Uranium, *Depleted Uranium Fact Sheet No. 257* (2003), available at <http://www.who.int/mediacentre/factsheets/fs257/en/print.html>.

⁸ International Atomic Energy Agency (IAEA) *Features: Depleted Uranium Questions and Answers* (2002), available at http://www.iaea.org/NewsCenter/Features/DU/du_qaa.shtml#q10.

⁹ *Id.*

¹⁰ Office of the Special Assistant for Gulf War Illness (OSAGWI), *Follow-Up Department of Defense Exposure Report, Environmental Exposure Report Depleted Uranium in the Gulf (II), III*, 9 (2002),

After enrichment, the residual mineral by-product with reduced levels of U-235 becomes the uranium waste, so-called “depleted uranium,” and is approximately 40% less radioactive than un-enriched natural uranium.¹¹ Depleted uranium has peaceful uses such as ballast counter weights in aircraft vessels, as medical radiation shields, and as containers for transporting radioactive material.¹²

In past decades the Department of Defense (DoD) has reprocessed spent nuclear reactor fuel in order to re-enrich the U-235 portion to extract plutonium for nuclear weapon usage.¹³ The twice-depleted uranium waste was thereafter manufactured to become munitions.¹⁴ In so doing, the Department of Defense created DU armaments with man-made, trace, and highly radioactive isotopes such as U-236, neptunium, americium, plutonium, and technetium-99.¹⁵ These isotopes are reported at very low levels within the manufactured DU penetrator, and lower still in the war theater environment (expressed as parts per billion).¹⁶

Man-made U-236 and plutonium have been found in spent DU munitions in Kosovo, as reported by NATO, citing to a UN study.¹⁷ Termed “dirty uranium

http://www.gulflink.osd.mil/du_ii/ (a detailed and readable synopsis of information on DU, its uses and relevance in Gulf War Illness); and see Deployment Health and Family Readiness Library, *Depleted Uranium for Clinicians* (2006), available at

[http://deploymenthealthlibrary.fhp.osd.mil/products/Depleted%20Uranium%20\(19\).pdf](http://deploymenthealthlibrary.fhp.osd.mil/products/Depleted%20Uranium%20(19).pdf).

¹¹ OSAGWI *Gulf (II)*, III, at 1.

¹² WHO, *Depleted Uranium Factsheet No. 257*, *supra* note 7.

¹³ OSAGWI *Gulf (II)* III, *supra* note 10 at 9. The transuranics were present at 0.8% in tested military vehicles with DU armor plating.

¹⁴ *Id.*

¹⁵ Peter Diehl, WISE Uranium Project, *Fact Sheet: Hazards from depleted uranium produced from reprocessed uranium* (June 17, 2005), available at <http://www.wise-uranium.org>; and see Military Toxics Project Information Sheet, “*Depleted*” *Uranium Munitions: Nuclear Waste as a Weapon* (2003), available at http://www.kahea.org/lcr/pdf/Depleted_Uranium_Fact_Sheet.pdf.

¹⁶ OSAGWI report *Gulf III*, *supra* note 10 at 9.

¹⁷ Press Release, North Atlantic Treaty Organization [NATO], *UNEP confirms U-236 found in DU penetrators*, (2001) available at <http://www.nato.int/du/docu/d010118a.htm> (NATO reported a UNEP study, *United Nations Environment Programme Recommends Precaution Action Regarding Depleted Uranium in Kosovo*, (2001), available at <http://balkans.unep.ch/press/press010116.html>); and see, UNEP, *Depleted uranium in Kosovo Post-Conflict Environmental Assessment* (2001), available at

munitions” due to its enhanced radioactive isotope activity, such material has been reportedly manufactured at facilities in the United Kingdom for the Ministry of Defense for use in the Balkans, and utilized 120,000 kg of United States’ exported “dirty” depleted uranium.¹⁸

B. Military uses

The military has also utilized depleted uranium as armor plating for M1 Abram tanks¹⁹ and fighting vehicles, missile nose cones, and as various calibers of armor-piercing ammunitions.²⁰ Depleted uranium has a density 1.7 times that of lead, and is an economical, freely available nuclear waste,²¹ giving DU an increased ammunition efficiency over conventional lead and tungsten ammunition.²² Depleted uranium self-immolates, a “pyrophoric” property, whereby DU ignites at temperatures of 600-700 degrees with the high-pressure of impact, and ten to seventy percent aerosolizes and/or

<http://postconflict.unep.ch/publications/uranium.pdf>; <http://www.nato.int/du/docu/d010118a.htm>; and see Jeremy T. Burton, *Depleted Mortality: Yugoslavia v. Ten NATO Members and Depleted Uranium*, 19 WISC. INT’L L. J. 16-40 (Fall 2000) (a review of the use of DU in Yugoslavia and its impact on the population and the military, and the response of the International Court of Justice to Yugoslavia’s concerns and actions).

¹⁸ Peter Capella et al., *UN finds Kosovo Nuclear Danger, US ammunition may have been contaminated with “dirty” depleted uranium*, THE GUARDIAN, Jan. 17, 2001, available at

<http://www.guardian.co.uk/world/2001/jan/17/armstrade.unitednations/>; and see Jim Mannion, *Contamination at plants source of plutonium in munitions*, AGENCE FRANCE PRESS, Jan. 24, 2001, available at <http://www.nci.org/d/du-pu-afp12501.htm> (contaminated DU used by NATO in Kosovo was processed at manufacturing plants in Piketon, Ohio; Padukah, Kentucky; and Oak Ridge, Tennessee).

¹⁹ Department of the Army, *Proposed Finding of No Significant Impact (FONSI) for the M1 Abram Main Battle Tank Heavy Armor System*, 63 Fed. Reg. 37858-59 (Department of Defense July 14, 1998) (acknowledged radiation exposure to tank crews without adjusting Nuclear Regulatory Commissions’ exposure safety levels).

²⁰ WHO, *Factsheet No. 257*, *supra* note 7; and U.S. Army Center for Health Promotion and Preventive Medicine, *Depleted Uranium Aerosol Doses and Risks: Summary of U.S. Assessments* (2004), available at <http://fhp.osd.mil/du/pdfs/ducapstone.pdf> (Capstone project part II is a comprehensive study of health risks posed by U.S. Gulf War troops’ DU exposure from various military sources) and see Military Toxics Project Information Sheet, *supra* note 15.

²¹ See IAEA, *Features: Depleted Uranium*, *supra* note 8; and see Dai Williams, “Part 3b, Military Use of Depleted Uranium: Known and Suspected DU Weapons Systems” in *Mystery Metal Nightmare in Afghanistan? Depleted Uranium Weapons 2001-2002, Occupational, Public and Environmental Health Issues*, (2002), available at <http://www.eoslifework.co.uk/pdfs/DUZ10ZA3a.pdf>.

²² Iliya Pesic, *Depleted Uranium, Ethics of the Silver Bullet* (2002), available at <http://ceserv.engr.scu.edu?StudentWebPages/IPesic/ResearchPaper.htm> (engineering student monograph).

burns.²³ A depleted uranium penetrator round has the ability to self-sharpen, or adiabatic shearing,²⁴ as it penetrates its target.²⁵ A penetrator, such as a 120mm antitank round containing thirteen pounds of depleted uranium, or a 30mm armor-piercing round with twelve ounces of DU, has the capacity to penetrate the tank armor or target, shed small fragments, spray aerosol DU dust which ignites in the air, then shear off its external layers and sharpen, pass through the substance of the target, and continue through the target to exit the far side and fly to the ground as a pencil-sized remnant of war.²⁶

Depleted uranium estimates have been computed based upon the usage by military aircraft or weapons firing such ammunition.²⁷ The total amount of depleted uranium munitions used is documented for the Persian Gulf War in excess of 320 tons by U.S. forces²⁸ and slightly less than one ton by U.K. army tanks.²⁹ The United Kingdom's Ministry of Defense ceased using DU munitions in 2005.³⁰

²³ IAEA, *Features*, *supra* note 21 at 5.

²⁴ *Id.*

²⁵ *Id.*

²⁶ Williams, *Depleted Uranium*, *supra* note 21.

²⁷ National Research Council, Committee on Toxicologic and Radiologic Risks to Military Personnel from Exposure to depleted Uranium During and After Combat, *Review of the Toxicologic and Radiologic Risks to Military Personnel from Exposure to Depleted Uranium During and After Combat*, (National Academies Press 2008) (cited 75 tons of DU use in Second Gulf War); and see Dan Fahey, *The use of depleted Uranium in the 2003 Iraq War: An Initial Assessment of Information and Policies* (June 24, 2003), at <http://www.danfahey.com/DanFahey/> (author provides thumbnail estimates of DU usage based on munitions used).

²⁸ OSAGWI *Gulf (II)*, Tab F–DU use in the Gulf War, 1-3 *supra* note 10 (part A, table F–1 delineates the Army usage of 50.55 tons; part B, the Air Force's 259 tons; part C, minimal usage by the Navy; part D, approximately 11 tons used by the Marines); and see UNEP, *Desk Study on the Environment in Iraq*, (2003), available at http://postconflict.unep.ch/publications/Iraq_DS.pdf (confirming use of 290 metric tones of DU in GWI, and citing a 150 meter contamination radius around each hard target hit).

²⁹ *Id.*, OSAGWI *Gulf (II)*, Tab–F, *supra* note 10 at 3.

³⁰ United Kingdom, Ministry of Defense, Veterans Policy Unit, About Defense, *Depleted Uranium (DU)* (2009), <http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/DepletedUranium/> (report noted the use of 120mm and 20mm DU ammunition in Iraq, discontinued 2005).

Table 1: Depleted Uranium Usage in Iraq, Afghanistan, Bosnia-Kosovo

Persian Gulf War	~321 tons ³¹
Bosnia-Herzegovina, 1993-1995	~6,230 rounds ³²
Kosovo (including Serbia & Montenegro)	~32,800 rounds ³³
Operation Enduring Freedom (OEF)	. . . ³⁴
Operation Iraqi Freedom (OIF)	~ 72 tons ³⁵

The quantity of depleted uranium used by all forces in Operation Enduring Freedom and Operation Iraqi Freedom is germane to training, prevention and post-exposure treatment, immediate and future testing, guidelines and methodologies.³⁶ Freedom of Information requests is pending to access this United States Department of Defense data.³⁷

III. MEDICAL EFFECTS OF DU EXPOSURE.

Depleted uranium has three main deleterious side effects to consider pertaining to Florida National Guard troops’ health: radiation, chemical, and irritant effects. All depend upon the mode of DU contact – inhalation or ingestion; embedded shrapnel; or skin contact. The exposure list is not exclusive.

All depleted uranium, through its various isotopes, emits alpha, beta and gamma

³¹ OSAGWI *Gulf (II)*, *supra* note 28.

³² UNEP, *Depleted Uranium in Bosnia and Herzegovina Post-Conflict Environmental Assessment*, 266 (2003), available at http://postconflict.unep.ch/publications/BiH_DU_Report.pdf. This report noted NATO tanks utilized 100mm and 120mm shells, the A-10 attack plane utilizes 25mm and 30mm utilized DU rounds, and also specified the number of rounds used in Kosovo (30,000 rounds), Serbia (2,500 rounds), and Montenegro (300 rounds).

³³ *Id.*; and see UNEP, *Kosovo*, *supra* note 17; and NATO Information, NATO’s role in Kosovo: Depleted Uranium, *Data concerning the locations of depleted uranium ordnance expended during Allied Operations Deny Flight-Deliberate Force, 1993-95 in Bosnia (grid co-ordinates)* (2003), available at <http://www.nato.int/du/docu/d010124b.htm>. The use of depleted uranium by NATO forces in Bosnia and Kosovo has been well documented, localized and updated.

³⁴ Williams, *Depleted Uranium*, *supra* note 21 (quantity is unknown, extensive use is suggested).

³⁵ Dan Fahey, *The Emergence and Decline of the Debate Over Depleted Uranium Munitions 1991-2004*, 8 (June 20, 2004), <http://www.danfahey.com/DanFahey/> (table estimates up to 136,000 kg. of DU used by tanks, fighting vehicles and jets).

³⁶ *Id.*

³⁷ Pending Freedom of Information Act [FOIA] requests to materiel commands of the Army, and the Air Force. The Navy/Marine FOIA request was denied on March 30, 2009.

radiation.³⁸ The U-238 and U-234 isotopes are primarily alpha radiation emitters.³⁹ Skin is a sufficient barrier to impede alpha radiation, although direct damage to the skin can result.

U-235 emits beta and gamma radiation.⁴⁰ Beta radiation can penetrate to the deepest levels of the skin and is hazardous if in contact with it for extended periods.⁴¹ Clothing or other barriers can impede beta radiation, and like alpha radiation, beta radiation also has less severe consequences if contacted externally.⁴² Gamma radiation from U-235 is very penetrating and is hazardous in whole body exposure.⁴³

Route of exposure and DU dose-quantity can determine which organs are targeted and predict probable outcome scenarios. Inhalation exposure of aerosolized DU after penetrator perforation of a target is extensively documented in Department of the Army studies.⁴⁴ Inhaled aerosolized DU can be exhaled where it is dissolved in pulmonary fluids (depending on the solubility of the DU compound inhaled) and taken into the blood stream to be excreted in the urine via the kidney.⁴⁵ Depleted uranium may be transported

³⁸ WHO Programme, *Depleted Uranium, Sources, Exposure, and Health Effects*, (April 2001), available at http://www.who.int/ionizing_radiation/env/du/en/index.html (total resource document of depleted uranium); and see *WHO Guidance on Exposure to DU, Guidance to Exposure to Depleted Uranium for Medical Officers and Programme Administrators*, (2001), available at http://www.who.int/ionizing_radiation/en/Recomend_Med_Officers_pdf; see Memorandum from Gregory K. Lyle, LTC. USA “Item of Interest,” (March 1991), available at <http://www.grassrootspeace.org/twomemos.html>. This reference to the hazards of military DU usage is paired, by Charlie Jenks’s website, with the Los Alamos memo of Lt. Col. Ziehm, who notes the potential for adverse publicity toward depleted uranium as a military weapon, and the need to obfuscate its future weapon development. The memos were provided by Col. Doug Rokke, a military DU expert, DU victim, and anti-DU activist.

³⁹ *Id.*, *WHO Guidance*.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ Mary Ann Parkhurst & Raymond A. Guilmette, *Conclusions of the Capstone Depleted Uranium Aerosol Characterization and Risk Assessment Study*, 96 HEALTH PHYS. 393-409 (Mar. 2009) (“robust data from the Capstone DU Aerosol Study have provided a sound basis for assessing the inhalation exposure to DU aerosols and the dose and risk to personnel in combat”). The entire March 2009 issue of HEALTH PHYSICS is devoted to contemporary information on depleted uranium.

⁴⁵ The kidney is the primary organ for DU excretion and post-exposure testing. There are numerous

to other organs for elimination, or may sequester in other organs, tissue, regional lymph nodes, or bone.⁴⁶ Insoluble fine dust and particles can embed in the lung tissue, thoracic lymph nodes, or adjacent tissues.⁴⁷ Laboratory research has linked depleted uranium to activation of processes that incite toxic reactions and tumor induction in human liver cells⁴⁸ and other potentially adverse reactions when ingested, or inhaled, where the metals are transported by the lymphatic system to whole body distribution.⁴⁹

Particles of DU in the lung could induce cellular chromosome damage⁵⁰ and are potentially associated with an increased risk of lung and kidney cancer.⁵¹ Inhaled depleted uranium has a direct irritant effect on pulmonary tissue, can it induce chronic cough and potentially asthma.⁵² A Department of the Army depleted uranium munitions PowerPoint presentation noted the cellular mutation effects and bone cell cancer-inducing

references to: (a) kidney pathology, Melissa A. McDairmid et al., *Surveillance results of depleted uranium-exposed Gulf War I veterans: sixteen years of follow-up*, 72 J. TOXIC HEALTH A. 14 (2009)(chronic DU exposure adversely affects bone formation and kidney tubular filtration functions); (b) urine levels of DU, Roberto H. Gwiazda et al., *Detection of depleted uranium in urine of veterans from the 1991 Gulf War*, 86(1) HEALTH PHYS. 12 (2004), and World Information Service on Energy, WISE Uranium Project - FAQ, *Depleted Uranium in Urine of Soldiers* (June 17, 2005) available at <http://www.wise-uranium.org/pdf/duusfaq.pdf>; and (c) the need for continued surveillance, Katherine S. Squibb et al., *Prediction of renal concentration of depleted uranium and radiation dose in Gulf War veterans with embedded shrapnel*, 89 HEALTH PHYS. 267 (2009) (calls for continuing monitoring for veterans' renal abnormalities).

⁴⁶ WHO, *Depleted Uranium sources*, supra note 38.

⁴⁷ Brian G. Spratt, *Depleted uranium munitions – where are we now?* 22 J. RADIOL. PROT. 125-130 (2002) (noted tendency for lung cancer increase more than soft tissue sarcomas and other cancers, cited animal studies and Chernobyl research).

⁴⁸ Alexandra Miller et al., *Effect of the militarily-relevant heavy metals depleted uranium and heavy tungsten-alloy on gene expression in human liver carcinoma cells (HepG2)*, 255(1-2) MOL. CELL. BIOCHEM. 247 (2004).

⁴⁹ Elena Craft et al., *Depleted and Natural Uranium: chemistry and toxicological effect*, 7 J. TOXIC. ENVIRON. HEALTH, B. 297 (2004).

⁵⁰ Diane M. Stearns et al., *Uranyl acetate induces hprt mutations and uranium-DNA adducts in Chinese hamster ovary EM9 cells*, 20 MUTAGENESIS 417-423 (2005).

⁵¹ The Royal Society, *The Health Hazards of Depleted Uranium Munitions-Part I* (May 2001), available at <http://royalsociety.org/displaypagedoc.asp?id=11496>; and *The Health Hazards of Depleted Uranium- Part II* (Mar. 2002) available at <http://royalsociety.org/downloadaddoc.asp?id=1179>. While DU induced cancer risks are said to be small, they do exist.

⁵² A. W. Abu-Quare & Mohamed B. Abou-Donia, *Depleted uranium- the growing concern*, 22 J. APPL. TOXIC. 149 (2002) (notes respiratory ailments, kidney stones, cellular mutations, cancers and birth defects in several other studies).

effects of depleted uranium.⁵³ There are conflicting studies that infer minimal side effects to DU radiation on the lung and kidney,⁵⁴ yet the studies acknowledge a chemical toxicity effect on the kidneys and neurological systems.⁵⁵ Other reports diminish possible cancer induction by DU, yet suggest long-term follow up for veterans with extreme exposure veterans.⁵⁶ Two studies by the U.S. Army and the Department of Defense (Capstone DU Project, Part I and II) had also minimized any risks of DU to Gulf War veterans.⁵⁷ A comprehensive contemporary study by the Research Advisory Committee on Gulf War Veterans' Illnesses (the Binns Report) has drawn research from diverse institutions and agencies and pragmatically rebukes many of the Pentagon-funded studies and their narrow conclusions about the effects of DU and other agents on troop health.⁵⁸

There are several depleted uranium studies and commentaries regarding DU use and its potential harmful effects by NATO forces in the Balkans.⁵⁹ Additional studies

⁵³ Col. J. Edgar Wakayama, OSD/DO&E/CS *Depleted Uranium Munitions* (Aug. 2002), available at <http://www.grassrootspeace.org/wakayama2.pdf> (officer's PowerPoint presentation).

⁵⁴ OSAGWI *Gulf (II)*, *supra* note 10 (analogizes DU chemical effect similar to lead's heavy metal effects, and cites to McDairmid, *Health Effects of Depleted Uranium on Exposed Gulf War Veterans*, *infra* note 63).

⁵⁵ *Id.*

⁵⁶ Albert C. Marshall, *Gulf War Depleted Uranium Risks*, 18 J. EXP. SCI. ENVTL. EPID. 95 (2008); and Albert C. Marshall, *An Analysis of Uranium Dispersal and Health Effects Using a Gulf War Case Study* (July 2005), at <http://www.sandia.gov/news-center/news-releases/2005/def-nonprolif-sec/snl-dusand.pdf>; R. E. Toohey, *Excretion of depleted uranium by Gulf War veterans*, 105 RAD. PROT. DOSIM. 171 (2003); Gary J. Macfarlane et al., *Incidence of Cancer among UK Gulf War Veterans: Cohort Study*, 327 BRIT. MED. J. 1373 (2003).

⁵⁷ U.S. Army Center for Health Promotion and Preventive Medicine, *Health Risk Assessment Consultation No. 26-MF-7555-00D: Depleted Uranium- Human Exposure Assessment and Health Risk Characterization in support of the Environmental Exposure Report "Depleted Uranium in the Gulf" of the Office of the Special Assistant to the Secretary of Defense for Gulf War Illnesses*, (Sept. 15, 2000), available at http://gulflink.osd.mil.chppm_du_rpt_index.html; and see Office of Special Assistant Gulf War Illness (OSAGWI), *Depleted Uranium Aerosol Doses and Risks: Summary of U.S. Assessments* (Oct. 2004), available at <http://fhp.osd.mil/du/pdfs/ducapstone.pdf> (2004 Capstone study).

⁵⁸ Research Advisory Committee on Gulf War Veterans' Illnesses, *Gulf War Illness and the Health of Gulf War Veterans: Scientific Findings and Recommendations* (Nov. 2008), available at http://sph.bu.edu/insider/images/stories/resources/annual_reports/gwi%20AND%20Health%20of%20GW%20Veterans%20RAC-GWVI%20Report_2008.pdf (this comprehensive and well referenced study is a general and useful resource).

⁵⁹ NATO forces used 24 tons of DU in Kosovo operations of the 1990s and inferences are there has been an increased incidence of leukemia in NATO troops; and see, J. Jarrett Clinton, *Information Paper: Depleted Uranium Environmental and Medical Surveillance in the Balkans* (Oct. 25, 2001), available at

correlate military troop exposure and medical signs to data collated on suspected depleted uranium effects on the Iraqi civilian population and their subsequent occurrence of rare cancers.⁶⁰

Non-inhalation, parenteral exposure to DU is via friendly-fire shrapnel injuries, or particles, entering the body through skin breaks and subsequently embedding,⁶¹ and represents the highest risk level for acute and chronic exposure⁶² and thus long-term health hazards.⁶³ This exposure route could enhance depleted uranium's radiation ability to induce cancer,⁶⁴ to induce germinal-reproductive maladies⁶⁵ or chromosomal mutations that adversely affect reproductive and fetal health,⁶⁶ and potentiate the chemical and heavy metal effects of DU on the neuro-endocrine system⁶⁷ and the neurological system.⁶⁸ Continuous surveillance of veterans-at-risk is recommended.⁶⁹

http://deploymentlink.osd.mil.du_balkans/index.html; see Press Release, NATO, *supra* note 17 (U-236 DU has been recovered from DU penetrator waste in Kosovo); see Felicity Arbutnot, "It Turns out that Depleted Uranium is Bad for NATO Troops" (Oct. 20, 2000) (regarding the deaths of NATO Italian troops) available at <http://emperors-clothes.com/articles/arbuth/port.htm>; and see Ken Takata, *Depleted Uranium and the Incidence of Leukemia in Italian Soldiers in Kosovo*, available at http://www.math.uic.edu/~takata/Kosovo/Leukemia_And_DU/Depleted_Uranium_and_the_Incidence_of_Leukemia_among_Italian_Soldiers_in_Kosovo.pdf (a mathematic analysis of NATO's denial of DU induced leukemia in its troops).

⁶⁰ Souad N. Al-Azzawi, *Depleted Uranium Radioactive Contamination In Iraq: An Overview*, (Aug. 2006), available at <http://brusselstribunal.org/DU-Azzawi.htm> (notes leukemia and cancer incidence in civilian populations and animal models, DU contained in Cruise missiles, and colloquial medical statistics).

⁶¹ OSAGWI, *Depleted Uranium Aerosol Doses Summary supra* note 55 at xiii (friendly fire DU exposure may exceed radiation and chemical exposure standards dependant upon the ventilation system of the tank or fighting vehicle).

⁶² *Id.*, summary xiii, table S-4.

⁶³ McDairmid, *Surveillance Results, supra* note 45.

⁶⁴ Alexandra C. Miller et al., *Genomic instability in human osteoslast cells after exposure to depleted uranium: delayed lethality and micronuclei formation*, 64 (2-3) J. ENVIRON. RADIOACT. 247 (2003).

⁶⁵ Melissa McDairmid et al., *Health Effects of Depleted Uranium on Exposed Gulf War Veterans*, 82 ENVIRON. RES. 168 (2000) (study found DU in the semen of five of twenty-two shrapnel exposed veterans).

⁶⁶ Rita Hindin et al., *Teratogenicity of depleted uranium aerosols: a review from an epidemiological perspective*, 4 ENVIRO. HEALTH 17 (2005).

⁶⁷ Katherine S. Squibb & Melissa A. McDairmid, *Depleted uranium exposure and health effects in Gulf War veterans*, 361 PHILOS. TRANS. R. SOC. LOND. B: BIOL. SCI. 639 (2006).

⁶⁸ R. W. Haley et al., *Evaluation of neurologic function in Gulf War veterans: a blinded case control study*, 227 J.A.M.A. 223 (1997). Veterans with neurologic damage manifested as generalized injury to nervous system.

⁶⁹ Squibb, *Predictions of renal concentrations of depleted uranium, supra* note 45.

IV. FLORIDA NATIONAL GUARD (FNG) EXPOSURE RISKS AND DEMOGRAPHIC DATA.

The Office of Special Assistant Gulf War Illness Report lists three levels of DU exposure risk applicable to all troops in the combat theaters.⁷⁰ The most severe exposures, Level I, are combat troop victims with friendly-fire wounds; those with shrapnel wounds or those who had direct contact with DU ammunition-impacted targets; those who inhaled aerosolized DU; or those troops who were open-wound contaminated with DU.⁷¹ Level II risk exposure examples include those who had inhaled aerosolized DU; had oral, ingested particles of DU, or clothes contamination while working around DU targets or DU damaged military vehicles; and those troops who repaired or handled the damaged combat vehicles that had been hit with friendly fire.⁷² Risk Level III examples are those troops who had transient DU exposure downwind from depleted uranium-impacted targets, target fires, or burning munitions.⁷³

The raw numbers of Florida National Guard troops deployed to theaters where depleted uranium is or was utilized are displayed below in Table II.

⁷⁰ OSAGWI *Gulf (II)*, Tab G, *DU Exposures in the Gulf War*, *supra* note 10 at 1-13; and see Office of the Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness and Military Deployments Health Risk Assessment Consultation No. 26-MF-577-00D: Depleted Uranium-OSAGWI Levels I, II, and III Scenarios (Sept. 15, 2000) available at <http://www.gulflink.osd.mil/du/>. This is a highly technical, heavily tabulated, and detailed analysis of all risk level exposures, enumerated with cross-referenced exposure scenarios for Southwest Asia depleted uranium exposures.

⁷¹ *Id.*, OSAGWI *Gulf (II)*, Tab-G, 1-3.

⁷² *Id.*, 3-13; and see End Notes at 93, *Lead Sheet #14316, Interview with 144th Services and Supply Company NJANGNCO*, (Jan. 28, 1998), available at http://www.gulflink.osd.mil/du/du_refs/n21en093/8033_010_0000001.htm. National Guard troops were often rear deployed troops assigned to assess the damage of these DU contaminated military vehicles, End Notes at 97, *Lead Sheet #14200, Interview with the Platoon Leader Operations Center of the 144th Services and Supply Company NJANG Storage Yard at KKMC*, (Jan. 19, 1998) available at http://www.gulflink.osd.mil/du/du_refs/n21en097/8019_026_0000001.htm. New Jersey's 144th Service and Supply Company who evaluated damaged vehicles as they were hauled from Iraq to Kuwait prior to reshipment stateside, initially did not know the vehicles were radioactive, and the Guard unit was not properly trained for this task as per the Department of the Army.

⁷³ *Id.*, Tab-G, D, *Level III Participants*, 1. *Camp Doha*. The report specified the Camp Doha clean up and fire and the DU exposure that occurred in 1991.

Table II: Deployed Florida Army & Air National Guard Troops, 1990 to Present

Theater	Florida Army NG	Florida Air NG
Persian Gulf War (GWI/Desert Storm, 1990) ⁷⁴	xxxx	xxxx
Operation Enduring Freedom (OEF, 2002 to date) & Operation Iraqi Freedom (OIF, 2003 to date) ⁷⁵ As of 1/14/09 ⁷⁶	9,132 869	1,379 4
Bosnia-Kosovo As of 1/14/09 ⁷⁷	1	

These numbers do not differentiate duty, deployment locale, or the DU exposure risk. The depleted uranium risk level of Florida National Guard troops was determined by the Department of Defense⁷⁸ using a post-deployment questionnaire through the Veterans Administration,⁷⁹ or, if friendly-fire shrapnel-injured, by the Department of Defense protocol⁸⁰ which acknowledges the risk level promptly as required and brings the soldier into an assigned program.⁸¹

The quantity of DU used in the Persian Gulf War and the number of troops exposed in all three risk levels incited the Secretary of Defense and Congress to enhance the medical tracking protocols of troops,⁸² the medical treatment guidelines of depleted

⁷⁴ Pending FOIA request from Florida National Guard.

⁷⁵ FOIA request, Mar. 5, 2009, Laurie Conley, 1SG, Support Staff Supervisor, Florida Army National Guard (St. Francis Barracks, St. Augustine, Florida). This FOIA data is combined totals for both theaters, prior to 1/14/2009.

⁷⁶ *Id.*, FOIA update, Mar. 27, 2009.

⁷⁷ *Id.*, Florida Air National Guard deployed to Serbia.

⁷⁸ Department of Defense, Comprehensive Clinical Evaluation Program, *DD Form 2872: Depleted Uranium (DU) Questionnaire*, (Feb. 2004), available at <http://www.pdhealth.mil/du.asp> (most current form for DU exposure evaluation).

⁷⁹ Veterans Administration, *Gulf War Registry Exam VA Form 10-9009D, Depleted Uranium (DU) Questionnaire* (Jan. 2008), available at <http://www.va.ov/vaforms/medical/pdf/VHA-10-9009D-fill.pdf> (most current for DU exposure evaluation, this program is administered by the Veterans Health Administration, <http://ww1.va.gov/health/index.asp>).

⁸⁰ William Winkenwerder, Jr., M.D., Health Affairs Policy Memorandum: Policy for the Operation Iraqi Freedom Depleted Uranium (DU) Medical Management, with Attachments: 1-Guidance for Depleted Uranium (DU) Bioassay Urinalysis for DU, May 8, 2003 (interim); 2-Policy for the Treatment of Personnel Wounded by Depleted Uranium Munitions, July 30, 1999; 3-Depleted Uranium Information for Clinicians, USACHPPM, May 15, 2003 (May 30, 2003), available at <http://www.ha.osd.mil/policies/2003/03-012.pdf>.

⁸¹ 10 U.S.C. §1074f (amended in 2008 to include neurologic disorders, traumatic brain injuries, and post-traumatic stress disorder).

⁸² Winkenwreder letter, *supra* note 80.

uranium wounded veterans,⁸³ and to acknowledge the deficiencies of its flawed DU post-exposure screening programs⁸⁴ and of its handling procedures for DU contaminated equipment and munitions.⁸⁵

During the Persian Gulf War, troop preparation for DU use, handling, exposure, and treatment was scarce or absent.⁸⁶ Some Guard equipment recovery units did not know that Abrams heavy tanks were DU-plate-reinforced and therefore emitted radioactivity.⁸⁷ Details on the lack of Army core-training for DU munitions use and handling (except for Lieutenant Colonel and Colonel-ranked officers) prior to the Persian Gulf War is noted in a General Accounting Office document, which also states that it wasn't until 1998 when DU training was tasked as a requirement for unit-level training.⁸⁸ Further, it noted that fifteen percent of the Persian Gulf War soldiers exposed to DU experienced such bureaucratic problems as no post-deployment contact by the Department of Defense or with the Veterans Administration; no urine screening for DU toxic exposure; no medical appointments pertaining to DU exposure; and no participation in DU screening program.⁸⁹

The current depleted uranium and ionizing radiation exposure programs for the veterans and troops of the Persian Gulf War, Operation Enduring Freedom and Operation

⁸³ *Id.*

⁸⁴ The Department of Defense in 1994 created the CCEP, *supra* note 78. This was modeled upon the Veterans Administration's Gulf War Registry, *supra* note 75, which is administered by the Veterans Health Administration, available at <http://www1.va.gov/health/index.asp>.

⁸⁵ *Department of the Army Pamphlet 700-48: Handling Procedures for Equipment Contaminated with Depleted Uranium or Radioactive Commodities* (Dec. 1999), available at http://www.army.mil/USAPA/epubs/pdf.p700_48.pdf. This pamphlet was ordered by General Shinseki to apply to all, Department of the Army commands, the U.S. Army Reserve, and the Army National Guard of the United States, it prescribes 40 hours of DU training for soldiers, and is referenced in certain States' legislation as the controlling federal DU protocol manual.

⁸⁶ General Accounting Office (GAO), *Gulf War Illnesses: Understanding of Health Effects from Depleted Uranium Evolving but Safety Training Needed* (2000) available at <http://www.gao.gov/new.items/ns00070.pdf>.

⁸⁷ *End Notes, supra* note 70 at nn. 93, 97.

⁸⁸ *GAO report, supra* note 82 at 17, 19.

⁸⁹ *Id.*, at 5.

Iraqi Freedom fall within the Office of Public Health and Environmental Hazards of the Department of Veterans Affairs.⁹⁰

V. CURRENT DU PROTOCOLS FOR FLORIDA NATIONAL GUARD

A. Department of Defense/Veterans Administration

Both branches of the Florida National Guard provide its troops the DU training, information, and post-deployment questionnaires and toxicology screenings mandated by the Department of Defense⁹¹ and the Department of Veterans Affairs.⁹² Information is provided at the Florida Army National Guard⁹³ and Florida Air National Guard offices and websites,⁹⁴ and the Florida Veterans Administration offices and website.⁹⁵ The Veterans Health Administration within the Department of Veterans Affairs currently has detailed handbooks pertaining to depleted uranium and the Gulf War, Operation Enduring Freedom and Operation Iraqi Freedom veterans.⁹⁶

B. Florida National Guard

The primary guide relating to procedures for handling DU munitions and DU contaminated equipment is Army pamphlet 700-48.⁹⁷ The Florida Army National Guard and the Florida Air National Guard require forty hours of training in DU handling and

⁹⁰ This site directs veterans to other VA contact locations: <http://www.publichealth.va.gov/index.asp>.

⁹¹ CCEP, *supra* note 84.

⁹² VA Gulf War Registry, *supra* note 84.

⁹³ Florida Army National Guard, St. Francis Barracks, St. Augustine, Florida, *available at* <http://www.florida.guard.army.mil/>.

⁹⁴ Florida Air National Guard, Joint Forces Headquarters, St. Francis Barracks, St. Augustine, Florida, *available at* <http://www.125fw.ang.mil/>.

⁹⁵ Florida Department of Veterans Affairs, *at* <http://www.floridavets.org/index.asp>.

⁹⁶ Veterans Health Administration, *Gulf War (Including Operation Iraqi Freedom) Registry (GWR) Program (Formerly Persian Gulf War (GWR) Registry)* (June 5, 2007), *available at* <http://www1.va.gov/GWOIFHANDBOOK062007.pdf>; *Transition Assistance and Case Management of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) Veterans* (May 31, 2007), *available at* http://www1.va.gov/VHAPUBLICATIONS/ViewPublication.asp?pub_ID=1573; *VA War Related Illness and Injury Study Centers (WRIISC)*(July 15, 2004), *available at* http://www1.va.gov/VHAPUBLICATIONS/ViewPublication.asp?pub_ID=1121. These three handbooks, germane to Florida National Guard DU exposure issues, are at the VA website: <http://www1.va.gov/vhapublications/>.

⁹⁷ Handling Procedures, *supra* note 85.

safety.⁹⁸

The United Kingdom and its Ministry of Defense, like the U.S. government, has enacted comprehensive programs for monitoring and testing of its troops and veterans.⁹⁹

The Royal Society in response to Parliament's concerns monitored the Ministry of Defense DU programs.¹⁰⁰

VI. FEDERAL ENACTMENTS FOR FLORIDA NATIONAL GUARD TROOPS AND VETERANS.

A. Federal statutes and regulations

Federal statutes ensure basic entitlement to Florida National Guard veterans for personal injuries incurred or diseases contracted in the line of active military, naval or air service duty during a period of war,¹⁰¹ or during a period other than war,¹⁰² and specifically the Persian Gulf War.¹⁰³ Other federal statutes and regulations specify disease conditions¹⁰⁴ and cancer types that may be attributed to military service.¹⁰⁵

Congress enacted, and amended to liberalize, federal mandates to assure military medical tracking with broad discretionary program allowances for the Secretary of Defense¹⁰⁶ and to provide for compensation for disabilities due to undiagnosed

⁹⁸ *Id.*; and see GAO, *supra* note 86 at 31-37.

⁹⁹ The Undersecretary of State for Defense, *Final Report of the Depleted Uranium Oversight Board* (Feb. 2007), available at http://www.mod.uk/NR/rdonlyres/CABAB04E-3584-4234-A62E-C6034E543B6C/0/final_reportfeb2007.pdf.

¹⁰⁰ The Royal Society *Part I and Part II*, *supra* note 51.

¹⁰¹ 38 U.S.C. § 1110 (2008). The basic entitlement statute for compensation of United States' veterans disabled, injured or diseased in the line of duty during war.

¹⁰² 38 U.S.C. § 1131 (2008). The parallel statute for United States' veterans disabled, injured or diseased in the line of duty during other than a time of war.

¹⁰³ 38 U.S.C. § 1117 (2008). Applies to health care for Persian Gulf War veterans and codified the Secretary of Defense's discretion to clarify conditions of chronic illness within 38 U.S.C. § 1117(b).

¹⁰⁴ 38 U.S.C. §§ 1112(a) and (b) (chronic diseases which may be presumed to be related to military service); and see 38 C.F.R. § 3.307 (defines chronic, tropical, and prisoner-of-war related disease conditions).

¹⁰⁵ 38 U.S.C. § 1112(c) (cancer conditions which may be presumed to be related to military service), and see 38 C.F.R. § 3.308 (defines chronicity and continuity legal principles that apply to disease and cancer).

¹⁰⁶ *Supra* note 77.

illnesses.¹⁰⁷ The Secretary of Defense has been empowered to ascertain multi-factorial conditions, especially those with neurological symptoms to establish appropriate programs and tracking systems.¹⁰⁸ The Department of Defense¹⁰⁹ and the VA have specific programs in place for troops and veterans of both wars.¹¹⁰

The presence of federal statutes, regulations, and programs has not assured usage or compliance by veterans. Troop or veteran resistance to seeking care or an inability or neglect in seeking care could all contribute to a future veterans' health care crisis in Florida.¹¹¹ The problem of non-compliance, and veterans' non-engagement in their own health care would be exacerbated by neurological problems resulting from combat.¹¹²

B. Department of Defense and Veterans Administration programs

In a report dated 2000, there were less than 500 veterans in the Department of Defense and/or Veterans Administration programs for DU exposure.¹¹³ All veterans were in Risk Levels I and II and had been entered in the programs based upon active duty injuries attended to while in-service.¹¹⁴ A total of 600 veterans had availed themselves of the DU questionnaire and DU post-exposure screening.¹¹⁵ A follow-up 2004 report dealing with OIF troop testing noted 766 troops' urine bioassay results.¹¹⁶ Subsequently, in the semi-annual report of 2005, 1,607 troops had been tested,¹¹⁷ and the 2007 test

¹⁰⁷ 38 C.F.R. § 3.317(2008) (specifies veterans of Persian Gulf War).

¹⁰⁸ *Supra* note 77 (applying specially to Gulf War Illness).

¹⁰⁹ CCEP, *supra* note 74.

¹¹⁰ VA Gulf War Registry, *supra* note 75.

¹¹¹ Nema Milaninia, *The Crisis at home Following the Crisis Abroad: Health Care Deficiencies For US Veterans of the Iraq and Afghanistan Wars*, 11 DEPAUL J. HEALTH CARE L. 327 (2008).

¹¹² Charles W. Hoge et al., *Combat Duty in Iraq and Afghanistan, Mental Health Problems and Barriers to Care*, 351 N.E.J.M. 13-22 (2004).

¹¹³ OSAGWI *Gulf (II)*, *supra* note 10 at Tab-P.

¹¹⁴ *Id.*

¹¹⁵ *Id.* at End Note 657.

¹¹⁶ William Winkenwerder, Memorandum for Assistant Secretary of Defense, *Operation Iraqi Freedom Depleted Uranium Bioassay Results and Semi-Annual Data Submission*, (Sept. 10, 2004).

¹¹⁷ William Winkenwerder, Memorandum for Assistant Secretary of Defense, *Operation Iraqi Freedom Depleted Uranium Bioassay Results and Semi-Annual Data Submission*, (Feb. 14, 2005).

number grew to 2,161 soldiers.¹¹⁸ A precise number of depleted uranium-exposed troops in all three risk levels may not be known to the Department of Defense, the Veterans Administration, the Florida National Guard, or the soldiers themselves.¹¹⁹

Contemporary figures for DU testing of soldiers and veterans indicate roughly 3,000 screened personnel, both American and English troops,¹²⁰ in the Persian Gulf War, Operation Enduring Freedom and Operation Iraqi Freedom. The Florida National Guard had specific occasions of increased DU exposures.¹²¹ Florida veterans of OIF have died due to cancer from documented DU exposure.¹²²

In the United Kingdom, depleted uranium testing has been utilized more by lower ranked soldiers and veterans.¹²³ Such skewing was attributed to the individual's current health status, not service-connected DU exposure.¹²⁴

VII. STATE LEGISLATION REGARDING DU AND TROOPS.

A. Why legislate?

Why should Florida follow the lead of other states and legislate on behalf of its National Guard troops and veterans? The reasons are many, and the list not exclusive:

1. Florida affords direct care for its citizen-soldiers.
2. Florida's outreach is to veterans missed by the Department of Defense, or

¹¹⁸ William Winkenwerder, Memorandum for Assistant Secretary of Defense, *Operation Iraqi Freedom Depleted Uranium Bioassay Results and Semi-Annual Data Submission*, (Feb. 5, 2007).

¹¹⁹ OSAGWI *Gulf (II)*, *supra* note 10 at Tab-P, 4-5 (enumerates exposure numbers for GWI, 219 Risk Levels I, and 117 Risk Level II exposed veterans) The summation process arrived at in Tab-P is circuitous and challenging to collate.

¹²⁰ Peter Diehl, WISE Uranium Project, *Depleted Uranium in Urine of Soldiers* (Aug. 10, 2005), available at <http://www.wise-uranium.org/pdf/duusfaq.pdf>; and see Pending FOIA request.

¹²¹ Pending FOIA request.

¹²² E-4 Specialist Dustin Brim (U.S. Army mechanic, 1st Maintenance Co., 541st Maintenance Battalion, deployed to Iraq, October, 2003) Port Orange, Florida, died from DU-induced cancer on September 24, 2004. Dustin Brim's DU Risk Level of exposure was never disclosed, other than Fallujah, his possible exposure site is unknown, as is his route(s) of exposure, and see Audrey Parente, *A War Within the War* (March 28, 2006), available at <http://www.news-journal on line.com/special/uranium/main story.htm>.

¹²³ Neil Greenberg et al., *Screening for depleted uranium in the United Kingdom armed forces: who wants it and why?*, 58 J. EPID. COMM. HEALTH 558 (2004) (linked reasons to current health status not necessarily actual exposure to DU).

¹²⁴ *Id.* This social commentary stands without comment.

the Veterans Administration, or uninformed regarding current law change.¹²⁵

3. Florida assures follow-up toxicology screening for its citizen-soldiers.
4. Florida assures post-exposure screening for veterans excluded due:
 - a. To lower risk level assessments at the time of active duty or discharge and
 - b. To question or controversy of self-assessed risk level at above times.
5. Florida assures testing for suspected effects of sequestered DU such as:
 - a. dysfunction of diverse organ systems- genito-urinary, neurological, etc.;
 - b. diverse cancers of multiple organ systems; and
 - c. dysfunction of reproduction, or next-generation birth abnormalities.
6. Florida assures state-of-the-art post-exposure screening for its veterans.
7. Florida assures proactive care for veterans where the Department of Defense was unprepared for the consequences of the war activity.¹²⁶
8. Florida proactively intercedes for its veterans to facilitate federal program entrance and federal benefits.
9. Florida assists its veterans to navigate the maze of protocols, information, acronyms, websites, and details necessary to obtain DU testing and inclusion in federal programs.
10. Florida's veterans warrant the best care available.

B. Legislative components.

The states¹²⁷ that enacted DU legislation generally cite to the federal statutes defining the combat assignment of its National Guard veterans.¹²⁸ As a representative example, “[E]ligible member” means a “member of the New York army national guard or the New York air national guard who served in the Persian Gulf War, as defined in 38 U.S.C. §101, or in an area designated as a combat zone by the president of the United States during Operation Enduring Freedom or Operation Iraqi Freedom.”¹²⁹ States cite to the federal statutes obligating the federal pre- and post-deployment testing of Persian

¹²⁵ Veteran's appeal, 2004 BVA Lexis 30237, BVA 04-17099 (June 28, 2004) (veteran never received notice of federal statute changes; continued case).

¹²⁶ Donald Rumsfeld, Secretary of Defense, Secretary Rumsfeld Town Hall Meeting in Kuwait, *Secretary Rumsfeld Town Hall Meeting in Kuwait*, (Dec. 8, 2004) (“[Y]ou go to war with the army that you have. . .”) Secretary of Defense's ad lib question and answer exchange with a troop member in Kuwait on Dec. 2004, available at <http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=1980>.

¹²⁷ *Supra* notes 1-6.

¹²⁸ 10 U.S.C. § 101 (2009).

¹²⁹ N.Y. Exec. § 366(1)(a) (McKinney 2009).

Gulf War veterans, “[p]re-deployment health assessments and post-deployment assessments and reassessments for evaluating Gulf War Veterans are required under Section 1074f of title 10, United States Code.”¹³⁰ And, they cite to the Veterans Health Administration protocols¹³¹ and the Army DU handling protocol pamphlet,¹³² “[t]hat Veterans Health Administration (VHA) Handbook outlines the policy and procedures evaluating Gulf War veterans, including those who served in Operation Iraqi Freedom, with possible exposure to depleted uranium. Army Regulation 700-48 prescribes policy and procedures for the management of equipment contaminated with depleted uranium or radioactive commodities. The regulation applies to the department of the army, U.S. Army Reserve and Army National Guard.”¹³³

Typically, state funding of depleted uranium information and screening was excluded from the legislation, deeming cost absorption was a function of the federal government, “[N]o State funds shall be used to pay for such tests or other federal treatment services.”¹³⁴ In the single instance where state legislation included funding for DU outreach and veteran monitoring, the legislation failed to be signed into law.¹³⁵

All of the states’ enactments utilize urine sample monitoring as described in VHA protocols.¹³⁶ All legislation phrased the urine testing as choosing “best practice” health screening to “[A]ssist veterans who may have been exposed to depleted uranium to obtain the best practice health screening test from the federal department of veterans affairs to test for exposure to depleted uranium using a bioassay procedure involving

¹³⁰ *Id.*, quoting N.Y. Laws ch. 743 § 1 (2008).

¹³¹ Winkenwerder, Health Affairs Policy Memorandum, *supra* note 80.

¹³² *Supra* note 81.

¹³³ *Id.*

¹³⁴ 330 Ill. Comp. Stat. 130/10 (2008). This is exemplary of the phraseology used.

¹³⁵ *Supra* note 6. Connecticut legislation attempted to fund its DU outreach program.

¹³⁶ Winkenwerder, Health Affairs Policy Memorandum, *supra* note 76.

methods sufficiently sensitive to detect depleted uranium at low levels.”¹³⁷

Contemporary legislation often augments this phraseology by adding the phrase:

“[p]rovide information to veterans upon their discharge from active duty regarding the health and safety issues concerning depleted uranium exposure, including the types and efficacy of tests to detect depleted uranium exposure, the treatments available for veterans affected by exposure to depleted uranium, and the federal and state benefits that are available for veterans exposed to depleted uranium,”¹³⁸ and, in order to update DU programs available to its veterans, “[P]rovide information to departmental staff, interested veterans organizations, health care providers, and county veterans service officers regarding the effects of depleted uranium exposure, the detection programs that are available to determine if a veteran has been exposed to depleted uranium, the federal treatment programs that are available to veterans who may have been exposed to depleted uranium, and the federal and state benefits that are available to veterans who have been exposed to depleted uranium.”¹³⁹

Wisconsin’s legislation mandated that DU testing must comport to technological advancements in radiation testing which could be decisive in the future, during the life-span of the afflicted veterans. Geologists, in highly technological laboratory settings, are able to detect urine uranium radioactivity for minimal exposure risk levels (Risk Levels III or II) twenty years post-exposure.¹⁴⁰ From these ascertained levels, and knowing the bio-kinetic body-clearance rate for uranium, it is mathematically possible to project

¹³⁷ Wis. Stat. § 45.03(21)(a) (2008).

¹³⁸ *Id.*, § 45.03(21)(b).

¹³⁹ *Id.*, § 45.03(21)(c).

¹⁴⁰ Randall R. Parrish et al., *Determination of 238u/235u, 236u/238u and uranium concentration in urine using sf-icp-ms and mc-icp-ms: an interlaboratory comparison*, 90 HEALTH PHYS. 127-138, (2006) (signifies inductively coupled plasma mass-spectrometry, analysis has a 0.5% to 4% accuracy); and see Randall R. Parrish et al., *Depleted uranium contamination by inhalation exposure and its detection after approximately 20 years: implications for human health assessment*, 390 SCI. TOTAL ENVIRON. 58-68 (2007) (study of workers from a closed DU munitions plant in Colonie, N.Y.).

backwards to calculate when and to how much DU a soldier was exposed.¹⁴¹

Different states' legislation typically received broad bipartisan support and success with no evidence of failed passage save the exception where a governor refused to sign the legislation into law.¹⁴²

VIII. FEDERAL RULES, FEDERAL LAW CHANGES PERTAINING TO DU, AND FEDERAL LITIGATION.

A. Federal DU control attempts.

Attempts by citizens to curtail DU usage by petitioning the Nuclear Regulatory Commission to alter its rules for uranium use, personal exposure limits, and environmental contamination have failed.¹⁴³ These petitions were directed at the uranium-use licenses of each specific service branch – the Army, Air Force, and Navy.¹⁴⁴

There have been several attempts to codify many of the current Department of Defense military procedures and DU protocols have been attempted and failed. Congressional action proposed by Representative Jim McDermott of Washington to study depleted uranium, how to mitigate damages, and to provide for a Department of Defense clean-up of DU contaminated sites has been presented in the House.¹⁴⁵ The Senate has submitted legislation to acknowledge DU military usage and provide comprehensive testing for troops.¹⁴⁶ Representative Juan Serrano of New York resubmitted DU testing

¹⁴¹ WHO, *Depleted Uranium, Exec. Summ.*, 6 (67% of radioactive isotopes excreted in the first 24 hours); *id.* at § 7.6, 64, 65 (90% excreted in first few days), and *id.* at Annex 4.1 (International Commission on Radiological Protection, The Human Respiratory Tract Model mathematically charts the bio-kinetic clearance of depleted uranium in its many forms, and by contemporaneous placement on their chart an individual's DU exposure can be traced back to date and dose, *supra* note 38).

¹⁴² *Supra* note 4 (Wisconsin's DU bill had 29 House co-presenters, and 9 Senate co-sponsors), and *supra* note 6.

¹⁴³ James Salsman, Denial of Petition for Rulemaking, 73 Fed. Reg. 43381 (Nuclear Regulatory Commission, July 25, 2008).

¹⁴⁴ Notice of Issuance of Director's Decision Under 10 C.F.R. § 2.206, 71 Fed. Reg. 1456 (Nuclear Regulatory Commission, Jan. 9, 2006).

¹⁴⁵ H.R. 2410, 109th Cong. (2005) (Rep. Jim McDermott).

¹⁴⁶ S. A. 4374 to S. 2766, 110th Cong. (2006) (Senator Cantwell).

legislation in 2009.¹⁴⁷

B. Administrative claims

Federal statutes, regulations, and Department of Defense programs for active duty personnel, and Veterans Administration programs for veterans have not prevented legal disputes, claims, or survivor's cause-of-death litigation. There is a catalog of disease and cancer-related VA claims involving depleted uranium exposure which include autoimmune thyroid disease;¹⁴⁸ unlisted conditions such as anemia, chronic pain and neuropathy;¹⁴⁹ child birth defects and chronic fatigue;¹⁵⁰ and neurological problems and tinnitus.¹⁵¹ Cancer claims encompass multi-systemic cancers;¹⁵² pancreatic cancer in a young veteran;¹⁵³ cancer of the appendix;¹⁵⁴ and cancers of the skin and colon.¹⁵⁵ The cancers present a time lag of years from time of discharge to claim initiation.

Veterans' claims are handled expeditiously according to federal statute.¹⁵⁶ If there is equipoise between the veteran's claim and evidence, and the finding of the Veterans Administration investigator, the veteran's claim prevails.¹⁵⁷ The veteran's

¹⁴⁷ Depleted Uranium Screening and Testing Act, H.R. 177, 111th Cong. (2009); prior legislative history is also *available at* <http://www.opencongress.org/bill/111-h177/test>.

¹⁴⁸ *Supra* note 121.

¹⁴⁹ *Hardin v. West*, 11 Vet. App. 74 (Vet. App. 1998) (quadriplegic veteran's unlisted conditions as per 38 C.F.R. § 3.311 and 38 U.S.C. § 1112(c) remanded for general VA compensation system procedures).

¹⁵⁰ Veteran's appeal, BVA 01-10729, 2001 BVA Lexis 28436, (B.V.A. 2001) (denied; no DU exposure, only veteran's contention; lacked expert evidence).

¹⁵¹ Veteran's appeal, BVA 06-11953, 2006 BVA Lexis 71341, (B.V.A. 2006) (never afforded VA examination to obtain expert opinion; continued).

¹⁵² *Rucker v. Brown*, 10 Vet. App. 67 (Vat. App. 1997) (cancers of bladder, kidney, prostate and lung denied due to lack of "competent medical evidence linking . . . to service . . . or ionizing radiation, denied but remanded for non-ionizing radiation adjudication).

¹⁵³ Veteran's appeal, BVA 05-09762, 2005 BVA Lexis 88760, (B.V.A. 2005) (36-year-old veteran, likely-as-not pancreatic cancer caused by depleted uranium; veteran prevailed).

¹⁵⁴ Survivor's cause-of-death appeal, BVA 05-34207, 2005 BVA Lexis 117527, (B.V.A. 2005) (VA physician linked DU exposure and onset of cancer to support association; death-survivor prevailed).

¹⁵⁵ *Davis v. Brown*, 10 Vet. App. 2009, (Vat. App. 1997) (a plausible claim of an injury incurred or aggravated by service must be supported by competent medical evidence; denied).

¹⁵⁶ 38 U.S.C § 5109B (2009).

¹⁵⁷ *Gilbert v. Derwinski*, 1 Vet. App. 49, 53 (Vet. App. 1990) ("veteran need only demonstrate that there is an approximate balance of positive and negative evidence in order to prevail").

claim still must comport to stare decisis protocols in past case law¹⁵⁸ and fall within the list of service-related cancers,¹⁵⁹ “radiogenic” diseases,¹⁶⁰ and show there was a current condition, incurred by or aggravated by military service, and a nexus between these factors and the current disability.¹⁶¹ Such a claim would then be a “plausible claim,” and further, its grounds must be based upon competent medical evidence, not the veteran’s contention.¹⁶² The evidence will then be scrutinized by the Daubert standards¹⁶³ and Federal Rule of Evidence §702.¹⁶⁴

In 2001 the Secretary of the Department of Veterans Affairs released a decision that there was “no positive association between” DU exposure and a panorama of acute and chronic diseases, and cancers.¹⁶⁵ The Secretary had been tasked by Congress¹⁶⁶ to find “credible evidence” utilizing diverse National Academy of Science Institute of Medicine studies.¹⁶⁷ Congress subsequently modified the relevant federal statute in 2006 and 2008, giving the Secretary of Defense broader autonomy to determine certain combat disease components.¹⁶⁸

“radiogenic disease” as listed in 38 C.F.R. § 3.311(b); or a malady was incurred or aggravated
¹⁵⁸ See Rucker, *supra* note 152, citing *Ramey v. Brown*, 9 Vet. App. 40, 44 (Vet. App. 1996) (radiation exposure cancer proven by list of 38 U.S.C. § 1112(c) presumed service connected; a by service must trace its cause to a condition or event, as per *Combee v. Brown*, 34 F. 3d 1039, 1043 (Fed. Cir. 1994)).

¹⁵⁹ 38 U.S.C § 1112(c) (2009).

¹⁶⁰ 38 C.F.R. § 3.311(b) (2009).

¹⁶¹ See *Combee*, *supra* note 158 at 1043.

¹⁶² See *Davis*, *supra* note 155.

¹⁶³ See *Rucker*, *supra* note 152 at 73.

¹⁶⁴ *Id.*

¹⁶⁵ Secretary Anthony Principi, *Illnesses Not Associated With Service in the Gulf during the Gulf War*, 66 Fed. Reg. 35702 (Department of Veterans Affairs, July 6, 2001). Juxtapose this directive with Federal Statute 38 U.S.C. § 1112(c), and 38 C.F.R. § 3.311(b). Both delineate a formidable list of cancers and disease conditions attributable to military service.

¹⁶⁶ Persian Gulf War Veterans Act, Pub. L. No. 105-277, 112 Stat. 2681 (1998) (“GWVA”), and Veterans Programs Enhancement Act, Public Law 105-368, 112 Stat. 3315 (1998) (“VPEA”).

¹⁶⁷ *Supra* note 161 at 35705 (found no positive association between lung cancer at high levels of DU cumulative exposure, bone cancer, nervous system disease, etc.).

¹⁶⁸ 10 U.S.C. 1074f (mandates a medical tracking system for military deployed overseas, includes Legislative history of amendments in 2006 and 2008, broadens the discretion of the Secretary of Defense to define Gulf War Illness and its neurological manifestations); and see all NAS/IOM studies, available at http://www7.nationalacademies.org/ocga/Other/Congress_Mandated_Reports_105.asp.

C. Federal litigation

Veterans' court actions and legal remedies for Gulf War injuries have been argued and approached from the perspective of the Feres doctrine,¹⁶⁹ the *Stanley* case,¹⁷⁰ and the lessons of Agent Orange.¹⁷¹ A watershed depleted uranium exposure case, recently decided, involved the Feres doctrine, the Federal Tort Claims Act,¹⁷² the confirmed Risk Level I depleted uranium exposure of the New York National Guard's 442d Military Police, and the consequences for a post-exposure conceived birth-deformed child.¹⁷³ The federal government was determined immune, and the family members' claim denied as the soldier's cause was dismissed.

The British Ministry of Defense acknowledged the hazard of depleted uranium as a component of Gulf War Syndrome, a position supported by its Pensions Appeal Tribunal.¹⁷⁴

IX. FUTURE IMPACT OF DU ON FLORIDA NATIONAL GUARD VETERANS

A. Cumulative nature of DU.

The effects of DU, its potential to sequester in the veteran's body, and its potential to incite disease states in veterans or their offspring was emphasized to affirm the need for present, continual and future monitoring of Florida National Guard troops to

¹⁶⁹ *Feres v. United States*, 340 U.S. 135 (1950) (government sovereign immunity is not waived for servicemen in service related injuries in negligence actions).

¹⁷⁰ *United States v. Stanley*, 483 U.S. 669 (1987) (secret LSD testing on troops and government's culpability for resulting injuries).

¹⁷¹ Kevin J. Dalton, *Gulf War Syndrome: Will the Injuries Of Veterans and Their Families Be Redressed?* 25 U. BALT. L. REV. 179 (1996) (disserts government and contractor liabilities and past federal conduct).

¹⁷² 28 U.S.C. §§ 1346(b), 2401(b), 2671-2680 (2009) in this multi-party action.

¹⁷³ *Matthews v. United States*, 2009 U.S. App. Lexis 3362, (2d Cir. 2009); *and see Matthews v. United States*, 452 F. Supp. 2d 433 (S.D.N.Y. 2006).

¹⁷⁴ Ministry of Defense, *Gulf Veterans Illnesses*, (Nov. 24, 2005), available at http://www.parliament.the-stationary-office.co.uk/pa/cm200506/cmhansrd/vo051124/wmstext/51124mo1.htm01.html_spm1 (noted the Pensions Appeal Tribunal opinion which consummated in the successful claim by veteran Daniel Martin on Oct. 31, 2005).

prevent a medical crisis in this population.¹⁷⁵ Scientists contend that DU usage is cumulative in the environment where it has been used, although they minimize the DU compared to other effects of war.¹⁷⁶ DU was dispersed through the environment up to a 150 meters radius around impacted hard targets.¹⁷⁷ Aerosolized and small particles of DU¹⁷⁸ and burning depleted uranium munitions can be carried great distances by wind currents.¹⁷⁹ Contemporary studies have been able to differentiate between plume (fire) and puff (impact) dispersion of DU,¹⁸⁰ and serve to emphasize the dispersal and imprecise spread of fine-particle depleted uranium.

B. Absence of U.S.-Iraq clean-up program.

It is alleged that a radioactive depleted uranium cloud lifted as a result of the 2003 “shock and awe” bombardment of Iraq drifted in air currents from the Middle East to arrive over the British Isles nine days later, setting off radiation monitors countrywide.¹⁸¹

Depleted uranium weapons were used extensively in concentrated areas in GWI, and there was scattered and incomplete clean-up of residual DU contamination that remained in Iraq and which was integrated into the environment. To address this reality,

¹⁷⁵ Milaninia, *supra* note 111; and see Dalton, *supra* note 171. There may be lessons from DU usage in the Balkans and post-exposure maladies in NATO troops, where statistical analysis, coupled with the laboratory isotope urine testing, should provide clarity for FNG troop exposures.

¹⁷⁶ Steve Fetter & Frank von Hippel, *After the dust settles: uranium munitions*, 55 BULL. ATOM. SCI. 42 (1999) (DU could cause an extra 10 cancer deaths per year per one million of the Iraqi population).

¹⁷⁷ UNEP Desk Study Iraq, *supra* note 17 at 82; and see Handling Procedures, *supra* note 85 (mandates a 366 meter safety zone around DU ordnances in the battlefield).

¹⁷⁸ Royal Society Part II, *Annexe III Assessments of depleted uranium intakes from the use of depleted uranium on the battlefield*, *supra* note 51 (references the Camp Doha fire and contends that DU in air only spreads meters, yet tested soldiers up to 10 kilometers distant, cites several times to Fetter *supra* note 176).

¹⁷⁹ OSAGWI *supra* Tab-G, *DU exposure in the Gulf War*, *supra* note 10 at 8-9, (citing the Camp Doha DU munitions fire in Kuwait).

¹⁸⁰ C. Mitsakou et al., *Modeling of the dispersion of depleted uranium aerosol*, 84 HEALTH PHYS. 538, (2003).

¹⁸¹ Chris Busby & Saoirse Morgan, *Did the use of uranium weapons in Gulf War 2 result in contamination of Europe? Evidence from the Measurements of the Atomic Weapons Establishment, Aldermaston, Berkshire, U.K.*, EURO. BIOL. BIOELEC., Feb. 16, 2006, at 650-68; and see Mark Gould and John Ungood-Thomas, *UK radiation jump blamed on Iraq shells*, THE SUNDAY TIMES, Feb. 19, 2006 (nine days after the shock and awe bombardment of Bagdad, U.K. atmospheric radiation detectors in Aldermaston, Berkshire, registered significant increases in atmospheric radiation; denied by Brian Spratt, author of a Royal Society report).

the UN sent an eight-man team to Iraq in 2001.¹⁸² The team noted contaminated military vehicles were brought to area metal recycling centers where all metals were mixed, melted, and reused.¹⁸³ These sites and ammunition dumps were acknowledged depleted uranium-exposure “hot spots” in Iraq.¹⁸⁴

Depleted uranium appeared in GWI as friendly-fire in diverse and unexpected locales.¹⁸⁵ Small particles, penetrators, DU-damaged buildings, and military and civilian vehicles, things of war, water sources, and DU “dust” remain in theater.¹⁸⁶

C. Implication within international treaties

The Pentagon has no plans for depleted uranium recovery and clean-up programs,¹⁸⁷ and this DU use-and-discard policy has been challenged by ethicists stressing international law¹⁸⁸ and doctrines such as the precautionary principle which could steer military policy regarding environmental health.¹⁸⁹ Law Reporter articles argue that the unclear risks of DU radioactive contamination operate within the Geneva Protocol and Hague Convention and mandates proof that DU will not cause multi-

¹⁸² Clare Kapp, *WHO Sends Team to Iraq to Investigate Effects of Depleted Uranium*, 358 LANCET 737 (2001) (WHO Regional Office for the Eastern Mediterranean, team led by Abdelaziz Saleh, Aug. 27, 2001).

¹⁸³ UNEP, *Assessment of Environmental “Hot Spots” in Iraq* (2005), available at http://postconflict.unep.ch/publications/Iraq_ESA.pdf.

¹⁸⁴ *Id.*

¹⁸⁵ OSAGWI *Gulf (II)*, *supra* note 10 at Tab-F, 2, and *End Note* 228. From a distance of 3 miles, the USS Missouri suffered a 30mm DU friendly-fire strike from the USS Jarrett. The DU penetrator transited totally through the superstructure of the vessel’s deck cabins and disappeared into the sea on the far side, typifying the force and distribution capacity of a (small caliber) DU round, its ability to strike the target, and disappear into an environment anywhere—aquatic or terrestrial.

¹⁸⁶ Fetter, *supra* note 176.

¹⁸⁷ Alex Kirby, *US Rejects Iraq DU Clean-Up* (BBC News Online Interview, April 14, 2003), available at <http://news.bbc.co.uk/2/hi/science/nature/2946715.stm> (Col. David Lapan stated “no long term effects from depleted uranium,” and no clean-up plans).

¹⁸⁸ Mark D. Sameit, Note: *Killing and Cleaning in Combat: A Proposal to Extend the Foreign Claims Act to Compensate for Long-Term Environmental Damage*, 32 WM. & MARY ENVTL. L. & POL’Y REV. 547 (Winter 2008).

¹⁸⁹ Lesley Wexler, *Limiting the Precautionary Principle: Weapons Regulation in the Face of Scientific Uncertainty*, 39 U.C. DAVIS L. REV. 459 (Feb. 2006).

generational harm.¹⁹⁰ International agencies have performed post-conflict DU assessments and clean-up.¹⁹¹

Residual depleted uranium will persist in areas within the current war theaters for generations, impacting indigenous population and foreign deployed troops.¹⁹² Depleted uranium's deleterious effect upon the current and future Iraqi population has been estimated.¹⁹³

D. Continual veteran monitoring recommendation

Florida National Guard, if redeployed in any war theater where DU has been used, will be exposed to DU in some degree.¹⁹⁴ Such redeployment to Iraq, Afghanistan, Kosovo or any area where DU has been used could place these troops in Risk Level statuses.

Repeating: Risk Level I exposure would be from friendly-fire shrapnel wounds, a remote possibility.¹⁹⁵ Risk Level II exposure happens when/if the troops contact their own DU friendly-fire damaged military vehicles or DU armaments itself.¹⁹⁶ Risk Level III would apply to DU dust inhalation downwind from fires, hard-target impact, or

¹⁹⁰ Robert Thompson, *Radioactive Warfare: Depleted Uranium Weapons, the Environment and International Law*, 36 ENVTL. L. REP. 10474 (June 2006) (explains contemporary executive actions and the U.S. governments interactions with international treaties).

¹⁹¹ WHO Team to Iraq, *supra* note 182; and UNEP Iraq "hot spots", *supra* note 183; and see C. Papastefanou, *Depleted Uranium in Military Conflicts and the Impact on the Environment*, 83 HEALTH PHYS. 280-282 (2002).

¹⁹² IAEA, Features, *supra* note 8.

¹⁹³ See Fetter, *supra* note 176.

¹⁹⁴ Dan Fahey, *The Final Word on Depleted Uranium*, 25 FLETCHER F. WORLD AFF. 189, 194 (2001). Also, the DU is a "settled" heavy metal contaminant of the soil, plant, animal and aquifer of these combat areas.

¹⁹⁵ OSAGWI *Gulf (II)*, *supra* note 10, at Tab-G, 1-3 (Risk Level I), and Tab-F. In the Persian Gulf War, Air Force A-10 Warthog war plane, uses 3,100 rounds per mission of 30mm ammunition, which fired a combat mixture of 5 DU armor piercing incendiary rounds: 1 high explosive Incendiary; see also UNEP *Depleted Uranium in Kosovo*, 116-118, *supra* note 17 (in Kosovo the A-10 used a 30mm DU/ATI tracer mix of as much as 5:1, or as little as 5:8).

¹⁹⁶ OSAGWI *Gulf (II)*, *supra* note 10, at Tab-F (Risk Level II).

incidental exposures in contaminated locales.¹⁹⁷

X. CONCLUSION.

Depleted uranium is radioactive and a toxic heavy metal, potentially dangerous in several aspects. Persian Gulf War and Bosnia-Kosovo veterans, Operation Enduring Freedom, Operation Iraqi Freedom, and Kosovo troops and veterans all could potentially receive some level of in-theater DU exposure. Department of Defense and its military branches, its directives, regulation, and protocols frequently are not statutory law.¹⁹⁸ Federal statutory laws regarding military DU use, handling controls and clean-up, veterans' exposure, testing methods, and risk acknowledgement have been frustrated.

Florida, following the precedent of several other states, could legislate depleted uranium information distribution, pre-exposure training compliance, post-exposure testing, future veteran monitoring, and outreach for its National Guard troops and veterans. Such legislation can be effected with minimal cost. The legislation would be a popular cause. Successful legislation would acknowledge the responsibility of the Department of Defense and the Veterans Health Administration programs as first-line care providers for Florida National Guard troops and veterans injured by DU exposure.

Such state legislation would make as statutory law the utilization of the Department of Defense and Veterans Health Administration programs, regulations, and procedures assuring that Florida would provide an additional safeguard for its citizen-soldier and would supplement federal deficiencies in soldier and veteran care. Florida's National Guard troops and veterans warrant the best care available to prevent or alleviate problems where problems exist or may exist.¹⁹⁹

¹⁹⁷ *Id.*; and see Fetter, *supra* note 172 (noting DU persistence in environment with minimal cancer risks).

¹⁹⁸ Handling Procedures, *supra* note 85.

¹⁹⁹ Milaninia, *supra* note 110.

The stories, faces, and sufferings of veterans and their families impacted by depleted uranium exposure escape particularization or recognition. Public acknowledgement of the tragic consequences of depleted uranium exposure is rare. In the case of Dustin Brim and his still-grieving mother Lori, it was her personal efforts confronted with her son's unheard of terminal illness that resulted in local publicity and notice of Dustin's condition and subsequent death.²⁰⁰ Dustin Brim's story, even with its scant public distribution was an atypical occurrence.

More typical is the anonymous situation of David Gallon, a 45 year old, eleven year regular Army veteran from Madison County, Florida. Gallon served in the Persian Gulf War, was exposed to Saddam Hussein's oil well fires and possibly U.S. military depleted uranium.²⁰¹ In 2009, Gallon was diagnosed with metastatic lung cancer, service related according to the Veterans Health Administration. Gallon has no remembrance of a pre-termination physical examination, or medical testing relevant to any Gulf War issue or hazard exposure.

Dustin Brim, veteran of Operation Iraqi Freedom, and David Gallon, Persian Gulf War veteran, harbingers the gravity of service in our theaters of modern warfare. These Florida veterans are Cassandra-type prophets of the need for health monitoring of Florida National Guard stationed in Iraq, and Afghanistan. Protective legislation enactment behooves Florida's own National Guard servicemen and women.

²⁰⁰ *Supra* note 122, and see Lonnie D. Story, *Without a Shot Fired: The Dustin Brim Story* (Sept. 11, 2006) available at http://www.populistamerica.com/without_a_shot_fired_the_dustin_brim_story (site links to other articles by the author about Dustin Brim, depleted uranium, and the consequences of war).

²⁰¹ The Veterans Health Administration is treating his cancer. David has not been told what instigated his malignancy.

1 **ADDENDUM: PROTOTYPE FLORIDA DEPLETED URANIUM LEGISLATION**

2 **Synopsis:** A bill to be entitled

3 An act relating to Florida National guard veterans to safeguard the health of these
4 veterans by assisting them in obtaining federal treatment services, including best practice
5 health screening tests capable of detecting low levels of depleted uranium. The
6 Legislature finds and declares all of the following:

7
8 **NOTICE:** [A> UPPER CASE TEXT WITHIN THESE SYMBOLS IS ADDED <A]

9
10 **TEXT:** Be It Enacted by the Legislature of the State of Florida

11
12 Section 1. [A> DEPLETED URANIUM TESTING DESCRIPTION. <]

13
14 [A> (1) Depleted uranium is a chemically toxic, radioactive heavy metal that is created as
15 waste during nuclear fuel and weapons production. <A]

16
17 [A> (2) Depleted uranium, has a radioactive half-life of four and one-half billion years
18 (U-238), emits radioactive particles that may cause kidney and lung damage, may cause
19 cancer when inhaled or ingested, and may cause genetic mutations that are carried to
20 future generations. <A]

21
22 [A> (3) Depleted uranium munitions and armor have been used extensively by the United
23 States Armed Forces since the 1991 Gulf War. Veterans living in Florida who served in
24 combat theaters in the first Gulf War, and veterans who served after the first Gulf War
25 may have been exposed to depleted uranium in unknown doses with unknown
26 consequences to their health. <A]

27
28 Section 2. [A> DEPLETED URANIUM TESTING DEFINITIONS <A]

29
30 [A> (1) For the purposes of this Section, the following terms shall have the following
31 meanings: <A]

32
33 [A> (A) “Eligible member” means a member of the Florida Army National Guard or the
34 Florida Air National Guard who served in the Persian Gulf War, as defined in 38 USC
35 §101, or in an area designated as a combat zone by the president of the United States
36 during Operation Enduring Freedom or Operation Iraqi Freedom; <A]

37
38 [A> (B) “Veteran” means a person, male or female, resident of this state, who has served
39 in the active military, naval or air service of the United States during a time of war in
40 which the United States engaged and who has been released from such service otherwise
41 than by dishonorable discharge, or who has been furloughed to the reserve; <A]

42
43 [A> (C) “Depleted uranium” or DU means uranium containing less uranium-235 than the
44 naturally occurring distribution of uranium isotopes. <A]

45

46 [A> (2) On and after October first, two thousand ten, the Department of Veterans Affairs
47 and the Florida National Guard shall assist any eligible member or veteran who has been
48 experiencing health problems. Such problems may include exposure to toxic materials or
49 harmful physical agents such as depleted uranium. An eligible member or veteran who
50 has been assigned a Risk Level I, II or III for depleted uranium exposure by his or her
51 branch of service, is referred by a military physician, or has reason to believe that he or
52 she was exposed to toxic materials or harmful physical agents such as depleted uranium
53 during such service, in obtaining federal treatment services. <A]

54

55 [A> (A) Such treatment shall include, but not be limited to, a best practice health
56 screening test for exposure to depleted uranium using a bioassay procedure involving
57 sensitive methods capable of detecting depleted uranium at low levels and the use of
58 equipment with the capacity to discriminate between different radioisotopes in naturally
59 occurring levels of uranium and the characteristic ratio and marker for depleted uranium.
60 As more scientific reliable tests become available such test shall be included in the
61 treatment protocol. <A]

62

63 [A> (B) With the assistance of the Department of Veterans Affairs, the Florida National
64 Guard will provide information to veterans upon their discharge from active duty
65 regarding the health and safety issues concerning depleted uranium exposure, including
66 the types and efficacy of tests to detect depleted uranium exposure, the treatments
67 available for veterans affected by exposure to depleted uranium, and the federal and state
68 benefits that are available for veterans exposed to depleted uranium. <A]

69

70 [A> (C) Provide information to departmental staff, interested veterans organizations,
71 health care providers, and county veterans service officers regarding the effects of
72 depleted uranium exposure, the detection programs that are available to determine if a
73 veteran has been exposed to depleted uranium, the federal treatment programs that are
74 available to veterans who may have been exposed to depleted uranium, and the federal
75 and state benefits that are available to veterans who have been exposed to depleted
76 uranium. <A]

77

78 [A> (D) No Florida state funds shall be used to pay for such tests or such other federal
79 treatment services. <A]

80

81 [A> (3) On or before October first, two thousand ten, the Florida National Guard shall
82 submit a report to the chair of the senate veterans affairs committee and the chair of the
83 house's veterans' affairs committee on the scope and adequacy of training received by
84 members of the Florida Army National Guard and the Florida Air National Guard on
85 detecting whether their service as eligible members is likely to entail, or to have entailed,
86 exposure to toxic materials or harmful physical agents such as depleted uranium. <A]

87

88 [A> (A) The report shall include an assessment of the feasibility and cost of adding pre-
89 deployment training concerning potential exposure to depleted uranium and other toxic
90 chemical substances and the precautions recommended under combat and noncombat
91 conditions while in a combat theater or combat zone of operations. <A]

92

93 [A> (4)The legislature finds that pre-deployment health assessments and post-
94 deployment assessments and reassessments for evaluating Gulf War Veterans are
95 required under Federal statute, 10 U.S.C. §1074f. <A]
96

97 [A> (A) The legislature finds that Veterans Health Administration (VHA) Handbooks
98 outline the policies and procedures evaluating Gulf War veterans, including those who
99 served in Operation Iraqi Freedom, and Operation Enduring Freedom with possible
100 exposure to depleted uranium. <A]
101

102 [A> (B) Army Regulation 700-48 prescribes policy and procedures for the management
103 of equipment contaminated with depleted uranium or radioactive commodities. The
104 regulation applies to the Department of the Army, U.S. Army Reserve and Florida Army
105 National Guard. <A]
106

107 [A> (B) The legislature finds that many veterans who have served in the Persian Gulf
108 area since the 1990s and Afghanistan since 2002 have experienced health problems. <A]
109

110 [A> (C) The legislature declares that an examination of the medical issues and exposure
111 of troops to toxic materials or harmful physical agents such as depleted uranium should
112 be ascertained. <A]
113

114 [A> (D) The legislature also declares that assisting troops who are members of Florida
115 Army National Guard and the Florida Air National Guard who have been federalized and
116 sent to combat theater areas or combat zones and have returned home to Florida state is
117 warranted. <A]
118

119 [A> (5) With the assistance of the department of military affairs, to provide information
120 to veterans upon their discharge from active duty regarding the health and safety issues
121 concerning depleted uranium exposure, including the types and efficacy of tests to detect
122 depleted uranium exposure, the treatments available for veterans affected by exposure to
123 depleted uranium, and the federal and state benefits that are available for veterans
124 exposed to depleted uranium. <A]
125

126 [A> (A) Provide information to departmental staff, interested veterans organizations,
127 health care providers, and county veterans service officers regarding the effects of
128 depleted uranium exposure, the detection programs that are available to determine if a
129 veteran has been exposed to depleted uranium, the federal treatment programs that are
130 available to veterans who may have been exposed to depleted uranium, and the federal
131 and state benefits that are available to veterans who have been exposed to depleted
132 uranium. <A]
133

134 [A> (B) Create information on the Internet about the health effects of depleted uranium
135 exposure, the detection programs that are available to determine if a national guard
136 member or veteran has been exposed to depleted uranium, the federal treatment programs
137 that are available to those who may have been exposed to depleted uranium, and the
138 federal and state benefits that are available to those Florida National Guard members or
139 veterans who have been exposed to depleted uranium. <A]

ADDENDUM: PROTOTYPE FLORIDA DEPLETED URANIUM LEGISLATION

Synopsis: A bill to be entitled

An act relating to Florida National guard veterans to safeguard the health of these veterans by assisting them in obtaining federal treatment services, including best practice health screening tests capable of detecting low levels of depleted uranium. The Legislature finds and declares all of the following:

Be It Enacted by the Legislature of the State of Florida

Section 1. DEPLETED URANIUM TESTING DESCRIPTION.

- (1) Depleted uranium is a chemically toxic, radioactive heavy metal that is created as waste during nuclear fuel and weapons production.
- (2) Depleted uranium, has a radioactive half-life of four and one-half billion years (U-238), emits radioactive particles that may cause kidney and lung damage, may cause cancer when inhaled or ingested, and may cause genetic mutations that are carried to future generations.
- (3) Depleted uranium munitions and armor have been used extensively by the United States Armed Forces since the 1991 Gulf War. Veterans living in Florida who served in combat theaters in the first Gulf War, and veterans who served after the first Gulf War may have been exposed to depleted uranium in unknown doses with unknown consequences to their health.

Section 2. DEPLETED URANIUM TESTING DEFINITIONS

- (1) For the purposes of this Section, the following terms shall have the following meanings:
 - (A) “Eligible member” means a member of the Florida Army National Guard or the Florida Air National Guard who served in the Persian Gulf War, as defined in 38 USC §101, or in an area designated as a combat zone by the president of the United States during Operation Enduring Freedom or Operation Iraqi Freedom;
 - (B) “Veteran” means a person, male or female, resident of this state, who has served in the active military, naval or air service of the United States during a time of war in which the United States engaged and who has been released from such service otherwise than by dishonorable discharge, or who has been furloughed to the reserve;
 - (C) “Depleted uranium” or DU means uranium containing less uranium-235 than the naturally occurring distribution of uranium isotopes.

(2) On and after October first, two thousand ten, the Department of Veterans Affairs and the Florida National Guard shall assist any eligible member or veteran who has been experiencing health problems. Such problems may include exposure to toxic materials or harmful physical agents such as depleted uranium. An eligible member or veteran who has been assigned a Risk Level I, II or III for depleted uranium exposure by his or her branch of service, is referred by a military physician, or has reason to believe that he or she was exposed to toxic materials or harmful physical agents such as depleted uranium during such service, in obtaining federal treatment services.

(A) Such treatment shall include, but not be limited to, a best practice health screening test for exposure to depleted uranium using a bioassay procedure involving sensitive methods capable of detecting depleted uranium at low levels and the use of equipment with the capacity to discriminate between different radioisotopes in naturally occurring levels of uranium and the characteristic ratio and marker for depleted uranium. As more scientific reliable tests become available such test shall be included in the treatment protocol.

(B) With the assistance of the Department of Veterans Affairs, the Florida National Guard will provide information to veterans upon their discharge from active duty regarding the health and safety issues concerning depleted uranium exposure, including the types and efficacy of tests to detect depleted uranium exposure, the treatments available for veterans affected by exposure to depleted uranium, and the federal and state benefits that are available for veterans exposed to depleted uranium.

(C) Provide information to departmental staff, interested veterans organizations, health care providers, and county veterans service officers regarding the effects of depleted uranium exposure, the detection programs that are available to determine if a veteran has been exposed to depleted uranium, the federal treatment programs that are available to veterans who may have been exposed to depleted uranium, and the federal and state benefits that are available to veterans who have been exposed to depleted uranium.

(D) No Florida state funds shall be used to pay for such tests or such other federal treatment services.

(3) On or before October first, two thousand ten, the Florida National Guard shall submit a report to the chair of the senate veterans affairs committee and the chair of the house's veterans' affairs committee on the scope and adequacy of training received by members of the Florida Army National Guard and the Florida Air National Guard on detecting whether their service as eligible members is likely to entail, or to have entailed, exposure to toxic materials or harmful physical agents such as depleted uranium.

(A) The report shall include an assessment of the feasibility and cost of adding pre-deployment training concerning potential exposure to depleted uranium and other toxic chemical substances and the precautions recommended under combat and noncombat conditions while in a combat theater or combat zone of operations.

(4) The legislature finds that pre-deployment health assessments and post-deployment assessments and reassessments for evaluating Gulf War Veterans are required under Federal statute, 10 U.S.C. §1074f.

(A) The legislature finds that Veterans Health Administration (VHA) Handbooks outline the policies and procedures evaluating Gulf War veterans, including those who served in Operation Iraqi Freedom, and Operation Enduring Freedom with possible exposure to depleted uranium.

(B) Army Regulation 700-48 prescribes policy and procedures for the management of equipment contaminated with depleted uranium or radioactive commodities. The regulation applies to the Department of the Army, U.S. Army Reserve and Florida Army National Guard.

(C) The legislature finds that many veterans who have served in the Persian Gulf area since the 1990s and Afghanistan since 2002 have experienced health problems.

(D) The legislature declares that an examination of the medical issues and exposure of troops to toxic materials or harmful physical agents such as depleted uranium should be ascertained.

(E) The legislature also declares that assisting troops who are members of Florida Army National Guard and the Florida Air National Guard who have been federalized and sent to combat theater areas or combat zones and have returned home to Florida state is warranted.

(5) With the assistance of the department of military affairs, to provide information to veterans upon their discharge from active duty regarding the health and safety issues concerning depleted uranium exposure, including the types and efficacy of tests to detect depleted uranium exposure, the treatments available for veterans affected by exposure to depleted uranium, and the federal and state benefits that are available for veterans exposed to depleted uranium.

(A) Provide information to departmental staff, interested veterans organizations, health care providers, and county veterans service officers regarding the effects of depleted uranium exposure, the detection programs that are available to determine if a veteran has been exposed to depleted uranium, the federal treatment programs that are available to veterans who may have been exposed to depleted uranium, and the federal and state benefits that are available to veterans who have been exposed to depleted uranium.

(B) Create information on the Internet about the health effects of depleted uranium exposure, the detection programs that are available to determine if a national guard member or veteran has been exposed to depleted uranium, the federal treatment programs that are available to those who may have been exposed to depleted uranium, and the federal and state benefits that are available to those Florida National Guard members or veterans who have been exposed to depleted uranium.