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Rob White

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# Depleted uranium, state crime and the politics of knowing

ROB WHITE

*University of Tasmania, Australia*

## Abstract

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This article explores the use of depleted uranium (DU) munitions and armour in war, and its impact on environments, humans and other animals. Specifically, the concern is to describe the use of depleted uranium weapons in the Gulf (over two wars, within the space of sixteen years), and to trace the health and environmental implications of this use. The article then analyses the use of depleted uranium from the point of view of state crime, in relation to the issues of legitimacy and denial. This is followed by consideration of the relevance of such issues for a 21st-century critical criminology. The politics of knowing—when ‘knowledge’ is uncertain—is highlighted in discussion of the complexities of denial/affirmation surrounding the use of DU for war purposes.

## Key Words

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critical criminology • ‘denial’ • depleted uranium • ‘politics of knowing’ • scientific expertise • ‘state crime’

## Introduction

The aim of this article is to discuss the use of depleted uranium (DU) as a matter of concern for critical criminology because of its actual and potential hazards to people and environments. It may be a harmful substance, but DU is none the less employed in modern weaponry and has been extensively deployed in both the Gulf Wars (1991 and 2003) as well as in Bosnia, the Balkans and Afghanistan. In the first part of the article, I briefly outline the use of DU as a war tool, and some of the effects of its use on combatants

and civilians alike. The discussion will mainly focus on its use in the Gulf region.

The second part of the article refers to the concept of state crime in order to explore the manner in which DU seems to escape critical scrutiny as a public, and potentially criminological, issue. One of the key features of state crime is in fact denial on the part of the State that an act or omission is a crime. The main concern here, therefore, is to provide an extended analysis of the varying ways in which the harms associated with use of DU have been denied by official state agencies.

The third section considers the harms perpetrated by DU use from the point of view of a critical criminology perspective. The harms and denial of harm associated with DU are considered gross violations of basic principles of social and ecological justice. But how are we to know this? What knowledge claims and affirming statements can critical criminology bring to bear upon the issue? What guides to action are made possible by critical criminological analysis? Answering these questions forces us to (re)consider the nature of evidence, to acknowledge the position of different stakeholders in regards to the issue(s) and to identify the principles that can be drawn upon in devising suitable intervention strategies.

### **Depleted uranium as a war tool**

The use of depleted uranium as a war tool has its origins in both the intrinsic properties of depleted uranium as a material substance, and in the economic and social circumstances surrounding the stockpiling of depleted uranium. In the first instance, to understand its usefulness for war, we need to understand what depleted uranium actually is.

Depleted uranium refers to that uranium remaining after removal of the enriched fraction through its use as reactor fuel and in nuclear weapons. Natural uranium is partially altered by the extraction of U-235 (the radioactive isotope that is enriched as part of use in nuclear power plants). The residue or tails is a radioactive waste that constitutes the depleted uranium. To put it simply, most nuclear reactors require uranium in which the U-235 content is enriched from its naturally occurring concentration. The uranium remaining after removal of the enriched fraction is referred to as depleted uranium.

DU is considered a waste product. It is weakly radioactive, with a radiation dose of about 60 per cent of that provided from purified natural uranium with the same mass (World Health Organization, 2003). Various international organizations and contemporary scientific research offer the view that the specific hazards posed by DU are inadequately understood. The risks posed by low-level exposure, and the health effects of low-level radiation, are subject to much debate. Nevertheless, there is growing evidence that use of DU is closely associated with higher than normal levels of human illness (Durakovic, 2001).

On the other hand, DU is also a source material, one that can be used as feed material for advanced laser enrichment processes among other purposes. This has generated some dispute over whether or not DU ought to be legally classified as waste, since to do so has important implications vis-à-vis importation licensing arrangements (see DUSK, 2006). The legal definition of DU has ramifications for its storage, further use, transport, sale and disposal.

It was estimated in 2001 that existing stockpiles of DU consisted of over 600,000 metric tons of depleted uranium hexafluoride (Durakovic, 2001: 130). Additional large quantities of depleted uranium are constantly being produced, even though the issue of storage and disposal have not yet been satisfactorily addressed. Over 50,000 tonnes of depleted uranium is produced each year. In 2005, world stock was estimated at about 1.2 million tonnes (Uranium Information Centre, 2005).

Depleted uranium is a very heavy substance. Due to its high density, about twice that of lead, DU has a number of peaceful applications. It is used as counterweights or ballast in aircraft, radiation shields in medical equipment used for radiation therapy and containers for the transport of radioactive materials (World Health Organization, 2001).

### *DU in combat situations*

DU is also used for military purposes. This is so for two key reasons. First, because of its density, it is used for defensive armour plate. For the same reason, it is used in armour penetrating military ordnance. The hardness of the substance thus makes it suitable as a war technology.

A second reason why DU is favoured for military use relates to its physical property of burning slowly at certain temperatures. Its pyrophoric property refers to the fact that when heated in air at 500 degrees centigrade, DU oxidizes slowly, sustaining combustion. In other words, in combat situations, DU ordnance is effective not only because it can pierce armour plating better than other substances, but as it does so it also burns on contact. When a DU projectile strikes an armoured target, it does not flatten on contact but instead penetrates and 'self sharpens' as it passes through the armour. This happens because as the DU projectile is penetrating its target, its outer layer catches fire, creating a very fine radioactive dust, essentially lubricating the remaining projectile, helping it to penetrate further. It has been estimated that, upon impact, about 30 per cent of the projectile atomizes and burns to uranium oxide dust (Uranium Information Centre, 2005). This is, in essence, a radioactive gas comprised of extremely minute particles that, when attached to dust, can move wherever the wind blows.

Another reason for the extensive use of DU in armaments and ordnance in recent years is the price and availability of DU. Basically DU is provided to the military manufacturers at low cost or 'for free' by stockpilers. As indicated above, there are huge and growing stockpiles of the substance worldwide. Suppliers have the apparent attitude of 'waste not, want not', since

they are very amenable to providing the military apparatus with as much DU as they want to utilize. Thus, DU has been given away to military industries at no cost to the manufacturer of arms and ammunition. In its own way, this represents one means to dispose of what is legally considered 'waste'. It also ensures the transnational movement of the waste when military operations take place in other parts of the world—such as the Middle East and the Balkans—which do not produce such products (and waste) to begin with.

Military applications of DU include tank armour and the removable armour of combat vehicles that are also hardened with DU plate. Armour-piercing weapons include guns such as the 20mm Phalanx gun in the navy, through the 30 mm gun in A-10 aircraft, to 120mm and large tank barrels. These are solid uranium projectiles (Medical Association for Prevention of War, Australia, 2003).

DU aerosol particles are much more hazardous to humans than naturally occurring uranium particles in soil or food. While deadly, DU aerosols are also largely undetectable to the senses. They also have been shown to be very light and to travel large distances from their release point—at least 42 kilometres under relatively controlled circumstances (see Bertell, 2006).

It has been estimated that, at a minimum, over 300 metric tonnes of depleted uranium were fired during the first Gulf War of 1991. Some 11 tonnes were used in the Balkans in 1999 (Uranium Information Centre, 2005). It has been estimated that 1000–2000 tonnes of depleted uranium were used by coalition forces in the 3-week conflict marking the second Gulf War in 2003 (Medical Association for Prevention of War, Australia, 2003; DUSK, 2006).

### *DU effects on combatants and citizens*

The damage caused by uranium weapons cannot be contained to 'legal' fields of battle; they continue to act after the conclusion of hostilities; they are inhumane because they place the health of non-combatants, including children and future generations, at risk; and they cannot be used without unduly damaging the natural environment.

(Medical Association for Prevention of War, Australia, 2003)

Most of the depleted uranium 'lost' in the Gulf from 1991 to the present has been converted into aerosol, although shrapnel injuries have also been recorded. In its gas form, DU can reside in a person's lungs for years. This is not insignificant, given the specific properties of DU as a chemical toxic and radioactive hazard.

Insoluble uranium, such as was released in the [first] Gulf War, is regulated by its radiological properties, and not its chemical properties. Because of its slow absorption through the lungs and long retention in body tissues, its primary damage will be due to its radiological damage to internal organs rather than chemical damage to the renal system. Obviously, both types of damage occur simultaneously, therefore it is a matter of judgement which severe

damage, radiological or chemical, occurs at the lowest dose level. However, with the lengthening of the time during which the contaminant resides in the body and the low overall dose, the risk of cancer death becomes greater than risk of significant damage to the renal system.

(Bertell, 1999)

Evidence of this is found in episodes related to the Gulf War Syndrome (and, indeed, the Balkans Syndrome) affecting soldiers, on all sides, who participated in the first (and now second) Gulf War. It has been estimated that 82 per cent of veterans of the first Gulf War handled DU or had entered into captured Iraqi vehicles which had been contaminated with DU, and that many took home DU fragments as war souvenirs (Bertell, 2006). By 1999, it was reported that:

In the US over one-third of the 600,000 veterans deployed in the Gulf have sought help from Veterans' Administration hospitals; in Britain, 8,000 of the 29,000 troops are ill and over 400 have died ... A study of cancers and leukaemias among 14,000 Iraqi soldiers who had been in the heavily bombarded area around the southern town of Basra showed chilling increases; for example, ten cases of lymphomas in 1991 and 106 in 1996. Brain cancer too showed a startling rise; one case in 1991 and 40 in 1996.

(Arbuthnot, 1999)

Evidence is also found in the suffering of Iraqi people who were caught up in the war. According to Dr Jawad Al-Ali, a cancer specialist and member of Britain's Royal College of Physicians:

The dust carries death. Our own studies indicate that more than 40 per cent of the population in this area [Basra] will get cancer in five years' time to begin with, then long afterwards. Most of my own family now have cancer, and we have no history of the disease. It has spread to the medical staff of this hospital. We are living through another Hiroshima.

(quoted in Pilger, 2001)

What readers should note about this quotation is that it was recorded in 2001, two years before the second Gulf War, which produced much more in the way of DU and thus greater levels of contamination. Studies undertaken by four universities in Mosul in northern Iraq showed a fivefold increase in cancers after 1991. Estimates based on contemporary projections in 1998 were that if cancers were to continue on the upward curve, 44 per cent of the population would develop cancer within 10 years (Arbuthnot, 1999). Again, it needs to be emphasized these estimates were made before the second Gulf War.

## **Depleted uranium, state crime and denial**

The legality of the second Gulf War remains disputed and unsettled (see, for example, Kramer and Michalowski, 2005). It was certainly started on false

pretences, namely the supposed presence of weapons of mass destruction under the control of dictator Saddam Hussein. For present purposes, however, the concern is not with the legality or otherwise of the war, but the crimes committed in and as part of the war effort.

Specifically, if DU is as harmful as alleged above, if it constitutes an indiscriminate weapon of mass destruction and if knowledge of its potential hazard was known in advance (especially ahead of the second Gulf War), then one could well argue that its (continued) use ought to be considered a war crime—a crime against humanity perpetrated by particular nation-states. This implies criminal action and criminal responsibility. It also implies that those responsible for the violation also take responsibility to repair the harm associated with the use of DU in weapons.

### *Nature of state crime*

The authority vested in the State means that it has an intrinsic capacity to do harm. The question of the legitimacy of the State—the extent to which its actions are within its political mandate and receive the approval of the citizenry—is therefore central to how any harms associated with the State are interpreted. Broadly speaking, state crime refers to crimes involving the State acting against its own citizens, or against the citizens of another state as part of inter-state conflict. Definitions of state crime are varied. This is mainly because descriptions of state crime cannot rely upon strict legal definitions in so far as such definitions derive from the State itself. It remains the case that who does the defining and what is defined as a crime are intrinsically linked to issues of legitimacy and to the scope of analysis (see Green and Ward, 2004; Hillyard et al., 2004; Rothe and Friedrichs, 2006).

It has been suggested that there should be a deviance-based definition of state crime, one that involves some degree of subjectivity. Green and Ward (2000, 2004), for example, argue that state crime should be defined as ‘state organisational deviance involving the violation of human rights’ (2000: 101). To determine whether or not a state has committed a crime requires the involvement of citizens as witness or audience, in cases of acts or omissions that violate human rights.

Alternatively, Kauzlarich et al. (2003) argue that a holistic account and definition of state crime would include the following key elements:

- generates harm to individuals, groups and property;
- is a product of action or inaction on behalf of the State or state agencies;
- the action or inaction is related directly to an assigned or implied trust/duty;
- is committed or omitted by a governmental agency, organization or representative; and
- is done in the self interest of (a) the State itself or (b) the elite groups controlling the State.

Attempts to explore and explain state crime have in recent years stressed the importance of processual accounts of state action and inaction. For the purposes of identification and classification of the many different types of state crime, Kauzlarich et al. (2003) have developed what they call a 'complicity continuum of state crime'. The point of this model is to explicate differences in state behaviour according to the extent to which harm is the result of deliberate action. At one end of the continuum, state crimes such as genocide result from the conscious goal-directed activity of the State, while at the other end they result from a failure to act against preventable harm such as the acceptance of inequality and the associated social problems that result from this.

The use of DU is very much an explicitly commissioned act on the part of participating states. It has and continues to cause harm and to violate basic human rights. Its use serves the interests both of military planners and civilian suppliers, as well as bolstering the firepower of the key imperialist nation-state, namely the USA (and allies), in its attempts to exert direct rule in the Middle East.

Another way in which processual accounts have been used is in evaluating the overall human rights performance of a state over time. For instance, Ward and Green (2003) describe a process whereby states may be involved in either a 'virtuous' spiral or a 'vicious' spiral in relation to gross violations of human rights. Each spiral makes reference to the dynamic ways in which norms about the institutionalization of human rights are reinforced or abandoned, depending upon the particular political context. The virtuous spiral, for example, may involve a process whereby

human rights violations are labelled as deviant by domestic and later by transnational civil society in a mutually reinforcing process and, as a result, human rights norms are gradually adopted as criteria of the state's legitimacy. Human rights violations become illegitimate, in the process, *because* they are successfully labelled as state crimes.

(Ward and Green, 2003: 86, emphasis in original)

Such an analytical approach provides insight into how and why particular nation-states change their practices over time, either away from human rights violations or towards more intense ones. It also provides a guide to how nation-states do what they do to avoid being labelled human rights violators. This takes us into the realm of the politics of denial.

Violations of human rights are justified by states in a number of ways. One of the most common is that they are in the 'national interest' and that, while some people may have to suffer, the net result will be for the benefit of the majority. This type of ideological smoke-screen is used frequently as a means to justify what is wrong—namely, the systemic and intensive violation of human rights and democratic processes. Those who expose such violations are often accused of being disloyal, treasonous and ignorant of the 'real threat'. In such ways, a form of 'prescriptive patriotism' may be enforced as a means to stifle alternative viewpoints, especially in times of

war (O'Leary and Platt, 2001). This observation is highly relevant in regards to questioning the use of depleted uranium in the Gulf Wars and in highlighting the negative health aspects, the lack of concern for the Iraqi people and the nature of the war mandate itself.

One of the problems in dealing with and discussing state crime is that it is not only governments and perpetrators who deny its existence but citizens frequently do so as well (Cohen, 1993). Cohen (2001) provides the most systematic analysis of how it is that, contrary to UN Conventions and everyday moral standards, governments deny their responsibility for acts such as genocide, torture and massacres—and how so often ordinary people allow this denial to occur. Appeals to national loyalties, ethnic identifications and simply following orders are only some of a wide range of justifications put forward to justify the unjustifiable. In-depth analysis of the 'culture of denial' (Cohen, 2001) is one of the important tasks for a criminology that wishes to dissect and expose the nature of state crime. Along the way there are bound to be uncomfortable moments. This is because criminologists themselves are implicated in this culture.

For example, consider the issue of the Gulf War(s) and how each individual relates to the rightness or wrongness of their country's involvement (or non-involvement). This entails a political and moral value judgement, one that is heavily influenced by personal factors, social contexts, flow of information and analytical interpretations. Yet, whether in favour of the war(s) or opposed to it, to remonstrate against the use of DU adds an interesting layer of complexity and responsibility. For those in support of a nation-state's military action, there is pressure to conform to the war effort and to be 'loyal' to the cause (i.e. relatively uncritical of things related to this cause). For those opposed, the main game is the anti-war movement, and issues such as DU weapons may be mobilized towards this end (i.e. the issue is used for instrumental purposes). Not only does one's political and ideological perspective colour how events are interpreted, it also shapes how an individual's interpretation of events is interpreted, and evaluated, by those around them. This, also, can make discussion of DU weapons intensely complicated, as who is denying what varies depending on vantage point. At a minimum it requires space for dialogue and reflection.

State crime does not occur in a vacuum. A critical question for contemporary criminology is to what extent and in what ways criminology itself sustains different sorts of state crime, as well as how best it might contribute to addressing it (see also Hillyard et al., 2004; Tombs and Whyte, 2004). For example, silence on the part of criminology is, in itself, a form of response. How states cover up illegal and criminal acts, how they deny wrongdoing and how they absolve themselves of responsibility for harming others are important topics for research and investigation. So too, the 'culture of denial' pertaining to state crime and associated harms has implications for the role and activities of criminology—as handmaiden of the State, or public critic and agent of change (see Chancer and McLaughlin, 2007).

### *Denial of responsibility*

Whatever the name of the illness, the fact remains that 15% to 18% of several hundred thousand of Desert Storm veterans are sick and over 25,000 are dead, regardless of the official statements of various Departments of Defense and Ministries of Defence that no unique illness can be associated with the Operation Desert Storm.

(Durakovic, 2001: 132)

The concept of denial is a familiar one in mainstream criminology, thanks to the work of Sykes and Matza (1957) on how ordinary delinquents invoke accounts that neutralize the moral bind of the law. This analytical framework has been used quite effectively and usefully to interrogate the actions and denials of white-collar and corporate criminals (Rosoff et al., 1998), as well as instances of state crime (Cohen, 2001). Typically, the usual list of denials includes denial of responsibility, denial of injury, denial of the victim, condemnation of the condemners and appeal to higher loyalties. Many of these elements are present in 'official' efforts to de-legitimize criticisms of the use of DU and to avoid responsibility for any potential harm or wrongdoing. A review of literature dealing with DU use in the Gulf Wars reveals the following kinds of denials.

### *Outright denial*

Depleted Uranium has not affected the health of Gulf War veterans.

(US Department of State, 2006)

In 2001, the UN Environment Program examined the effects of nine tonnes of DU munitions having been used in Kosovo, checking the sites targeted by it. UNEP found no widespread contamination, no sign of contamination in water or the food chain and no correlation with reported ill-health in NATO peacekeepers. A two-year study by Sandia National Laboratories in USA reported in 2005 that consistent with earlier studies, reports of serious health risks from DU exposure during the 1991 Gulf War are not supported by medical statistics or by analysis.

(Uranium Information Centre, 2005; see also WHO, 2001, 2003)

On 9 January, 2001, the British Defence Minister, John Spellar, told the House of Commons that the conclusion of many years of research showed 'there is no evidence linking DU to cancers or to the more general ill health being experienced by some Gulf verterans.

(quoted in Pilger, 2001)

### *Denial by comparison of least risk*

A General Accounting Office report to the US Congress on the dangers of DU munitions was to state that 'Army officials believe that DU protective

methods can be ignored during battle and other life-threatening situations because DU-related health risks are greatly outweighed by the risks of combat' (Anti-Nuclear Alliance of Western Australia, 2006). In other words, the immediate risks of armed combat for soldiers as soldiers are more significant than longer-term risks of soldiers as non-combatants (i.e. what happens to these individuals once the battle is over). This is essentially saying that someone shooting at you has greater immediate urgency over the threat posed by exposure to uranium at that particular moment in time. It is a spurious argument in that in either case the individual is likely to die without suitable protections in place.

### *Denial by refusal to pass on testing technology*

The International Atomic Energy Agency refused to allow Iraq to import radiology equipment needed to carry out research on the effects of DU among the Iraqi population. Requests for such technology were turned down as part of UN sanctions and trade restrictions leading up to the second Gulf War. The argument was that such technology was 'dual use', meaning that it could be used to develop nuclear weapons. Without adequate technical means, however, it is difficult to know the precise source of contamination, to conduct proper scientific surveys or to even test for excess levels in people's bodies. In 2001, even though the United Nations committee on disarmament and international security had earlier approved the plan, the General Assembly voted 54–45 against (with 45 abstentions) an Iraqi proposal that the UN study the effects of the depleted uranium shells used by US-led forces in the first Gulf War. Nevertheless, the official State Department line is that: 'There have been no independent studies related to Depleted Uranium inside Iraq. Since 1991, Iraq has refused to allow health inspectors assess the alleged impact of Depleted Uranium' (US State Department, 2006).

### *Denial by exemption*

It has been observed that the US Department of Defense is the largest producer of toxic waste per year, well outpacing its private sector chemical company 'competitors'. Simultaneously, however, the military is also most likely to be subject to less oversight, less regulation and less sanction than any other polluter (Santana, 2002). It is notable, as well, that in the British context, nuclear power plants and military bases involving uranium and radioactive substances are routinely exempt from close regulatory scrutiny (Walters, 2007). Shielding of the military from outside criticism is the norm. In the context of war and active combat, total exemptions are more likely to apply. Wrongdoing cannot take place if the rules are not there by which to judge the act.

*Denial by silencing of expertise and dismissal of experts*

Only 24 of the US Gulf War Syndrome patients have been examined for uranium lung burden. The DU aerosol is insoluble and expected to stay in the lungs for a very long time, delivering a radiation dose to the tissue. Using old equipment, admittedly not very sensitive, Dr Belton Burroughs and Dr David Slingerland of the Veterans Administration Medical Centre in Boston, were able to identify fourteen of the 24 as having measurable lung burdens of DU. The testing was terminated, and all records have subsequently been 'lost'. Some urine samples were sent to the US Army Radiochemistry Laboratory in Aberdeen, Maryland, for testing. Some samples never reached the laboratory, and the results of those that did were supposedly 'lost'. The Medical Doctor who gave this testimony to the US Congress, Dr Asaf Durakovic, an internationally recognized expert in internal contamination with radioactivity, has lost his job with the Veterans Administration.

(Bertell, 2006; see also Arbuthnot, 1999)

*Denial by shifting of responsibility and blame*

On the one hand, the British Ministry of Defence had guidelines in place (by 1999) in which the then Armed Forces Minister Douglas Henderson had given strict instructions that no troops were to approach any target that might have been hit by DU unless they were wearing protective clothing against radiation. On the other hand, when asked about the problem of people living in and returning to affected regions, the Ministry said that was a problem for the UN High Commissioner for Refugees to solve (see Arbuthnot, 1999). Another related aspect of shifting the focus is to blame other causes for the observed phenomenon: 'Depleted Uranium does not cause birth defects. Iraqi military use of chemical and nerve agents in the 1980's and 1990's is the likely cause of alleged birth defects among Iraqi children' (US Department of State, 2006).

*Denial of long-lasting effects*

Studies conducted through March 2002 consistently indicate the health risks associated with radiation from exposures to depleted uranium are low—so low as to be statistically undetectable, with one potential exception: Radiation doses for soldiers with embedded fragments of depleted uranium.

(US Department of State, 2006)

General screening or monitoring for possible depleted uranium-related health effects in populations living in conflict areas where depleted uranium has been used is not necessary.

(World Health Organization, 2001: vii)

Yet, for all of these attempts at denial, there is a long record of official correspondence and internal memos within US state agencies that indicate that many people did, in fact, know about the dangers and hazards of DU use (see Fahey, 1998). In part, disquiet about the use of DU is reflected in the many efforts that have already been made to restrict and ban the use of DU weapons. A 1991 report by the Atomic Energy Authority found that use of DU weapons in the Gulf War could eventually lead to half a million potential deaths from cancer (Pilger, 2001). It was suppressed by the British government until 1998. In 1999, the European Parliament voted to urge NATO to suspend the use of DU munitions pending the results of an independent study. The request was ignored. At the 2002 annual UN Human Rights Convention, a motion was tabled to ban the use of depleted uranium munitions until a full-scale medical survey could be conducted. The USA and Britain were the only two countries to vote against the motion.

### **Twenty-first century critical criminology and the politics of affirmation**

Professor Doug Rokke is the ex-Director of the Pentagon's depleted uranium project. He is a former professor of environmental science and one-time US army colonel who was given the task by the US Department of Defense to undertake the post-first Gulf War desert cleanup. He describes the use of DU weapons as a war crime:

There is a moral point to be made here. This war was about Iraq possessing illegal weapons of mass destruction—yet we are using weapons of mass destruction ourselves. Such double-standards are repellent ... A nation's military personnel cannot wilfully contaminate any other nation, cause harm to persons and the environment and then ignore the consequences of their actions. To do so is a crime against humanity.

(quoted in Mackay, 2003)

In 2001, Professor Rokke was already ill from his own exposure to DU, with 5000 times the permissible level of radiation in his body. He was highly conscious of the death and suffering of Iraqi civilians in southern Iraq, as well as the death and dying of members of his own team (see Pilger, 2001).

Dr Siegwart-Horst Gunther, one of the first to expose the use of DU in Iraq, commented in 1995 about the environmental effects of DU:

Much of the uranium dust has been scattered about thousands of square miles of desert. As the Gulf region has a rainy season, it is feared that uranium particles get at one time or the other into the ground water and finally reach the food chain. Highly toxic uranium dust, if inhaled, can result in lung cancer. Many DU projectiles spread over the battle fields have been collected by children and used as toys with possibly devastating consequences.

(quoted in South Movement, 2006)

Even the World Health Organization, long an institution downplaying the risks and threats posed by DU materials, acknowledges that:

Following conflict, levels of DU contamination in food and drinking water might be detected in affected areas even after a few years. This should be monitored where it is considered there is a reasonable possibility of significant quantities of DU entering the ground water or food chain.

(World Health Organization, 2003)

### *Matters of evidence*

So what is *really* going on with regard to the alleged harms associated with DU? In answering this question, we shift rapidly to the horns of the knowledge dilemma. That is, on the one hand, as this article has argued, state crime is rarely something that is affirmed by states—rather, it is precisely the locus of denial. Accordingly, information and data that may make denial more difficult is likely to be made scarce by the very agencies capable of producing them.

Yet, on the other hand, regardless of humanitarian sentiment, passionate commitment and ideological predilection, those who claim that DU is harmful tend to do so with very little *systematic* evidence. And this is a problem. For anecdotal evidence is not the same as convincing, scientific evidence. Moreover, given the toing-and-froing over the scientific evidence that is available—with some arguing damaging effects, others arguing negligible effects—there is no consensus at all within the scientific community regarding the safety of DU.

However, there is more to this observation than may at first appear. For a start, some of the ‘harm scientists’ include those who have been fired or eased out of their job (often with the military) precisely because of their activity as presumably neutral, objective scientists. Consequently, they also tend to be marginalized within mainstream academic publishing circles, while simultaneously being brought to the fore by the alternative movements and press (including through the Internet and anti-DU conferences). In the main, the key anti-DU protagonists have been non-government organizations (NGOs) (such as the Australian Medical Association for the Prevention of War), dissident journalists (such as John Pilger) and environmental social action groups (such as South Movement).

Given their openly political and ideological value positions, association with these groups and individuals may well undercut the ‘scientific’ credibility of those scientists who wish to speak out against the use of DU. This extends in other directions as well. For example, Dr Asaf Durakovic is one of the medical doctors who was mentioned above as having been sacked from the Veterans Administration for his testimony to the US Congress; he is also the author of an article published in the Croatian Medical Journal (also cited above) that was critical of the use of DU in armaments. One might possibly surmise that the journal in question is less prestigious and

possibly more ideologically tainted (given the use of DU weapons in the Balkans) than other medical journals, including those from DU source countries (such as the USA and the UK). But what kinds of outlets exist for medical professionals who have been caught up in the politics of knowledge in this way, and who wish to continue to make their voice heard? The issue is not and never is simply about 'quality' or 'science' or 'objectivity'.

Expertise is socially constructed, and how this is achieved has major implications for the DU debate. A common criticism of those who propose DU as harmful is the lack of adequate evidence. This 'lack of evidence' is, in turn, linked to reliance upon anecdotal evidence rather than peer-reviewed studies, upon studies that are incomplete, and upon research that is methodologically suspect in terms of basic assumptions and scientific modelling (see Wexler, 2006). The uncertainties of knowledge are then used precisely to undercut the arguments of the harmful DU protagonists. No proof, no issue.

Yet, there are at least two problems with this approach. The first is that it denies the power of inferential evidence. That is, we can infer from incomplete sources broad trends and possibilities. We can infer general harm from discrete instances of specific harms. Incomplete knowledge is in fact exactly why the precautionary principle has become so essential in issues of this kind (see below). Second, alarm bells surely must sound when the key obstacles to knowledge acquisition are put up by those who most rely upon DU in their weapons systems. For instance, it is the USA that has done the most to stymie systematic research into DU effects, that has balked at supporting independent reviews and that has continued to block efforts to examine closely DU weapons sites.

The uncertainties surrounding DU are compounded by the fact that DU in its gas form is basically undetectable to unaided human senses. Such risks are thereby invisible, and thus 'unknowable' to the ordinary layperson (see Beck, 1992). In such circumstances there is greater reliance upon technical expertise and technological capacity for the measurement and recording of DU levels and impacts. Where these are unavailable, or where direct experience is excluded for being speculative (as in the case of hospital reports linking DU with increased levels of cancer), then knowledge of risk is considered uncertain.

Moreover, as recent news media stories indicate, general knowledge of risk has continued to be actively suppressed and the debate thereby diminished. For example, in November 2006, the BBC reported that Dr Keith Baverstock, who worked on the 2001 World Health Organization report that stated that DU posed only a small contamination risk, said that research showing how depleted uranium could cause cancer was withheld from the original report. He described a process known as genotoxicity, which begins when depleted uranium dust is inhaled, ultimately leading to potential negative effects in the human body (BBC News, 2006).

In fact, Dr Baverstock had already spoken with the *Sun Herald* in February 2004 about his concerns, a story that certainly did not make it

into the mainstream US press. At that time, he spoke about his suspicions that the WHO had been leaned on by the powerful pro-nuclear UN body, the International Atomic Energy Agency (IAEA). According to Baverstock:

I believe our study was censored and suppressed by the WHO because they didn't like its conclusions. Previous experience suggests that WHO officials were bowing to pressure from the IAEA, whose remit is to promote nuclear power ... That is more than unfortunate, as publishing the study would have helped forewarn the authorities of the risks of using DU weapons in Iraq.

(quoted in Edwards, 2004)

Regardless of who is right or wrong vis-à-vis the scientific evidence, it is clear that there is enough information—from 'dissident' scientists and medical staff, from Iraqi civilians, from war veterans in the USA, UK, Canada and Iraq, from former army environmental experts and from advocacy groups—to lean on the side of precaution. Stories and voices from 'below' are important to discerning actual harms and potential risks. There is enough in the case of DU to warrant consideration of the prohibition and banning of such weapons.

For critical criminology, it is essential that 'evidence' becomes part of the focus of analytical attention—how it is constructed, how it is contested and who says what and why.

### *Stakeholder differences*

The social construction of evidence is also very much linked to questions of stakeholder interests. The main critics outside of government have been identified above as NGOs and certain journalists. The power of environmental groups and other lobby groups has been enhanced by the concerns of soldiers and their families as well. The notion of victimhood has also played a big part in how DU harms are construed.

In regards to this, it is essential here to acknowledge fully that it is Iraqi territory that is being affected, not the homelands of the allied forces, the invader. Concern about the welfare and wellbeing of the Iraqi people has not been at the forefront of media and political attention. Indeed, the West has experienced in the past decade and a half a systematic vilification of the Arab and Islamic worlds (see, for example, Green and Ward, 2004; Poynting et al., 2004). This translates into notions such as 'justified punishment' in which a whole nation is considered culpable for the actions of the despot (Green and Ward, 2004). In sociological terms, it has meant a process of 'othering', a process that implies social distance and less empathetic connections between people. The suffering of the Iraqi people is thus justified and ignored; the damage to their lives, livelihoods and local environments too far removed from humane considerations to be worthy of attention or intervention.

It is also important to acknowledge the ways in which soldiers (on all sides) are generally ignored and/or de-humanized in regards to DU use in

the Gulf. They tend to be treated in terms of functionality (the job of war) rather than humanity (the preciousness of being). The value of the soldier is found in military action; they are combatants, not people. As such, they suffer disproportionately now and into the future for decisions made about and for them by others. They simply do not count in the larger scheme of things. The controversy surrounding Gulf War Syndrome very much parallels the ways in which the 'shell shocked' and the 'hysterical' soldier of the First World War was subjected to analysis, abuse, disbelief, multiple types of diagnosis and various social dislocations (see Leese, 2002; Lerner, 2003; Killen, 2006). Whatever the connection, if any, between Gulf War Syndrome and the use of DU, the striking thing is the concerted attempt by authorities to diminish the very concept of Gulf War Syndrome and to downplay the generic problems facing war veterans.

But what happens if 'our' soldiers are suffering more than 'your' soldiers? This appears to be the question asked about the use of DU in the Balkans, and in this instance it has had major political ramifications. The concern over the health effects of DU emerged in the context of cases of leukaemia among soldiers who had served as NATO peacekeepers in Bosnia and Kosovo. A United Nations study published in 2001 found radioactive contamination at sites in Kosovo where NATO aircraft fired weapons containing DU in 1998. Initially, NATO, as an organization, denied that there was a health danger from DU. However, splits within NATO then emerged. Countries such as the United States, Germany, the UK, Spain and Turkey, among other countries, said that they had found no evidence of a link. Contrary to this, Italy, France, Belgium, the Czech Republic and Portugal urged further investigation into the issue (BBC News, 2001). The country spearheading the demand for answers, Italy (which had lost six of its soldiers) also happened to be the one providing the bulk of the troops serving in the Kosovo peacekeeping mission. This was at a time when the USA was signalling its intention to withdraw its troops out of the Balkans as soon as possible (Karon, 2001).

In response, individual countries carried out screening of their own soldiers, and the European Union conducted its own inquiry. The European Parliament Working Paper was to conclude that, on the basis of existing reports at the time, 'that up to now there is no scientific evidence for health damages among army personal (*sic*) or the civilian population as a consequence of the use of DU-ammunition in the Gulf War and the war in the Balkans'. It continued,

Controversial Information (*sic*) and reports about dramatic health effects of DU among soldiers of the Iraqi and Yugoslavian army as well as among the civilian population in the areas concerned do not withstand a peer-review. Therefore they were not considered any further.

(Keller et al., 2001: x)

The report nevertheless concluded that while DU use did not appear to be linked to serious widespread contamination of the environment or to be an

appreciable long-term hazard for man's (*sic*) health, areas of localized concern should be identified, penetrators and fragments properly disposed of and periodic survey of the drinking water in the areas of concern performed.

The European Parliament was further to express its concerns about depleted uranium in resolutions in 2001, 2003 and 2006. The 2003 resolution reaffirmed the need to establish moratoriums on depleted uranium ammunition (and other uranium warheads), particularly in the light of the fact that NATO had not banned these types of weapons. The 2005 resolution once again reiterated the EU call for a moratorium, with a view to the introduction of a total ban, on the use of depleted uranium munitions. While in the UK and Europe the DU debate has at various times been public and vigorous, it has never reached such levels in the USA. Not surprisingly, the main stumbling block to a NATO moratorium (much less a UN resolution) on the use of DU has been the United States.

Intense politicking around the DU issue has thus had an impact on how various nation-states approach the use of DU. It has also highlighted major differences in opinion and outlook among allied nations. These differences are indicative themselves of serious underlying concerns about the use of DU, concerns that cannot be dismissed as trivial or as simply the fantastical claims of particular NGOs and dissident groups. For critical criminology, the debate over DU within institutionalized forums such as the UN, NATO and the EU provides ready sources of information, as well as confirmation that DU use is a 'legitimate' concern as a social (and criminological) issue. Such processes also provide potential avenues for social change in relation to DU.

### *Intervention principles*

From a critical criminology perspective, the intervention question is basically framed around what we can do in the here and now to stop these kinds of 'state crime'. In the context of great uncertainty regarding existing and potential harm associated with DU, one possible starting point is to make reference to and utilize the precautionary principle. This refers to the idea that official action be taken to protect people and environments in cases where there is scientific uncertainty as to the nature of the potential damage or the likelihood of risk. To invoke the precautionary principle is to involve assessment of risk. In the case of DU, the issue is whether or not it is harmful (and to whom and what), and what are the potential future risks. Yet, the issue of risk is highly contentious in regards to DU, for as illustrated earlier in the article, there is sustained *denial of risk* in many official government circles.

There are also objections to the notion of a *military* precautionary principle, especially in relation to DU. Specifically, it has been argued that there is insufficient scientific evidence to accept whether the threat of harm exists; that alternative armaments to DU weapons could bear worse environmental and health harms to humans; that remediation carries with it its own

risks (to removal workers, in regards to the impact of current cleanup methods and in relation to overall costs); and that such prohibitions negatively affect wealthy states with the resources to devote to technological arms change relative to states lacking military resources (Wexler, 2006). The regulation of military weapons, it is proposed, ought to be based upon a global weapons toxics registry.

These are important issues, since they bring to our attention the varying ways in which 'risk' is constructed within a specifically military (and political) context. That is, when proposing courses of action to take, it is crucial to consider the choices made by military planners for this or that sort of weaponry (and the tactical and strategic advantages of each type of ordnance), and the social and environmental impacts that flow from these choices. DU is used in war, but its use is guided by considerations of cost, availability, national security, utility and effectiveness as measured against potential alternatives.

None the less, the 'alternatives' to DU, while technically different, are, along with DU, never socially neutral. The use of DU weapons, seek-and-destroy munitions or cluster bombs is not only dictated by immediate military objectives. As with nuclear weapons, what is actually used in the field of combat is to lesser or greater extent shaped by world opinion. What *is* used can be distinguished from what *can* be used. These are, from start to finish, political decisions. This is reflected, for example, in international law that contains a number of specific weapons bans. The intent of measures such as the Chemical Weapons Convention, the Biological Weapons Convention and the Convention on Certain Conventional Weapons, for instance, is to limit the use of certain weapons precisely due to their horrific effects on humans and the environment.

While risk analysis ought to be sensitive to the ways in which political leaders and military planners make decisions over weapons, it should not allow such decisions to be enfolded within a blackbox of 'national security' or 'military technical expertise'. Transparency is crucial to assessment of risk, whether this be in relation to military ventures or environmental issues. Also vital to risk assessment is consideration of the humans (and other inhabitants of the environment) who are often on the receiving end of the weaponry. Military objectives need to be separated out from, and linked back to, questions of human rights and ecological justice. Only by such means can state crime, as such, be investigated by critical criminologists. For otherwise, there is no crime committed, regardless of the violations of human rights and ecological wellbeing actually occurring. The presence of extra-legal criteria in establishing harm is essential to the eventual criminalization of such harms.

Analysis of the precautionary principle in regards to DU therefore must translate into analysis of social and environmental impact. Those who suffer do so precisely because of where they live. Those who will suffer in the future likewise will do so because of geography. The half-life of depleted uranium is measured in the billions of years. Parts of Iraq are now permanently

contaminated. This situation offends against the principle of intergenerational equity, a key principle of ecological sustainability and of the human right to a healthy environment. That is, future generations of Iraqi people will not enjoy the quality of environment experienced by those prior to the Gulf Wars. Without remedial action, the contaminants will continue to pose a hazard to human health and wellbeing now and far into the future. The cumulative impact of DU, and indeed of low-level radiation generally, is surely a matter of great and ongoing concern.

The indiscriminate contamination of people is also simultaneously the indiscriminate contamination of places and other living creatures. From the point of view of ecological justice, this means that human actions such as these violate basic ecological citizenship principles and the rights of non-human animals to be free from abuse and suffering (White, 2007). Respect for the biosphere and for animals has obviously not been built into the war effort. It is also rare to find anyone talking about or studying the impact of DU on non-human animals or the biosphere. For example, the only reference to animal welfare or otherwise seems to be in regard to animal studies on the effects of acute, intermediate and chronic duration exposure to DU (see Bertell, 1999). In the case of the biosphere, select reference is sometimes made to widespread, low-level contamination of the ground surface by DU, or the possible migration of DU into ground water, but systematic environmental audit and analysis of DU harm does not seem to be a high priority (United Nations Environment Programme, 2003).

Ideally, the response to the use of DU in war ought to be multi-pronged and long term. For a start, it would be useful to use global position monitoring data and related technologies to map the environmentally hazardous regions in Iraq (and in other countries in which DU has been used). The BBC reports, however, that:

Iraqi scientists trained by the UN are seeking to carry out [an environmental and health] assessment, but Henrik Slotte of the United Nations Environmental Programme said without clear information from the US on what was used and where, it was 'like looking for a needle in a haystack'. He said there was 'no indication' this information was forthcoming from the US. (BBC News, 2006)

It could well be that this reflects the concerns of the main Coalition protagonists—the USA and UK in particular—that the scale and cost of the cleanup by those who use DU weapons would be enormous. As it stands, it appears that no one and certainly not the USA is taking any leadership in and responsibility for cleanup, environmental restoration or provision of health care to exposed combatants or civilians in Iraq. Without the removal and disposal of contaminated equipment, debris and soil, the harms associated with DU will continue for many years hence.

From the point of view of critical criminology, precaution has to be constructed around values associated with social and ecological justice. It is never just a technical exercise, nor should it simply reflect the complexities

of pragmatic military planning. Rather, risk ought to be assessed in regard to close analysis of the violation of human rights and environmental degradation. Where military and political authorities refuse to co-operate in undertaking such analysis, this is enough to warrant protracted action against the activity in question.

## **Conclusion**

From the arguments presented in this article it is clear that the banning, and criminalization, of weapons of mass destruction, such as those utilizing depleted uranium, is a matter worthy of greater attention and debate. Human beings, environments and animals ought to be protected from hazards and harms that are entirely preventable but which have huge effects and that last for long periods of time. This will take concerted action at the global level, and involve much work on the part of social movements, NGOs and sympathetic nation-states towards reforming international law, especially those provisions dealing with the use and regulation of conventional weapons. The contributions of such alliances and coalitions in making the use of nuclear weapons illegal (as decided by the International Court of Justice) and in investigating and prosecuting war crimes and crimes against humanity (via the development of the International Criminal Court), provide useful examples of how DU and the harms associated with it can be addressed through relevant international forums and social action (see Kauzlarich, 2007).

As this article has demonstrated, however, there are strategic responses on the part of state authorities that belittle, befuddle and denigrate issues surrounding DU weaponry and the immediate and longer-term risks it poses to quality of environments and health and wellbeing.

For a criminology that is critical and informed by concepts of social justice, the challenge is to expose both the levels of harm and the denials. But, as indicated, this implies further analytical challenges than are otherwise usually faced within mainstream criminology. In particular, while it is vital to expose the politics of denial, it is equally important to begin the process of engaging in a politics of affirmation. At what stage, in the light of contested evidence, do we or should we 'take a stand'? For critical criminology, responding to this means doing more than simply asserting truth, assuming rightness or counselling social action. It means doing our best to unpack the evidence, to identify potential allies among existing stakeholders (including states parties) and to establish basic principles of intervention.

This is hard work. Ultimately it involves sifting through various types of evidence, of listening to diverse voices of authority, of considering differing methods of intervention. Whether it be DU issues or issues relating to environmental harm, there are serious practical challenges in relation to dealing with matters that are intrinsically multidisciplinary in nature, interconnected with other issues, highly politicized and that are global in scope. To convert

'hidden' harms into pressing public matters, what kinds of methodological skills, research sites, data bases, specialist technical knowledge and working alliances will critical criminologists need to develop and draw upon? What resources are needed—including scientific and medical literature, socio-legal studies, international law and conventions, human rights reports and so on—to generate credible knowledge on issues such as this? Do our assumptions and practices as we go about our work have to change if critical criminology is to be relevant to 21st-century social problems?

When the former head of the DU cleanup operation speaks out against the use of DU weaponry, we ought to listen carefully. When doctors and medical scientists associated with line management organizations are fired because of their engagement in certain types of research, we ought to take notice. When front-line doctors and medical staff tell us about the new horrors of war, involving soldiers and civilians alike suffering trauma and illness of a peculiar nature, we ought to be very wary. Social scientific research into military weaponry and involving war zones is always going to be contentious, messy and extremely difficult (especially when it also includes reference to health studies and those involving reliance upon sophisticated technologies and testing procedures). But, such investigation and analysis is essential to developing a pathway to discursive democracy, and, ultimately, in forging a world that has no need for depleted uranium weapons in the first place.

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ROB WHITE is Professor of Criminology, School of Sociology and Social Work,  
University of Tasmania.

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