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**Cc:** Norato, Michael; Conley, Maureen; wbchang11@yahoo.com  
**Subject:** Re: Meeting Summary of Feb 19 2015 Meeting Between the  
US ARMY and the NRC an...  
**Attachments:** du briefing col wakayama.pdf

In a message dated 3/17/2015 4:13:03 P.M. Central Daylight Time, [paka@sandwichisles.net](mailto:paka@sandwichisles.net) writes:

Although the U.S. Department of Defense (DoD) discounts the potential for adverse health effects from inhalation and ingestion of depleted uranium, more than a few objective experts' around the world disagree.

To Ms. Snyder and all. after army assistant secretary ordered us at cerl- aeipi in dec 1992 to du du study at aeipi we wrote the following summary

## EXECUTIVE SUMMARY

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### Background

In response to a Congressional request, the Army Environmental Policy Institute (AEPI), acting under the direction of Office of the Assistant Secretary of the Army (Installations, Logistics & Environment), conducted a study to determine:

- **The health and environmental consequences of using depleted uranium (DU) on the battlefield.**
- **Remediation technologies that exist or might be developed to clean up DU contamination.**
- **Ways to reduce DU toxicity.**
- **How to best protect the environment from the long-term consequences of DU use.**

In response to this request, AEPI assembled a team of health, environmental, legal and systems professionals. These experts conducted a literature review of scientific studies concerning depleted uranium. They also interviewed scientists, engineers and military officials, as well as soldiers involved in Operation Desert Shield/Desert Storm. Their purpose was not to verify the technical performance of DU weapon systems but to assess the health and environmental consequences associated with the use of DU. A summary report of the findings of this study, Summary Report to Congress (Appendix A), was prepared for Congress and made available in June 1994.

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## Scope of This Technical Report

This technical report, intended for scientific experts and advisors, is being published to document the sources used in preparing the Summary Report to Congress and to provide more detail regarding some of the physical, chemical and radiological health and environmental effects of the DU used in Army weapon systems. This technical report repeats (and in some cases, embellishes) the findings and conclusions presented in the Summary Report to Congress; no new findings are introduced here.

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## Findings

After an exhaustive review of weapon systems containing DU, AEPI concluded that the Army has done an excellent job attending to the environmental and health impacts of these systems. The following findings were first published in the Summary Report to Congress in a condensed form. They specifically address the four areas of concern raised in the original congressional tasking.

### **Health and Environmental Consequences of Battlefield Use**

A battlefield may be contaminated with many dangerous substances. The impact of DU contamination on the battlefield is a new issue and is not well-defined. Relative to many other hazards, such as unexploded ordnance, the hazards from DU contamination are small.

### **Remediation Technologies to Clean Up DU Contamination**

DU remediation technologies may involve one or more of the following processes: excavation and earth moving, physical separation, chemical separation and in-place stabilization. Very few remediation technologies have actually been used to clean up DU-contaminated sites. The Army continues to identify and evaluate alternative remediation technologies.

# Ways to Reduce DU Toxicity

## No available technology can significantly change the inherent chemical and radiological toxicity of DU. These are intrinsic properties of uranium.

### Protecting the Environment from Long-Term Consequences

The Army has implemented range management and DU recovery systems and is improving these systems. The Army is also developing models to better describe the environmental fate and effects of DU. DU migration on test ranges in the United States appears to be insignificant because the soil and water conditions on the ranges tend to prevent the formation of soluble DU.

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## Conclusions

The following conclusions, reported in the summary document and expanded in this technical report, describe additional efforts that would lead to an even higher level of health and environmental security relative to DU. However, Army environmental goals must support the Army mission, contribute to readiness and serve the collective national best interests. Thus, investment in DU management is tempered by resource realities among competing needs.

The conclusions fall into the following categories: general recommendations, those relating to test ranges and battlefields, and those relating to environmental policy.

### General Conclusions

- The Army or DoD should designate a single office, independent of DU systems development or use, to improve management and control of DU health, environmental and regulatory issues.
- The Army should revise its regulations and policy documents to explicitly link DU acquisition, use, safety and health, disposal, demilitarization, and environmental management.
- The Army should determine the full life-cycle cost of DU weapon systems. This analysis must take into account not only production costs, but also demilitarization, disposal and recycling costs; facility decontamination costs; test range remediation costs; and long-term health and environmental costs.
- An Environmental Assessment (EA) is normally used to assess the incremental impact of systems at a specific site; however, within the DoD acquisition process, an EA can also be item-specific (pertaining to a specific weapon system). Use of the same term for two entirely different types of assessments could lead to an

inappropriate conclusion that the requisite environmental documentation has been prepared.

### **Test Ranges and Battlefields**

- The Army should continue to improve training programs for the wide variety of soldiers and support personnel who may come in contact with DU or DU-contaminated equipment. At a minimum, the Army should include armor, infantry, engineer, ordnance, transportation and medical personnel in this training.
- Before Desert Storm, the probability of human survival in a vehicle hit by a DU penetrator was estimated to be quite low, but fortunately, the actual survival rate for U.S. soldiers in vehicles that sustained friendly fire DU strikes was 80 to 90 percent. For this reason, in future conflicts where either side uses DU weapons, the Army should anticipate managing patients with DU-contaminated wounds.
- The Army should continue to investigate equipment modifications and procedures that will minimize exposure to the chemical and radiological hazards of DU, including the development of: a combat-oriented document that would define protective techniques for medical and maintenance personnel; standard markings for all weapon systems containing DU; experiments and analyses to better define the risks of DU internalization to recovery and maintenance personnel; and continue to evaluate potential DU contamination in gun tubes and crew compartments from gun bore gases or flashback incidents.

### **Environmental Policy**

- The Army should review all current environmental documentation on DU and consider preparing a programmatic Life-Cycle Environmental Document.
- The Army should encourage Congress to revise the Low-Level Radioactive Waste Policy Act allowing allocation of waste according to the value added in each phase of development, testing and fielding a weapon system. Under this approach, a proportional share of the waste generated during testing would be charged against the waste disposal capacity of the states that receive economic benefit from the process.
- The only systematic DU contamination of Army land occurs during the research, development, testing, and evaluation (RDT&E) cycle for DU ammunition. The following actions could help the Army better manage DU contamination of test ranges:
  - Plan site remediation activities on Army installations to be consistent with long-term land-use goals. Develop a strategy to address the long-term liabilities from DU contamination.
  - Fund recovery, recycling and waste disposal programs.
  - Develop waste disposal options, including volume reduction, waste minimization, waste form modification and waste disposal facilities.
  - Separate high-explosives ranges from new DU ranges.
  - Require catch boxes on all DU ranges; maximize recovery of DU penetrators at test ranges; maximize DU recycling within the Army ( DU testing will always produce wastes).
  - Provide a means to ensure timely disposal of DU waste from test ranges.

- Environmentally and financially sound remediation of DU contamination on Army test ranges requires tools to conduct site assessments, apply fate and effect models, and estimate environmental risks and costs. The Army needs to:
- Expand funding of site investigations.
- Evaluate the effectiveness and cost of remediation technologies (proposed and existing).
- Evaluate the environmental fate and effects of DU on U.S. test ranges.
- Review environmental and health hazard data obtained to date to ensure that they are consistent and scientifically defensible.
- Review DU particle data from Army studies and elsewhere to determine data gaps and conduct experiments to generate the requisite data to fill these gaps.
- Develop a better understanding of DU particles generated from impacts or burning.
- Develop environmental fate and effect models to determine relative risk as a function of migration.
- The Army should be prepared to provide guidance to other governments on the health and safety risks associated with DU for affected battlefields. This guidance may include information on environmental measurement, monitoring, migration and remediation techniques.

Actions to implement the policies suggested by the findings and conclusions in this report should be weighed against the costs associated with the environmental safety and health issues presented. Decisions must be framed in the broadest context to consider whether the studies proposed have the potential to mitigate the real costs of remediation and health management as related to Army DU weapon systems.

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IN RESPONSE WROTE AR 700-48, DA PAM 700-48, DU CTT, AND WE REVISED RICH'S TB 9-1300-278. AND LOTS OF MEDICAL CARE ORDERS. THE PENTASGOIN GODS ADMIT DU IS A NIGHTMARE IN (attached ) ( [http://www.traprockpeace.org/du\\_dtic\\_wakayama\\_Aug2002.html](http://www.traprockpeace.org/du_dtic_wakayama_Aug2002.html)) COL. J EDGAR WAKAYAMA DU BRIEF and all of our medical problems confirm it is bad to include airborne hazards via redistribution despite denials in compliance with march 1991 los alamos memo. it is time to end this nightmare my army du team (not many left) and i and all others sure care and we want

the mes stopped. we believed the honchos and they took us do oblivion.



doug rokke

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