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CORRESPONDENCE CONTROL TICKET

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ACTION OFFICE: EDO

To: Paperiello, RES

AUTHOR: James Salsman

AFFILIATION:

ADDRESSEE: Albert Lillibridge

SUBJECT: Metal coating for superior depleted uranium/propellant barriers

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DEDMRS  
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NMSS

ACTION: Appropriate

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NOTES:

FILE LOCATION: ADAMS

DATE DUE:

DATE SIGNED:

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**Date:** Wed, Dec 1, 2004 3:52 PM  
**Subject:** metal coating for superior depleted uranium/propellant barriers

Dear Ladies and Gentlemen:

Earlier I suggested that an effective ordnance flame barrier between cartridge ammunition propellant and a depleted uranium slug bullet might be either cellulose, paper or wadding -- treated, for example, with sodium borate, or, the DuPont NOMEX brand flame-resistant fiber. It is entirely unclear to me whether these materials, which are used by cannon and shotgun enthusiasts as barrier wadding, are appropriate for modern ammunition. DuPont has sent me their NOMEX Technical Guide -- too large to attach, so I've placed at: <http://bovik.org/nomex.pdf> -- and I believe they will be sending me several hundred square centimeters of NOMEX fabric with which I intend to use to determine some properties that are not immediately evident from my skimming of their Technical Guide. I think it is unlikely that I will be able to shed any real light on its effectiveness as a plasma/gas protective barrier under conditions between the propellant and slug in modern cartridge ammunition. Moreover, I have since learned that such barriers and waddings can detract from the reliability of ammunition, by increasing the potential for misfirings and resulting in barrel debris and internal surface contamination, which in turn can lead to other malfunctions, some very serious.

However, a much cleaner solution exists: The D.U. bullet slugs can be plated or otherwise coated with a layer of another metal, either on the trailing edge, or entirely. This is already being done with some of the 120 mm D.U. antitank ordnance, if I remember correctly, ostensibly to provide radiation shielding. I am certain that this would have a very good likelihood of preventing the reported problems with D.U. scraping off in gun barrels, in addition to providing a firm and reliable chemical barrier between the propellant and bullet slug. I doubt a plating step would significantly increase the cost of ammunition production, and certainly would be cost-effective if it leads to the health benefits I expect. I have only about a year of academic and amateur experience with pyrotechnics, and that includes only propellants which were well-understood in the mid-1980s. I have only amateur experience with cartridge ordnance and powders from the same era, so I am unable to continue this train of thought. However, I have great confidence that you will be able to measure the extent of the problem and/or effect a good solution soon.

On that note, I would like to point out that I have generally not been satisfied with past government research on the subjects of D.U., as you probably have gathered from my Freedom of Information Act Requests, my petition to the E.P.A., and my allegation challenging the ammunition depleted uranium license from the N.R.C. I truly

hope that there is research, perhaps classified or obscure, which will prove my concerns unfounded. If there is, I understand that I may never have access to that research because of the sensitivity of these topics. I can only hope that you all recognize the seriousness of the health problems which have only come to light in the peer-reviewed medical literature this and last year, and that you agree that a solution is necessary. Although I have some faith that the E.P.A. and/or N.R.C. may be able to encourage a good solution, I believe it will take an immediate and concentrated effort on the part of you in the armed forces and your colleagues in ammunition-related industry to provide a timely solution. I can think of very little more rewarding than protecting the health of U.S. service men and women from such long-term dangers resulting from what amounts to a new form of friendly fire. I can only wish you the best of luck, and ask that you all use your best judgement to find a solution as soon as possible. Thank you also, for your kind and helpful correspondence and your efforts toward a solution.

Sincerely,  
James Salsman

----- Earlier Message -----

> Subject: Re: FW: [health.mil] Study Finds Little Risk From

> Depleted-Uranium Particles {01}

> Date: Tue, 30 Nov 2004 15:37:40 -0800

> From: James Salsman <james@bovik.org>

> To: Lankowicz, Andrew J LTC USAARL-Ft Rucker

> <Andrew.Lankowicz@se.amedd.army.mil>....

>

> Dear Lt. Col. Lankowicz:

>

> Thank you very much for the depleted uranium information. I understand  
> the concerns on both sides of the issue. I don't have any direct  
> interest in the issue either; I'm simply astonished by how much the  
> apparent effects have changed over time. When uranium is inhaled as a  
> partially soluble compound, which hasn't been considered in any of the  
> studies I've seen, then the bio-kinetics are much different than with  
> the oxides and metal particles, which have been studied carefully. I'm  
> not even sure whether the EPA is going to accept my petition, because  
> I don't have any direct involvement, and Administrative Procedure Act  
> petitioners must be "interested" persons.

>

> On one hand, there's a huge tactical advantage of D.U. rounds in air  
> support fire. I understand that the 30 mm DU rounds perform better  
> than any other 30 mm ordnance in most situations.

>

> On the other hand, just this year, birth defect incidence rate in  
> children fathered by Gulf War I vets is seriously increasing, from an  
> initial bump around 1993, to undetectable levels seven years after the  
> first gulf war, to a 50% increase in birth defects among children  
> fathered by all G.W. I vets over the past decade in research published  
> this year. The statistics from civilians in Basrah have a similar  
> steep trend, with an initial bump coincident with miscarriages and then  
> several years of apparently undetectable effects, and now a very steep  
> increase.

>

> The solution might be to put some wadding between the DU slug and the  
> propellant, at least for 30 mm DU rounds. That should keep the hot  
> nitrogen ions away from the metal, and significantly reduce the mass  
> of nitrogen compounds produced in muzzle flash. If you and/or your  
> colleagues agree, this can be suggested to the responsible people such  
> as:

>  
> Brig. Gen. Paul S. Izzo.  
> Program Executive Officer, Ammunition  
> Picatinny Arsenal  
> izzop@pica.army.mil

>  
> Brig. Gen. Jerome Johnson  
> Commander  
> Joint Munitions Command  
> afsc-ofc-gc@afsc.army.mil

>  
> Mr. Jim Wheeler  
> Director  
> Defense Ammunition Center  
> dir-dac@dac.army.mil

>  
> I'm going to try to ask CHPPM to make that suggestion, too.  
> But the problem here is that nobody has verified the nitrogen  
> compound theory. I have a feeling that at least a few people,  
> perhaps at Oak Ridge Laboratory, who were supposed to do this  
> for the NRC back in the 1980s, just let it slide; what may have  
> happened is that the D.U. munitions were approved without any  
> consideration of the combustion products in the presence of a  
> shell's explosive or a round's propellant.

>  
> The problem with Aberdeen's Capstone study is that they looked  
> for dust (metal oxides) instead of nitrates, which remain  
> dissolved in the air for long time (melting points are 60 deg. C  
> for uranyl nitrate versus > 2800 deg. C for the oxides.) I'm  
> coming to the conclusion that inhaling uranium oxides is safer  
> overall than inhaling 1/1000th as much nitrogen compounds;  
> maybe even more disparate. The oxides are insoluble, and they  
> flush out from the lungs over time without ending up in the  
> testes, which is where the dissolved uranyl ions end up to do  
> the congenital damage. The uranyl ions also get put into bone  
> where they catalyze white blood cell chromosome damage, too,  
> which is easy to detect. The oxides, and even the chelate  
> dissolved from tissue-embedded DU shrapnel, just don't do the  
> same thing or end up near the same tissues.

>  
> I would hope that someone with a uranyl ionophore test can get  
> some real measurements of muzzle flash gasses from 30 mm DU  
> rounds sooner rather than later. Some simple insulation such as  
> cellulose, Nomex, or sodium borate-treated wadding could keep  
> the plasma-state nitrogen ions from the trailing end of the  
> slug. That could even slightly increase the muzzle velocity,  
> so there's not necessarily a downside to trying to get relative  
> measurements.

>  
> Sincerely,

> James Salsman

>

> P.S. I'm using "nitrates" as shorthand for all the uranium-  
> nitrogen compounds, of which there are at least a handful known  
> from uranium combustion in air and more from propellant and  
> explosive burns.

**CC:** Wenger Col Fred <WengerF@hqmc.usmc.mil>,  
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**Subject:** metal coating for superior depleted uranium/propellant barriers  
**Creation Date:** Wed, Dec 1, 2004 3:42 PM  
**From:** James Salsman <james@bovik.org>

**Created By:** james@bovik.org

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