

**From:** JMC-OFC-SF  
**Sent:** Thursday, July 31, 2003 8:03 PM  
**To:** 'radiationsafety@usarc-emh2.army.mil'; 'Frank.Dunfrund@HQ.HQUSAREUR.army.mil'; 'ColsonJ@usfk.korea.army.mil'; 'ManfreJ@hqamc-exchg.army.mil'; 'DunavantJ@alexandria-emh1.army.mil'; 'james.white3@FORSCOM.army.mil'; 'dukee@monroe.army.mil'; 'Mike.Scott@Hood.army.mil'; 'Roy.Lovett@Stewart.army.mil'; 'perlethb@bragg.army.mil'; 'carlsonj@benning.army.mil'; 'Mark.Melanson@amedd.army.mil'; 'Gary.Matcek@amedd.army.mil'; 'craig.goldberg@mail1.monmouth.army.mil'; 'McGuireK@tacom.army.mil'; Havenner, Jeffrey A; 'rfliszar@pica.army.mil'; 'aaseruder@dtc.army.mil'; Bevier, Douglas; Mardock, Lynne; Lundberg, Jay A; 'jstutts@cega.navy.mil'; 'handelsf@hq.cege.army.mil'; 'curryr@anad.army.mil'; 'scrivner.william@bluegrass.army.mil'; 'ShearinW@crane.army.mil'; 'dillinghamd@hawthorne-emh1.army.mil'; 'rhaines@americanordnance.com'; 'eholtry@emh1.lead.army.mil'; 'Luther.Winburn@mcaap.army.mil'; 'rneff@americanordnance.com'; 'barrettj@emh2.tooele.army.mil'; 'bevingtc@cebsexch.cege.army.mil'; 'michael.strach@kuwait.army.mil'  
**Cc:** Buckrop, Gary; Crooks, Kelly; Hayes, Sharon  
**Subject:** DU Ammunition Awareness Training (revised e-mail)

We wanted to include the paragraph below with this mailing; there is no change to the attachment. AMSJM-SF

"The attached Word document provides guidance to installation radiation safety officers on providing "DU Awareness" training to civilian ammunition supply personnel. The training applies to personnel involved in normal ammunition storage and handling operations in a non-combat situation and meets peacetime NRC license requirements. Military personnel who could be involved in combat should receive the Army's Tier I, "DU General Awareness Training".

-----Original Message-----

**From:** JMC-OFC-SF  
**Sent:** Wednesday, July 30, 2003 3:15 PM  
**To:** 'radiationsafety@usarc-emh2.army.mil'; 'Frank.Dunfrund@HQ.HQUSAREUR.army.mil'; 'ColsonJ@usfk.korea.army.mil'; 'ManfreJ@hqamc-exchg.army.mil'; 'DunavantJ@alexandria-emh1.army.mil'; 'james.white3@FORSCOM.army.mil'; 'dukee@monroe.army.mil'; 'Mike.Scott@Hood.army.mil'; 'Roy.Lovett@Stewart.army.mil'; 'perlethb@bragg.army.mil'; 'carlsonj@benning.army.mil'; 'Mark.Melanson@amedd.army.mil'; 'Gary.Matcek@amedd.army.mil'; 'craig.goldberg@mail1.monmouth.army.mil'; 'McGuireK@tacom.army.mil'; Havenner, Jeffrey A; 'rfliszar@pica.army.mil'; 'aaseruder@dtc.army.mil'; Bevier, Douglas; Mardock, Lynne; Lundberg, Jay A; 'jstutts@cega.navy.mil'; 'handelsf@hq.cege.army.mil'; 'curryr@anad.army.mil'; 'scrivner.william@bluegrass.army.mil'; 'ShearinW@crane.army.mil'; 'dillinghamd@hawthorne-emh1.army.mil'; 'rhaines@americanordnance.com'; 'eholtry@emh1.lead.army.mil'; 'Luther.Winburn@mcaap.army.mil'; 'rneff@americanordnance.com'; 'barrettj@emh2.tooele.army.mil'; 'bevingtc@cebsexch.cege.army.mil'; 'michael.strach@kuwait.army.mil'  
**Cc:** Buckrop, Gary; Crooks, Kelly; Hayes, Sharon  
**Subject:** DU Ammunition Awareness Training



DEPARTMENT OF THE ARMY  
HEADQUARTERS, USARMY JOINT MUNITIONS COMMAND  
1 ROCK ISLAND ARSENAL  
ROCK ISLAND, IL 61299-6000

REPLY TO  
ATTENTION OF:

AMSJM-SF

28 July 2003

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Depleted Uranium (DU) Ammunition Awareness Training

1. The US Army Joint Munitions Command, Safety/Rad Waste Office, manages Nuclear Regulatory Commission (NRC) license number SUC-1380 for the storage and handling of DU ammunition. During a 1997 inspection at one of our installations, the NRC stated that ammunition handlers should receive DU-awareness training. This reinforced a training requirement we began in March 1995.

2. In accordance with Title 49, Code of Federal Regulations, part 172.700, and as recommended by the NRC, installation radiation safety officers (RSOs) must ensure that personnel who handle pallets, containers, and/or individual DU ammunition rounds receive annual DU-awareness training. This requirement extends to personnel that come on post to make shipments of DU munitions (such as Army Reserve components) in support of Golden Cargo operations.

3. To document the training, installation RSOs must:

a. Have sign-in sheets with title "DU Awareness Training", date of training, and name of person providing the training for each class.

b. Provide awareness training on DU ammunition. The training should last approximately 1 hour and cover the radiological characteristics of DU, biological effects of radiation, methods of protection, emergency procedures, postings, and explanation of reference documents to include Department of Transportation Exemption 9649 (DOTE-9649) and Competent Authority (CA) document 2002090017. The DOTE-9649 and CA-2002090017 are available at the JMC Safety/Rad Waste Web page:

<http://www.osc.army.mil/dm/dmwweb/licenseindex.htm>

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c. Make NRC Regulatory Guides 8.13 and 8.29 available at the training session. You may obtain these NRC regulatory guides at:

<http://www.nrc.gov/reading-rm/doc-collections/reg-guides/occupational-health/active/>

d. Hand out an information page on DU ammunition to use during the training (encl 1).

e. Administer a short test at the end of each training session. Example test questions you may use are enclosed (encl 2). You may also add a few questions of your own.

f. Attach an outline of the training you provide and the DU information page to each sign-in sheet and place in a permanent file to maintain these records. We recommend you file the training records under number 11-9e1 and maintain the records for at least 6 years. Complete guidance on filing is available at:

<https://www.arims.army.mil/aersmain.asp>

4. Installation RSOs may supplement the training by showing the 16-minute videotape "DU General Awareness". We distributed the tape to installations storing DU ammunition on 5 March 2001 by memorandum. Below are two alternate methods to obtain the training.

a. The tape can be ordered at the following web address (enter "depleted uranium" in the word search box, reference PIN 711314 and/or TVT 3-120):

<http://dodimagery.afis.osd.mil/dodimagery/davis/>

b. The DU Awareness training can also be viewed on the Internet at the following web address:

[http://www.deploymentlink.osd.mil/du\\_library/training/education.shtml](http://www.deploymentlink.osd.mil/du_library/training/education.shtml)

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SUBJECT: Depleted Uranium Ammunition (DU) Awareness Training

5. The POCs are Messrs. Kelly Crooks and Gary Buckrop, AMSJM-SF, DSN 793-0338/2969 or (309) 782-0338/2969 respectively, E-mail jmc-ofc-sf@osc.army.mil.

2 Encls  
as

//signed//  
ROSALENE E. GRAHAM  
Chief, Safety/Rad Waste Office

DISTRIBUTION:

US Army Reserve Command (AFRC-SA/Ms. Gibbs), 3800 North Camp  
Creek Parkway South West, Atlanta, GA 30331-5099  
US Army Europe and Seventh Army, Office of the Deputy Chief of  
Staff (AEAGA-S/Mr. Dunfrund), Unit 29351, APO AE 09014  
US Eighth Army (FKSF/Mr. Colson), Unit 15236,  
APO AP 96205-0009  
US Army Materiel Command (AMCSF-P/Mr. Manfre, AMCSG-R/  
MAJ Dunavant), 5001 Eisenhower Avenue, Alexandria,  
VA 22333-0001  
US Army Forces Command (FCJI-SO/LTC White), Fort McPherson,  
GA 30330-6000  
US Training and Doctrine Command (ATOS-ER/Mr. Duke),  
Fort Monroe, VA 23651-5000  
US Army Third Corps and Fort Hood (AFZF-GA-SAFE-G/Mr. Scott),  
Fort Hood, TX 76544  
US Army 24th Infantry Division (Mech) and Fort Stewart,  
(AFZP-DCM/Mr. Lovett), Fort Stewart, GA 31314  
US Army XVIII Abn Corps and Fort Bragg, (Public Safety Business  
Center/Ms. Perleth), Building 4-2843, Fort Bragg, NC 28314  
US Army Infantry Center and Fort Benning, (ATZB-SO/Ms. Carlson),  
Fort Benning, GA 31905  
US Army Center for Health Promotion and Preventive Medicine  
(MCHB-TS-OHP/LTC Melanson), Aberdeen Proving Ground,  
MD 21010-5403  
US Army Center for Health Promotion and Preventive Medicine -  
Europe (MCHB-AE-ER/MAJ Matcek), CMR 402, Box 880,  
APO AE 09180  
US Army Communications-Electronics Command (AMSEL-SF/  
Mr. Goldberg), Fort Monmouth, NJ 07703-5024  
US Army Tank-automotive and Armaments Command,  
(AMSTA-AR-CZ/Mrs. McGuire), Warren, MI 48397-5000

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SUBJECT: Depleted Uranium Ammunition (DU) Awareness Training

DISTRIBUTION (continued):

US Army Tank-automotive and Armaments Command,

(AMSTA-LC-RS/Mr. Havenner), Rock Island, IL 61299-7630

US Army Armament Research Development and Engineering Center,

(AMSTA-AR-QAW-R/Mr. Fliszar), Picatinny Arsenal,

NJ 07806-5000

US Army Developmental Test Command (CSTE-DTC-IM-S/Mr. Aaserude),

314 Long's Corner Road, Aberdeen Proving Ground, MD 21005-5055

US Army Joint Munitions Command (AMSJM-CDL/Mr. Bevier,

Ms. Mardock), (AMSJM-MBG/Mr. Lundberg), 1 Rock Island Arsenal,

Rock Island, IL 61299-6000

US Army Joint Munitions Command (AMSJM-MBG/Mr. Lundberg),

1 Rock Island Arsenal, Rock Island, IL 61299-6000

US Army Materiel Command Afloat (SOSFS-A-CO/Mr. Stutts),

103 Guidance Road, Goose Creek, SC 29445-6060

US Army Materiel Command, Forward Combat Equipment Group Europe,

(SOSFS-E-CO/Mr. Handels), Unit 21615, APO AE 09703

Anniston Army Depot (AMSTA-AN-RK-S/Mr. Curry), 7 Frankford

Avenue, Anniston, AL 36201-4199

Blue Grass Army Depot (SJMBA-SF/Mr. Scrivner),

2091 Kingston Highway, Richmond, KY 40475-5001

Crane Army Ammunition Activity (SJMCA-SF/Mr. Shearin),

300 Highway 361, Crane, IN 47522-5099

Hawthorne Army Depot (SJMHW-SF/Mr. Dillingham), Hawthorne,

NV 89415-5000

Iowa Army Ammunition Plant (SJMIA-IS/Mr. Haines),

17571 State Highway 79, Middletown, IA 52638-5000

Letterkenny Army Depot (AMSAM-LE-EE-L-S/Mr. Holtry),

1 Overcash Avenue, Chambersburg, PA 17201-4150

McAlester Army Ammunition Plant (SJMMA-DMS/Mr. Winburn),

McAlester, OK 74501-5000

Milan Army Ammunition Plant (SJMML-SF/Mr. Neff),

2280 Highway 104 West, Milan, TN 38358-3176

Tooele Army Depot (SJMTE-CS-SO/Mr. Barrett), Tooele,

UT 84074-5000

US Army Combat Equipment Battalion-South (SOSLI-AO/Mr. Wayne),

Unit 31301, Box 42, APO AE 09613

US Army Central Command-Kuwait (Directorate of Installation

Safety Support/Mr. Strach), Unit 69905, APO AE 09889-9905

INFORMATION ON THE STORAGE AND ROUTINE HANDLING OF  
DEPLETED URANIUM (DU) AMMUNITION

1. The Nuclear Regulatory Commission (NRC) allows the Army to store and handle ammunition items containing DU penetrators under license number SUC-1380. The Safety/Rad Waste Office, AMSJM-SF, of the US Army Joint Munitions Command (JMC) manages this license. You can reach AMSJM-SF on DSN 793-0338/2969/2989. After hours, call DSN 793-4815/3510 or (309) 782-4815/3510. Our e-mail address is: [jmc-ofc-sf@osc.army.mil](mailto:jmc-ofc-sf@osc.army.mil). Our license management web page is at:

<http://www.osc.army.mil/dm/dmwweb/licenseindex.htm>

2. Your installation could receive DU munitions (or already has). The license holder, as well as 49 Code of Federal Regulations (CFR), part 172.700, requires awareness training.

3. The NRC and Army regulations require that your Radiation Safety Officer (RSO) maintain a copy of the license and related documents. You can request to see the license and other radiation safety-related documents.

4. The three primary types of radiation are alpha, beta, and gamma. Alpha radiation only travels a few inches in air and can be blocked by a sheet of paper or the outside layer of dead skin on our bodies. Beta radiation will travel many feet in air, but can be blocked by a thin layer of plastic or metal. Depending on the strength of the source, gamma radiation can be highly penetrating and require a lot of shielding material.

5. The DU emits alpha, beta, and gamma radiation. Ammunition shipping and storage containers shield the alpha and the beta radiation coming from DU munitions. The gamma radiation from DU is relatively mild and drops off rapidly as you increase your distance from it. At several feet, the gamma radiation from DU is hard to detect. The two best ways to limit your exposure to DU are: increase your distance from it; decrease the amount of time you spend near it.

6. Although DU metal is slightly radioactive and can be chemically toxic to humans if large amounts enter the body (swallowed, eaten, or inhaled), the primary hazard of a round of DU ammunition is the explosive hazard of the propellant. In addition to safe handling practices, personnel must also follow ammunition rules for accountability, compatibility, and security.

7. The DU is only a hazard if taken into the body in large amounts. Once in the bloodstream, it acts similar to other heavy metals (like lead) and can be chemically toxic. In large concentrations, it can affect kidney function. Inside the body, DU can also cause internal radiation exposure since there is no dead layer of skin, and the alpha and beta radiation can damage the soft tissues.

8. Inhalation is the primary pathway for DU to get inside your body. For you to breathe in DU, it must get airborne through an explosion, fire, or during a penetrator strike. These are associated with the battlefield and not with normal storage and handling. The SUC-1380 license does not authorize firing or operations that can cause DU dusts, mists, or gases. If you are near an explosion or fire involving DU, you should leave the area and stay out of the smoke plume.

9. The only personal protective measure needed when handling intact DU rounds in a storage and handling environment is to wear gloves. Always wash your hands afterward, even if you wore gloves. As required by the NRC, do not chew gum, eat, drink, or apply cosmetics in areas where DU munitions are stored or handled.

10. The radiation levels from DU ammunition are low enough that you do not have to wear a dosimeter (badge) during normal storage and handling operations. Your installation RSO will decide when personnel need dosimeters. Do not sit or rest against DU ammunition containers or pallets. Your exposure is directly related to the amount of time you spend in close proximity to DU munitions.

11. Your RSO has radiation detection instruments that can detect the presence of DU. He or she can check the radiation levels in your work area to see if you should wear a dosimeter.

12. Areas and buildings where DU munitions are stored or handled must be posted with a "Caution Radioactive Materials" sign. You will also see three other forms posted in the ammunition area. These signs are: (1) NRC Form 3; (2) Public Law 93-438; and (3) A page providing the name and telephone number of your RSO. This page will also list other documents relating to radiation safety you can view.

13. The metal shipping and storage containers for DU ammunition are stenciled with "DOT-E 9649". This is a Department of

Transportation exemption (DOTE) that allows the Army to ship DU munitions according to the primary explosive hazard and without radiation markings. A copy of the DOTE-9649 document must accompany all shipments of DU ammunition. In addition, overseas shipments of DU ammunition must also be accompanied by a document referred to as Competent Authority 2002090017. This document is similar to DOTE-9649 and allows shipment to or thru foreign countries.

14. The Army uses DU because it self-sharpens during penetration. This means that DU penetrators are very effective in punching through armored targets. Tungsten has also been used in kinetic energy munitions because it also is a dense material. Although tungsten is not radioactive, it is less effective, is more expensive, and, when alloyed with other metals in the manufacture of penetrators, is more toxic than DU.

15. Following are web links that provide additional information on the biological effects of uranium, enriched uranium, and DU.

a. Military Radiobiology, 1987.

<http://www.nato.int/du/010116pc/index/frame.htm#s0016.htm>.

b. Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological Profile for Uranium, Update, US Department of Health and Human Services, September 1999, Research Triangle Institute for Agency for Toxic Substances and Disease Registry, Atlanta, GA, September 1999.

<http://www.atsdr.cdc.gov/toxpro2.html>.

c. National Defense Research Institute, RAND, "A Review of the Scientific Literature as Pertains to Gulf War Illnesses, Volume 7: Depleted Uranium", December 1998;

<http://www.gulflink.os.mil/library/randrep/du/>

## SAMPLE TEST QUESTIONS

Circle the correct answer.

1. This training is required by:

a. The Environmental Protection Agency and the State Department.

b. The Department of Transportation and the US Army Joint Munitions Command.

2. The DU ammunition license is managed by:

a. The US Army Materiel Command.

b. The US Army Joint Munitions Command.

c. The US Army Tank-automotive and Armaments Command.

3. The primary hazard of DU ammunition is the explosives.

a. True.

b. False.

4. Ammunition handlers must wear dosimeters when handling DU munitions.

a. True.

b. False.

5. You should wash your hands when you are done handling DU munitions, even if you wore gloves.

a. True.

b. False.

6. Shipping and storage containers of DU munitions must be marked "Radioactive Material Inside".

a. True.

b. False.

## ANSWER SHEET

1. b. The Department of Transportation and the US Army Joint Munitions Command.
2. b. The US Army Joint Munitions Command.
3. a. True.
4. b. False.
5. a. True.
6. b. False.