NRC FORM 313 **U.S. NUCLEAR REGULATORY COMMISSION**
(4-2008)
10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 **EXPIRES: 10/31/2008**
Estimated burden per response to comply with this mandatory collection request: 4.4 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
612 E. LAMAR BOULEVARD, SUITE 400
ARLINGTON, TX 76011-4125

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
   - [x] A. NEW LICENSE
   - [ ] B. AMENDMENT TO LICENSE NUMBER _____
   - [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include ZIP code)*
   US Army Installation Command
   2511 Jefferson Davis Highway
   Arlington, VA 22202

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED
   US Department of Army Installations

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION
   Mario Owens

   TELEPHONE NUMBER
   703-681-5200

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
   a. Element and mass number; b. chemical and/or physical form; and c. maiximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*
    FEE CATEGORY **2B** AMOUNT ENCLOSED $ **750.00**

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTANED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Robert Wilson, Lieutenant General, Commander		NOV 0 6 2008

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			$		
APPROVED BY				DATE	

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

REPLY TO
ATTENTION OF

IMCG

NOV 0 6 2008

MEMORANDUM FOR US Nuclear Regulatory Commission (Dr. Tom McLaughlin), 11545 Rockville Pike, Rockville, MD 20852

SUBJECT: Statement of Intent – Depleted Uranium Possession

1. Reference electronic mail, 25 Mar 08, subject: Nuclear Regulatory Commission License (Encl 1).

2. In accordance with the above reference and as Commander of the U.S. Army Installation Management Command, I exercise the authority to request funding for decommissioning of operations within my command.

3. The funding requirement associated with decommissioning of each activity is estimated at $1.9 M (see encl 2). This estimate includes the soft-target areas as well as a 25 percent contingency factor. Subject to availability, we expect funding be made available to prevent delay of required decommissioning actions.

4. Please contact our Safety Chief, Mr. Mario A. Owens, with any questions or concerns at Mario.Owens@us.army.mil or by phone at (703) 681-5200. Thank you for your support.

2 Encls
as

ROBERT WILSON
Lieutenant General, USA
Commanding

Item 1. New License.

While the U.S. Army has not determined that the Atomic Energy Act (Act) requires a license in this situation, we are providing this application to promote cooperation between our agencies and to the extent required by the Act.

Item 2. Name and Mailing Address of Applicant

US Army Installation Command
2511 Jefferson Davis Highway
Arlington, VA 22202

Item 3. Address Where Licensed Material Will Be Used or Possessed

This license will authorize the possession of residual quantities of depleted uranium system at US Department of Army Installations.

The initial discovery of depleted uranium from the M101 spotting round was at locations within Hawaii and at Fort Hood, TX. Nonetheless, presence of depleted uranium may be determined to exist at additional installations. Installations identified as potential sources for depleted uranium contamination will be subjected to additional investigations to consist of historical site assessments and radiological surveys/ evaluations as necessary to confirm the existence of depleted uranium at a given facility. Additional installations where the M101 spotting round has been found include: Fort Benning, GA; Fort Campbell, KY; Fort Carson, CO; Fort Hood, TX; Fort Knox, KY; Fort Lewis, WA; Fort Riley, KS; Schofield Barracks, HI; and Pohakuloa Training Area, HI. Installations currently subject to further investigation include: Aberdeen Proving Ground, MD; Fort Dix, NJ; and Makua Military Reservation, HI. The NRC will be notified upon confirmation that depleted uranium is present at a given installation and that installation will then be incorporated into this permit.

A common characteristic of the sites where the M101 spotting round fragments are located is that they are well within the installation boundary and are located in an impact area where access is strictly controlled. These impact areas contain a number of other hazards such as unexploded ordinance which require restricted access and additional training prior to entry. This limits the potential for inadvertent exposure and ensures members of the general public, to include Army civilians and soldiers, are not directly exposed to the material.

Item 4. Name Of Person To Be Contacted About This Application

Mario Owens

703-602-1342

Item 5. Radioactive Material:

a. Element and Mass Number: Depleted uranium (^{238}U, ^{235}U, and ^{234}U); mass number (92)

M101 spotting round. A total of 75,318 rounds were originally produced. "Each depleted uranium projectile body weighed 3,180 ± 25 grains" (USACE 2007). This equates to about 206 g or 0.45 lb. Given a composition of 92 percent depleted uranium and 8 percent molybdenum, 2926 grains or 190g of depleted uranium was contained within each round.

b. Chemical and/or physical form: Any

c. Maximum amount that will be possessed: 8000 Kg (17,637 lbs) of depleted uranium.

The M101 spotting round was manufactured and distributed under NRC License SUB 459. "In the 1970's, approximately 44,000 DU rounds were demilitarized under the Remington Arms license by firing into the 600-Yard Bullet Catcher." (Cabrera 2006) In addition, about 2000 rounds were fired at LCAAP in the 1960's for lot testing. As such, a total of about 46,000 rounds can be accounted for out of a total production of 75,318 leaving about 29,300 rounds for distribution to Army organizations. Details with regard to the specific number of rounds issued to a given installation, previously recovered from ranges or disposed of as radioactive waste is not currently known. Given 29,318 rounds each containing 206 grams of alloy equates to an actual maximum possession quantity of about 6040 Kg of alloy containing about 5560 Kg of depleted uranium.

Item 6. Purpose for Which Licensed Material will be Used:

This U.S. Nuclear Regulatory Commission (NRC) license application is for authorization to possess and manage depleted uranium present at US Army installations as a result of previous use of depleted uranium. Specific functions to be performed under the license will be limited to radiological surveys as necessary to fully characterize the nature and extent of contamination and, when appropriate, to obtain information necessary to support development of decommissioning plans. Depleted uranium possessed pursuant to this license may also be subjected to disposal by transfer to a properly permitted/licensed disposal facility.

Item 7. Individual(s) Responsible for Radiation Safety Program and Their Training Experience:

Executive management and the Radiation Safety Staff Officer (RSSO) will work as a team to oversee the Radiation Safety Program for this NRC license. The Army Radiation Safety Officer (ARSO) directs the Army Radiation Safety Program on behalf of the Director of Army Safety (DASAF) for all radiation sources used or possessed by the Army, to include those authorized under this license, and fulfills the functions specified in paragraph 1-4m, Department of the Army Pamphlet 385-24. In this capacity the ARSO promotes good radiation safety practices throughout the Army, provides radiation safety consultation and resolves radiation safety issues. The ARSO is a senior professional health physicist with extensive education, training and experience in health physics to include radiation protection aspects involving depleted uranium.

Pursuant to paragraph 1-4i, Department of the Army Pamphlet (DA Pam) 385-24, (Attachment 1) Commanders will ensure command compliance with conditions of this NRC license. This will be accomplished in part by designating, in writing, a trained Health Physicist/RSSO who will be responsible for day-to-day operation of the radiation safety program. The RSSO will have, as a minimum, a college degree at the bachelor level in a physical or biological science, mathematics or engineering and training and experience commensurate with the scope of the license to include specific training involving depleted uranium. Consistent with NUREG-1556, training will be from "a formal course designed for RSOs presented by an academic institution, commercial radiation safety consulting company, or a professional organization of radiation protection experts". Training will include the following subjects:

- Radiation Protection Principles
- Characteristics of Ionizing Radiation

- Units of Radiation Dose and Quantities
- Radiation Detection Instrumentation
- Biological Hazards of Exposure to Radiation
- NRC Regulatory Requirements and Standards
- Hands-on use of radioactive materials.

In addition to the RSSO, each Garrison Commander will designate, "in writing, a trained Garrison RSO" in accordance with paragraph 1-4l, DA Pam 385-24. The Garrison RSO "establishes and directs the garrison Radiation Safety Program (to include a written Radiation Safety Program document)" and performs the functions detailed in paragraphs 1-4p, q, and r, DA Pamphlet 385-24, as applicable. Further, each RSO "designee is trained (and periodically retrained, as necessary) to a level commensurate with the Radiation Safety Program scope and responsibilities. (see chap 7)." (paragraph 1-4k(2)(a), DA Pam 385-24). "Acceptable courses for unit and garrison radiation safety officers are offered by the U.S. Army Chemical School, MEDCOM, NGB, and Army Materiel Command licensees." (paragraph 7-2, DA Pam 385-24). The ARSO is responsible for identifying qualifying courses for Army RSOs and may approve alternate training if they meet equivalent standards of the above listed courses.

Resume for Primary RSO.

Gregory R. Komp, CHP, Senior Health Physicist
U.S. Army Safety Office
Office of the Chief of Staff United States Army
Commercial (703) 601-2405

1. Education:

a. M.S. in Health Physics (1992), Georgia Institute of Technology, Atlanta, Georgia.

b. B.S. in Chemistry (1978), Gonzaga University, Spokane, Washington.

2. Relevant Professional Experience:

a. January 2005 to Present. Army Radiation Safety Officer. Responsible for the Radiation Safety Program for the United States Army. Develops and implements policies to ensure the safe use of radioactive materials within the US Army and ensure Army and subordinate programs comply with applicable local, state and federal regulations.

b. January 1991 to January 2005 - U.S. Army Test, Measurement, and Diagnostic Equipment Activity (USATA) – Serves as the Senior Health Physicist for USATA. Responsible for establishing and maintaining the USATA Health Physics Services Program and ensuring all subordinate programs are in compliance with applicable local, state, and federal regulations. Responsible for organizing and managing all features of the USATA Secondary Reference/Transfer (S/T) level worldwide Radiation Safety Program. Responsible for radiation safety program evaluation, policy development, managing USATA S/T level licenses, and accident/incident investigation and control. Provides technical support to the U.S. Army worldwide radioactive waste consolidation program. Oversees the USATA ALARA program. Serves as a health physics consultant to the Defense Threat Reduction Agency (formerly On-Site Inspection Agency).

c. July 1985 to January 1991 - U.S. Army Chemical School and Fort McClellan, AL - Served as primary RSO on 3 NRC licenses. As a Health Physics Officer was responsible for a complete broad scope radiation safety program to include: dosimetry, monitoring, surveys, environmental studies, inventories, transportation, disposal, calibration, instrumentation, and safety training. Program encompassed over 1,000 sources, 50 radiation workers, and trained 3,000 students per year.

d. October 1982 to March 1983 - U.S. Army Chemical School and Fort McClellan, AL - As an Instructor/Doctrine Writer, presented instruction on basic nuclear physics, NRC regulations, and radiation detection instruments. This course is accepted as the primary qualification course for U.S. Army Radiation Protection Officers worldwide.

e. May 1979 to August 1980 - Fort Ord, CA - As a Nuclear emergency team (monitoring and survey team) leader, this team was responsible for locating and containing radioactive material from any nuclear accident occurring in the Western United States.

Resume for Primary RSO (Continued)

3. Experience with Radioisotopes (Jul 85 to Present):

a. Sealed/Plated Sources. Experience is with primarily calibration and reference sources. Activities range from microcurie check sources to a 1000 curie Cobalt-60 calibrator/irradiator, 3000 curie Cesium-137 calibrator/irradiator, plated alpha sources up to 20 microcuries.

b. Liquid Sources. Experience in using liquid radioactive material solutions to make sources for instrument performance checks, training, and quality assurance audits. Activities used were primarily in the microcurie to millicurie range.

c. Neutron Sources. Experience is with Californium-252, up to 40 micrograms; Plutonium/Be-238, up to 10 Curies; and Plutonium/Be-239, up to 20 Curies.

5. Professional Memberships:

a. Health Physics Society -

Governmental Section
Environmental Section
Radiation Safety Section
Symposia Committee Member, 1999 to 2001 (Current Chairman)

b. Alabama Health Physics Society -

Past President
Past Treasurer
Current Executive Council

6. Certification: Certified by the American Board of Health Physics

Item 8. Training for Individuals Working in or Frequenting Restricted Areas:
Paragraph 1-4k, DA Pam 385-24 mandates that each commander or director is responsible to ensure "that all personnel occupationally exposed to radiation receive appropriate radiation safety training commensurate with potential work place hazards". This requirement is consistent with and implements the requirements of 10 CFR 19 such that all individuals authorized unescorted access to restricted areas in which depleted uranium is present will receive training to meet the requirements of 10 CFR 19 prior to working in or frequenting such areas. This site-specific training will be performed by the Unit and/or Garrison Radiation Safety Officer or their designated representatives.

Item 9. Facilities and Equipment.

The Department of Defense (DOD) has a broad range of radiological facilities and equipment and associated capabilities to include a variety of different military and commercial Radiation Detection, Identification and Computation (RADIAC) instruments. DOD also has significant organic radioanalytical capabilities. Each U.S. Army Command has assigned RADIAC instruments (and qualified users) as needed to fulfill a variety of tactical and non-tactical nuclear and radiological missions. Although the specific instruments will vary to some extent, military RADIAC instruments generally available at all Army installations typically include the AN/VDR-2 Radiac Set and the AN/PDR-77 Radiac Set. Army organizations may also possess a wide variety of different types of commercial RADIAC instrumentation or older model sets such as the AN/PDR-27.

Although the limited emissions from depleted uranium are such that external dosimetry is not generally required, in the event that dosimetry devices are determined to be appropriate, such devices will be obtained from the U.S. Army Dosimetry Center, Redstone Arsenal, AL 35898-5000.

Item 10. Radiation Safety Program.

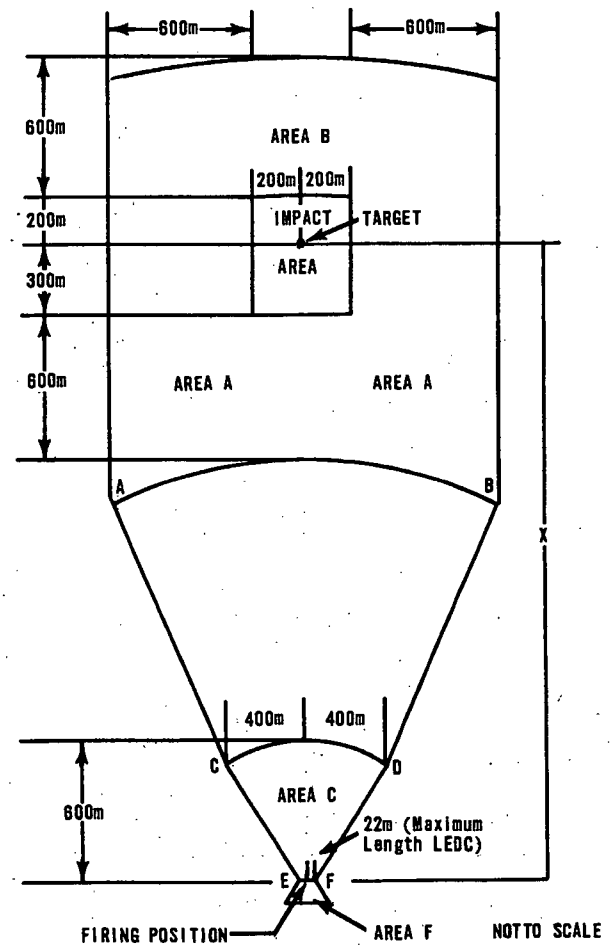
Army Regulation 385-10, entitled "The Army Safety Program", provides "policy on Army safety management procedures with special emphasis on responsibilities and organizational concepts." "This regulation applies to the Active Army, the Army National Guard/Army National Guard of the United States and the Army Reserve unless otherwise stated." Chapter 7 entitled "Radiation Safety Management" "prescribes DA safety policy and processes for the Army radiation safety function" (See Attachment 4). AR 385-10, Chapter 7, is augmented by Department of the Army Pamphlet (DA Pam) 385-24. DA Pam 385-24 "establishes procedures and guidance for the safe use, storage, licensing, disposal, transportation, safety design, and inventory control of ionizing and non-ionizing radiation sources. It also provides radiation exposure standards and dosimetry and accident reporting instructions. Its objective is to ensure safe use of radiation sources and compliance with all applicable Federal and Department of Defense (DOD) rules and regulations." (DA Pam 385-24, paragraph 1-1)

Paragraph 1-4, DA Pam 385-24 stipulates that Each Commander or Director or an organization requiring an RSO must have "Established written policies and procedures to ensure compliance with applicable Federal, DOD and Army radiation safety regulations and directives" and mandates

Individual(s) responsible for radiation safety program and their training and experience are listed in Item 7. Specific duties and responsibilities of Garrison RSOs, all RSOs and unit RSOs are

specified in paragraphs 1-4p, q, and r, respectively. The responsibilities of RSOs may not be transferred to other individuals. Many tasks and duties associated with managing the program may be assigned or delegated to other qualified individuals; however, the responsibility for these tasks and duties is with the RSO. NRC does recognize that a qualified individual will have to fill in for the RSO when the RSO will be away for short periods of time for professional conferences, vacation, or illness. However, this should not occur for extended or indefinite periods of time. Consideration must also be given to how the RSO will be contacted in the event of an emergency.

As derived from circa 1968 "Typical Davy Crockett Weapon System Range Layout," the impact area for the Davy Crockett is about 400m by 500m or about 200,000 m^2. Distribution of 560 Kg (0.2016 Ci) (assuming 10 percent of the total DU) of depleted uranium in surface soils (top 15 cm (6 inches) would result in distribution in a total of volume of 3.0×10^{10} cm^3.

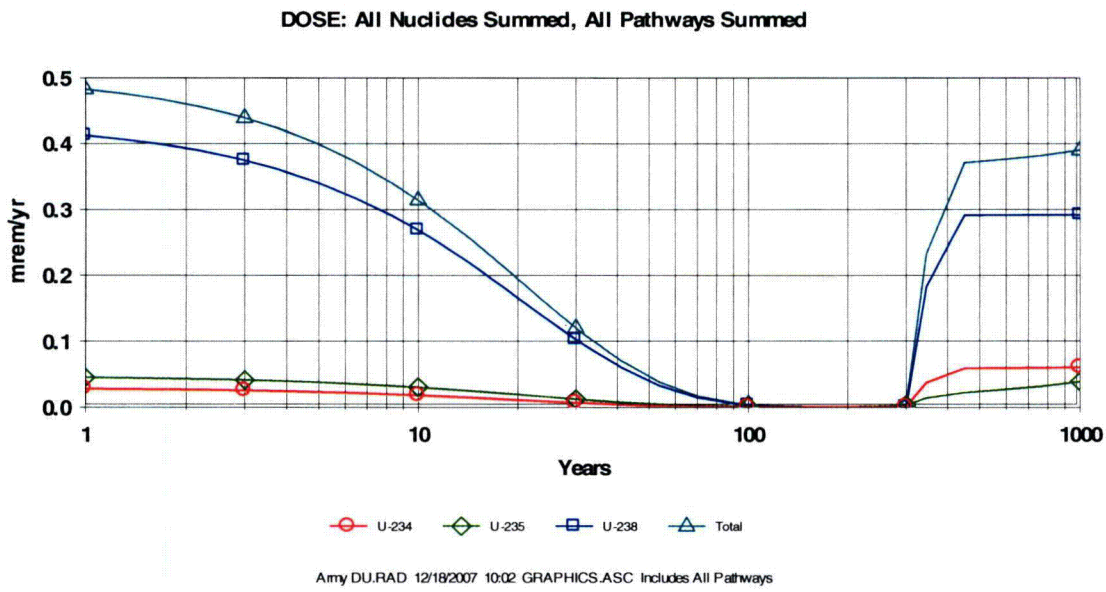


M28 Davy Crockett Weapon System Range Layout

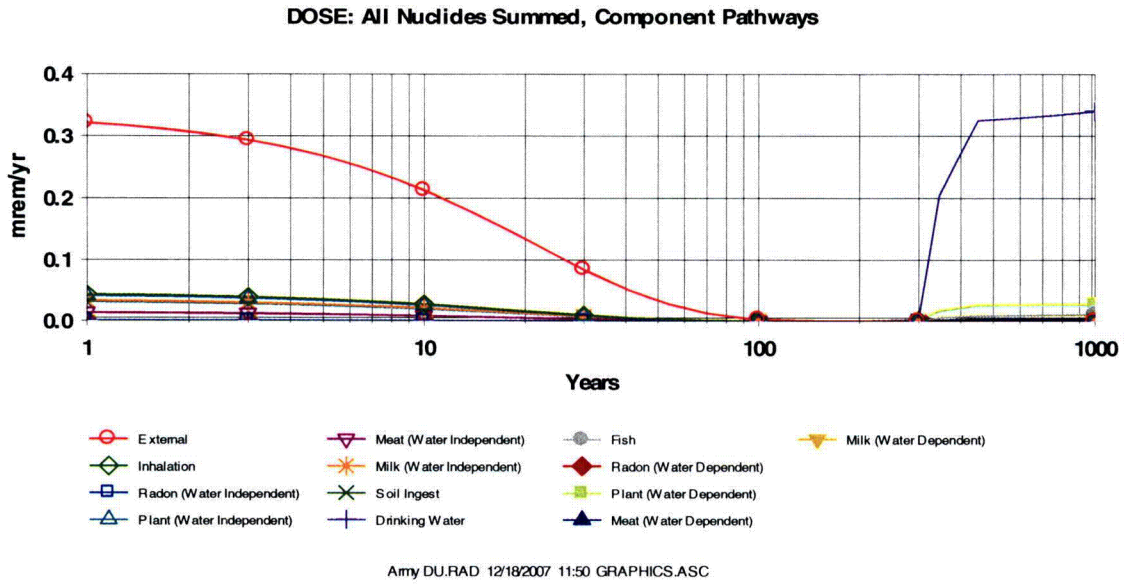
For a soil density of 1.5 g/cm^3 the soil concentration would equate to an average concentration of about 4.5 pCi/g if 10 percent of all rounds that are not currently accounted for were, in fact, fired at a given Army range used for Davy Crockett training. This concentration is significantly lower than the screening values for uranium (13, 8 and 14 pCi/g for ^{234}U, ^{235}U and ^{238}U, respectively) specified in Volume 2, Appendix H, NUREG-1757. Further, given that "Only the ground water pathways are affected by the total inventory of residual radioactivity, including that deeper than

15 centimeters. The direct, inhalation, ingestion and crop pathways are determined by concentration only, not total inventory." (Paragraph G.2.1, Volume 2, NUREG-1757). This should represent an appropriate bounding condition. As such, one can reasonably conclude that potential doses due to the presence of depleted uranium from the M101 Spotting Round used by the M28 Davy Crockett Light Weapon are expected to be much less than general public exposure limits specified in 10 CFR 20.1301 and are likely to be some small fraction of the 25 mrem/yr prescribed by 10 CFR 20.1402. (Preliminary assessment using RESRAD Version 6.3 results in an estimated dose of 0.5 mrem/yr for the stated criteria with model default parameters. If all unaccounted rounds were, in fact, fired at one of the Army's ranges used for Davy Crockett training, RESRAD Version 6.3 results in an estimated dose of 5 mrem/yr for the stated criteria with model default parameters. (These doses were derived using all RESRAD default pathways)

RESRAD Dose per Isotope (10% of Rounds at a Single Site)



RESRAD Dose per Pathway (10% of Rounds at a Single Site)



Consistent with the philosophy of maintaining radiation exposures as low as reasonably achievable, the Radiation Safety Program for depleted uranium from the Davy Crockett weapon system will consist of identification of the area(s) containing depleted uranium as a result of the use of the Davy Crockett weapon system; imposition of access restrictions with appropriate radiological monitoring requirements pending assessment of radiological conditions within a given affected area; the performance of scoping and characterization surveys to delineate the affected area (subject to precautions required due to the presence of unexploded ordnance); and investigation of remedial alternatives for the affected area. The NRC will be appropriately notified upon identification of areas containing depleted uranium from the Davy Crockett weapon system. In addition, actions to address the presence of depleted uranium will be fully coordinated with the NRC upon determination that contamination exists at a given installation or activity.

Migration of depleted uranium has been and continues to be extensively studied at a variety of military installations to include Aberdeen Proving Ground, MD, Jefferson Proving Ground, IN, Lake City Army Ammunition Plant and the Iowa Army Ammunition Plant. Available information indicates that depleted uranium metal generally remains in the immediate vicinity where initially deposited with limited migration over the periods that the materials have been present. The potential for DU to migrate depends on a number of factors to include chemical form of the uranium; chemical characteristics of soil including pH; proximity to surface water bodies; depth to groundwater; and topography/terrain. Given that migration would generally distribute uranium over a larger area thus reducing its concentration and that dose depends primarily on the average concentration, migration would tend to lower doses but to increase the potential for low level exposures.

Radiological surveys of areas determined to be contaminated as a result of the M101 spotting round will be subject to appropriate radiological investigations. These surveys will most commonly involve 2" X 2" or similar NaI(Tl) scintillation detectors. The scan MDC for depleted

uranium (0.34% U-235) as specified in Table 6.4, NUREG-1507, is about 56 pCi/g with a weighted cpm/uR/h of 3,790. Comprehensive studies have been performed to assess the ability of such detectors to assess the existence of depleted uranium metal. These studies indicate that a DU penetrator fragment as small as 0.37 cubic inches (6 cubic centimeters) can be located easily on the soil surface during a typical scan (assuming an investigation threshold of 2,000 cpm above background). Similar evaluation indicates that a DU penetrator fragment as small as 0.61 cubic inches (10 cubic centimeters) can be located easily below 2 inches (5.1 centimeters) of soil during a typical scan (again assuming an investigation threshold of 2,000 cpm above background). (SAIC 2005).

Since each site has unique geological and climatic conditions, whether a site specific environmental monitoring plan will be necessary for every installation where M101 spotting round fragments are located will be considered, subject to availability of funding. Any monitoring plan must be agreed to by both the Army and the NRC. Where feasible and where existing environmental monitoring plans are in place to demonstrate that other constituents of concern are not being transported off range, DU will be added to those monitoring efforts.

11. Waste Management.

Screening levels for clearance are defined in Table 5-2, DA-PAM 385-24. When depleted uranium contamination exceeding these screening levels are confirmed at an Army installation, then the Army will coordinate with the NRC in developing appropriate site-specific action incorporating the requirements of DA-PAM 385-24. When disposal is necessary, the material will be transferred to an authorized disposal site.

12. License Fees:

Category/Amount: 2B/$750 (Per telephonic communication with Ms. Brenda Brown, USNRC (301) 415-6055)

References:

ANL 2001 – Human Health Fact Sheet, Depleted Uranium, Argonne National Laboratory, October 2001

Cabrera 2001- 600-Yard Bullet Catcher Final Status Survey Report, Lake City Army Ammunition Plant, Lake City, Missouri, August 2001

Cabrera 2006 – Area 31 Final Status Survey Work Plan, Addendum to: Final Removal Action Memorandum and Work Plan – Housekeeping Removal Action, October 2006

PNNL 2000 - PNNL-MA-860, Battelle Pacific Northwest Laboratory Manual 860, Chapter 7, September 30, 2000

RHH 1970 – Radiological Health Handbook, U.S. Department of Health, Education and Welfare, Public Health Service, Rockville, MD, January 1970

SAIC (Science Applications International Corporation) 2005. - Field Sampling Plan, Site Characterization of the Depleted Uranium Impact Area, May 2005.

USACE 2007 – Archive Search Report on the Use of Cartridge, 20mm Spotting, M101 for Davy Crockett Light Weapon M28, USACE St. Louis District, May 2007