



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TACOM LIFE CYCLE MANAGEMENT COMMAND
6501 East 11 Mile Road
Warren, MI 48397-5000
22 February 2006

US Army TACOM Life Cycle Management Command
Safety Office

U.S. Nuclear Regulatory Commission
Region III
ATTN: Materials Licensing Branch
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Reference: Nuclear Regulatory Commission (NRC) License SUB
1536, Docket No. 040-08994

Dear Sir/Madam:

Enclosed are three copies of a NRC license renewal application for NRC License SUB 1536. The NRC license is scheduled to expire 31 March 2006.

The renewal application consolidates prior amendments to the license and represents the current program.

Request that the license be renewed and the DA 209 card be returned with signature acknowledging receipt.

If you have any questions regarding this matter, please contact Mrs. Karen Lapajenko McGuire at (586) 574-7635/6194.

Sincerely,


GEORGE G. JARVIS
Safety Director

Enclosures

CF:

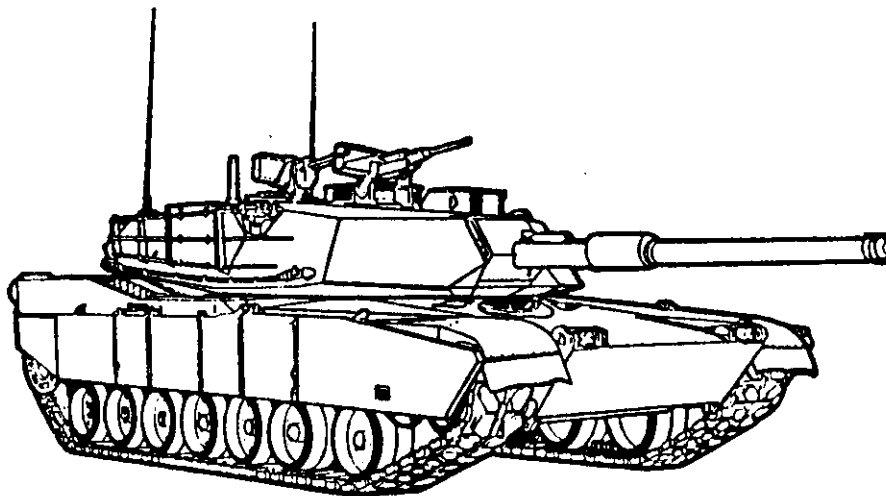
Cdr, AMC, ATTN: AMCSF-P, 9301 Chapek Rd, Ft. Belvoir, VA
22060-5527

RECEIVED FEB 28 2006

NUCLEAR REGULATORY COMMISSION RENEWAL LICENSE APPLICATION



**FOR
DU ARMOR
(USED IN M1A1/M1A2 TANK)**



U.S. Army TACOM Life Cycle Management Command (LCMC)

Warren, Michigan 48397-5000

22 February 2006

NRC FORM 313
(10-2005)
10 CFR 30, 32, 33,
34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

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, NE08-10202, (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.

APPLICATION FOR MATERIAL LICENSE

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, MISSISSIPPI, 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, 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
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-4005

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)

A. NEW LICENSE

B. AMENDMENT TO LICENSE NUMBER _____

C. RENEWAL OF LICENSE NUMBER SUB-1536

2. NAME AND MAILING ADDRESS OF APPLICANT (Include ZIP code)

Commander, U.S. Army TACOM
Life Cycle Management Command (LCMC)
6501 East Eleven Mile Road
Warren, MI 48397-5000
AMSTA- CS-CZ (MS 485)

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

U.S. Department of Defense (DoD) installations and activities worldwide; DoD contractors facilities and operations, excluding General Dynamics (GD) and its subcontractors, approved of by the licensee Radiation Safety Officer (RSO) and at temporary job sites of the licensee anywhere in the U.S.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Karen Lapajenko McGuire

TELEPHONE NUMBER

586-574-7635/6194

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. maximum 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	AMOUNT ENCLOSED	\$
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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 CONTAINED 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 82 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

GEORGE G. JARVIS, TACOM SAFETY DIRECTOR

SIGNATURE

DATE

FOR NRC USE ONLY

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

Cont'd NRC Form 313 "Application for Material License"

5. Radioactive Material.

a. Element and Mass Number – Depleted Uranium (DU).

1. Chemical and/or Physical Form – Solid Slabs encased in stainless steel packages (This is called "DU Packages"). Radiation readings are no higher than 0.5 mr/hr or 0.005 mSv/hr on the external surfaces of turrets containing DU packages in the M1 series tanks. The DU packages in the turret and hull become the DU Armor for the turret and hull. (See Supplement A Drawing)

2. Maximum Amount which will be Possessed at Any One Time – Unlimited for the M1 Series turret and 5 DU Armored tank hulls (The 5 tanks with DU hulls are located at Army Schools).

b. Element and Mass Number – Transuranics and Technetium-99 contaminants in Depleted Uranium.

1. Chemical and/or Physical Form – Contained in DU metal encased in stainless steel.

2. Maximum Amount which will be Possessed at Any One Time – Not to exceed a total of 100 picocuries/gram of each transuranic and not to exceed 500 picocuries/gram total for all transuranics. Not to exceed 500 picocuries/gram of technetium-99. The existence of the transuranics at these levels doesn't change safety requirements in handling the DU Armored Tanks or the DU Armored turrets/hulls.

6. Purpose(s) For Which Licensed Material Will Be Used.

The license is for the use of DU material utilized as Armor in tank turrets/hulls of the Abrams M1 series tanks at the locations listed in item 3 above. The turrets and hulls are components of the Abrams M1 series tanks. The scope of the license is for field (user) possession, usage and storage only. The license does not cover repair or maintenance work directly on the DU Armor.

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

TACOM LCMC Warren – Karen Lapajenko McGuire
Radiation Safety Officer (RSO)

Cont'd NRC Form 313 "Application for Material License"

Storage/Normal Maintenance sites require no RSO. Depot maintenance/overhaul sites RSO requirements will be addressed in another NRC license by another Army agency or in the case of the Marine Corps via Navy/Marine Corps licensing, if the Army doesn't license their tank maintenance/overhaul.

(See Supplement B).

8. Training for Individuals Working In or Frequenting Restricted Areas.

There are no restricted areas (See Supplement C).

9. Facilities and Equipment.

(See Supplement D).

10. Radiation Safety Program.

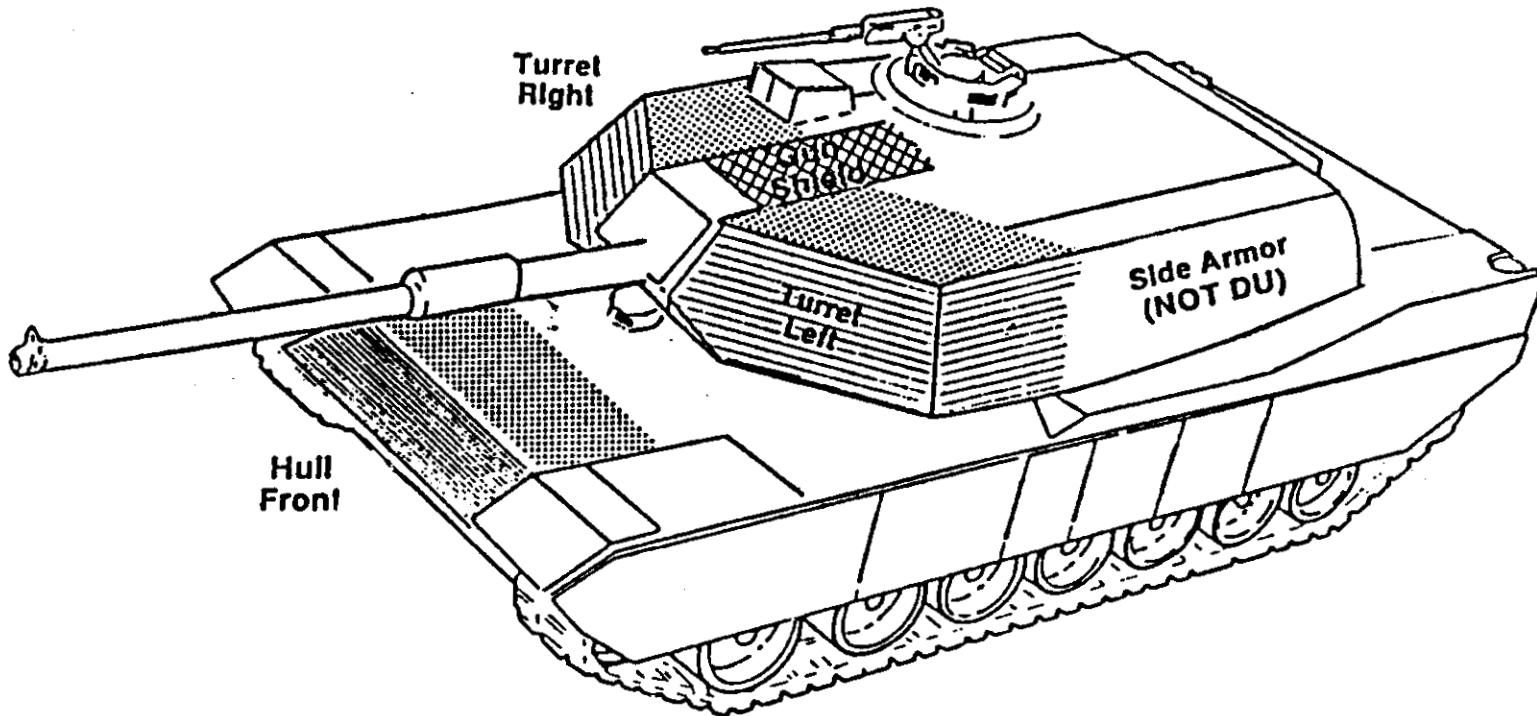
(See Supplements E & F).

11. Waste Management.

(See Supplement G).

12. Environmental Assessment.

(See Supplement H).



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Figure 1. M1A1 Abrams tank with areas indicated (shaded) where Abrams Heavy Armor is installed.

Exception: Gun Shield area does not contain Heavy Armor.

NOTE: DU Armor in the Hull front only exists in 5 tanks which are located at Army Schools.

SUPPLEMENT B

RESUMES OF PERSONNEL RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM.

RESUME

KAREN LAPAJENKO MCGUIRE

Current Position: Health Physicist
U.S. Army TACOM Life Cycle Management Command (LCMC)
Warren, MI

EDUCATION:

1981 -- AA Liberal Arts, Macomb County Community College, Warren, MI

1983 -- B.S. Industrial Health and Safety, Oakland University, Rochester, MI

1984 -- Occupational Health and Safety Specialist Intern Training Program, U.S. Army Material Command, Field Safety Activity, Charlestown, IN.

1999 -- MSA Administration, Central Michigan University, Mt. Pleasant, MI

TRAINING:

	<u>Duration of Training</u>	<u>On-the-Job</u>	<u>Formal Course</u>
Radiological and Laser Safety, AMC Field Safety Activity, IN, August 1984	6 days	No	Yes
Transportation of Radioactive Materials, Afftrex, LTD, Ft. Belvoir, VA, January 1985	1 week	No	Yes
Applied Health Physics, Oak Ridge Associated Universities, Oak Ridge, TN, April - May 1985	5 weeks	No	Yes
Radiological Safety of Depleted Uranium, U.S. Army Materials Technology Laboratory, MA, July 1985	1 week	Yes	No
Environmental Assessment Preparation, Ft. Lee, VA August 1985	1 week	No	Yes

	<u>Duration of Training</u>	<u>On-the-Job</u>	<u>Formal Course</u>
Instructor's Training Course For Operators of the Tester, Density and Moisture, Nuclear Method, NSN 6635-01-030-6896, TACOM, December 1985	1 day	No	Yes
Radioactive Waste Packaging, Transportation, and Disposal Chem-Nuclear Systems, Inc., Columbia, SC, November 1986	1 week	No	Yes
Radiation Protection Internal Review Course Fort Belvoir, VA August 1988	1 week	No	Yes

WORK EXPERIENCE

Jan 1982 to Dec 1983: Safety Internship sponsored by Oakland University at an Industrial Health Clinic, with General Motors Safety, with Awrey Bakery Co., and with Clayton Environmental Consultants (An Industrial Hygiene Firm).

Apr 1984 to Oct 1984: Safety Specialist Intern, U.S. Army Materiel Command Field Safety Activity, Charlestown, IN. Received formal training in all aspects of safety and occupational health in order to function as a safety specialist for the Department of the Army.

Oct 1984 to May 1985: Safety Specialist Intern, U.S. Army Tank Automotive Command (TACOM), Warren, MI. Performed safety and health surveys/inspections throughout TACOM, U.S. Army Detroit Arsenal Tank Plant and Selfridge Air National Guard Base which are heavy industrial, and research and development facilities with hazardous processes and materials. Assistant instructor of vehicle safety operations for Department of Army (DA) licensed operators.

May 1985 to Oct 1988: Occupational Health and Safety Specialist, Alternate Radiation Protection Officer (ARPO), Radiation Control Officer (RCO), and Laser Safety Officer (LSO), TACOM, Warren, MI. Conducted safety inspections throughout TACOM, DATP and Selfridge ANG Base which are heavy industrial and research and development facilities with high hazard processes and materials, to eliminate safety and health hazards and enforced corrective actions in this area. Coordinator and Evaluator for suggestions submitted to the Command Safety Suggestion Program. Performed health physics functions at TACOM, DATP, and LATP. Health Physics functions involved life cycle controls of TACOM commodities utilizing radioactive material and ionizing radiation producing devices and the evaluation of radiological protection programs and radiation facilities.

Oct 1988 to Present: Health Physicist, Radiation Safety Officer (RSO), Radiation Safety Staff Officer (RSSO) and Laser Safety Officer (LSO), TACOM LCMC, Warren, MI. Responsible for the management of the TACOM LCMC Radiation Safety Program. Implement Federal, State and Army Directives and develop policy and guidance for and monitor operations within TACOM LCMC involving procuring, receiving, using, storing, handling, maintaining, transferring and disposing of radioactive materials, ionizing producing devices, laser and radio frequency/microwave radiation sources. Prepare and review applications for DA Authorizations, DA Permits and NRC licenses. Manage and administer health physics/radiological engineering programs for the life cycle control of TACOM LCMC radioactive commodities utilized worldwide which includes, but is not limited to, various stages of research, development, test, production, deployment and disposal. Develop and provide guidance to Department of Defense elements worldwide in the radiological safety aspects of radioactive items of supply. Responsible for the evaluation of radiological safety programs and facilities at formerly DATP (now closed), JSMC Lima, Selfridge ANGB, TACOM LCMC and worldwide, to insure compliance with TACOM LCMC responsible Department of the Army Radiation Authorizations/Permits and NRC licenses. Perform health physic surveys of TACOM LCMC responsible x-ray operations and of TACOM LCMC responsible laser operations.

Experience with Radiation.

Radioactive Material.

<u>Isotope</u>	<u>Maximum Activity</u>	<u>Duration of Experience</u>	<u>Type of Use</u>	<u>License</u>
1. Cs-137	6 mCi	10 years	Calibrate radiac equipment, Health Physics surveys and Leak Test (TACOM).	NRC 21-01222-02 (terminated) Manage License.
2. Ra-226	1.92 mCi	10 years	Calibrate radiac equipment, health physics surveys and leak tests (TACOM).	DA Authorization A21-12-02 (terminated) Manage Authoriza-tion.
3. Am 241-Be Cs-137	50 mCi 10 mCi	20 years	Used in the MC-1 soil tester world wide by Army units.	NRC License 21-01222-05, Manage License.
4. Ra-226 Ni-63 Cs-137	0.7 uCi 15 uCi 5 uCi 5 uCi	20 years	Used in dials and gauges and in spark igniters in vehicles worldwide.	DA Authorization A-21-12-04 Manage Authori-zation.
5. Th 232	0.908 uCi/lb	20 years	Used in the combustor liner in the M-1 series tank worldwide.	DA Authorization A21-12-05, Manage Authoriza-tion.
6. Cs-137	50 mCi each Total 200 mCi	10 years	Used in density gauges in a baghouse.	NRC License 21-01222-02 (Terminated) Manage License.

Experience with Radiation.

7.	Th-232 H-3	0.06 uCi/unit 10 Ci/unit	20 years	Used in the M-1 series tank in the Night Sight, Combustor Liner and in the Muzzle Reference Sensor at DATP and and JSMC Lima.	DA Permits P21-DATP-12-01 P21-DATP-12-02 P21-DATP-12-03 (Terminated) JSMC Lima Permit (Manage Permit).
8.	Tl-204 Cr-51 Co-60 Mn-54 Ra-226 Cs-137 Am 241-Be Cs-134 Eu-152 Ag-108 Na-22	0.3 uCi 1 uCi .2 uCi .247 uCi 4.96 uCi 9.6 uCi 5.3 Ci	Apr-May 1985	Laboratory work at Oak Ridge Assoc. University.	
9.	DU		Jul 85 Present	Manufacture of DU containing items at Watertown, MA. Installation/Use of Heavy Armor In the Abrams Tank.	

Organization Membership:

American Society of Safety Engineers (ASSE)
 World Safety Organization

SUPPLEMENT C

TRAINING

Warning statements are published in vehicle manuals [Technical Manuals (TM's)] for the 120 mm gun M1 series Heavy (DU) Armor General Abrams tank. These manuals are with the vehicle. The statements indicate that the turret contains DU Armor and that the DU is completely encased, presenting no hazard unless it is opened up exposing the DU armor. It then states that exposure to radiation in the crew compartment of an undamaged tank by the DU armor is minimal.

The statements then refer to TB 9-1300-278, if there is damage or a fire. TB 9-1300-278 gives guidelines for the safe response to handling, storage, and transportation accidents involving armor which contain DU.

TACOM Warren, AMSTA-CS-CZ and its phone number is then listed in the manuals for radiation safety support, to include obtaining copies/information pertinent to the Rules/Regulations/NRC License/License Conditions and License Application. It is also listed for notification of fire/breakage or theft/loss of the DU Armor. TACOM LCMC Safety Office also has a web site at www.tacom.army.mil/safety to which Army personnel can access a copy of the NRC license, NRC regulations, Army regulations and other information. The web site also has Tier 1 training covering DU General Awareness. There are different tier training based on the involvement with DU like medical, etc. The other tier training is provided through the Army Command TRADOC.

Army personnel also have the Abrams Security Classification Guide, AR 700-48 (Management of Equipment Contaminated with DU or Radioactive Commodities) and DA Pam 700-48 (Handling Procedures for Equipment Contaminated with DU or Radioactive Commodities). They also receive training on DU and protective measures in the Soldier Common Task Manual.

The tanks at the schools with the DU armor hull were identified to the schools, and notations were made in the Abrams Maintenance Work Request (DMWR) and in the Abrams Demilitarization Procedures.

SUPPLEMENT D

FACILITIES AND EQUIPMENT

U.S. DOD installations/activities worldwide, temporary job sites of the licensee anywhere in the U.S.; DOD contractor facilities/operations, excluding GD and its subcontractors, approved of by the licensee RSO, require no special facilities/equipment for the Abrams tank with DU armor, due to the low radiation levels (less than or equivalent to 0.5 mr/hr or 0.005 mSv/hr on external surfaces).

The tank system has physical security requirements, which are addressed in various Army regulations and cover structures/buildings/motor parks, motor pools, in the field, commercial and controlled ports, port facilities, rail guards, etc. for storage of the tanks and at unit/installation level. The regulations provide surveillance of the tanks. For example, the regulations state that tanks cannot be removed off of an approved installation without it being attended and must be under constant observation by a responsible individual (U.S. Military, Department of Defense or Department of the Army Civilian, DOD Contractor Personnel, U.S. Cleared Contractor or Local National with a Favorable Foreign National Screening). The local commanders under the regulations are to establish Standard Operating Procedures to ensure the tank is safeguarded and accounted for.

SUPPLEMENT E

OCCUPATIONAL RADIATION PROTECTION PROGRAM

OCCUPATIONAL RADIATION PROTECTION PROGRAM

This program was prepared for the guidance of DOD personnel; and contractor activities/locations approved of by the TACOM LCMC RSO, who are engaged in the receipt, handling and storage of Abrams Heavy (DU) Armor tanks and the DU turrets/hulls. The objective of the program is to assure compliance with the Code of Federal Regulations (CFR's) and Army regulations. The radiation protection program policy within the US Army, and stated in this program, is to accomplish the mission while maintaining radiation exposures/releases of radioactive materials "As Low As Reasonably Achievable" (ALARA). An organization chart to be utilized to conduct the mission is enclosed as Figure 1. Key elements of the Occupational Radiation Protection Program include:

1. RESPONSIBILITIES:

a. The U.S. Army TACOM Life Cycle Management Command in Warren, MI provides guidance, through manual statements and the NRC license application/amendment, to the field (users).

b. MACOM Commanders/DOD Command Centers and approved of DOD Contractors are responsible for the implementation, review and enforcement of the applicable AR's, TM's, TB 9-1300-278, Abrams Security Classification Guide and the NRC license requirements involving the DU Armor (All of the above identified parties agreed to the NRC license application, which the NRC approved of and issued a NRC license based on the application commitments).

c. PM Heavy Brigade Combat Team Logistics Management Division Fielding Branch (SFAE-GCS-HBCT-LF) with APM Production Abrams Tank System of the PM Heavy Brigade Combat Team (SFAE-GCS-HBCT-AB) located in Warren, MI shall maintain inventory records accounting for the number of Army DU Armored tanks and their locations. The Marine Corps is responsible for accounting for DU Armored tanks by locations for Marine Corps tanks. The Marine Corps Command responsible for this is the U.S. Marine Corps Systems Command, Code PMM-142 AFSS (Tank Systems). The inventory records are continuous records and include tanks or DU Armored Turrets/Hulls that are disposed of (for security and decommissioning purposes).

d. PM Heavy Brigade Combat Team Logistics Management Division Fielding Branch (SFAE-GCS-HBCT-LF) located in Warren, MI has oversight responsibility for records of loans/leases/Government Furnished Equipment (GFE's) of Abrams Heavy Armor tanks and for ensuring the coordination of the TACOM LCMC RSO's approval of loans/leases/GFE's of Abrams Heavy Armor tanks. This same office has the responsibility for the Army DU Armored tanks within the loans/leases and GFE fleet.

The loaned/leased and GFE'd fleet is a subset of the total Army DU Armored Also, SFAE-GCS-HBCT-LF shall inform the TACOM LCMC RSO of extensions to the loans/leases/GFE's. Tank.

e. PM Heavy Brigade Combat Team Logistics Management Division Fielding Branch (SFAE-GCS-HBCT-LF) and APM Production Abrams Tank System of the PM Heavy Brigade Combat Team (SFAE-GCS-HBCT-AB) in conjunction with the Materiel Fielding Team and applicable TACOM LCMC Warren Item Managers validate on-hand inventory by the following methods: On-Site Inspections, Records Maintained by the Materiel Fielding Team for Tanks Handed Off, Field Service Representatives Records, and Records from Contractor Modification Teams. This is a continuous process and not done every 12 months.

f. The TACOM LCMC RSO on the license:

1. Shall be technically qualified by education, training, and professional experience commensurate with the responsibilities of the assignment.

2. Reviews proposed procedures involving Abrams Heavy Armor handling and emergency procedures to evaluate the hazard potential, adequacy of protective measures and to assure ALARA.

3. Reviews TM warnings and NRC license requirements and prepares as appropriate amendments/changes.

4. Investigates radiation accidents/incidents where unusual levels of radiation or contamination are suspected and submits findings and recommendations to the appropriate officials, IAW Army regulations, 10 CFR and 49 CFR.

5. Maintains radiation protection program records for this license (exception being records under 1(c) and (d) above).

g. User's (Are not considered Occupationally Exposed), but shall:

1. Comply with this license (Work on or penetration of the DU Armor is not authorized under this license).

2. Comply with TB 9-1300-278, the Abrams Security Classification Guide, AR 700-48 and DA Pam 700-48, and the Abrams Heavy Armor TM's. These documents give emergency procedures in handling the Heavy Armor tank.

3. Be responsible for performing work in accordance with paragraphs 1(g) (1) and (2) above and in such a manner as to maintain his/her exposure ALARA

2. HEAVY ARMOR TANK IDENTIFICATION.

Serial numbers of turrets have a "U" in the end of the number indicating that they contain DU.

3. TRANSPORTATION.

a. The DU Armored tank is shipped under 49 CFR 173.426 (excepted packages or articles containing natural uranium or thorium).

b. The outside of the inner packaging (DU package before insertion in the tank) is marked radioactive by general Dynamics Land Systems (GDLS) under their NRC license SUB-1564.

c. Placards are not required.

d. If the turret is separated from the tank, then the trunion area must be closed up to prevent exposures from the trunion area. The trunion area has readings higher than 0.5 mrem/hr or 0.005 mSv/hr.

e. The shipping paper must indicate UN 2910 in lieu of marking the DU Armored Tanks or Turrets/Hulls with the UN number.

f. (1) If the tank is destroyed to the point that the inner packaging marking in the armor is destroyed. Then the outside of the tank must be marked with the word "Radioactive" in letters at least ½ inches high and in a contrasting color of the tank. The marking may be covered with a tarp if necessary, since 49 CFR allows the marking to be on the outside of the inner package. It is recommended that the marking be painted in white letters on the turret and covered with a tarp.

(2) If the tank is contaminated, it will be decontaminated down to the limits specified for exclusive or nonexclusive use (49 CFR 173.443) and shipped accordingly under 49 CFR 173.426.

4. FINANCIAL ASSURANCE FOR DECOMMISSIONING.

Based upon the type, form, and quantity of material (DU) the license does not warrant a certification of financial assurance. This is based on the DU being in metal (non-dispersable) form.

5. EMERGENCY PROCEDURES.

Emergency procedures have been established for actions required in the event that certain postulated accidents occur. The purpose of these procedures is to minimize the impact of

these events on personnel exposure and hazard to the environment. The emergency procedures are listed in Army TB 9-1300-278, "Guidelines for Safe Response to Handling, Storage and Transportation Accidents Involving Army Tank Munitions or Armor Which Contain DU". Also, procedures are in AR 700-48, (Management of Equipment Contaminated with DU or Radioactive Commodities), DA Pam 700-48 (Handling Procedures for Equipment Contaminated with DU or Radioactive Commodities), Abrams Security Classification Guide, and Vehicle TMs. For example, the regulations indicate that the damaged portion shall be covered by a welded on metal armor patch after the area has been decontaminated. If the patch cannot be applied, then the damaged area needs to be covered by a blanket, field jacket, etc., or packed with mud and guarded from further exposure by uncleared personnel. The repair of the DU exposed section to occur under another NRC license for CONUS sites at the appropriate maintenance level. The repair to include decontamination of fixed contamination.

SUPPLEMENT F

OPERATIONAL DOSE ASSESSMENT

A. Maintenance. The most potential for exposure would be on contact with the exterior surface level of the tank turret areas with Heavy Armor. The highest exposure potentials to personnel would be to maintenance personnel. The location with the highest amount of maintenance hours was used to document the exposure. These maintenance hours were taken as being with direct surface contact (worst case) and calculating against 0.5 mr/hr giving the highest exposure of 9.75 mrems per year. The exposure is below the 100 mrem/year standard for the general public. The hours of exposure is unrealistic in that the majority of maintenance is performed in shop areas/benches (away from the Heavy Armor). Maintenance operations involve insignificant amounts of time in close proximity to the turret heavy armor that would require direct body contact with the armor surface. Crew members performing maintenance inside of the tank do not receive any radiation above background from the DU Armor. Crew exposures due to maintenance activities performed outside of the tank would be less than exposures received by support maintenance personnel.

B. Crew Occupancy. The driver receives the most exposure of the crew with the hatch open and seat elevated, due to the position of driver in relation to the DU Armor. All other crew members have lower potential doses than the driver. The highest reading for the driver being at the head level. The dose being approximately 0.12 mrem/hr. This dose is then reduced in calculating the average whole body dose. Based on occupancy figures provided by the US Army, the overall crew (to include the driver) exposure is well below the 100 mrem/year public limit standard.

SUPPLEMENT G

WASTE MANAGEMENT

Normal storage and handling operations will not generate radioactive waste materials. Disassembly operations or damage due to war may result in the need to dispose of the DU as low-level radioactive waste.

Radioactive waste in the field (locations listed in Block 3 of application) should be held at the installation or at a nearby Army installation, until disposition instructions are requested IAW AR 11-9 from the Commander of the Joint Munitions Command (JMC) [Formerly AMCCOM, IOC, OSC and AFSC] and received (See Supplement E and H). JMC is the Army's Program Office for Low-Level Radioactive Waste Disposal. Radioactive waste generated under SUB-1536 will be disposed of in accordance with Army Regulations and current Nuclear Regulatory Commission and Department of Transportation regulations. JMC issues complete instructions to users on proper packaging and marking of shipment of radioactive waste.

Per the Abrams Declassification and Demilitarization Guide, the Heavy Armor tanks can only be declassified and demilitarized at Aberdeen Proving Grounds, Aberdeen, MD, who has a NRC license covering DU for such activities. Further the guide states that areas for demilitarization and declassification will be approved as required.

SUPPLEMENT H
ENVIRONMENTAL ASSESSMENT
OF THE
ABRAMS HEAVY ARMOR SYSTEM

ENVIRONMENTAL ASSESSMENT OF THE ABRAMS HEAVY ARMOR SYSTEM

The fielding of tanks with DU Armor has no significant environmental impact and so a Finding of No Significant Impact for the Abrams Tank System Family of Vehicles (FONSI) was issued in accordance with National Environmental Policy Act (NEPA) requirements.

**FINDING OF NO SIGNIFICANT IMPACT
FOR THE ABRAMS TANK SYSTEM FAMILY OF VEHICLES**

Summary: The U.S. Army Project Management Office, Abrams Tank System, prepared the Abrams Tanks System Life Cycle Environmental Assessment, dated November 2001. The Life Cycle Environmental Assessment (LCEA) addresses the environmental aspects of manufacturing, maintaining, fielding, training, and demilitarization of the Abrams Tank System Family of Vehicles (ATS FOV). The LCEA concluded that these activities will not have a significant impact on the environment. As a result, the preparation of an environmental impact statement is not required for the Abrams vehicles.

This Finding of No Significant Impact (FONSI) for the ATS FOV, as well as the LCEA, has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and Army Regulation (AR) 200-2.

1. Purpose and Need for the Proposed Action:

The Abrams Tank Systems' mission has always been to act as the principal weapon of tank battalions and cavalry squadrons of the Army during all types of combat operations. ATS FOVs are being updated to more survivable, fightable, lethal and modern digitized tanks through the System Enhancement Package (SEP) and Abrams Integrated Management 21st Century (AIM) programs. The purposes of these program improvements are to provide the U. S. Army with a superior Main Battle Tank (MBT) that incorporates the most recent technology and to insure combat effectiveness of the Abrams Tank Fleet.

2. General Description of the Proposed Action:

- a. ATS FOVs consist of M1A1s and M1A2s. All variations are turbine engine powered heavy tracked vehicles with composite or heavy armor and a 120 mm cannon. Improvements have been made to the base M1 vehicle over the years, resulting in the M1A1 and M1A2 configurations, which have advanced armor, improved fire control and NBC systems. The M1A2s will have the same basic armor, armament, and propulsion system as the latest configuration M1A1s except for configuration changes including the addition of a commander's independent thermal viewer, under armor auxiliary power unit, thermal management system, and numerous improved electronic/fire control system components. The two most recent Abrams programs are the M1A2 SEP, which involves reworking existing M1 MBT hulls, adding a new turret assembly, and completely refitting the entire vehicle, and the AIM program, which will produce a better than original production tank. This is achieved through the insertion of upgraded, refurbished, or reclaimed subassemblies. General Dynamics Land Systems will serve as the prime contractor during the Operations and Sustainment Phase for both programs. Production activities will take place at Lima Army Tanks Plant in Lima, Ohio.
- b. Testing will occur at Aberdeen Proving Grounds (APG), Yuma Proving Grounds (YPG), White Sand Missile Range, Cold Regions Test Center at Fort Greely, Alaska, and Fort Hood, Texas. Future Developmental Testing will include subsystem testing and Follow-on Production Testing. APG has Live-Fire, Follow-up Production, Survivability/ Detection avoidance, Armor Plate Testing, Quality Assurance, Software, Re-Engine, and Ballistic Hull and Turret tests planned. YPG has Abrams Product Improvement

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Verification, Re-engine, and numerous component tests scheduled through FY 03. Operational Tests occur at Fort Hood.

- c. The MBTs will be maintained (repaired and overhauled) at Anniston Army Depot in Anniston (ANAD), Alabama, where demilitarization of M1s will also occur. Demilitarization of M1A1s and M1A2s will also occur at APG.
- d. Fielding of MBTs will be at Fort Hood, Fort Stewart, Fort Carson, Fort Knox, Fort Irwin, Fort Riley, and Fort Benning. Operational activities include training, maintenance, and unit-level repair activities.

3. Environmental Assessment:

The Abrams Tank System Life Cycle Environmental Assessment describes environmental impacts that may be encountered during the production, maintenance, testing, training, or demilitarization of the MBTs. The LCEA has evaluated all aspects of the vehicles' life cycle phases, including reasonable accidents.

Conclusions:

- a. Manufacturing activities at Lima Army Tank Plant (LATP) and major subsystem contractors have been conducted in accordance with national and state environmental regulations and laws. The facilities have the appropriate controls to ensure emissions remain within regulatory limits. Potential hazards have been identified, evaluated, and appropriate measures taken. These facilities have established pollution prevention plans to minimize the amounts of hazardous materials used to the extent reasonable. Likewise, these facilities have the required air emission, hazardous and non-hazardous waste handling, radioactive material, and wastewater discharge permits to ensure the minimal impact on the environment.
- b. Some of the ATS FOVs major subsystems contain hazardous and radioactive materials, such as depleted uranium, tritium, and beryllium. These materials are labeled and users and maintenance personnel are aware of their presence. Halon 1301 is used in ATS FOV as part of their fire suppression systems. Inadvertent releases have been limited in the past, and it is anticipated to remain so in the future. The vehicles are coated with Chemical Agent Resistant Coatings that contain chromium and cadmium. Removal of these coatings will occur in a controlled environment. Thorium linings can be found in the engine liner and on ocular pieces. Tritium is present in the Muzzle Reference Sensor (MRS). PM Abrams is reviewing replacements for these hazardous components, and has been successful in finding replacements for Halon 1301 in the engine compartment and tritium in the MRS. Halon 1301 replacement has been a priority for the PM and an Engineering Change Proposal (ECP) for the dry powder system was approved in September 2000 and will be cut-into production in August 2001. There is an ECP to replace the tritium found in the MRS with a non-radioactive lithium battery. PM Abrams is also taking part in a joint pollution prevention initiative to look at lead solder replacements and work towards its elimination.
- c. Transportation of completed tanks from LATP to field organizations for use is conducted in compliance with Department of Transportation requirements for the transportation of oversize vehicles and articles containing depleted uranium. Compliance with Department

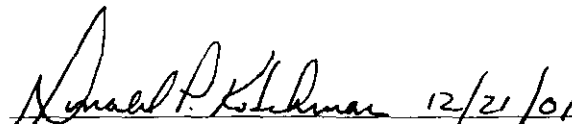
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of Transportation requirements assures appropriate protection of the involved personnel and members of the general public from the potential radiation and other hazards associated with transportation.

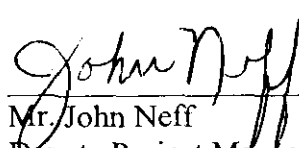
- d. The test activities and field use of the ATS FOVs have been evaluated, and it has been determined that appropriate controls exist from the review of the installations' resource management plans and processes. Restricted vehicle use and maintenance procedures ensure impact minimization is maintained within the required regulatory and installation limits. Therefore, impacts can be considered insignificant to the environment and members of the general public.
- e. Demilitarization Plans have been developed to ensure that the demilitarization of the ATS FOVs is properly managed and controlled.

4. Finding of No Significant Impact

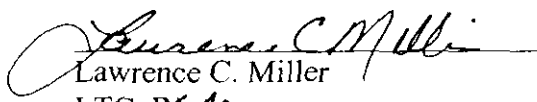
Based on the assessment it is concluded that the environmental impacts of the Abrams Tank System Family of Vehicles will not significantly affect the quality of the human environment and preparation of an Environmental Impact Statement is not required for the continued manufacture and use of the vehicles.



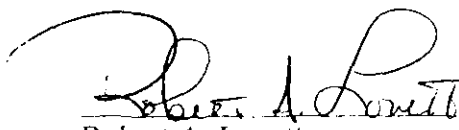
Donald P. Kotchman 12/21/01 Date
COL, OD
Project Manager,
Abrams Tank System



Mr. John Neff 12/19/01 Date
Deputy Project Manager
Abrams Tank System

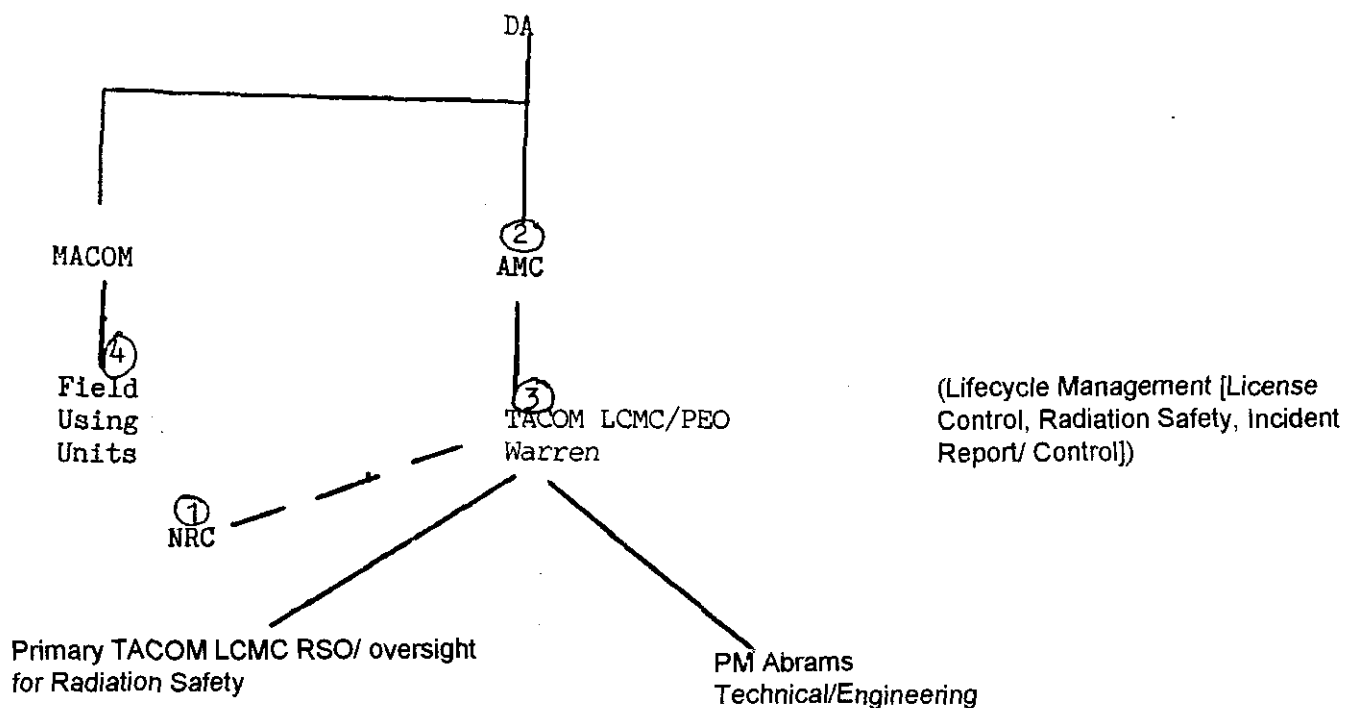


Lawrence C. Miller 12/21/01 Date
LTC, ~~AR~~
Product Manager, M1A1
Abrams Tank System



Robert A. Lovett 19 Dec 01 Date
LTC, AR
Product Manger, M1A2
Abrams Tank System

Figure 1



1. NRC Issues license to TACOM LCMC.
2. DA/AMC licensing control is administered by AMC Safety Office.
3. TACOM LCMC conducts license oversight through RSO at TACOM LCMC Warren
4. In the event of incident at Field Using Sites, they will notify the TACOM LCMC Warren Office who will implement action through TACOM LCMC, or other required organization.

DEPARTMENT OF THE ARMY
USATACOM-LCMC
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