



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY FIELD SUPPORT COMMAND
1 ROCK ISLAND ARSENAL
ROCK ISLAND, IL 61299-6500

REPLY TO
ATTENTION OF:

March 4, 2004

Office of the Chief of Staff

Mr. John Madera
Chief, Materials Licensing Branch
US Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

Dear Mr. Madera:

We are resubmitting our SUC-1380 license application for renewal (reference control number 311964). In this cover letter, as well as in the enclosed Summary of Significant Changes and renewal application, we address the comments from Mr. Hueter, Nuclear Regulatory Commission Region III.

a. The Nuclear Regulatory Commission acknowledged the Army's change to the name of this command, the US Army Field Support Command, in amendment 42, January 22, 2004. We have enclosed a current diagram of the US Army Field Support Command organization structure.

b. Validation testing of ammunition peculiar equipment will take place under the SUC-1380 license, and we have added information to the renewal application. The US Army Field Support Command plans for this type of work to take place at McAlester Army Ammunition Plant, but may use other Army locations in the future. Due to the minimal radiological hazard, we see no need to name locations for this type of work.

c. We base our justification for reducing the number of ammunition storage structures we will survey annually from 50 percent to 25 percent on the negative survey data we have gathered over the last 4 years. We believe a 25-percent survey effort is more than adequate to continue to show that containerized depleted uranium munitions do not cause contamination of storage structures.

d. We have reviewed license condition 14B and recommend that the Nuclear Regulatory Commission remove all letters they list there, except for Army letter dated August 8, 2001 (with enclosures). This letter (which resulted in amendment 39) concerns deferral of remediation activities for the Lake City Army Ammunition Plant area-10 sandpile until December 2008.

The Nuclear Regulatory Commission considered our initial submission in April 2003 as timely. We will continue to operate under the SUC-1380 license as it currently stands until the Nuclear Regulatory Commission grants renewal.

We have made many changes in the enclosed license application and request renewal in its entirety. As stated above, we have enclosed a Summary of Significant Changes for your convenience. Major Jason Dunavant, the US Army Materiel Command Radiation Safety Officer, has concurred with the license application, and we are providing him a copy of this submittal.

Please direct questions or comments to Mr. Gary Buckrop, AMSFS-SF, (309) 782-2969/0338, electronic mail address afsc-ofc-sf@osc.army.mil.

Sincerely,

//signed//

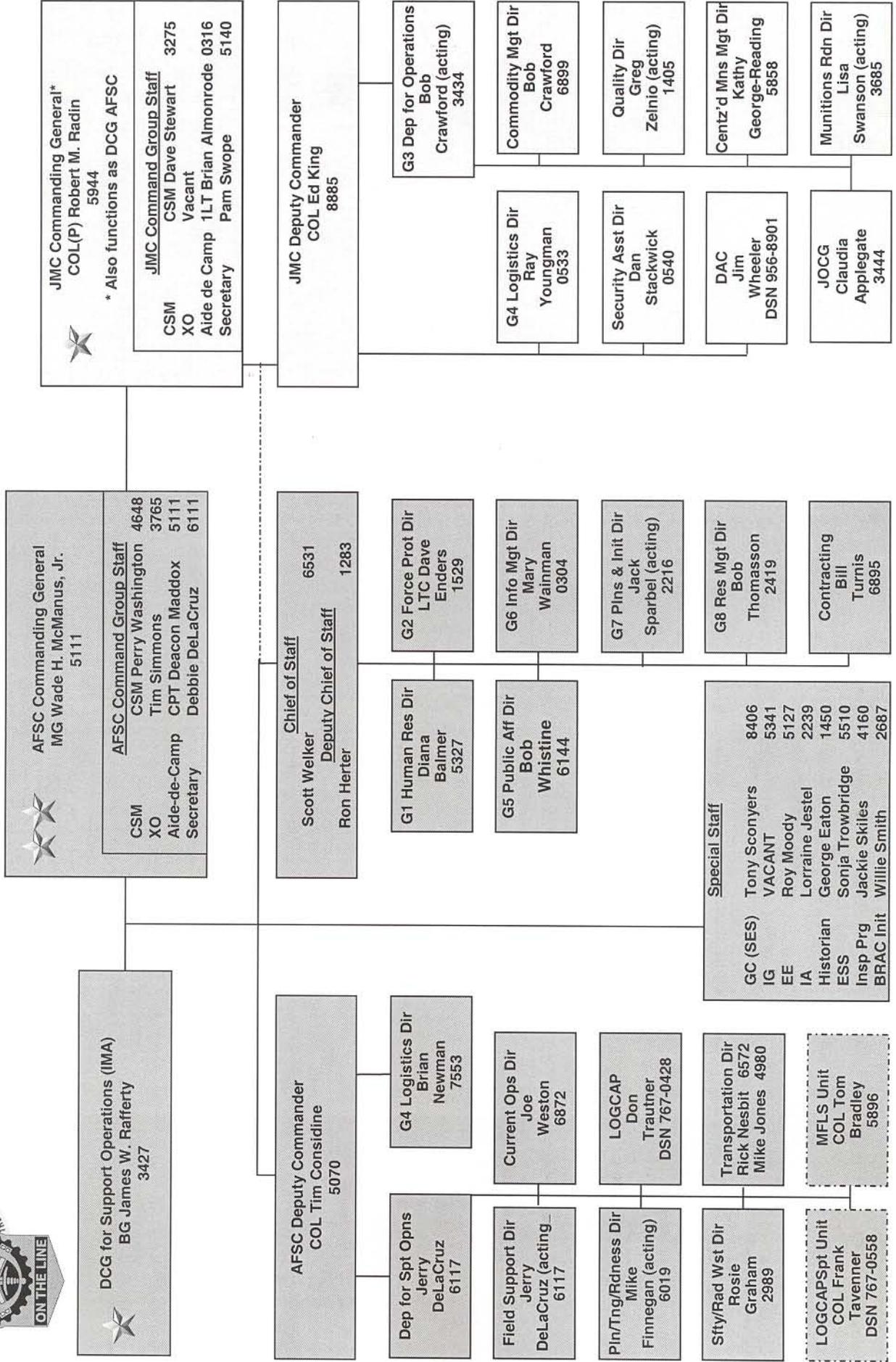
D. Scott Welker
Chief of Staff

Enclosures



US Army Field Support Command & Joint Munitions Command

As of 1 Dec 03



SUMMARY OF SIGNIFICANT CHANGES TO THE SUC-1380
LICENSE RENEWAL APPLICATION

NOTE: The following are significant changes to the SUC-1380 license application. We request the Nuclear Regulatory Commission renew the license in its entirety.

1. Command name: Since the last license renewal in 1997, the US Army Industrial Operations Command changed its name to the US Army Operations Support Command, and then to the US Army Joint Munitions Command, and finally to the US Army Field Support Command.
2. Former bulk storage location: We request the Nuclear Regulatory Commission remove Sierra Army Depot from the license. Sierra Army Depot no longer stores depleted uranium munitions and has gone through the decommissioning process.
3. Posting: Installation personnel will no longer have to post individual storage magazines with NRC Form 3, Public Law 93-438, and the notice informing employees where they can view the license, standard operating procedures, and Federal and Army regulations. Installation personnel can now post these documents in convenient locations, such as break rooms or where workers draw storage magazine keys.
4. Overseas posting: Posting Caution Radioactive Material signs on depleted uranium ammunition storage structures overseas will be in accordance with host nation agreements or at the discretion of the local commander.
5. Accountability: For clarification, we have added information on accountability and removed reference to physical inventory. The Army does have an accountability system in place for ammunition and physically counts ammunition periodically. The Army does not plan to physically count all depleted uranium munitions at all locations every year.
6. Shipping/Receiving: Installation personnel will no longer have to wipe or take exposure readings on outgoing and incoming shipments of depleted uranium munitions unless evidence of damage or corrosion exists.
7. Prepositioned ships: We state our position in the application that prepositioned ships are in transit.

8. Disassembly operations: We have added ammunition disassembly operations for Government Owned Government Operated installations when authorized by the US Army Field Support Command Safety/Rad Waste Directorate.
9. Radiation surveys: The license now requires fewer radiation surveys for routine storage areas and provides more information on radiation survey procedures. In addition, we grant relief from the annual survey requirement for US Army forts and overseas installations in times of war or high threat of war.
10. Lake City Army Ammunition Plant firing range: The section on the Lake City firing range now reflects that the Nuclear Regulatory Commission has released the 600-yard bullet catcher and the southeast wing of building 3A for unrestricted use.
11. Storage of contaminated equipment at McAlester Army Ammunition Plant: We removed this entire section from the license application. We transferred the equipment to a licensed contractor, and the Nuclear Regulatory Commission released the storage facilities for unrestricted use via amendment 30. The Army will continue to use McAlester for the storage of depleted uranium munitions.
12. Instruments: We have updated the section on radiation detection instruments with information on the PDR-77 and VDR-2.
13. Authorized users: In addition to Department of the Army civilian and military personnel, we have added contractor and foreign national personnel as authorized users at Army installations within the United States or at overseas locations.
14. Modified ammunition items: We have added interim license coverage for storage of standard ammunition items at US Army Field Support Command installations that Army research, development, test, and evaluation organizations have modified for testing purposes.
15. Foreign/captured items: We have added interim license coverage, so that owning United States military organizations can store foreign or captured ammunition items that contain depleted uranium.
16. Upload: We have removed upload language from the license application, because the Army only uploads depleted uranium ammunition for possible combat.

(11-2003)
10 CFR 30, 32, 33,
34, 35, 36, 39, and 40

APPLICATION FOR MATERIAL LICENSE

Estimated burden per response to comply with this mandatory collection request: 7 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 Management Branch (T-6 E6), 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:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND,
MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA,
RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO
RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,
SEND APPLICATIONS TO:

SAM NUNN ATLANTA FEDERAL CENTER
U. S. NUCLEAR REGULATORY COMMISSION, REGION II
61 FORSYTH STREET, S.W., SUITE 23T85
ATLANTA, GEORGIA 30303-8931

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
801 WARRENVILLE RD.
LISLE, IL 60532-4351

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 SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

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 SUC-1380

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

Department of the Army
HQ, US Army Field Support Command
ATTN: AMSFS-SF
1 Rock Island Arsenal
Rock Island, IL 61299-6500

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Worldwide use

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Mr. Kelly Crooks

TELEPHONE NUMBER

(309) 782-0338

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. See supplement 1

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
Supplement 2

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE. (Medical use applicants: Complete NRC Form 313A)
Supplement 3

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.
Supplement 3

9. FACILITIES AND EQUIPMENT.
Supplement 4

10. RADIATION SAFETY PROGRAM.
Supplement 5

11. WASTE MANAGEMENT.
Supplement 6

12. LICENSE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY Exempt AMOUNT ENCLOSED \$

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

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 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

D. Scott Welker, Chief of Staff

SIGNATURE

D. Scott Welker

DATE

3/4/04

FOR NRC USE ONLY

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

INTRODUCTION

1. Headquarters, US Army Field Support Command, formerly Headquarters, US Army Joint Munitions Command, located at Rock Island, Illinois, has the logistical responsibility to provide ammunition to the US Joint Military Services (Army, Air Force, Navy, and Marine Corps). This license application is for the possession and handling of depleted uranium as cartridge penetrators.

2. This license application is a request for renewal of license number SUC-1380 in its entirety.

3. The Nuclear Regulatory Commission granted the original SUC-1380 license in June 1980. The Nuclear Regulatory Commission granted the last license renewal on January 21, 1997, with an expiration date of November 30, 2002. At the request of the licensee, the Nuclear Regulatory Commission extended the expiration date to April 30, 2003, in amendment 40. The US Army Field Support Command submitted the SUC-1380 license for renewal in April 2003, and the Nuclear Regulatory Commission considered it a timely submittal. This resubmission of the US Army Field Support Command renewal application addresses the comments of the Nuclear Regulatory Commission.

4. The Army recognizes the jurisdiction of the Nuclear Regulatory Commission within the boundaries of the United States. Overseas, the Army will abide by Army regulations or host nation agreements.

5. In brief, this license application authorizes the following:

a. Possession of depleted uranium ammunition and components for, (1) storage and handling at Army locations worldwide as war reserve material for combat use by the US Joint Military Services and, (2) disassembly operations as approved by the US Army Field Support Command.

b. Possession of depleted uranium fragments on the firing range at Lake City Army Ammunition Plant, Independence, Missouri.

6. This license application does not authorize firing ammunition containing depleted uranium components. Since depleted uranium

ammunition is only uploaded in times of war or the threat of war, this license does not cover the upload of weapon systems.

7. Radiological hazards associated with the activities authorized by this license application are minimal, and the Army will practice the concept of "as low as reasonably achievable".

Application for Nuclear Regulatory Commission
Source Material License for Possession of Depleted Uranium
as Component Parts of Ammunition Items

Index

<u>Section</u>	<u>Description</u>	<u>Page</u>
	Introduction	i
	Index	ii
Supplement 1:	Radioactive Material	1-1
Supplement 2:	Purposes for which the Licensed Material will be Used	2-1
	Section A - Depleted Uranium Ammunition	2-1
	Section B - Lake City Firing Range	2-12
	Enclosure 1 - Sierra Army Depot Closeout Documents	2-15
Supplement 3:	Individual(s) Responsible for the Radiation Safety Program and their Training and Experience	3-1
	Enclosure: Qualifications of License Management Personnel	3-3
Supplement 4:	Facilities and Equipment	4-1
Supplement 5:	Radiation Safety Program	5-1
	Enclosure 1: Example Warning Statements	5-14
	Enclosure 2: Example Drawings	5-15
Supplement 6:	Waste Management	6-1
Appendix A	Record of Environmental Consideration	A-1

Supplement 1 (Reference: NRC Form 313, block 5)

RADIOACTIVE MATERIAL

1. Element and Mass Number: Uranium 238 depleted in the uranium 235 isotope.

2. Chemical and Physical Form: Solid metal alloy, not less than 95-percent uranium 238.

3. The maximum amounts that may be possessed at all locations at any one time are:

a. Depleted uranium as penetrators for conventional ammunition items: 42,000,000 kilograms.

b. Depleted uranium penetrator fragments on the Lake City Army Ammunition Plant firing range, Independence, Missouri: 14,000 kilograms.

Supplement 2 (Reference: NRC Form 313, block 6)

PURPOSES FOR WHICH THE SOURCE MATERIAL WILL BE USED

INTRODUCTION: The following two sections describe how the US Army will use the source material (depleted uranium). Section A, the largest section, describes the licensee's program for ammunition items. Section B covers depleted uranium fragments on the firing range at Lake City Army Ammunition Plant, Independence, Missouri.

SECTION A. DEPLETED URANIUM AMMUNITION

1. General: The licensee will use depleted uranium as a component part of conventional ammunition items. The depleted uranium component is in the form of a solid metal rod, commonly called a penetrator. The penetrators covered by this license vary in weight according to the ammunition model. Depending on the model of ammunition, some penetrators weigh several kilograms and others less than 1 kilogram.

1.1 The licensee will consider newly developed depleted uranium ammunition items for license coverage only after the developing organization, or service, has certified to the licensee that the item has been properly tested and is suitable for military use. Once approved by the licensee, newly developed depleted uranium ammunition items will be covered by this license without license amendment unless significantly different in design from currently fielded depleted uranium ammunition items.

1.2 All depleted uranium ammunition components are manufactured and assembled under separate Nuclear Regulatory Commission or agreement State licenses. The Headquarters, US Army Field Support Command, will receive newly produced ammunition items into the SUC-1380 license with the depleted uranium components fully assembled and packaged.

1.3 The Headquarters, US Army Field Support Command, will provide interim license coverage for standard depleted uranium munitions that other Army license holders have modified for testing purposes. This interim license coverage is to allow adequate time for these other license holders to decide on, and implement, the final disposition of the modified munitions. This license coverage is for US Army Field Support Command storage installations only (such as depots and ammunition

plants) and does not include installations (such as proving grounds or research, development, test, and evaluation facilities) that make the modifications or test the munitions. In addition, this license does not include testing or firing of depleted uranium munitions.

1.4 The Headquarters, US Army Field Support Command, will provide interim license coverage for foreign or captured depleted uranium ammunition items. This interim license coverage will allow adequate time for the owning organization to determine the need and use of the munitions and pay for their final disposition. Installations will store foreign or captured depleted uranium munitions in accordance with the associated explosive hazard and in buildings separate from United States depleted uranium munitions. Although the US Army Field Support Command is requesting authority to disassemble depleted uranium munitions under this license, that request does not extend to foreign or captured depleted uranium ammunition items.

1.5 The licensee will not use the depleted uranium covered by this license in any chemical, nuclear, or metallurgical processes. Under limited conditions, trained ammunition workers may briefly handle the depleted uranium component during disassembly operations, but no direct processing of the depleted uranium component, such as machining, cutting, grinding, etc., will occur.

2. Authorized Operations: Ammunition containing depleted uranium components will be involved in the following peacetime activities: storage, inspection, minor maintenance, transportation, render-safe, and disassembly. We explain these operations in the following paragraphs:

2.1 Storage: Conventional ammunition items containing depleted uranium components developed by the various services within the Department of Defense are authorized for storage at Army installations worldwide as war reserve material. Ammunition and components may also be stored at Army facilities pending final disposition.

2.1.1 The Headquarters, US Army Field Support Command, does not provide depleted uranium license coverage to other Army organizations that already have depleted uranium licenses for activities such as manufacturing or research, development, test, and evaluation. It is the position of the US Army Field Support

Command that these organizations provide license coverage for the depleted uranium munitions in their possession. This arrangement will reduce confusion by keeping the number of depleted uranium licenses in effect at any one installation to a minimum.

2.1.2 The Army primarily stores depleted uranium ammunition in standard ammunition storage structures and locates these structures inside security-fenced areas. Due to the security, sensitivity, and explosive hazard associated with ammunition items, the Army constructs these storage facilities to strictly limit the access of personnel, reducing the potential for loss of control and exposure of personnel to hazards.

2.1.3 As operational necessity dictates, the Army may store ammunition temporarily outdoors within security fenced areas. Ammunition temporarily stored in outdoor areas will be kept on pallets, in their shipping containers, and/or inside transport vehicles. These temporary ammunition storage areas will be located on Army installations that have 24-hour guard forces and will be provided security patrols in accordance with ammunition security procedures.

2.1.4 The Army establishes storage limitations for ammunition items on an item-by-item basis. Limitations are based upon the explosive hazard of each item and the physical capacity of the storage structure or vehicle. The quantity of depleted uranium within a storage structure or vehicle will not be a limiting factor. The explosive hazard classification for ammunition items are determined in accordance with Department of Defense explosive hazard classification procedures.

2.1.5 There are two categories of storage covered by this application; bulk storage and nonbulk storage. Bulk storage represents long-term storage of large amounts of ammunition. Bulk storage installations can store a maximum of 10 million kilograms of depleted uranium each. We identify the following as bulk storage installations within the continental United States. The Army chooses not to identify overseas storage locations.

- a. Anniston Army Depot, Anniston, Alabama.
- b. Bluegrass Army Depot, Richmond, Kentucky.
- c. Crane Army Ammunition Activity, Crane, Indiana.

d. Hawthorne Army Depot, Hawthorne, Nevada. Note: Hawthorne changed its name from Hawthorne Army Ammunition Plant to Hawthorne Army Depot in 1994.

e. Letterkenny Army Depot, Chambersburg, Pennsylvania.

f. McAlester Army Ammunition Plant, McAlester, Oklahoma.

g. Red River Army Depot, Texarkana, Texas.

h. Tooele Army Depot, Tooele, Utah.

2.1.5.1 In the following paragraphs, we discuss the status of two Army depots (Seneca Army Depot and Sierra Army Depot) that have been listed in the SUC-1380 license, but no longer store depleted uranium ammunition.

a. Seneca Army Depot, Romulus, New York. Seneca Army Depot formerly stored depleted uranium munitions under their SUC-1275 license as well as being listed in the US Army Field Support Command's SUC-1380 license. Seneca, through the US Army Corps of Engineers, hired Argonne National Laboratory to provide technical support and Parsons Engineering Sciences, Incorporated, to perform survey and sampling work. Seneca submitted a revised license termination plan, to Nuclear Regulatory Commission Region 1, on February 11, 2003. The Nuclear Regulatory Commission approved Seneca's termination plan in amendment 13 and letter dated September 17, 2003. The Seneca license termination plan includes provisions to close out Seneca Army Depot as a storage installation under the SUC-1380 license. Seneca Army Depot will remain listed in this license as a bulk storage installation until the US Army Field Support Command can provide documentation to the Nuclear Regulatory Commission that the decommissioning effort for the SUC-1275 license also covers the SUC-1380 license.

b. Sierra Army Depot, Herlong, California. We request the Nuclear Regulatory Commission remove Sierra Army Depot from the list of bulk storage installations covered by the SUC-1380 license. Sierra formerly stored depleted uranium munitions under their SUC-1274 license as well as being listed in the US Army Field Support Command SUC-1380 license. The Nuclear Regulatory Commission terminated Sierra's SUC-1274 license on December 5, 2001, in amendment 19. The US Army Corps of Engineers and the US Army Center for Health Promotion and Preventive Medicine did the survey and sampling work. The termination of the SUC-1274 license also served to close out Sierra Army Depot as a storage

installation under the SUC-1380 license. We have enclosed to this supplement the following documents on the termination of the SUC-1274 license and the closeout of Sierra Army Depot as a storage location under the SUC-1380 license.

a. Nuclear Regulatory Commission letter and amendment 19 to the SUC-1274 license, both dated December 5, 2001.

b. The executive summary of US Army Corps of Engineers License Termination and Site Release Survey Report for Sierra Army Depot, dated January 2001.

2.1.6 Nonbulk storage covers any Army installation that has a requirement to store lesser amounts of depleted uranium ammunition in support of military operations. Nonbulk storage installations can store a maximum of 50,000 kilograms of depleted uranium. Typical examples are installations that store depleted uranium ammunition in support of deployment, retrograde, shipment consolidation, or repair of military vehicles. Storage of depleted uranium ammunition under this category can range from a few days to long term.

2.1.7 As stated above, only US Army installations are authorized by this license for the storage and/or handling of depleted uranium ammunition. The US Air Force licenses air fields. The US Navy licenses Navy and Marine Corps facilities. Personnel working in ammunition operations under this license will be US Army civilian personnel, US Army military personnel, civilian personnel under contract to the US Army, or foreign nationals authorized to work at Army installations overseas.

2.2 Inspection: The Headquarters, US Army Field Support Command, directs ammunition inspections at Army installations. Most of the time, inspection procedures include a visual inspection of external surfaces for defects such as damage or corrosion. Occasionally, the licensee may have a need to disassemble depleted uranium ammunition items to visually inspect internal components. Inspection procedures that require functioning, firing, direct processing, or destruction of depleted uranium ammunition items will be performed under separate Nuclear Regulatory Commission or agreement State license. Headquarters, US Army Field Support Command determines disposition of unserviceable munitions or depleted uranium components.

2.3 Minor Maintenance: Occasionally, inspection of depleted uranium ammunition items will reveal conditions that require minor maintenance activities be performed to return them to a fully serviceable condition. The following types of minor maintenance activities that do not require disassembly, the handling of ammunition subassemblies, or the prolonged exposure of the depleted uranium component may be performed after Headquarters, US Army Field Support Command, grants approval:

- a. Linking and delinking of belted ammunition.
- b. Corrosion removal from nondepleted uranium components.
- c. Touchup painting and remarking of complete rounds.
- d. Repackaging of complete ammunition items.
- e. Preservation and repair of packaging.

2.3.1 Since minor maintenance operations do not involve direct or prolonged contact with the depleted uranium component of the munitions, no additional instructions or safety precautions which deviate from normal handling and storage instructions are required. The Army considers warning statements in technical manuals to be adequate radiological instructions.

2.3.2 Ammunition items containing depleted uranium components may reach a point where they require extensive renovation. The Army will return such ammunition items through the supply system to a separately licensed facility to perform the required work. Typically, extensive renovation involves disassembly of the ammunition round, so that work can be done on internal components.

2.4 Transportation: Transportation of depleted uranium ammunition items and components will comply with all transportation regulations applicable at the time of shipment unless specifically addressed in the following paragraphs:

2.4.1 The Army ships depleted uranium ammunition items under Department of Transportation Exemption 9649. According to this exemption, the Department of Defense can ship depleted uranium ammunition items according to the primary explosive hazard. The exemption allows dose rates of 2.5 millirem per hour on contact with packages and grants relief from marking and labeling shipments of depleted uranium ammunition as radioactive items.

Overseas shipments of depleted uranium ammunition will comply with host nation agreements.

2.4.2 Unless found damaged, depleted uranium munitions in their containers will not be subject to radiation surveys before shipment or upon receipt. This is because shipments of depleted uranium will never exceed the Type A quantity as described in Appendix A to Title 10 Code of Federal Regulations 71, which is unlimited. In addition, it has been the Army's experience that containerized depleted uranium munitions have never been found leaking contamination and have always been below the 2.5-millirems-per-hour limit as required by the Department of Transportation exemption referenced above.

2.4.3 The Army inspects ammunition packages before loading onto a conveyance and when unloading from a conveyance. Installation personnel are to immediately notify the installation Radiation Safety Officer if they find damaged packages of depleted uranium ammunition. The Radiation Safety Officer or his/her designee will survey damaged packages with radiation detection instruments and wipe for removable contamination. The Radiation Safety Officer or Transportation Officer will make notifications required by Title 10 Code of Federal Regulations 20.1906(d) if the conveyance delivering the munitions is contaminated. Damaged packages found to be contaminated will be segregated and stored until the Radiation Safety Officer obtains final disposition from the Headquarters, US Army Field Support Command.

2.4.4 Transport to overseas locations will normally be via ship. Some ships may linger for several months in regions where United States military units may need ammunition on short notice. The licensee considers the ammunition aboard these ships to be in transport and not in storage.

2.4.5 Under peacetime conditions, the Army transports ammunition and weapon systems separately, although they may be on the same ship. Upload and stowage of depleted uranium ammunition into weapon systems, such as tanks or Bradley fighting vehicles, only occurs in war or the threat of war, and thus, are not covered in this license.

2.5 Render-safe: Ammunition items containing depleted uranium components may be found unsafe for shipment or handling. On these occasions, personnel trained in the handling of suspect ammunition items will render the item safe. The procedures

implemented by these individuals will be primarily based upon the explosive hazard associated with the item.

2.5.1 Procedures to make a round of ammunition safe to handle result in the separation of the two major components of the round; the cartridge case and the projectile assembly. If mechanical separation is considered unsafe, the ammunition item will be subjected to a destructive separation. Destructive separation techniques will leave the cartridge case unusable, but will leave the projectile intact. The projectile, which contains the depleted uranium component, will be wrapped in plastic and stored until the Headquarters, US Army Field Support Command, determines final disposition. Normally, depleted uranium components resulting from operations to make the components safe to handle will not be stored in the same structure as serviceable munitions.

2.6 Disassembly: All ammunition items reach a point where they exceed their useful life. When this occurs, the Army sends the ammunition items back through the supply system to a facility capable of taking them apart. Disassembly renders the items unusable for their original military purpose. Because of this, the Army refers to disassembly operations as a form of demilitarization. The Headquarters, US Army Field Support Command, determines when ammunition items require demilitarization. Note: Supplements 4 and 5 of the license application contain more information on disassembly.

3. Amount of Material: The amount of depleted uranium involved in the activities described in paragraph 2 above will be based upon the explosive hazards associated with the ammunition item, the physical capacity of the storage structure or vehicle, and the operational requirements associated with the activity. In the following paragraphs, we discuss the anticipated quantities of depleted uranium that may be involved in each activity.

3.1 Storage: The anticipated quantity of depleted uranium in a single earth-covered storage structure could typically range between 4,536 and 136,078 kilograms (10,000 and 300,000 pounds), with some storage configurations approaching 204,117 kilograms (450,000 pounds). The quantity of depleted uranium in an aboveground structure could range between 45,356 and 272,155 kilograms (100,000 and 600,000 pounds), with some storage configurations approaching 771,107 kilograms (1,700,000 pounds). The anticipated maximum quantity of depleted uranium to be held

in a temporary outdoor storage area is 36,287 kilograms (80,000 pounds), which is the amount that can be carried by two railcars.

3.2 Transportation: The anticipated quantity of depleted uranium in a single road or rail transport vehicle is based upon the gross weight limitation imposed on the vehicle. Rail transport vehicles could contain as much as 18,144 kilograms (40,000 pounds) of depleted uranium while road transport vehicles could contain up to 6,804 kilograms (15,000 pounds) of depleted uranium. Typical peacetime shipments of depleted uranium ammunition by an ocean vessel could involve between 136,078 and 408,233 kilograms (300,000 and 900,000 pounds) of depleted uranium.

3.3 Inspection: Inspection operations typically involve from one box to several pallets of ammunition. The anticipated quantity of depleted uranium involved in inspection operations could range from 4.54 to 907 kilograms (10 to 2,000 pounds).

3.4 Minor maintenance: Installation personnel will position working quantities of ammunition awaiting maintenance near the maintenance line. Minor maintenance operations typically involve from one box to several pallets of ammunition. As installation personnel remove finished ammunition items from the maintenance line, they will bring in additional items to keep the operation going. The anticipated quantity of depleted uranium involved in minor maintenance activities at any one time could range from 4.54 to 1,588 kilograms (10 to 3,500 pounds) of depleted uranium.

3.5 Render-safe: The Army implements render-safe operations on short notice when ammunition items are found, or suspected to be, unsafe to handle or ship. Because the Army does not plan render-safe operations in advance, the quantity of depleted uranium involved in such an operation cannot be forecast; however, it is anticipated that less than 15 kilograms (33 pounds) of depleted uranium would be involved at any one time.

3.6 Disassembly: Installation personnel will position working quantities of ammunition awaiting disassembly near the disassembly line. Typical working quantities will involve from one box to several pallets of ammunition. As installation personnel take ammunition items apart and remove the components from the disassembly line, they will bring in additional ammunition items to keep the operation going. The anticipated quantity of depleted uranium involved in disassembly activities

at any one time could range from 4.54 to 1,588 kilograms (10 to 3,500 pounds) of depleted uranium.

4. Accountability: The Army has developed specific procedures to provide for accountability of ammunition at storage locations, by military groups, and in transit between installations. Additionally, the Army has developed a centralized reporting system to provide worldwide stockpile visibility. This system is used to assist in stockpile, production, and logistics planning. The centralized reporting system used by the Army keeps track of ammunition in storage and transport in 100-round increments. Ammunition that has been issued to individual Army units is not maintained within the centralized reporting system.

4.1 The inventory records maintained by each installation and each military unit keep track of ammunition items in single round increments and are used for accountability purposes. Installations update their inventory records after each receipt, shipment, or disbursement. In addition to the rigorous inventory and accountability procedures, all ammunition items are maintained under constant physical security.

4.2 The Headquarters, US Army Field Support Command, compares the ammunition records of Government-owned, contractor-operated installations to the Headquarters, US Army Field Support Command, accountable record annually. The Headquarters, US Army Field Support Command, compares the records of Government-owned, Government-operated installations to the accountable record on a monthly basis. If the records do not match, Headquarters, US Army Field Support Command, personnel research the discrepancy and initiate an investigation if necessary.

4.3 Ammunition shipped to another location or unit is subject to a 100-percent inspection. This inspection includes verification of the national stock number and quantity as part of the shipment process. Installations shipping ammunition send a notice of the shipment to the receiving installation separate from the actual shipment. Upon receipt, the receiving installation verifies the quantity of ammunition in the shipment against the quantity on the shipping documents. Additionally, a copy of the incoming inventory is sent to the installation originating the shipment. This inventory notifies the point of origin that the shipment has arrived.

4.4 Ammunition issued to individual military units is accountable property. An individual within the unit that

receives the ammunition signs for it. This individual is personally accountable for all of the ammunition within the unit. This responsibility is relinquished only when the ammunition is expended or turned in to an ammunition storage activity. Ammunition that is turned in to an installation is added to that installation's inventory, and a receipt is issued to the unit showing the disposition of the ammunition. Installations that issue ammunition to military units perform a physical inventory of their munitions at least once a year.

4.5 Physical security is maintained by storing ammunition inside secure, limited access areas, such as: security fenced areas and/or locked storage structures. Army installations storing ammunition have a 24-hour a day guard force, and ammunition storage areas are provided security patrols. Entry to ammunition storage areas is limited to specifically designated individuals. Additionally, only selected individuals are allowed access to the keys to unlock storage areas.

SECTION B. DEPLETED URANIUM CONTAMINATED FIRING RANGE AT LAKE CITY ARMY AMMUNITION PLANT

1. Lake City Army Ammunition Plant is a Government-owned, contractor-operated facility located in Independence, Missouri. From 1941, when the installation began operation, until 1985, Remington Arms Company operated the facility.

2. During the early 1960's, Remington Arms, while under Army contract, developed, manufactured, and tested a 20-millimeter depleted uranium spotter round known as the XM101. Manufacturing took place in building 12A and the southeast wing of building 3A. Each round contained approximately 206 grams of depleted uranium. The testing program consisted of firing the projectiles onto designated impact areas at 1,750 and 2,188 yards from the firing house. Remington operated under Nuclear Regulatory Commission license SUC-1195 until 1985. When Remington's contract was not extended in 1985, the Army assumed licensure for the depleted uranium on the firing range under this license (SUC-1380).

3. In 1968, the Army cancelled the XM101 project. Remington then proceeded to demilitarize approximately 45,000 rounds by firing them into a sand-filled bullet catcher 600 yards from the firing house. The bullet catcher sand was sifted, and the large depleted uranium fragments were collected, containerized, and shipped off site for burial at a low-level radioactive waste disposal site. The residual sand was piled in an area (known as the Area 10 sandpile) north of the active range.

4. In 1986, the licensee contracted with Chem-Nuclear Systems, Incorporated, to remediate building 12A. The Nuclear Regulatory Commission released building 12A for unrestricted use in their letter dated March 17, 1988, to the licensee.

5. In 1994, the licensee contracted with Allied Technology Group, Incorporated, to characterize the firing range. The characterization report served as the basis for remediation efforts at the 600-yard bullet catcher and the Area 10 sandpile.

6. In 2001, the licensee contracted with Cabrera Services to remediate the 600-yard bullet catcher. Also, in 2001, the licensee contracted with the Allied Technology Group to remediate the southeast wing of building 3A. The Nuclear Regulatory Commission released the 600-yard bullet catcher and the southeast wing of Building 3A for unrestricted use in their letter dated August 23, 2001, to the licensee.

7. At the time of license renewal (February 2004), the remaining depleted uranium contaminated areas left at Lake City Army Ammunition Plant are the two impact areas at 1,750 yards and 2,188 yards and the Area 10 sand pile. The Army posts these areas with "Caution Radioactive Materials" signs.

8. Per letter dated August 14, 2001, and amendment 39, the Nuclear Regulatory Commission granted the Army permission to defer the Area 10 decommissioning until December 31, 2008, when remedial activities will be conducted under the Comprehensive Environmental Response, Compensation & Liability Act program. Note: Amendment 39 was the result of Army letter dated August 8, 2001.

9. Per letter dated October 20, 1998, the Nuclear Regulatory Commission deferred remedial activities of the Lake City Army Ammunition Plant firing range impact areas to the US Environmental Protection Agency. The Nuclear Regulatory Commission continues to grant licensure to Headquarters, US Army Field Support Command, under SUC-1380.

10. In its April 8, 2003, letter, the Headquarters, US Army Field Support Command, updated its financial assurance document (statement of intent) to reflect an increase in soil in need of removal from the Area 10 sandpile and to reflect the release of the 600-yard bullet catcher and building 3A. We based our previous Area 10 decommissioning estimate on the 1994 range characterization conducted by the Allied Technology Group. Our estimate for Area 10 is based on information from the 1998 partial Area 10 decommissioning effort and from the August 2000 characterization report produced by IT Corporation.

11. The Lake City firing range is actively used (although NOT for testing or demilitarization of depleted uranium ammunition) and admission to the range area is strictly controlled. The range is completely enclosed and secured from unauthorized entry at all times.

12. The licensee has obtained water samples on an annual basis from several locations in and around the area of the firing range since 1988. The water samples are analyzed, and the results provided to the Nuclear Regulatory Commission Region III office in Lisle, Illinois. To date, none of the samples have produced a radiological anomaly. The well monitoring program will continue as long as the Nuclear Regulatory Commission requires it.

13. If the Army finds significant amounts of depleted uranium contamination in any of the water samples, they will take action to eliminate the source of contamination. Water sample testing would be increased to quarterly until it is determined the source of contamination has been eliminated.

Supplement 2, Enclosure 1
(Reference: NRC Form 313, block 6)

LICENSE TERMINATION DOCUMENTATION FOR THE SUC-1274 LICENSE ISSUED
TO SIERRA ARMY DEPOT AND LICENSE CLOSEOUT DOCUMENTATION FOR THE
SUC-1380 LICENSE WHICH LISTED SIERRA ARMY DEPOT AS A STORAGE
LOCATION.



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8084**

December 5, 2001

Department of the Army
Sierra Army Depot
ATTN: SMASI-BR, Bob Weis
Herlong, California 96113-5010

SUBJECT: TERMINATION OF YOUR NRC RADIOACTIVE MATERIALS LICENSE

By letter and NRC Form 314 dated September 27, 2001, you contacted the U.S. Nuclear Regulatory Commission and indicated that you wished to terminate your NRC radioactive materials license. The NRC staff has reviewed your site release survey and associated records. Based on its review, the staff has concluded that: 1) all licensable radioactive material has been removed from your facility and 2) residual radioactive material attributable to licensed activities does not exceed current NRC criteria.

Based on these conclusions no further remediation or actions with respect to NRC regulated material is required. Your facility is suitable for unrestricted use and NRC license number SUC-1274 for your facility at the Sierra Army Depot, Herlong, California, is hereby terminated.

If you have questions or require clarification on any of the information stated above, please contact me at (925) 673-9646.

Sincerely,

IRA

James L. Montgomery
Senior Health Physicist
Nuclear Materials Licensing Branch

Docket: 040-08527
License: SUC-1274
Control: 468811

Enclosure: As stated

Materials License Termination/Retirement Form

LICENSE #: SUC-1274

DOCKET #: 04008527

LICENSEE: Department of the Army
Sierra Army Depot

EXPIRATION DATE: 3/3/02
DATE OF CONTACT: 10/11/01
CONTACTED BY: Bob Weis
TITLE: Environmental Coordinator
TELEPHONE: 530-827-4892

ADDRESS: Herlong, CA

LICENSE TERMINATED: Yes

LICENSE TRANSFERRED:

LICENSE TRANSFERRED TO: NAME:
ADDRESS:
TELEPHONE:

BASIS FOR TERMINATION AND/OR RETIREMENT: All licensed material transferred to licensed authorized recipient. No residual contamination above NRC regulatory limits exists at licensee's facility.

TERMINATION DOCUMENTATION

1. License termination meets Type I criteria: Yes No

Licensee used sealed sources only and the most recent leak test demonstrates that they did not leak while in the licensee's possession.

Licensee used radioactive material with $T_{1/2} \leq 60$ days and it has decayed to less than the activity in 10 CFR Part 20, Appendix C.

2. License termination meets type II criteria: Yes No

Licensee possessed and used only sealed sources but cannot demonstrate that the sources did not leak while in the licensee's possession.

Licensee possessed unsealed radioactive material with $T_{1/2} \leq 60$ days but the maximum activity authorized under the license has not decayed to less than the quantity specified in 10 CFR Part 20, Appendix C.

Licensee possessed unsealed radioactive material with $T_{1/2} > 60$ days but $T_{1/2} \leq 120$ days.

Licensee possessed C14 or H3 but the total activity and use authorized under the license warrants decommissioning under Type II (describe rationale above).

3. License termination meets Type III criteria: Yes No

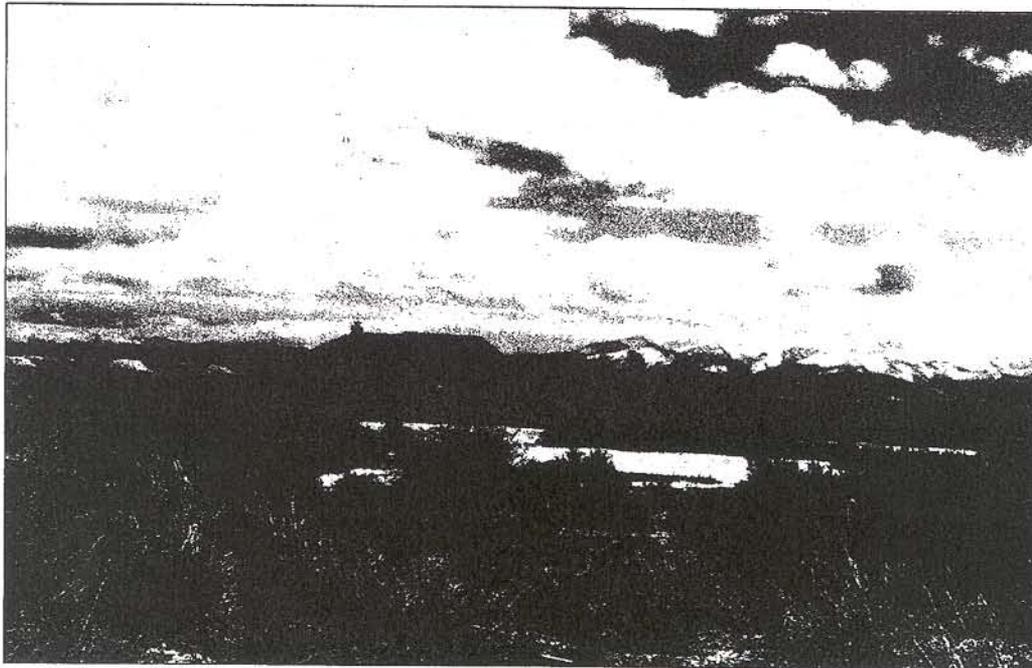
Decommissioning qualifies for a categorical exclusion under 10 CFR 51.22(c) and

Licensee will decommission its facility in accordance with the NRC's criteria for unrestricted use.

4. License termination meets Type IV criteria: Yes No
 ___ Decommissioning does not qualify for a categorical exclusion under 10 CFR 51.22(c).
 ___ Licensee will decommission its facility such that residual radioactive material may remain in excess of NRC's criteria for unrestricted use.
5. Termination survey required: ✓Yes No
 ___X___ Termination survey submitted by licensee. ✓Yes No
 ___X___ Termination survey satisfies NRC survey requirements. ✓Yes No
6. Form 314 or equivalent submitted:
 ___X___ Staff verified disposition of sealed sources or unsealed radioactive material by:
 ___X___ letter from Form 314 recipient
 ___X___ call to Form 314 recipient
7. Licensee transfer records discussed in 10 CFR Parts 30.35, 30.36, 30.51; 40.36, 40.42, 40.61; or 70.25, 70.38, 70.51
 ___ To USNRC Yes ✓No (N/A)
 ___ To individual assuming responsibility for the license, with a copy of the cover letter to NRC.
8. NRC closeout inspection required: Yes ✓No
 ___ Closeout inspection performed:
 On:
 Inspector:
9. Closeout survey performed: Yes ✓No
 On:
 By:

Licensing staff completing form: IRA Date: _____
 James L. Montgomery
 Sr. Health Physicist

**NRC License Termination and Site Release
Survey Report
SIERRA ARMY DEPOT
LASSEN COUNTY, CALIFORNIA**



FINAL
Report Number CESWT-SO-R1-11-2000



**U. S. Army Corps
of Engineers
Sacramento District, Tulsa District**

**Sierra Army Depot
Lassen County, CA
JANUARY 2001**

EXECUTIVE SUMMARY

NRC LICENSE TERMINATION AND SITE RELEASE SURVEY

REPORT NO. CESWT-SO-R1-11-2000

SIERRA ARMY DEPOT

HERLONG, CALIFORNIA

30 MAY – 23 JUNE 2000

1.0 PURPOSE. The purpose of this survey is to provide an assessment of the radiological condition of the Nuclear Regulatory Commission (NRC) licensed radioactive material use areas at Sierra Army Depot (SIAD). Specifically;

1.1 The objective of the final status survey was to demonstrate that the radiological parameters from potential residual radioactive contamination are below the release criteria for each area surveyed.

1.2 The objective of this report is to provide the survey data required for the NRC and the state of California to enable the termination of the NRC license and the release of surveyed areas from any potential restrictions due to the use of radioactive materials.

2.0 CONCLUSION. A review of the survey results indicate that there is no radiological contamination above the guidelines for release or distinguishable from background. There are, therefore, no health hazards identified due to NRC licensed radiological material use at SIAD. A list of surveyed areas is included in Appendix B. This report serves as the license termination survey report for license #SUC-1274 and will serve as a place of use termination survey report for license numbers BML12-00722-07, SUC-1380, SUB-834, and 45-16023-INA.

3.0 RECOMMENDATION. Recommend the surveyed areas listed in Appendix B be released for future use without radiological restrictions. This constitutes the following areas of SIAD:

- Depleted Uranium (DU) Storage areas
- Law Rocket Storage areas
- Shipping and Receiving
- DU inspection areas

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

SUC-1274

Docket or Reference Number

040-08527

Amendment No. 19

Department of the Army
Sierra Army Depot
ATTN: SDSSI-S
Herlong, California 96113-5010

In accordance with NRC Form 314 dated September 27, 2001, License No. SUC-1274 is hereby terminated.



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date December 5, 2001By (RA)

James L. Montgomery
Nuclear Materials Licensing Branch
Region IV
Arlington, Texas 76011

Supplement 3 (Reference: NRC Form 313, blocks 7 and 8)

INDIVIDUALS RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

1. Headquarters, US Army Field Support Command: The Commander, Headquarters, US Army Field Support Command, in his capacity as the principal field operating command for the Single Manager for Conventional Ammunition, is responsible for the life-cycle commodity management of conventional ammunition. This responsibility includes acting as custodian of the Nuclear Regulatory Commission license for subject licensed material. The Headquarters, US Army Field Support Command, command level radiation safety officer and alternates provide health physics guidance and serve as the technical advisors to the Commander, Headquarters, US Army Field Support Command. The Headquarters, US Army Field Support Command, license manager acts for the commander to ensure full compliance with the provisions of the SUC-1380 license.

1.1 As licensee, Commander, Headquarters, US Army Field Support Command, ensures the radiation safety officers at those installations storing depleted uranium ammunition implement the requirements of this license. The Headquarters, US Army Field Support Command, provides assistance and guidance to each command or installation that stores depleted uranium munitions under the SUC-1380 license.

1.2 To verify that license requirements are met, the Army inspects its installations periodically. The goal of the Headquarters, US Army Field Support Command, is to inspect one to three installations per year. The licensee also receives the results of radiation safety related inspections done by other Army organizations.

2. Other Army Commands: Each command outside Headquarters, US Army Field Support Command, is responsible for implementing the provisions of the license. Per Army regulation, each using command will designate a command-level radiation safety officer to have oversight of its subordinate installations.

3. Bulk Storage Installations and Installations Performing Disassembly Operations: Each bulk storage installation and each installation performing disassembly operations will designate a radiation safety officer and alternate and will ensure that they

have training commensurate with their responsibilities. The installation radiation safety officer will have, as a minimum, one of the following:

a. Eighty (80) hours of formal training to include the following:

- (1) Principles and practices of radiation protection.
- (2) Radioactivity measurements, standardization and monitoring techniques and instruments.
- (3) Mathematics and calculations basic to the use and measurement of radioactivity.
- (4) Biological effects of radiation.
- (5) Applicable Federal and Army regulations.

b. Successful completion of US Army Radiological Safety Course (4JF3) satisfies this requirement.

4. Nonbulk Storage Locations: Nonbulk storage installations will designate a radiation safety officer and alternate. The radiation safety officer at a nonbulk storage installation will have at least 40 hours of radiation safety training. The topics will essentially be the same as those above, with consideration given to the shorter length of the training time available.

Supplement 3, Enclosure

(Reference: NRC Form 313, blocks 7 and 8)

QUALIFICATIONS: LICENSE MANAGER, RADIATION SAFETY OFFICER, AND
ALTERNATE RADIATION SAFETY OFFICER

ROSALENE E. GRAHAM, CSP

Education:

Doctoral Studies in Public Administration with Safety Management and Methods Concentration, Virginia Commonwealth University, Richmond, Virginia.

Masters of Science in Safety Management, University of Southern California, Los Angeles, California - 1986.

Masters of Science in Adult and Occupational Education, Kansas State University, Manhattan, Kansas - 1984.

Bachelor of Science in Secondary Education (Chemistry Major), University of Wisconsin-LaCrosse, LaCrosse, Wisconsin - 1972.

Current Position: July 1998 - Present:

Chief, Safety and Radioactive Waste (Management) Office: Serves as the Program Manager of the worldwide radioactive waste program and related multifaceted projects on behalf of the Department of Defense. Also serves as the command safety manager for a complex US Army Field Support Command Safety Program, including oversight the safety of military munitions manufacturing. Serves as license manager on Nuclear Regulatory Commission licenses issued to the Field Support Command. Ensures adequate resources are provided for the management of command licenses to ensure compliance with Federal, State, and Department of Defense regulations. Responsible for establishing, implementing, and enforcing the policies and responsibilities for the storage, transportation, and disposal of unwanted radioactive material. Responsible for establishing and providing uniform guidance and training for Department of Defense personnel on storing, packaging, and transporting radioactive waste.

Previous Safety Management Positions:

1996 - 1998. Chief, Plans, Policies, and Programs, US Army Safety Center: Directed US Army Safety Center Policy, Plans, and Programs Division activities. Served as technical consultant on developing Army-wide policy and procedures in safety and risk management. Possessed and applied knowledge of the principles and practices of risk management and risk

management integration; formulated Headquarters, Department of the Army, policy; and analyzed policy results. Provided risk management and safety support to Headquarters, Department of the Army. Served as the Army Safety Program Element Manager for range safety. Developed and maintained the Director of Army Safety strategic plans for Army Safety Program improvement.

1992 - 1996. Safety Director, Fort Lee, Virginia: Integrated safety and risk management into combat service support doctrine and Army Logistics Management College curriculum. Managed installation safety program. Served as core team member to Safety Installation Support Module. Provided adjunct instructor services to the Army Logistics Management College. Detailed to special project to assess the organization using Malcolm Baldrige Award criteria.

1986 - 1991. Safety Director, VII Corps, Stuttgart, Germany: Technical safety oversight for 13 military communities, 3 divisional, 10 nondivisional, and 4 combined maintenance center safety programs. Supervised a staff of 10 who performed a variety of program functions including aviation, ammunition, range, tactical, Occupational Safety and Health Act, family, radiation protection, and accident analysis. Served as VII Corps Safety Manager during Operation Desert Storm. Risks included tactical operations, industrial operations, vehicle (air and ground) movement, range operations, ammunition storage in corps area.

1983 - 1986. Safety Specialist, US Army Safety Center: Team member assigned to track vehicle team. Tracked Army combat vehicle accidents in order to determine trends and develop countermeasures to prevent recurrence. Reviewed technical material from a safety perspective. Conducted classroom instruction. Developed instructional material on ground systems. Developed maintenance accident-prevention measures for Army-wide use.

Member

American Society of Safety Engineers (Professional Member)
Association of the United States Army
Federal Executive Institute Alumni Association

NAME: Kelly W. Crooks
 SERIES/GRADE: GS-1306-14
 JOB TITLE: Health Physicist
 US Army Field Support Command
 Safety/Rad Waste Directorate
 BIRTH DATE: April 5, 1960

POST HIGH SCHOOL EDUCATION:

<u>DATES</u>	<u>SCHOOL</u>	<u>PLACE</u>	<u>MAJOR</u>	<u>DEGREE</u>
1978-1982	University of Iowa	Iowa City, Iowa	Civil Engr.	BSCE
15 hours post graduate study, 1983, University of Iowa, Civil Engineering				

CAREER HIGHLIGHTS:

<u>DATES</u>	<u>SERIES/GRADE</u>	<u>POSITION</u>	<u>ORGANIZATION</u>	<u>LOCATION</u>
1986	GS-1306-05	Health Physicist	AMCCOM Safety Office	Rock Island
1987	GS-1306-07	Health Physicist	AMCCOM Safety Office	Rock Island
1988	GS-1306-09	Health Physicist	AMCCOM Safety Office	Rock Island
1989	GS-1306-11	Health Physicist	AMCCOM Safety Office	Rock Island
1990	GS-1306-12	Health Physicist	AMCCOM Safety Office	Rock Island
1991-95	GS-1306-13	Health Physicist	AMCCOM Rad Waste Ofc	Rock Island
1995-04	GS-1306-14	Health Physicist	AFSC Rad Waste Dir	Rock Island

SPECIAL QUALIFICATIONS: Radiation worker trained, OSHA hazardous materials trained, emergency response trained, Contracting Officer's Technical Representative trained, secret clearance.

SIGNIFICANT GOVERNMENT TRAINING:

<u>DATE</u>	<u>COURSE</u>	<u>SCHOOL</u>	<u>LOCATION</u>
Jun 03	DOD Radioactive Waste Guidance	Duratek	Rock Island, IL
May 01	Federal Express Dangerous Goods	FEDEX	Rock Island, IL
Jun 00	Radioactive Materials Shipping Broker	CNS	Barnwell, SC
Feb 00	Technical Transportation of Hazardous Materials	DAC	Fort Hood, TX
May 98	DOD Radioactive Waste Guidance	CNS	Columbia, SC
Mar 97	Health Physics in Radiation Accidents	REACTS	Oak Ridge, TN
Mar 95	Contracting Officers Representative Course (ALMC-CL)	USALMC	Fort Lee, VA

<u>DATE</u>	<u>COURSE</u>	<u>SCHOOL</u>	<u>LOCATION</u>
May 94	LLRW Packaging, Transportation and Disposal	CNSI	Hilton Head, SC
Jan 94	Hazardous Materials Incident Response Operations	Safety Mgt Consulting	Rock Island, IL
Apr 93	Applied Health Physics	ORAU	Oak Ridge, TN
May 92	LLRW Packaging, Transportation and Disposal	US Ecology	Las Vegas, NV
Feb 92	40 Hour OSHA Hazardous Materials	CNSI	Barnwell, SC
Apr 90	Nuclear Accident/Incident Response Force Training	RIA	Rock Island, IL
Jun 89	Senior Officer Nuclear Accident Course	SONAC	Kirtland AFB
Apr 89	Radioactive Waste Guidance	CNSI	Rock Island, IL
Apr 88	Health Physics Instrumentation and Air Sampling	Army	Fort Belvoir, VA
Jan 88	Radiological Safety	Army	Fort McClellan, AL
Nov 87	Depleted Uranium Safety	Army	Fort Belvoir, VA
Apr 87	Laser Microwave Hazards	AEHA	Aberdeen Proving Ground, MD

3. EXPERIENCE WITH RADIONUCLIDES:

Am241 Cs137	Soil density gauges, Alpha Testing, Dallas, TX, 1984-86
Am241 Co60 H3 Ni63 Pm147 Ra226 Th232 U238 Various others	Quality assurance testing, license management, packing and shipping of radioactive and mixed waste, and project management of radioactive and mixed waste remediations, US Army, 1986-present.

4. GENERAL HEALTH PHYSICS BACKGROUND:

Health Physicist for Headquarters, US Army Field Support Command Safety/Rad Waste Office, 1995 to present. Establishes, implements, and enforces the policies and responsibilities for the handling, packaging, storage, transport, processing, and recycle or disposal of low-level radioactive waste and mixed waste. Provides instructions to Department of Defense generators for shipments of low-level radioactive waste, acts as DOD representative on technical issues and manages the health physics program associated with low-level radioactive waste. Also acts as Radiation Safety Officer for management of two Nuclear Regulatory Commission licenses.

Health Physicist for Headquarters, US Army Armament, Munitions and Chemical Command (AMCCOM), 1986 to 1991. Includes advising Command Group on radiological safety matters; preparing NRC license applications, amendments, and renewals for AMCCOM-managed radioactive commodities; reviewing and formulating publications regulating radiation safety; serving as member of On-Scene Commander's Staff for response to radiation incidents/accidents; providing assistance and review of applications for NRC licenses and Department of the Army authorizations and permits for subordinate installations and depots storing licensed items of supply for compliance with Federal and US Army regulations; providing certification and direction on the packaging, marking, labeling, and shipment of US Army-generated radioactive waste for processing/storage/disposal; providing project management of remedial activities.

Resume of Training and Experience
Gary W. Buckrop
US Army Field Support Command Health Physicist

1. General Educational Background:

Bachelor of Science, July 1987, Saint Ambrose University,
Davenport, Iowa. Major: General Physics

Associates in Science, May 1978, Black Hawk College,
Moline, Illinois. Major: Biological Science

2. Radiation Safety and Related Training:

<u>Course /Organization/Location</u>	<u>Duration</u>	<u>Date</u>
Radioactive Waste Guidance, Duratek, Rock Island Arsenal, IL	32 hours	Jun 2003
Dangerous Goods Seminar, Federal Express, Rock Island Arsenal, IL	24 hours	May 2001
Radioactive Waste Guidance, Chem-Nuclear, Rock Island Arsenal, IL	32 hours	May 2000
Radiation Safety Officer, US Army CECOM, Atlanta, GA	40 hours	Oct 1999
Radioactive Material Handling Safety Course, US Army TACOM-RI, Rock Island Arsenal, IL	28 hours	Aug 1999
Conventional Ammunition Radiation Hazards, US Army DAC, McAlester AAP, OK	24 hours	May 1999
AMC License Cross Training, US Army Materiel Command, Aberdeen, MD	16 hours	Feb 1998
Army Low Level Rad Waste Packing and Shipping, Chem-Nuclear, Bettendorf, IA	40 hours	Aug 1997
Radiation Program Management, Fort Belvoir, VA	40 hours	Jul 1997
Hazardous Waste Site Worker, Scott Community College, Bettendorf, IA	40 hours	May 1997
Radiation Protection Officer Review, Consultec Scientific, Oak Ridge, TN	40 hours	Dec 1995
Radioactive Waste Guidance, Chem-Nuclear, Columbia, SC	40 hours	Jun 1995

Radiological Safety Course, U.S. Army Chemical School, Fort McClellan, AL	120 hours	Feb 1994
Basic Radiation Protection and Tritium Devices, Allied Technology Group, Davenport, IA	20 hours	Nov 1992
Ammunition Manager Internship, US Army Defense Ammunition Center and School, Savanna Army Depot, IL	16 months	Jan 1988 -Apr 1989

3. General Health Physics Background:

a. November 1992 - July 1995. Health Physicist, US Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, Illinois. Major job duties: preparing Nuclear Regulatory Commission license applications, amendments, and renewals for command managed commodities; reviewing and formulating publications regulating radiation safety; working issues involving AMCCOM-licensed items; performing inspections; performing accident/incident investigations; taking water samples; and providing assistance and review of applications for NRC licenses and Department of Army authorizations and permits for subordinate installations possessing licensed items of supply for compliance with Federal and US Army regulations.

b. July 1995 - present. Health Physicist, US Army Field Support Command (JMC), Rock Island, Illinois. Major job duties: preparing Nuclear Regulatory Commission license applications, amendments, and renewals for command-managed commodities; reviewing and formulating publications regulating radiation safety; working depleted uranium ammunition and light antitank weapon license issues; performing inspections; performing accident/incident investigations; taking water samples; setting up wipe test programs; and providing assistance and review of applications for NRC licenses and Department of Army authorizations and permits for subordinate installations possessing licensed items of supply for compliance with Federal and US Army regulations.

4. Experience with Radioisotopes: Administrative license management including wipe testing of radioisotopes in command-licensed items.

Radioisotopes: Am241, Ni63, U238, Pm147, and tritium.

FACILITIES AND EQUIPMENT

1. Facilities:

1.1 The Army will store depleted uranium ammunition items on secure facilities as described in supplement 2, section A. Disassembly operations will also occur on secure Army facilities and in buildings designed for ammunition and explosive operations. The general public will not have access to buildings where depleted uranium munitions are stored or disassembled.

2. Equipment:

2.1 Radiation safety equipment. The licensee will not grind, cut, machine, or involve the depleted uranium component in any other direct processing operation that could generate fumes, dusts, mists, or gases. As a result, no special ventilation systems, special handling equipment, or special protective equipment will be required, except for that addressed in the following paragraph.

2.1.1 For the special case of disassembly operations involving munitions with depleted uranium corrosion product, the licensee will install down-draft tables with high-particulate filter systems at workstations where the corrosion product poses a potential risk. Munitions that normally do not exhibit corrosion product are those with penetrators in aluminum jackets or those that have an anticorrosion coating. Other munitions that normally do not exhibit corrosion product are those that have not been out of their storage containers, as well as newly produced munitions. Typically, munitions that exhibit corrosion product are those that military units have removed from their storage containers for possible use and especially those munitions that have experienced inclement weather conditions. In addition, older munitions may exhibit corrosion product.

2.2 Automated equipment. Whenever possible, the Army automates ammunition operations to reduce the risk to personnel from explosive hazards. In the case of depleted uranium munitions, the use of automated equipment also limits worker exposure to the depleted uranium component. The Army refers to automated equipment it has designed for ammunition operations as ammunition peculiar equipment. Before authorizing any type of

ammunition peculiar equipment for general use, the Army subjects it to a series of engineering tests. In the initial stages of the testing, the Army exclusively uses inert (dummy) cartridges to identify mechanical design problems. In the final stage of testing, the Army uses live munitions to "prove out" or "validate" the equipment. For example, when designing ammunition peculiar equipment to disassemble depleted uranium munitions, the final validation test will include cycling a small number of depleted uranium munitions through it.

2.2.1 The Army only uses a small number of ammunition items for validation testing of ammunition peculiar equipment, and the chance for contamination and personnel exposure is extremely remote. Locations that perform validation testing of ammunition peculiar equipment will survey the location and the equipment upon completion of each validation project.

2.3 Radiation detection instruments. The following radiation detection instruments, or their equivalent, are available to facilities for routine and emergency monitoring:

a. The AN/PDR-77 radiation detection, identification, and computation set. This set consists of a radiation detection, identification, and computation meter and three probes (alpha, beta/gamma, and x-ray). The default readout for the alpha probe is in counts per minute (cpm), but the user has the option to select microCurie (μCi) per square meter or disintegrations per minute (dpm) per 100-square centimeters. The ranges and the associated units for the alpha probe are below:

0-999,000 cpm
0-180 μCi per square meter
0-999,000 dpm per 100-square centimeters

The range for the beta/gamma probe is 0-999,000 milliRoentgen per hour (mR/hr) and the x-ray probe has a range of 0-999,000 cpm. The AN/PDR-77 radiation detection, identification, and computation set is also equipped with adjustable audio and visual alarms that can be set within a range of 0-999,000 cpm, for the alpha and x-ray probes or within 0-999,000 mR/hr for the beta/gamma probe.

b. The VDR-2. The VDR-2 is a beta/gamma instrument only. It detects and displays the gamma radiation dose rate from 0.01 microGray per hour ($\mu\text{Gy/hr}$) to 100 Gray per hour (Gy/hr). It

detects and displays the beta particle dose rate from 0.01 $\mu\text{Gy/hr}$ to 5 centigray per hour (cGy/hr). The VDR-2 can also measure, store, and display accumulated dose from 0.01 μGy to 9.99 Gy.

2.3.1 Instrumentation used for health and safety purposes are calibrated at least annually in accordance with standard calibration procedures traceable through the National Institute of Standards and Technology. The licensee will obtain calibration services from the US Army Test, Measurement, and Diagnostic Equipment Activity, Redstone Arsenal, Alabama, or equivalent provider.

RADIATION SAFETY PROGRAM

1. Introduction. The Army, through the chain of command to individual installations, has developed radiation safety programs to protect employees and the general public from ionizing radiation. In addition, each installation has developed safety procedures for the handling of ammunition and explosives that reduce the likelihood of fires, explosions, and physical damage to the ammunition items. These procedures have resulted in a relatively accident-free environment. The small number of incidents that have occurred have consisted of scratches and scrapes on vehicles and packages, with little or no damage to the ammunition items. The safety procedures implemented for depleted uranium ammunition items include, but are not limited to, the following:

1.1 Radiological surveillance of storage and use areas.

1.2 Local inventory and accountability of ammunition items containing depleted uranium components.

1.3 Periodic inspections and evaluations by commands having jurisdiction over the facility.

1.4 Regular inspections of work and storage areas and transport vehicles by installation personnel.

1.5 Housekeeping procedures to minimize or eliminate unnecessary combustible material in and around storage areas, work areas, and transport vehicles.

1.6 Use of lightning protection systems around storage and work areas.

1.7 Securing depleted uranium ammunition items within specially designed areas and structures and in vehicles during transit.

1.8 Storing noncompatible ammunition and explosive items separately from depleted uranium munitions.

1.9 Publishing basic radiological safety information in user manuals. Some examples of this type of information are at the first enclosure to this supplement.

1.10 Designating radiation safety officers to implement unit or installation radiation safety programs.

1.11 Maintaining a working environment where exposure to ionizing radiation is as low as reasonably achievable.

2. Ammunition Surveillance: Supplementing the controls described in the paragraphs above, the Department of the Army, in its role as the Single Manager for Conventional Ammunition for the Joint Services, operates the Quality Assurance Specialist Ammunition Surveillance program. This program consists of individuals trained specifically to perform surveillance inspections to verify the condition and serviceability of all ammunition items in the Department of Defense stockpile.

2.1 The Quality Assurance Specialists Ammunition Surveillance use published inspection criteria to visually inspect depleted uranium ammunition at locations and times determined by Headquarters, US Army Field Support Command. One of the things Quality Assurance Specialists Ammunition Surveillance look for when inspecting depleted uranium munitions is corrosion product. Evidence of depleted uranium corrosion may indicate that additional inspection and investigation is necessary to determine the cause and extent of the problem. Inspection intervals and criteria, as set by Headquarters, US Army Field Support Command, allows for adequate detection of problems.

3. Radiation Levels: The following paragraphs describe the radiation levels associated with depleted uranium ammunition.

3.1 Ammunition packages. The Department of Defense predominantly stores depleted uranium ammunition in metal containers, but does use a number of wooden boxes. The maximum penetrating dose rate on the surface of any ammunition package or a pallet of packages is less than the 2.5-millirem-per-hour dose rate limit required for shipment under Department of Transportation Exemption 9649. As an example, the maximum penetrating dose rate on the surface of a single container of the largest currently existing depleted uranium ammunition round (the M829A3) is 0.34 millirad per hour. The highest dose on contact with a pallet of these containers is 1.03 millirad per hour.

3.2 Routine operations. The Army does not require personal monitoring devices for routine handling operations. For the

majority of their lifetime, depleted uranium ammunition items remain in their containers and are stored in secure Army facilities. When outside of their container, ammunition items are handled for relatively short time periods. In addition, workers enter or work in ammunition storage buildings on a very infrequent basis.

3.2.1 If unexpected situations arise, the installation radiation safety officer will institute a personnel dosimetry program if administrative protective measures cannot be reasonably implemented or fail to reduce exposures to within 10 percent of the dose limits. If required, the installation will request dosimetry services from the US Army Test, Measurement, and Diagnostic Equipment Activity, Redstone Arsenal, Alabama, or equivalent provider.

3.2.2 Unless personnel dosimetry is required, routine handling and storage areas are considered radiologically unrestricted areas.

3.3 Disassembly operations. The Headquarters, US Army Field Support Command, Safety/Rad Waste Directorate contracted with Aerojet, Incorporated, to provide a dose assessment report on depleted uranium ammunition disassembly operations. The following information comes from that report:

3.3.1 The Aerojet report states, "It is likely that a worker could exceed 10 percent of the dose limits for the estimated dose criteria for the skin, extremity, and lens of the eye." The report goes on to say, "If safety glasses and medium weight gloves are worn while handling bare penetrators, the dose limit for lens of the eye, extremity, and skin dose should not be exceeded."

3.3.2 The Aerojet report shows that whole body exposure is well below 10 percent of the annual limit for disassembly of all munitions except for the 25 millimeter, M919. The anticipated whole body exposure for the 25 millimeter, M919, is 0.251 millirem per hour (2.51E-6 Sievert per hour). Assuming constant workload throughout an entire year (2,000 hours), this equates to 502 millirem per year or approximately 10 percent of the annual whole body dose limit. The anticipated whole body exposure for 105 millimeter rounds is slightly less than half of this, and the anticipated whole body exposure for 120-millimeter and 30-millimeter rounds is even less.

3.3.3 The licensee will consider individuals involved in disassembly operations as occupational workers. As recommended in the Aerojet dose assessment report, the licensee will require safety glasses, gloves, and extremity dosimeters for workers who handle depleted uranium penetrators during disassembly line operations. The licensee will not require whole body dosimeters for 30-, 105-, and 120-millimeter disassembly operations unless exposure levels are found, or anticipated to be, in excess of 10 percent of the annual whole body dose (10 percent of the whole body dose is 500 millirem per year). The licensee believes it prudent to require whole body dosimeters for disassembly of 25-millimeter, M919, munitions at least until experience with 25-millimeter disassembly is obtained and actual exposure data shows clearly that workers receive less than 10 percent of the annual limit.

3.3.4 Personnel who briefly handle a small number of depleted uranium penetrators will wear gloves, but will not have to wear extremity or whole body dosimeters.

3.3.5 If necessary, installations will institute administrative controls to maintain exposures within 10 percent of the annual whole body occupational worker limit (10 percent of 5,000 millirem per year is 500 millirem per year). If required, the installation will request dosimetry services from the US Army Test, Measurement, and Diagnostic Equipment Activity, Redstone Arsenal, Alabama, or equivalent provider.

4. Posting and Employee Notification: Within the continental United States, facilities used for storing or disassembling depleted uranium ammunition items will be posted with "Caution Radioactive Material" signs. Overseas, Army installations will post "Caution Radioactive Material" signs in accordance with host nation agreements or at the discretion of the installation commander for security reasons.

4.1 Installation radiation safety officers will post Section 206 of the 1974 Energy Reorganization Act and NRC Form 3 at central locations where ammunition workers can view them, such as bulletin boards in break rooms or in the building where keys to the storage magazines are drawn. In addition, information will be posted with these two documents stating that other applicable documents, such as the license, Federal regulations, and Army regulations can be viewed in the office of the radiation safety officer.

4.2 Installation personnel may request copies of the following documents by contacting the Headquarters, US Army Field Support Command, radiation safety officer at commercial (309) 782-0338/2969/2989 or defense switched network 793-0338/2969/2989:

a. Title 10 Code of Federal Regulations Part 19 - Notices, Instructions, and Reports to Workers; Inspections.

b. Title 10 Code of Federal Regulations Part 20 - Standards for Protection Against Radiation.

c. Title 10 Code of Federal Regulations Part 21 - Reporting of Defects and Noncompliance.

d. Section 206 of the 1974 Energy Reorganization Act.

e. License application and amendment.

f. NRC Form 3.

g. NRC Regulatory Guide 8.13.

h. NRC Regulatory Guide 8.29.

5. Radiological Surveys. Each Army installation possessing depleted uranium ammunition cartridges and/or components under this license will perform radiological surveys of their facilities as outlined in this section. Surveys will include the taking of wipes to check for removable contamination and the use of a beta/gamma instrument to check exposure levels. It is the responsibility of the installation radiation safety officer to ensure radiation surveys are done accurately.

5.1 Storage structures.

5.1.1 Structures storing complete rounds. Each installation will perform annual surveys in 25 percent of the total number of on-post structures storing complete depleted uranium ammunition cartridges. Note: During times of war or threat of war, installations outside the continental United States in affected theatres of operation as well as continental United States installations (such as forts) heavily engaged in supporting the overseas operation will be relieved of the annual survey requirement.

5.1.2 Structures storing ammunition components. Installations involved in disassembly operations will survey the building(s) where they store depleted uranium components twice a week. When not involved in disassembly operations, installations will survey buildings storing depleted uranium components at least twice a year.

5.2 Ammunition surveillance workshops. Each installation will perform a radiological survey of its ammunition surveillance workshop on a weekly basis when inspecting complete cartridges. Ammunition surveillance workshops will be surveyed daily if depleted uranium ammunition components are inspected.

5.3 Ammunition maintenance lines. Each installation will perform a radiological survey of depleted uranium ammunition maintenance lines on a weekly basis. As stated in supplement 2, section A, this license authorizes minor maintenance on complete cartridges and does not authorize maintenance on cartridge subassemblies.

5.4 Ammunition disassembly lines. During the first 2 weeks of operating a depleted uranium ammunition disassembly line, the installation will perform daily radiological surveys. Installations will pay particular attention to work areas where workers handle depleted uranium or components that have been in direct contact with the depleted uranium. After this initial trial period, the frequency between surveys may be lengthened to twice a week if contamination is found below the contamination limits specified in paragraph 8 of this supplement.

5.5 Installation personnel will check radiological wipes with a beta/gamma detection instrument before sending the wipes to the laboratory.

5.6 The licensee will obtain laboratory service from the US Army Test, Measurement, and Diagnostic Equipment Activity, Redstone Arsenal, Alabama, or equivalent provider, or a lab approved by the US Army Test, Measurement, and Diagnostic Equipment Activity, Redstone Arsenal, Alabama, to analyze radiological wipes.

6. Disassembly. All models of depleted uranium ammunition are similar in that they consist of two major components: the projectile assembly and the cartridge case. During disassembly operations, the Army mechanically separates these two major

components. At the second enclosure of this supplement are drawings of these major components for one model of depleted uranium ammunition. The drawings show: a complete round, a cut-away of a complete round, and finally the cartridge case and projectile assembly separated from each other. The Army may ship the projectile assemblies to a separately licensed facility for further disassembly or, when deemed advantageous, the Army will take apart the projectile assembly. Workers involved in taking apart projectile assemblies will have some contact with the depleted uranium penetrator.

6.1 Projects to disassemble depleted uranium munitions will include the removal and proper disposal of all explosive components, and the removal of the depleted uranium for recycling, reuse, or disposal as radioactive waste. The licensee will not subject the depleted uranium to any form of drilling, cutting, or mechanical abrasion.

6.2 Personnel involved in disassembly operations will typically wear flame-retardant clothing, safety eyewear, conductive shoes, and gloves. Since the depleted uranium will not be subjected to operations that could cause an airborne hazard, workers will not wear respiratory protective equipment. Before individuals leave the disassembly area, they will be monitored for radiological contamination.

6.2.1 No eating, drinking, gum chewing, tobacco use, or the application of cosmetics will be allowed in depleted uranium ammunition storage, handling, or disassembly areas. As required by Nuclear Regulatory Commission guidance, exposure to ionizing radiation will be limited to levels that are as low as reasonably achievable.

6.3 If possible, installations that store depleted uranium penetrators or contaminated components will do so in buildings separate from serviceable munitions. The Headquarters, US Army Field Support Command, Safety/Rad Waste Directorate will provide instructions to the installation for disposition of items generated during demilitarization operations.

6.4 At other licensed facilities, such as Savanna Army Depot Activity (Nuclear Regulatory Commission license SUC-1394, terminated) and the Iowa Army Ammunition Plant (Iowa State license 0290-1-29-SM1, formerly Nuclear Regulatory Commission license SUC-1381), the disassembly of ammunition items

containing depleted uranium has caused little, if any, contamination. Likewise, exposures to personnel have been low.

6.5 The Headquarters, US Army Field Support Command, will determine which Government-owned, Government-operated installations will perform disassembly operations. When making these decisions, the Headquarters, US Army Field Support Command, will take into consideration the location of the assets to be disassembled, the availability of adequate facilities and equipment, and the status of the installation's radiation safety program to include the qualifications of radiation safety personnel.

6.5.1 The Headquarters, US Army Field Support Command, Safety/Rad Waste Directorate will approve each Government-owned, Government-operated installation for depleted uranium ammunition disassembly before operations begin at that installation. The Safety/Rad Waste Directorate will base its approval upon the installation being able to meet all license requirements.

6.6 Worker training. Installations will ensure training is provided to individuals who work in depleted uranium ammunition disassembly operations and that the training is documented. Normally, the installation radiation safety officer will provide the training, although other Government or contractor personnel can provide the training as long as they are knowledgeable in radiation safety and can explain the topics identified in the following paragraph:

6.6.1 Installations will provide initial training before disassembly operations begin and annual refresher training thereafter. Initial training will last approximately 1 hour and cover the following topics at a minimum; radiological characteristics of depleted uranium, biological effects of radiation, methods of protection, emergency procedures, postings, and reference documents. Installations will also provide an approximate 1-hour block of annual refresher training that will cover the same topics. Workers will take a test for each training session. The installation radiation safety officer will ensure Nuclear Regulatory Commission Regulatory Guides 8.13 and 8.29 are available to interested personnel.

6.7 Operating procedures. Installation personnel will develop operating procedures for disassembly operations. The radiation safety officer of the installation will assist in the development of these procedures and will coordinate with the

licensee on radiation safety aspects of the procedures. The installation will obtain the approval of the licensee when the procedures are finalized. Installation radiation safety officers will implement radiation protection programs at their installations in accordance with license conditions as well as Federal and Army regulations.

6.8 The operations described in Section A of this license (including disassembly) do not require a decommissioning funding plan per Title 10 Code of Federal Regulations, section 40.36, since the operations described in Section A will not involve depleted uranium in dispersible form. The licensee does have a financial assurance document (statement of intent) in place for the depleted uranium on the Lake City Army Ammunition Plant firing range. Information on the Lake City firing range is in Section B of supplement 2.

7. Emergency Response: The Army has developed emergency procedures for handling, storage, and transportation accidents involving depleted uranium ammunition items. These procedures are detailed in Technical Bulletin 9-1300-278, Guidelines for Safe Response to Handling, Storage, and Transportation Accidents Involving Army Tank Munitions which Contain Depleted Uranium, which is distributed throughout the Army. In addition, each storage and using location has developed specific emergency procedures for use with operations involving ammunition items.

7.1 Ammunition items are designed to withstand extreme environmental conditions and rough handling without being a hazard to either the user or the environment. Accidents involving ammunition items containing depleted uranium components that are not associated with a fire or the threat of a fire pose little or no radiological hazard and will be handled in accordance with local procedures that are based primarily upon the explosive hazard of the item.

7.2 The response to a fire involving ammunition is generally based upon the location of the fire, the potential threat to human life, and the explosive hazard associated with the munitions involved in the fire. In all cases, the senior fire officer present will make fire-fighting decisions.

7.3 Fires involving depleted uranium ammunition items have a dual hazard. The primary hazard is that of the explosives associated with the munitions. Secondary to the explosive hazard is the potential radiation hazard associated with

oxidized depleted uranium. When depleted uranium ammunition items become involved in a fire, a very small portion of the depleted uranium may become aerosolized and migrate with the smoke plume. The Army considers the concentration of depleted uranium to be found in the inhalation exposure pathway from a fire plume involving depleted uranium munitions and/or armor to be low/insignificant based on data collected from various laboratory and field studies of burning depleted uranium penetrators and depleted uranium armor. The majority of the depleted uranium involved in a fire remains at the scene. This depleted uranium can pose an external radiation hazard if it remains in contact with the skin for an extended period of time. The depleted uranium remaining in the vicinity of the fire has been analyzed and has been found to be highly nonrespirable and highly nonsoluble in lung fluid. The small portion of this depleted uranium that is respirable can be an internal radiation hazard through inhalation if it is suspended in the air. Suspension could occur due to wind, explosion, or the activity of recovery crews. Because the depleted uranium, which remains at the scene of the fire, is highly nonsoluble in lung fluid, the primary internal hazard of this depleted uranium is not chemical toxicity, but is the radiation exposure to the lung.

7.4 Historically, the occurrence of fires or explosions involving finished ammunition items for all services is rare. Burn tests conducted by the Army and Air Force have shown that only small quantities of depleted uranium are released into the environment if a fire should involve ammunition items containing depleted uranium components. The extreme density of depleted uranium tends to result in its being deposited in the immediate area of the fire.

7.5 Fires aboard ocean-going vessels are generally fought to the maximum extent possible by all available personnel. Land-based fires involving munitions with a mass detonation, fragmentation, or mass fire hazard are not fought on a routine basis. For these types of fires, the area is generally evacuated, and attempts are made to fight incipient fires that are generated by the main fire. Fires involving munitions with a moderate fire hazard are generally fought. Additionally, fires posing a serious threat to human life may also be fought.

7.6 No special fire-fighting equipment is needed beyond that commonly worn by fire-fighting personnel. Typical fire-fighting gear and self-contained breathing apparatus is adequate. Although the smoke plume poses a small radiation hazard,

personnel downwind of a fire involving depleted uranium ammunition should be evacuated mostly due to the possible presence of other nonradiological products in the smoke.

8. Surface Contamination Limits: Installations will consider a surface contaminated if one or more of the levels listed below is exceeded. These levels apply to alpha emission of the material covered by this license and associated decay products.

AVERAGE (fixed and removable) ^{a,b}	MAXIMUM (fixed and removable) ^{a,c}	REMOVABLE ^{a,d}
5,000 dpm / 100 cm ²	15,000 dpm / 100 cm ²	1,000 dpm / 100 cm ²

Note a - As used here, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

Note b - Measurements of average fixed and removable contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

Note c - The maximum fixed and removable contamination level applies to an area of not more than 100-square centimeters (100 cm²).

Note d - The amount of removable radioactive material per 100-square centimeters of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100-square centimeters is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys show that the total residual surface contamination levels are within the limits for removable contamination.

8.1 Cleanup of depleted uranium contaminated soil will be to levels less than, or equal to, 35 picoCuries of depleted uranium/gram of soil. In addition, cleanup operations at

accident sites will be conducted based upon the explosive and the radiological hazards associated with the material involved.

8.2 In all cases, radiological cleanup will be to levels that are as low as reasonably achievable.

9. Reporting: Accidents and incidents involving ammunition items containing depleted uranium components will be reported in accordance with Army procedures to the local radiation safety officer. The local radiation safety officer will report any accident or incident to the license radiation safety officer. The license radiation safety officer will report accidents and incidents to the Nuclear Regulatory Commission as required. Reports to the Nuclear Regulatory Commission will be made to the Nuclear Regulatory Commission regional office serving the license radiation safety officer regardless of the location of the accident or incident.

9.1 The following types of accidents and incidents will be reported as expeditiously as possible through the Army accident reporting system to the local radiation safety officer and license radiation safety officer:

a. Theft or loss of control of ammunition items containing depleted uranium components.

b. Functioning of ammunition items containing depleted uranium components.

c. Fires, explosions, or accidents involving storage structures, transport vehicles, or Army weapon systems that contain depleted uranium ammunition where the ammunition items are or could be damaged.

d. Accidents or incidents that damage or expose the depleted uranium components to the environment, or release depleted uranium to the environment.

9.2 Initial notification for the above types of accidents and incidents will be made telephonically or by priority message with a written followup report. When required, the license radiation safety officer will contact the Nuclear Regulatory Commission. Followup reports will be submitted to the Nuclear Regulatory Commission as the situation requires.

9.3 Unless specifically directed otherwise, only unclassified information will be transmitted to the Nuclear Regulatory Commission.

Supplement 5, Enclosure 1
(Reference: NRC Form 313, block 10)

EXAMPLES OF INFORMATION AND WARNINGS

1. As referenced in supplement 5, paragraph 1.9, the following serve as examples of the type of safety information and user warnings included in various Army publications:

The M829A1 is a full-service round, which is only fired during war emergency. All peacetime firings are prohibited except at locations having a Nuclear Regulatory Commission license.

Loss or unauthorized firing of the M829A1 must be reported to the Headquarters, US Army Field Support Command, Radiation Safety Officer.

Projectiles are not to be disposed of by burning or detonation.

Depleted uranium ammunition must be grasped by the sabot - not the penetrator.

The penetrator should not be banged, used as a resting point, or stepped upon.

The depleted uranium (tank ammunition) is encapsulated within the cartridge and poses no external or internal radiation hazard as long as the round remains intact. If extensive corrosion occurs or rounds are involved in a fire, radiation contamination can result. Care should be taken to prevent inhalation or ingestion of the depleted uranium contamination. The procedures in Technical Bulletin 9-1300-278 should be followed.

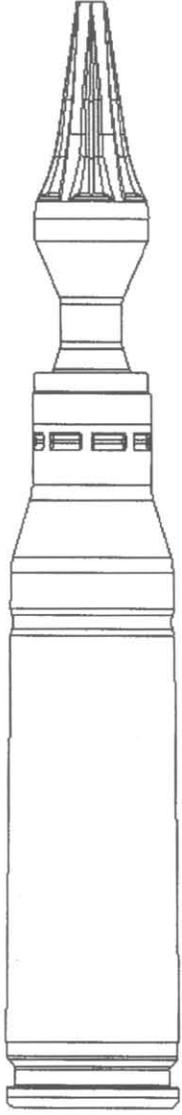
When handling depleted uranium ammunition, wear gloves. If corrosion product is found on the round, contact your local radiation safety officer.

Regardless if gloves are worn or not, wash your hands after handling depleted uranium ammunition.

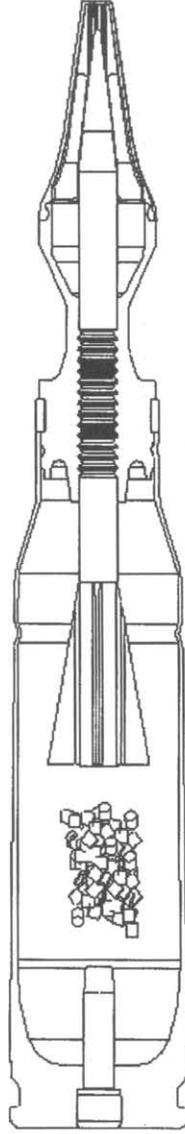
Supplement 5, Enclosure 2
(Reference: NRC Form 313, block 10)

DRAWINGS OF MAIN AMMUNITION COMPONENTS

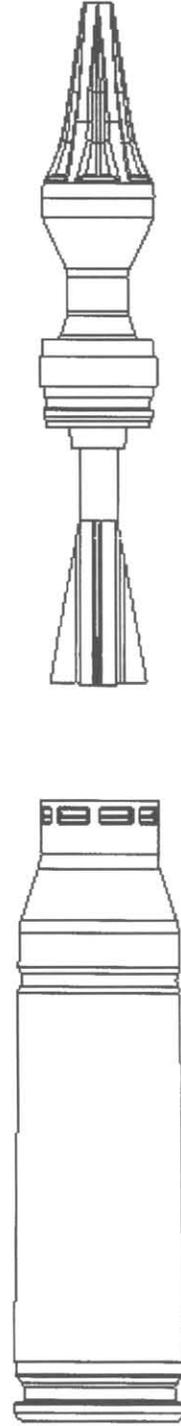
As referenced in supplement 5, paragraph 6, the following drawings are of a typical round of depleted uranium ammunition. The drawings serve as an example to show the two main components of any round of depleted uranium ammunition; the cartridge case and the projectile assembly.



Complete Round

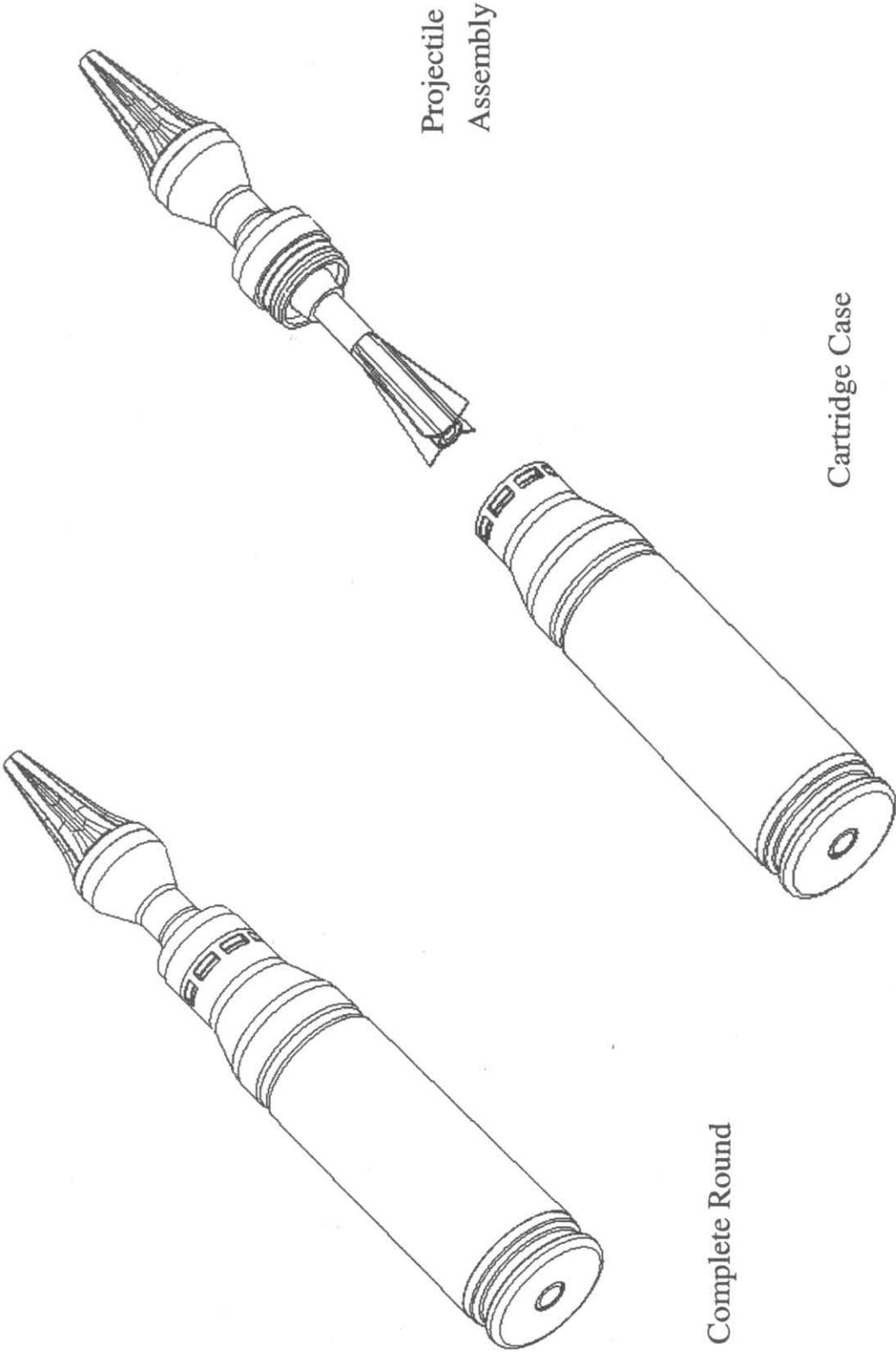


Complete Round Cutaway



Cartridge Case

Projectile Assembly



Projectile
Assembly

Cartridge Case

Complete Round

WASTE MANAGEMENT

1. Normal storage and handling operations will not generate radioactive waste materials. Disassembly operations may result in ammunition components that must be disposed as low-level radioactive waste. In addition, render-safe operations, although infrequent, could also generate ammunition components to be disposed as low-level radioactive waste.

2. Headquarters, US Army Field Support Command, is the central manager for disposal of all low-level radiological waste materials generated by the Joint Services, other than the Nuclear Navy. Radioactive waste generated under the SUC-1380 license will be disposed in accordance with Army Regulations and current Nuclear Regulatory Commission and Department of Transportation regulations. Headquarters, US Army Field Support Command, issues complete instructions to users on proper packaging and marking of shipments of radioactive waste. Headquarters, US Army Field Support Command, also conducts on-site audits of radioactive waste shipments to ensure full compliance with Nuclear Regulatory Commission, Department of Transportation, and burial-site criteria.

APPENDIX A

**RECORD OF ENVIRONMENTAL
CONSIDERATION**

S: 4 October 2002

AMSOS-SF (11-9k)

16 September 2002

MEMORANDUM FOR AMSOS-ISE

SUBJECT: Record of Environmental Consideration (REC) for Nuclear Regulatory Commission (NRC) License Number SUC-1380

1. Reference NRC license number SUC-1380, January 1997, Possession of Depleted Uranium (DU) as Cartridge Penetrators.
2. We will submit the subject license for renewal to the NRC by 30 October 2002 and require an updated REC. Please sign and return the enclosed REC to AMSOS-SF by 4 October 2002. The current REC is dated 16 August 1996.
3. The DU ammunition authorized by the license is located at numerous Army installations within CONUS and OCONUS. Since its inception in 1980, the license has authorized typical ammunition handling operations, to include storage, inspection, shipment, receipt, and minor maintenance. These operations have produced no known radiological contamination.
4. We are adding ammunition disassembly capability to the license and do not anticipate radiological contamination of the environment from disassembly operations. All planned disassembly operations will occur inside standard Army ammunition facilities. Slight contamination of disassembly equipment could occur. Such contamination should be easy to control and remove.
5. The POCs are Messrs. Kelly Crooks and Gary Buckrop, AMSOS-SF, extensions 20338 and 22969 respectively, E-mail amsos-sf.

//signed//

Encl

KRISTINE K. PRESTON
Acting Ch, Safety/Rad Waste Ofc

