

**NUCLEAR REGULATORY  
COMMISSION  
LICENSE AND APPLICATION  
FOR  
POSSESSION OF PROMETHIUM -147  
IN THE  
LIGHT ANTI-TANK WEAPON  
ROCKET SYSTEM  
(BML 12-00722-07)**



**HEADQUARTER  
U.S. ARMY INDUSTRIAL OPERATIONS  
COMMAND  
ROCK ISLAND, ILLINOIS 61299-6000  
MAY 1997**

MATERIALS LICENSE

Amendment No. 22

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

- 1. Department of the Army  
Commander, Headquarters  
U.S. Army Industrial Operations Command
- 2. ATTN: AMS10-DMW  
Rock Island, IL 61299-6000

In accordance with letter dated  
December 24, 1997

3. License Number 12-00722-07 is amended in  
its entirety as follows:

4. Expiration Date April 30, 2007

5. Docket or  
Reference No. 030-14796

6. Byproduct, Source, and/or  
Special Nuclear Material

7. Chemical and/or Physical  
Form

8. Maximum Amount that Licensee  
May Possess at Any One Time  
Under This License

A. Promethium-147

A. Radioactive material  
as ceramic microspheres  
(3M Company) sealed in  
sights of military rocket  
weapons systems

A. 10,000 curies  
(No single  
source to  
exceed 3  
millicuries)

9. Authorized Use:

A. For receipt, possession, storage, transfer to authorized recipients within the Department of Defense, and use in the sighting mechanism of military rocket systems.

CONDITIONS

- 10. Licensed material may be used anywhere in the United States.
- 11. Licensed material shall be used by, or under the supervision of, individuals who have completed the training outlined in applications dated March 28, 1995, and April 10, 1997, and have been appointed by the installation Radiation Protection Officers.
- 12. A. The Radiation Safety Officer for this license is Mr. Kelly W. Crooks.  
B. The Alternate Radiation Safety Officers are Gary W. Buckrop and Paul Grooms.

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License Number  
12-00722-07

Docket or Reference Number  
030-14796

Amendment No. 22

- 13. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
- 14. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
  - A. Application dated March 28, 1995; and
  - B. Letters dated July 31, 1995, April 10, 1997, April 21, 1997, and December 24, 1997.



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date FEB 26 1998

By Loren J. Hunter  
Nuclear Materials Licensing Branch, Region III



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION III  
801 WARRENVILLE ROAD  
LISLE, ILLINOIS 60532-4351

MAY 08 1997

(DMW) *© [unclear]*

JAMES P. FAIRALL, JR.  
Colonel, GS  
Chief of Staff

14 MAY 1997

Colonel Thomas F. Springer, GS  
Chief of Staff  
Department of the Army  
U.S. Army Industrial Operations Command  
AMS10-DMW  
Rock Island, IL 61299-6000

Dear Colonel Springer:

It has come to our attention that Amendment Number 21 to License No. 12-00722-07 issued on April 25, 1997 contained an error.

Enclosed is a corrected copy reflecting changes made to Items 1 and 2, and License Condition Nos. 11, 12.B and 14 of your license. We apologize for any inconvenience this may have caused you.

Sincerely,

A handwritten signature in cursive script that reads "Kevin G. Null".

Kevin G. Null  
Nuclear Materials Licensing Branch

License No. 12-00722-07  
Docket No. 030-14796

Enclosure: Corrected Copy of  
Amendment No. 21

15 MAY 1997

21 APR 1997

Radioactive Waste  
Disposal Division

Mr. Kevin Null  
U.S. Nuclear Regulatory Commission  
Nuclear Materials Licensing Branch  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Dear Mr. Null:

We are enclosing the information you requested on April 16, 1997, concerning our disposal program for light antitank weapon rocket sights and training records for installation radiation protection officers. Please consider this additional information as supporting our April 10, 1997, letter.

If you have further questions, the POCs are Mr. Kelly Crooks and Mr. Gary Buckrop, AMSIO-DMW, (309) 782-0338 and (309) 782-2969 respectively, electronic mail addresses [kcrooks@ria-emh2.army.mil](mailto:kcrooks@ria-emh2.army.mil) and [gbuckrop@ria-emh2.army.mil](mailto:gbuckrop@ria-emh2.army.mil) respectively.

Sincerely,

**SIGNED**

Stephen R. Mapley  
Chief, Radioactive Waste  
Disposal Division

Enclosure

385-11m - Licenses

Gary/wp61  
renew97a

skh  
4/20

Headquarters, U.S. Army  
Industrial Operations Command  
Additional Information for  
Light Antitank Weapon (LAW) Rocket Sights  
Disposal Program

DISPOSAL PROGRAM. AR 385-11, 1 May 1980, Ionizing Radiation Protection, paragraph 5-1b (enclosure 1), prohibits the Army from land burial of radioactive material at other than Nuclear Regulatory Commission-approved sites. We are the Army's low-level radioactive waste (LLRW) disposal office and manage the disposition of the Army's unwanted radioactive material. We do not allow disposal on Army installations or local landfills. We have contracts with the Hanford, WA; Barnwell, SC; and Envirocare of Utah, UT; disposal sites for land burial of Army LLRW and mixed waste.

We periodically remove radioactive materials, including expended LAW rocket sites, from Army installations for disposal as LLRW. The needs of the installations dictate our shipment schedule each year. We prioritize the pickups based on:

- a. Health and safety.
- b. Regulatory compliance.
- c. Costs.

We have enclosed (enclosure 2) our schedule of pickups for fiscal year 1997 as an example of our removal process. For economy of scale, we sweep large geographic areas of the country making several stops with one truck. We ship the materials to one of two contractor processing facilities based on the burial site the waste is going to: the Chem-Nuclear Consolidation Facility at Barnwell, SC, or the Richland Consolidation Facility, operated by Allied Technology Group outside of Hanford, WA. The contractors prepare the materials for disposal and ship to the proper disposal site. This process ensures the Army does not permanently store unwanted radioactive materials at any one site, and the installation properly package and ship the material for disposal.

TRAINING RECORDS. The LAW rocket license application describes the qualifications an individual must meet to be an installation radiation protection officer (RPO). Installation commanders appoint only those individuals who meet the qualifications. We maintain the name and phone number of RPOs at Army installations

in possession of our licensed items. We periodically contact these individuals and are aware of their knowledge level. In addition, we check the qualifications of the installation RPO during on-site audits. To strengthen our program, we will review the qualifications of current and incoming RPOs at installations possessing our licensed items.



DEPARTMENT OF THE ARMY  
HEADQUARTERS, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  
ROCK ISLAND, ILLINOIS 61299-6000



REPLY TO  
ATTENTION OF

April 10, 1997

Deputy Chief of Staff for  
Industrial Risk Management

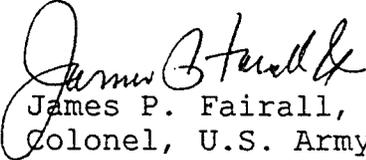
Mr. Kevin Null  
U.S. Nuclear Regulatory Commission  
Nuclear Materials Licensing Branch  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Dear Mr. Null:

We have enclosed our response to your January 8, 1997, letter regarding renewal of Nuclear Regulatory Commission license number BML12-00722-07 (reference control number 98359). In addition, we have identified a need to change item number 11 as currently worded in the license. We discuss this issue in paragraph 10 of the enclosure.

The point of contact is Mr. Kelly Crooks,  
AMSIO-DMW, (309) 782-0338, electronic mail address  
kcrooks@ria-emh2.army.mil.

Sincerely,

  
James P. Fairall, Jr.  
Colonel, U.S. Army  
Chief of Staff

Enclosure

Headquarters, U.S. Army  
Industrial Operations Command (HQ, IOC)  
Comments

1. RADIOACTIVE MATERIAL. The maximum possession limit is 10,000 curies of Promethium-147 (Pm-147) in front aiming sights for the M72 series light antitank weapon (LAW) rocket systems. No single aiming sight exceeds 3 millicuries.

The 3M Company manufactured the Pm-147 into inert ceramic microspheres with diameters ranging from 5 to 60 microns. These spheres are soluble to less than 0.1 percent in simulated human gastric acid (encl 1). The 3M Company mixed the spheres with self-luminous paint and then applied it at two locations on a piece of transparent plastic. This piece of transparent plastic is then laminated over with another piece of transparent plastic the same size. The finished transparent plastic sight, with the Pm-147 sealed inside, is approximately 2.6" long, 0.9" wide, and 0.15" thick. This transparent plastic piece is the primary component of the front aiming sight of the LAW rocket system (encl 2).

The 3M Company stopped manufacturing LAW rocket sights with Pm-147 in the 1970's. Thus, we have no need to increase the 10,000 curie license maximum. We addressed decommissioning financial assurance for the two licenses we hold (BML12-00722-07 and SUC-1380) in letter, AMSIO-CG, 29 April 1996 (encl 3). According to Regulatory Guide 3.66, a license limit of 10,000 curies of Pm-147 does not require decommissioning financial certification.

2. AUTHORIZED USE. Contractors working for the Department of Defense (DOD) manufactured several models of LAW rocket systems. Only the M72, M72A1, and M72A2 models use Pm-147 in the front aiming sight. The Pm-147 causes illumination of the 100- and 150-yard markings of the front sight so that soldiers can aim the weapon system under limited lighting conditions.

Light antitank weapon rocket front-aiming sights are rugged enough to meet the needs of a military weapon system. The Pm-147 contained within these sights cannot escape unless the sight is subject to crushing, melting, or breaking across either the 100- or 150-yard markings. We consider these accident scenarios remote. The license does not allow anyone to compromise the integrity of the front aiming sight in any way.

The LAW rocket system contains an explosive warhead. During combat, soldiers fire it against enemy vehicles or fortifications. The authorized peacetime use of the LAW rocket system includes shipping, receiving, transportation, storage, inspection, minor maintenance, firing, training, and demilitarization. We describe these uses below:

a. The DOD principally controls the shipment and receipt of LAW rockets according to the explosive hazard. The DOD follows all applicable transportation and handling requirements for the radioactive component.

b. The DOD may store LAW rockets with other compatible ammunition and explosive items following military storage compatibility criteria.

As stated in line item 10 of the license, DOD personnel can possess LAW rocket items anywhere in the U.S. Currently, the following installations are fulfilling the depot storage mission: Anniston Army Depot, Bluegrass Army Depot, Crane Army Ammunition Activity, Hawthorne Army Depot, Letterkenny Army Depot, McAlester Army Ammunition Plant, Red River Army Depot, Sierra Army Depot, and Tooele Army Depot. Other types of installations normally do not store as many LAW rockets as installations with a depot mission.

c. The Army allows trained individuals to inspect LAW rocket systems under conditions strictly controlled due to the explosive hazard. The HQ, IOC, directs when and where LAW rocket inspections take place.

d. Minor maintenance normally involves remarking or repairing exterior packaging, but also covers replacing or repairing non-radioactive components of the LAW rocket system itself. We do not allow maintenance on the Pm-147 containing plastic component of the front sight.

e. Soldiers fire the LAW rocket during combat training exercises or during test trials to assure the continued reliability of the system. Soldiers follow strict safety rules when firing LAW rockets.

f. Empty or expended launcher tubes can also serve as training devices. Soldiers may train with empty or expended launcher tubes by inserting and firing a subcaliber round of ammunition. This allows soldiers to practice with a live firing system that simulates a LAW rocket system without the hazard of an explosive warhead. Expended or empty launcher tubes can also

serve as classroom training devices. Classroom training devices are not operable systems. When not in use, installations keep training devices in secure storage.

g. Demilitarization is the process of rendering an item unusable for its intended military purpose. For the LAW rocket, demilitarization normally occurs after firing, and includes removal of the front aiming sight from the expended launcher tube. Demilitarization may also involve complete disassembly of the LAW rocket system into its component parts. This type of demilitarization normally occurs at Army depots and involves the removal of the explosive warhead and the front aiming sight on a disassembly line. As with other explosive operations, installations have security measures to limit access to these areas. The installation radiation protection officer (RPO) ensures the proper removal, collection, storage, and shipment for disposal of the front aiming sights.

3. PHYSICAL INVENTORY. The HQ, IOC, requires that installation personnel physically inventory LAW rockets annually because of the Pm-147 in the front sight. Installations may physically inventory their LAW rockets more often because it is a high security item.

Installations update their inventory records of LAW rocket items after each shipment or receipt. Installation inventory listings include identifying information, quantity, and storage location.

The HQ, IOC, maintains inventory information on quantities of LAW rockets at Army depots and ammunition plants. The HQ, IOC, updates inventory records within a few days after depots and plants update their inventory records. To build a complete LAW rocket inventory listing, the HQ, IOC, must ask the other Army Commands and military services individually for inventory information at their subordinate installations. We have attached inventories of LAW rocket items located within the U.S. (encl 4).

After firing LAW rockets, soldiers turn in the expended launcher tubes to the ammunition residue office. On Army installations, the ammunition residue office is normally in the ammunition supply point (ASP). Personnel working for the ASP remove the front aiming sight from expended launchers. After collecting a quantity of individual front sights, the ASP turns the individual front sights over to the installation RPO. The installation RPO places the individual front sights in his radioactive waste storage area and adds them to his inventory of items pending disposal.

The HQ, IOC, does not maintain an inventory of individual front aiming sights. Installation personnel maintain inventory and accountability of individual front sights. The HQ, IOC, requests inventory information from individual installations on a case-by-case basis. We have enclosed a list of Army installations that have had LAW rocket items within the last 2 years with current quantities of individual front aiming sights (encl 5). The U.S. Navy, U.S. Marine Corps, and U.S. Air Force do not regularly train with the LAW rocket system and currently report no quantity of individual sights for their installations.

4. LEAK TESTING. The random leak testing program has been in effect for several years; it is not new to this license renewal application. The HQ, IOC, strengthened the leak test program in 1996. The current program involves sending a wipe test kit to two installations per year. Each installation wipes approximately 39 front sights, resulting in approximately 78 wipe tests per year. The Rock Island Arsenal Independent Test Laboratory analyzes the wipes under NRC license number BML12-00722-10.

We believe a limited wipe testing program is sufficient for the front aiming sight of the LAW rocket system for the following reasons:

a. In its normal storage configuration, the front aiming sight is not physically accessible. Department of Defense contractors manufactured the LAW rocket with the front aiming sight folded down, the inner tube of the launcher telescoped inside the outer launcher tube, and the entire system packaged in sealed shipping and storage containers. In addition, installations store LAW rocket containers in secure structures that are at considerable distances from ammunition work areas.

b. Wipe testing LAW rockets containing the explosive warhead presents an unacceptable explosive hazard. Only when a person extends the LAW launcher tube into the ready-to-fire position does the spring-loaded front sight flip up (encl 6). In this position, the system is ready to fire. Installation personnel only extend LAW launcher tubes in preparation for firing or disassembly. Installations strictly control both of these operations.

c. To wipe test LAW rockets containing the explosive warhead is to perform destructive testing. Due to the explosive hazard, the military only allows access to the front aiming sight after firing or disassembly. Both of these operations are destructive and reduce the number of LAW rockets for military use.

d. Wipe test results have shown very little, if any, removable contamination. Wipe test results rarely exceed the Army's 2,000 dpm removable contamination limit for controlled items. Out of 71 wipe tests in 1996, the highest reading, by far, was 1,200 dpm. The vast majority of other wipe test results were either below the laboratory's reporting limit of approximately 180 dpm (2 times the lower limit of detection) or in the 200 - 400 dpm range, which we consider low. The Army specifies limits for contamination in table 4-3 of Army Regulation 385-11, 1 May 1980, Ionizing Radiation Protection (encl 7).

e. Per Regulatory Guide 10.7, August 1979, sealed sources containing less than 100 microcuries of beta/gamma emitting material do not require leak testing (encl 8). Upon original manufacture, LAW sights contained a maximum of 3 millicuries of Pm-147 each. The Army bought the last batch of LAW sights using Pm-147 in the late 1970's. We estimate that the last manufactured sights now contain around 15 microcuries each.

5. SECURITY OF MATERIAL. Because LAW rockets are a single-man, portable, shoulder-fired rocket system, the military provides them a high degree of security. When not in storage, LAW rocket items are under the control of an accountable person.

Installations accomplish long-term storage of LAW rockets in secure structures that are within ammunition storage areas. These are limited access areas with fences and gate guards. Structures storing LAW rockets have "Caution Radioactive Material" signs on the entry doors.

The military uses explosive compatibility rules when storing ammunition of different types in the same structure. Installations can store LAW rockets with other munitions.

Personnel needing access to LAW rocket storage structures receive explosive security training. This normally includes instruction on intrusion detection systems and the proper use of the two-man rule. The two-man rule stipulates that at least two men must enter the storage structure together, each having a different key. These procedures require that the two individuals entering the storage structure lock it when they leave.

The military may temporarily store LAW rocket items outside in securely fenced and guarded areas. The reasons for outside storage are:

a. To accommodate storage and handling at training facilities in field-type environments.

b. For collection of expended launcher tubes until demilitarizing them.

c. To ease shipping, receiving, and rapid deployment operations.

When not in use, installations store training devices in secure structures. Upon removal from the launcher tube, installations place individual front sights in secure structures.

6. AUDIT PROGRAM. The goal of the LAW rocket audit program is to inspect half the total number of storage installations within a 5-year time span. The licensee partially relies on inspections done by other organizations to accomplish this goal. Below, we list organizations that also do radiation safety inspections.

a. The U.S. Army Center for Health Promotion and Preventive Medicine, Aberdeen Proving Ground, MD.

b. The U.S. Army Armament Chemical Acquisition and Logistics Activity, Rock Island, IL.

c. The U.S. Army Communications-Electronics Command, Fort Monmouth, NJ.

d. The U.S. Army Test, Measurement, and Diagnostic Equipment Activity (TMDE), Huntsville, AL.

The HQ, IOC, notifies the installation in advance and identifies to them the major portions of their program we will review. Normal inspection procedures include a review of record keeping, interviews, and an inspection of storage structures. Our on-site inspections do not normally include independent surveys, although we have verified and collected some radiological data in the past. We out-brief the results of our inspection to the installation Commander or members of his staff. We document inspection results and provide them to the installation. Installations respond in writing to findings and take corrective actions. We track the progress of corrective actions to findings of a serious nature, check on the status of minor findings during the next inspection, and maintain documentation associated with inspections on file according to Army filing system rules, which is normally 3 to 4 years.

We decide which installations to inspect based on the following:

a. Any known LAW licensing issue.

- b. Whether the installation currently has LAW rockets.
- c. Whether the installation fires LAW rockets.
- d. Whether the installation stores depleted uranium ammunition.
- e. The time elapsed since the last licensee or other inspection.
- f. Whether there are other installations with IOC-licensed material in the same geographical region that we could visit in the same trip.

7. SURVEY PROGRAM. Per amendment 20 to the BML12-00722-07 license, installations survey structures storing LAW rockets annually. These are area surveys to check for contamination. Installations keep documentation of radiation surveys and only forward it to the office of the licensee upon request or if they find contamination.

We do not name specific radiation instruments to this license. Installation personnel use beta/gamma instruments, since Pm-147 is a beta emitter. The storage structure (controlled area) limit for fixed contamination is 0.02 mrad per hour at 1 inch, and for removable contamination, the limit is 400 dpm per 100 square centimeters. Limits for contamination are in AR 385-11, 1 May 1980, Ionizing Radiation Protection (encl 7).

8. INSTRUMENTATION. Each military service is responsible for its own instrument and calibration program. Below, we provide information for each military service. NOTE: RADIAC is an acronym derived from "radioactivity detection indication and computation", a generic term applying to radiological instruments and equipment (reference: The Health Physics and Radiological Health Handbook, 1984).

a. The U.S. Army Test, Measurement, and Diagnostic Equipment Activity provides calibration services for the Army under NRC license 01-00126-16 (encl 9). The TMDE publishes calibration interval information in Technical Bulletin 43-180. Calibration intervals vary up to 1 year according to the type and model of the instrument.

b. The Navy Radiological Affairs Support Office provides the following (encl 10):

"The Navy RADIAC Program is managed by Commander, Naval Sea Systems Command (SEA04R). The Marine Corps RADIAC Program is managed by Commander, Marine Corps Systems Command (Code CSLE). Under the authority of the Navy Master Materials License, 45-23465-01NA, there are presently seventeen Navy and three Marine Corps activities, worldwide, which calibrate all Navy and Marine Corps RADIACs. Each of the twenty calibration activities are authorized to possess and use appropriate calibration sources, under the auspices of individual Navy Radioactive Materials Permits, to conduct standardized calibration of RADIACs."

c. The Air Force Radioisotope Committee provides the following (encl 11):

"The USAF Radioisotope Committee requires that all radiation detection and measurement equipment, used for the purpose of determining compliance with the requirements of Title 10, Code of Federal Regulations, be calibrated by an organization authorized by an Air Force or Navy radioactive materials permit, or a Nuclear Regulatory Commission or Agreement State license, to perform such activities."

9. WASTE DISPOSAL. Soldiers turn in expended launcher tubes to an ammunition residue office on the installation after their training exercise is over. The ammunition residue office is normally within the ASP. Personnel working for the ASP remove the front aiming sight by removing two nuts. The ASP may temporarily store launcher tubes and front aiming sights. After ASP personnel have collected a quantity of sights, they turn them over to the installation RPO who places the individual front sights in his radioactive waste storage area and adds them to his inventory of items pending disposal.

Each military service ensures that they dispose of front sights IAW Federal regulations. The HQ, IOC, manages the Army's Radioactive Waste Disposal Program and packages and ships the waste sights to a licensed low-level radioactive waste burial site (either Barnwell, SC, or Hanford, WA) for disposal.

10. ITEM 11 OF THE LAW LICENSE. We request the NRC change the wording for item 11 of the LAW license. The literal interpretation of item 11 suggests that this office must maintain all military training records, which we cannot do. The installations using LAW rockets maintain those records.

Military unit commanders ensure that individual soldiers receive proper training, to include the unit RPO. An installation may have several military units on post. The installation RPO provides general oversight of the radiological aspects of the LAW rocket program for the entire installation. This normally includes providing training to the unit RPOs on post. The installation Commander ensures that his installation RPO gets adequate training.

Successful completion of the U.S. Army Radiological Safety Course (4JF3), or other applicable education, experience, and training, qualifies an installation RPO. Other applicable education, experience, and training must generally meet the requirements of Regulatory Guide 10.4 (December 1987). Radiation safety officer courses offered by the other services which meet the requirements of Regulatory Guide 10.4 are acceptable to the licensee.

## Description of Promethium-147 Microspheres

Mr. David Swenson  
Radiochemist  
3-M Company  
Austin, Texas  
512-834-3153

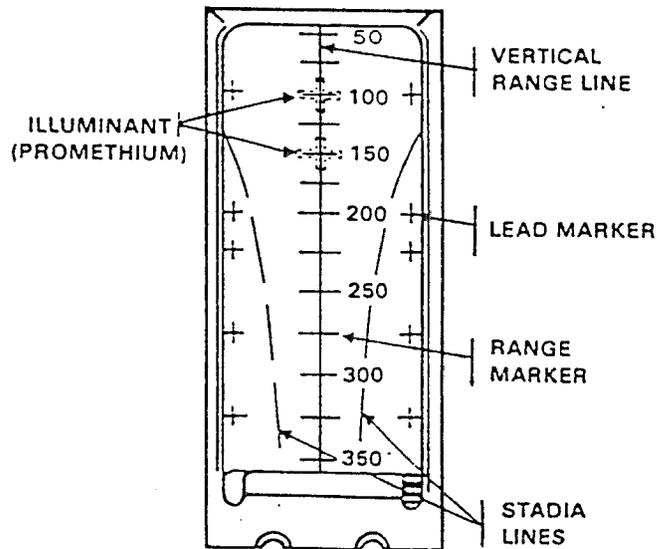
1. Promethium-147 ceramic microspheres are filtered to approximately 20-25 micron size for application to LAW (M-72) site.
2. The microsphere will withstand temperatures up to 1500°C where physical degradation begins to appear and melt at temperature of 2000°C.
3. Solubility tests were performed by soaking the microsphere in a .1% normal hydrochloric acid solution for 24 hours which simulates human gastric acid condition. The microspheres are virtually insoluble in water.
4. The black oily substance found on debris as a result of the fire is from petroleum based plastic parts of the LAW rocket launcher returning to their base state after heating. (Referring to fire in Republic of Korea, 1985)

## Section II. SIGHTS

### FRONT SIGHT

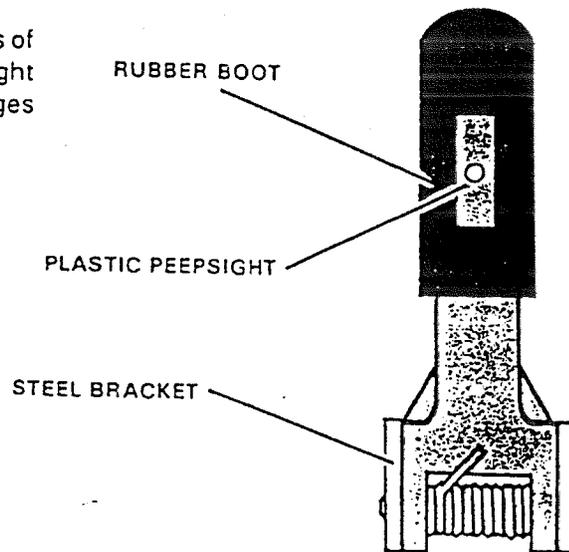
The front sight for the LAW has an embossed vertical range line showing ranges from 50 to 350 meters in 25-meter increments. The front sight on the M72A2 has a promethium range marker at the 100- and 150-meter points to aid the gunner in engaging targets under low light level conditions.

Two curved stadia lines are etched on the front sight, but these lines are no longer used for range estimation. On either side of the vertical line are lead marks which aid the gunner in engaging moving targets.



### REAR SIGHT

The rear sight of the LAW consists of a steel bracket and plastic peepsight which automatically adjusts to changes in temperature.





DEPARTMENT OF THE ARMY  
HEADQUARTERS, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  
ROCK ISLAND, ILLINOIS 61299-6000



REPLY TO  
ATTENTION OF

April 29, 1996

Office of the Commanding General

Administrator  
Nuclear Regulatory Commission, Region III  
Materials Licensing Branch (Mrs. Frazier)  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Dear Mrs. Frazier:

This letter provides information requested in your February 8, 1996, letter. It also updates letters, Headquarters, U.S. Army Armament, Munitions and Chemical Command, Safety Office, Systems, Chemical and Radiation Division, June 21, 1990, and August 2, 1990. These letters provided a Statement of Intent as certification of financial assurance, and explained the authority of the Chief of Staff to sign financial documents for the Commander, respectively.

I have enclosed the following documents per your request:

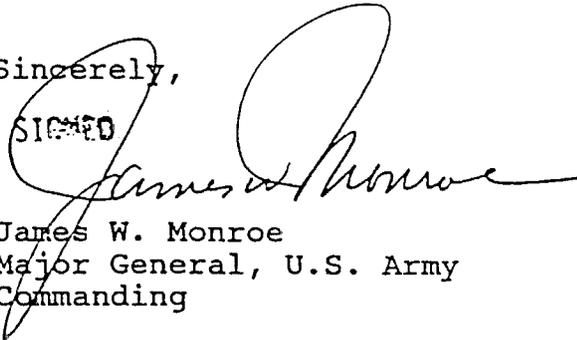
- a. Updated licensee information and an explanation of decommissioning financial assurance required for the two Nuclear Regulatory Commission licenses (SUC-1380 and BML12-00722-07) held by this Command.
- b. An explanation of the authority to expend decommissioning funds.
- c. An updated Statement of Intent.

The enclosed Statement of Intent assures the Nuclear Regulatory Commission that this Command will request adequate finances in a timely manner and in an amount based on the type and quantity of source material described in Title 10, Code of Federal Regulations, part 40.36.

The point of contact is Mr. Kelly Crooks,  
AMSIO-DMW, (309) 782-0338, electronic mail address  
kcrooks@ria-emh2.army.mil.

Sincerely,

SIGNED



James W. Monroe  
Major General, U.S. Army  
Commanding

Enclosures

UPDATED LICENSEE INFORMATION AND EXPLANATION  
OF DECOMMISSIONING FINANCIAL ASSURANCE

In October 1994, the Army reorganized the U.S. Army Armament, Munitions and Chemical Command (AMCCOM) into the U.S. Army Industrial Operations Command (IOC) and the U.S. Army Armament and Chemical Acquisition and Logistics Activity (ACALA). Both of these organizations are located in Rock Island, Illinois.

This reorganization distributed AMCCOM's eight Nuclear Regulatory Commission licenses. Six licenses are now held by the ACALA, and two are held by the IOC. This correspondence addresses the two licenses held by the IOC. The address of the IOC is:

Commander  
U.S. Army Industrial Operations Command  
ATTN: AMSIO-DMW  
Rock Island, IL 61299-6000

The Commander, IOC, is the licensee for the two licenses held by this Command. The Radioactive Waste Disposal Division manages the two licenses for the Commander. The attention line in the above address directs license correspondence to the Radioactive Waste Disposal Division.

The two licenses held by this Command are described below:

Source Material License, SUC-1380. For the purpose of reviewing decommissioning financial certification requirements, license coverage is divided into two categories. The first category is the storage of non-disbursable depleted uranium (DU) used as ammunition components. The second category is for DU in disbursable form at Lake City Army Ammunition Plant (AAP) and McAlester AAP. These two decommissioning categories of the SUC-1380 license are discussed in the following paragraphs.

Non-disbursable Form. The DU used in ammunition is alloyed with other metals to prevent corrosion. This alloy is in the form of a solid metal rod. This rod is located inside the ammunition and is further encased by a shipping and storage container. All Army installations are authorized, by the SUC-1380 license, to store DU ammunition. Storage locations are periodically monitored by the Army, and no contamination has ever been found. Thus, the DU in ammunition is not considered to be in a disbursable form, and decommissioning financial certification is not required of the licensee. The maximum possession limit for DU used in ammunition, as authorized by the SUC-1380 license, is 42 million kilograms.

Disbursable Form. Items 8 and 9 of the SUC-1380 license authorize Lake City AAP and McAlester AAP a maximum of 239,500 kilograms of DU in disbursable form. At Lake City, the DU is in the form of fragments on the firing range. At McAlester AAP, the DU is in the form of residues on manufacturing equipment in storage.

Using the specific activity for DU referenced in Title 10, Code of Federal Regulations (CFR), part 20, appendix B, which is  $3.6E-7$ , the activity level of 239,500 kilograms of DU is approximately 86.2 curies. Because the amount of DU in disbursable form exceeds the 100 mCi limit specified in 10 CFR 40.36 (b), decommissioning financial assurance must be at least \$750,000.

By-product Material License, BML12-00722-07. This license authorizes any Department of Defense installation to possess the light-antitank weapon rocket launcher which uses promethium-147 on the front sight. These sights originally contained 3 mCi of activity when manufactured in the 1970's, but due to the short half-life of promethium-147, they have decayed significantly. The promethium-147 is contained in ceramic microspheres which are further sealed into the plastic body of the sight. This arrangement is considered a sealed source. The total license possession limit is 10,000 curies. This possession limit does not require decommissioning financial certification.

## AUTHORITY TO EXPEND DECOMMISSIONING FUNDS

In accordance with Army Regulation 37-1, 30 April 1991, Army Accounting and Fund Control, the Commanding General has the overall responsibility for financial administration. Army Regulation 37-1 authorizes the Commander, U.S. Army Industrial Operations Command (IOC), to expend decommissioning funds subject to the provisions of 31 U.S.C., Section 1341 (Anti-Deficiency Act), for those installations that comprise the IOC.

Important license correspondence sent to the Nuclear Regulatory Commission (NRC) by this Command is normally signed by the IOC Chief of Staff. Industrial Operations Command Regulation 10-1, 22 January 1996, Organization and Functions, Headquarters, IOC, Organization, Mission, and Functions, authorizes the Chief of Staff to sign documents for the Commanding General. Due to NRC concerns as stated in letter, NRC, 8 February 1996, regarding an Acting Chief of Staff signing the Statement of Intent, the transmittal letter and the Statement of Intent (enclosure 3) were prepared for the signature of the Commanding General.

**LAW ROCKET ITEMS INVENTORY**  
(FEB-MAR 97)

INSTALLATION	QTY		NATIONAL STOCK NO.
<b>U.S. ARMY FORCES COMMAND</b>			
FORT A. P. HILL	130	EA	1340-25-116-2520
FORT CAMPBELL	377	EA	1340-25-116-2520
FORT CAMPBELL	35	EA	1340-00-426-1013
FORT POLK	417	EA	1340-25-116-2520
FORT POLK	10	EA	1340-00-426-1013
FORT CARSON	205	EA	1340-25-116-2520
FORT BRAGG	412	EA	1340-00-021-4491
FORT BRAGG	2646	EA	1340-25-116-2520
FORT LEWIS	75	EA	1340-00-007-4889
FORT LEWIS	690	EA	1340-25-116-2520
FORT LEWIS	34	EA	1340-00-426-1013
FORT HOOD	24	EA	1340-00-426-1013
FORT HOOD	16	EA	1055-00-143-6909
FORT STEWART	23	EA	1340-00-426-1013
FORT PICKETT	25	EA	1340-00-426-1013
FORT PICKETT	28	EA	1055-00-143-6909
FORT INDIANTOWN GAP	9	EA	1340-00-426-1013
YAKIMA TRAINING CENTER	197	EA	1340-00-426-1013
FORT DRUM	25	EA	1055-00-143-6909
FORT DEVENS	74	EA	1055-00-143-6909
<b>U.S. ARMY TRAINING AND DOCTRINE COMMAND</b>			
FORT MCCLELLAN	71	EA	1340-25-116-2520
FORT CHAFFEE	114	EA	1340-25-116-2520
FORT BLISS	4	EA	1340-25-116-2520
FORT BLISS	81	EA	1340-00-021-4480
FORT BENNING	797	EA	1340-25-116-2520
FORT BENNING	765	EA	1340-01-029-8012
FORT KNOX	19	EA	1340-25-116-2520
FORT RUCKER	5	EA	1340-25-116-2520
FORT RUCKER	15	EA	1340-01-029-8012
<b>U.S. ARMY NATIONAL GUARD</b>			
ARKANSAS	5	EA	1340-01-384-9483
CALIFORNIA	99	EA	1340-00-021-4480
FLORIDA	8	EA	1340-00-021-4480
INDIANA	4	EA	1340-25-116-2520
MICHIGAN	6	EA	1340-25-116-2520
UTAH	2	EA	1340-00-021-4491
UTAH	23	EA	1340-00-029-8012
UTAH	30	EA	1340-25-116-2520

Encl 4 *f.*  
*Enclosure*

Encl 4

**U.S. ARMY TEST AND EVALUATION COMMAND**

YUMA PROVING GROUND	90	EA	1340-00-021-4491
ABERDEEN PROVING GROUND	9	EA	1340-00-021-4491
ABERDEEN PROVING GROUND	10	EA	1340-01-029-8012

**U.S. ARMY INDUSTRIAL OPERATIONS COMMAND**

ANNISTON ARMY DEPOT	28	EA	1340-00-935-9285
ANNISTON ARMY DEPOT	15	EA	1340-00-143-7032
ANNISTON ARMY DEPOT	12	EA	1340-00-926-4086
ANNISTON ARMY DEPOT	4	EA	1340-00-007-4889
ANNISTON ARMY DEPOT	2660	EA	1340-00-021-4491
ANNISTON ARMY DEPOT	55212	EA	1340-01-029-8012
ANNISTON ARMY DEPOT	476	EA	1055-00-143-6909
ANNISTON ARMY DEPOT	5657	EA	1340-00-426-1013
ANNISTON ARMY DEPOT	6011	EA	1340-25-116-2520
BLUEGRASS ARMY DEPOT	15	EA	1340-00-007-4889
BLUEGRASS ARMY DEPOT	15	EA	1340-00-021-4491
BLUEGRASS ARMY DEPOT	61	EA	1055-00-143-6909
CRANE ARMY AMMUNITION ACTIVITY	20	EA	1340-00-892-1561
CRANE ARMY AMMUNITION ACTIVITY	1695	EA	1340-00-021-4491
CRANE ARMY AMMUNITION ACTIVITY	249	EA	1340-00-021-4491
CRANE ARMY AMMUNITION ACTIVITY	18625	EA	1340-01-029-8012
CRANE ARMY AMMUNITION ACTIVITY	46	EA	1055-00-143-6909
CRANE ARMY AMMUNITION ACTIVITY	13	EA	1340-00-426-1013
CRANE ARMY AMMUNITION ACTIVITY	62	EA	1340-25-116-2520
HAWTHORNE ARMY DEPOT	10	EA	1340-00-926-4086
HAWTHORNE ARMY DEPOT	25	EA	1340-00-892-1561
HAWTHORNE ARMY DEPOT	95	EA	1340-00-021-4491
HAWTHORNE ARMY DEPOT	2404	EA	1340-01-029-8012
HAWTHORNE ARMY DEPOT	7	EA	1340-00-426-1013
LETTERKENNY ARMY DEPOT	113	EA	1340-00-021-4491
LETTERKENNY ARMY DEPOT	12208	EA	1340-01-029-8012
LETTERKENNY ARMY DEPOT	141	EA	1055-00-143-6909
LETTERKENNY ARMY DEPOT	179	EA	1340-00-426-1013
MCALESTER ARMY AMMUNITION PLANT	70	EA	1340-00-935-9285
MCALESTER ARMY AMMUNITION PLANT	840	EA	1340-00-021-4478
MCALESTER ARMY AMMUNITION PLANT	529	EA	1340-00-021-4491
MCALESTER ARMY AMMUNITION PLANT	1005	EA	1340-01-029-8012
MCALESTER ARMY AMMUNITION PLANT	162	EA	1055-00-143-6909
MCALESTER ARMY AMMUNITION PLANT	44371	EA	1340-00-426-1013
RED RIVER ARMY DEPOT	30	EA	1340-00-926-4086
RED RIVER ARMY DEPOT	179	EA	1340-00-892-1561
RED RIVER ARMY DEPOT	4	EA	1340-00-007-4889
RED RIVER ARMY DEPOT	1230	EA	1340-00-021-4478
RED RIVER ARMY DEPOT	170	EA	1340-00-021-4480
RED RIVER ARMY DEPOT	2181	EA	1340-00-021-4491
RED RIVER ARMY DEPOT	47756	EA	1340-01-029-8012
RED RIVER ARMY DEPOT	316	EA	1055-00-143-6909
RED RIVER ARMY DEPOT	3287	EA	1340-00-426-1013
RED RIVER ARMY DEPOT	14	EA	1340-25-116-2520

U.S. ARMY INDUSTRIAL OPERATIONS COMMAND (CONTINUED)

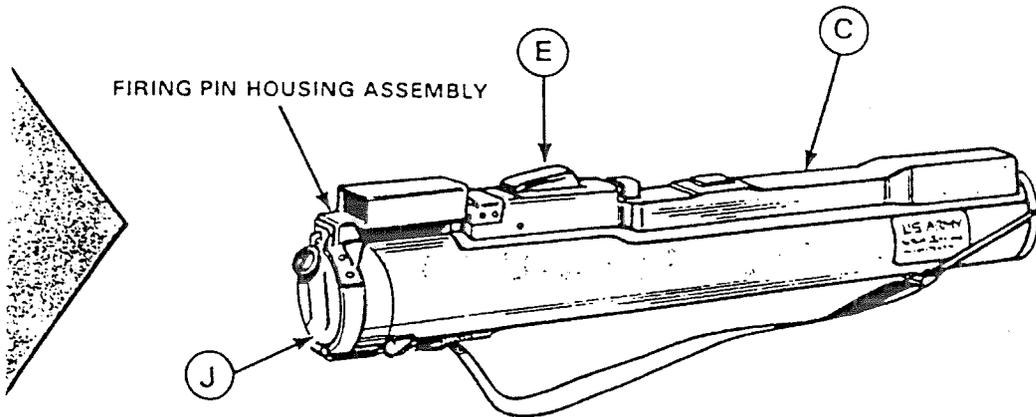
SAVANNA ARMY DEPOT	215	EA	1055-00-143-6909
SAVANNA ARMY DEPOT	244	EA	1340-00-426-1013
SIERRA ARMY DEPOT	25	EA	1340-00-021-4480
SIERRA ARMY DEPOT	106	EA	1340-00-021-4491
SIERRA ARMY DEPOT	2880	EA	1340-01-029-8012
SIERRA ARMY DEPOT	281	EA	1340-25-116-2520
TOOELE ARMY DEPOT	4	EA	1340-00-007-4889
TOOELE ARMY DEPOT	24	EA	1340-00-021-4491
TOOELE ARMY DEPOT	10	EA	1340-01-029-8012
TOOELE ARMY DEPOT	94	EA	1055-00-143-6909
TOOELE ARMY DEPOT	156	EA	1340-00-426-1013
TOOELE ARMY DEPOT	3780	EA	1340-25-116-2520

FRONT AIMING SIGHT QUANTITIES  
(FEB-MAR 97)

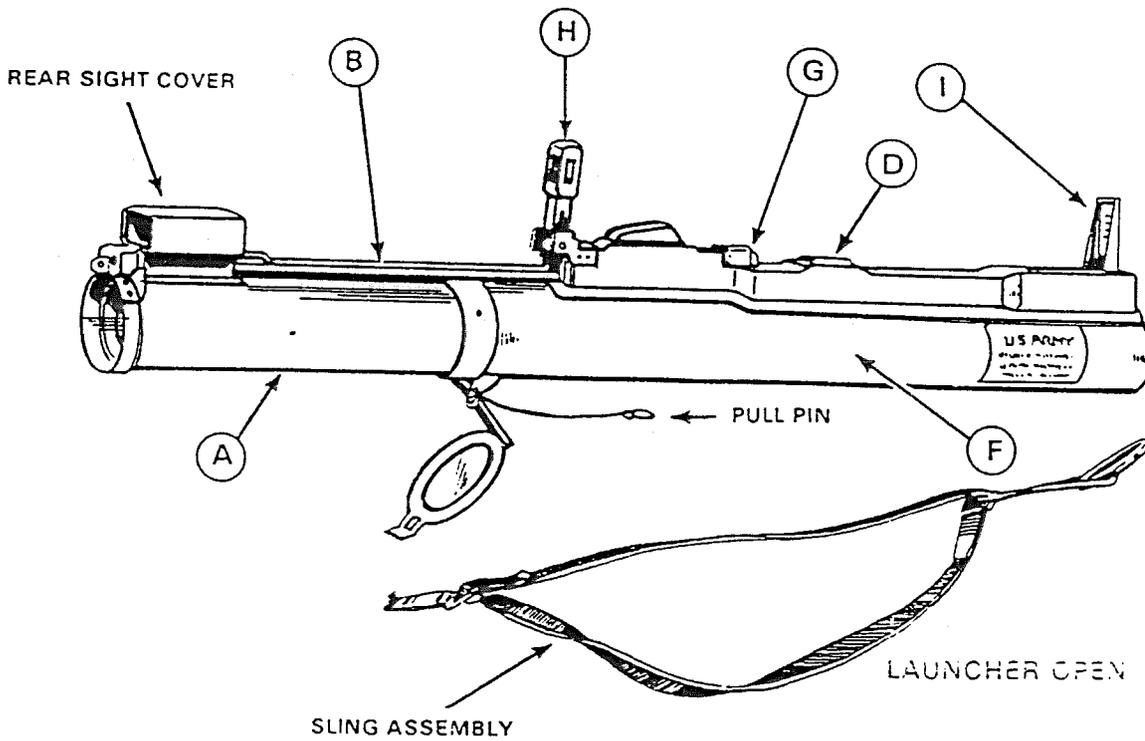
INSTALLATION NAME	QUANTITY
1. Anniston Army Depot	0
2. Bluegrass Army Depot	13
3. Crane Army Ammunition Activity	0
4. Hawthorne Army Depot	13,680
5. Letterkenny Army Depot	0
6. McAlester Army Ammunition Plant	0
7. Red River Army Depot	33,347
8. Savanna Army Depot	0
9. Sierra Army Depot	0
10. Tooele Army Depot	94
11. Fort Stewart	165
12. Fort Bragg	498
13. Fort Campbell	2,800
14. Fort Carson	0
15. Fort Drum	191
16. Fort Lewis	322
17. Fort Polk	6
18. Fort McCoy	681
19. Fort Riley	221
20. Fort Wainwright	5
21. Fort Benning	0
22. Fort Dix	10
23. Fort McClellan	0
24. Fort Rucker	0
25. Fort Bliss	416
26. Fort Knox	1,865
27. Fort Pickett	2
28. Fort Chaffee	0
29. Fort Indiantown Gap	110
30. Fort A.P. Hill	47
31. Fort Devens	54
32. Fort Hood	21
33. Yakima Training Center	0
34. Aberdeen Proving Ground	7
35. Yuma Proving Ground	0
36. Arkansas National Guard (NG)	0
37. California NG	1,506
38. Indiana NG	42
39. Florida NG	117
40. Michigan NG	0
41. Missouri NG	2
42. Mississippi NG	12
43. Utah NG	116

Encl 5

Encl 5



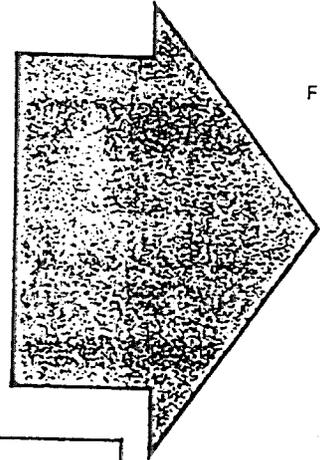
LAUNCHER CLOSED



## Section II. DESCRIPTION AND TABULATED DATA

### DESCRIPTION

**LAUNCHER.** The launcher is made of two tubes; one fits inside the other. The inner tube (A) is guided by a channel assembly (B), which rides in an alignment slot in the trigger housing assembly (C). It will extend telescopically along the channel assembly (B), which houses the firing pin rod assembly and locks the launcher in the extended position through the detent lever assembly (D). The firing pin rod assembly locks under the trigger assembly (E) and cocks the weapon when the launcher is extended. The outer tube (F) has the following parts affixed to it: the trigger housing assembly (C) located on the upper surface, trigger assembly (E), trigger arming handle (G), rear sight assembly (H), front sight assembly (I), and rear cover (J).



FIRING



(SEE CHAPTER 3  
ROCKET  
AMMUNITION)

**ROCKET.** The rocket consists of a 66-mm HEAT warhead, a point-initiating-base detonating fuze, and a rocket motor. Attached to the rear of the rocket motor are six spring-loaded fins which are folded forward along the motor when the rocket is in the launcher. When ignited, the propellant in the rocket motor burns and builds up gas pressure. The gas pressure moves the rocket to the target.

REAR SIGHT

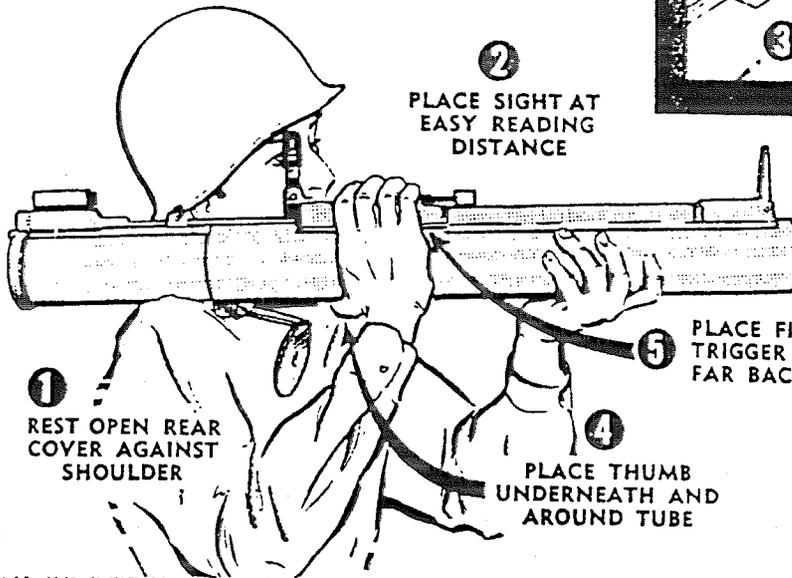
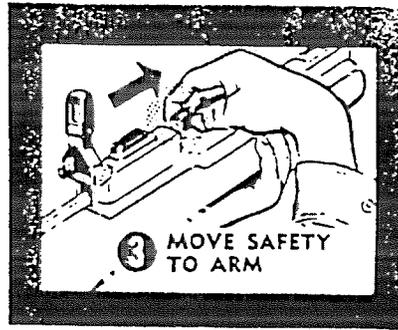
### TABULATED DATA

LAUNCHER	M72A2	M72A1
LENGTH (FIRING POSITION)	89.3 CM (35.16 IN)	89.3 CM
LENGTH (CLOSED POSITION)	65.6 CM (25.77 IN)	65.6 CM
WEIGHT (COMPLETE SYSTEM)	2.36 KG (5.2 LB)	2.13 KG
WEIGHT (LAUNCHER ONLY)	1.36 KG (3.0 LB)	1.13 KG
FIRING MECHANISM	PERCUSSION	PERCUSSION
SIGHTS (BOTH MODELS)	FRONT	RETICLE GRADUATED IN 25-METER RANGE INCREMENTS.
	REAR	PEEPSIGHT WHICH ADJUSTS AUTOMATICALLY TO TEMPERATURE CHANGE.





# READY



TARGET



# AIM

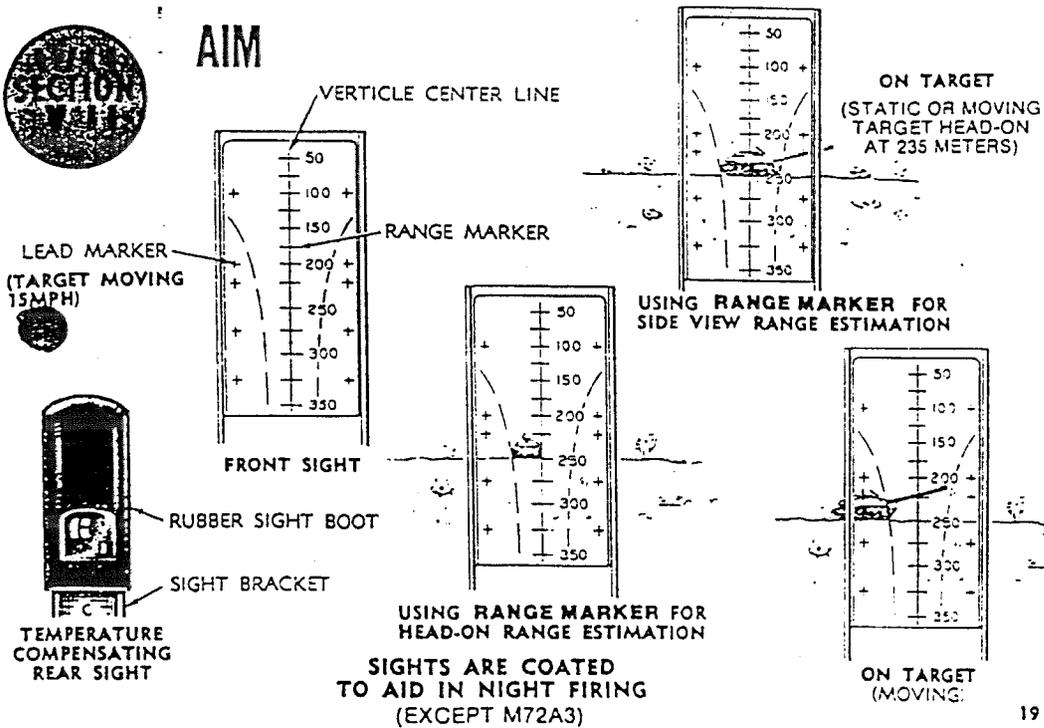


Table 4-3. Radioactive Contamination Guides

Contaminated Items and Indications for Actions	Fixed or Removable	Contamination Level				Method of Measurement
		Alpha		Beta-gamma <sup>1</sup>		
		dpm per 100 cm <sup>2</sup>	dpm per 100 cm <sup>2</sup>	mrad/hr @ 1 In.	dpm per 100 cm <sup>2</sup>	
1. Clothing, including shoes:						
a. Personal. Should be replaced, decontaminated, or stored for decay if above.	F	200		.05		Probe
b. Anticontamination. <sup>2</sup>	R		None		None	Smear <sup>3</sup>
(1) General. Should be replaced and/or decontaminated if above.	F	1000		0.2		Probe
(2) Respirators. Should be decontaminated or replaced after use, if above.	R		200		1000	Smear <sup>3</sup>
2. Containers. Before nonradioactive use, should be decontaminated if above.	F	200		1.0 <sup>4</sup>		Probe
3. Work Areas and Equipment. <sup>5 6</sup>	R		None		None	Smear <sup>3</sup>
a. Uncontrolled. Requires decontamination if above.	F	200		0.2		Probe
b. Controlled:	R		None		100	Smear <sup>3</sup>
(1) Areas.	F	1000		0.05		Probe
(2) Hoods.	R		100		100	Smear <sup>3</sup>
(3) Glove Boxes.	F	1000		0.02		Probe
(4) Workbench Surface.	R		200		400	Smear <sup>3</sup>
(5) Other Equipment Items.	F	1000		2.0		Probe
4. Skin:	R		200		2000	Smear <sup>3</sup>
a. Body. Continue decontamination if above.	F	5000		2.5		Probe
b. Hands. Continue decontamination if above.	R		1000		5000	Smear <sup>3</sup>
	F	1000		2.00		Probe
	R		2000		400	Smear <sup>3</sup>
	F	1000		2.00		Probe
	R		200		2000	Smear <sup>3</sup>
	F	200		0.06		Probe
	R		None		None	Smear <sup>3</sup>
	F	400		0.06		Probe
	R		None		None	Smear <sup>3</sup>

<sup>1</sup> Measured through not more than 7 milligrams per square centimeter of total absorber and averaged not more than 1 square meter.

F Fixed

R Removable

<sup>2</sup> Contaminated clothing should be released to a licensed laundry only.

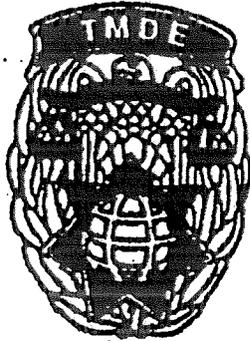
<sup>3</sup> Smears analyzed with a calibrated counting system.

<sup>4</sup> In contact with any surface of the mask.

<sup>5</sup> For natural uranium, U-depleted, and U-238; levels for alpha contamination should be increased by a factor of 5 (according to NRC guidelines).

<sup>6</sup> If Radium-226 is a contaminant, levels for alpha contamination should be reduced by a factor of 2.

# U.S. ARMY TMDE ACTIVITY



Radiation Standards and  
Dosimetry Lab  
Nucleonics Section

ATTN: AMXTM-SR  
Redstone Arsenal, Al 35898-5400

Steve Rogers  
Senior Physicist  
DSN 788-8597  
Com (205) 842-8597

Paul Pittman  
Senior Technician  
DSN 746-7666  
Com (205) 876-7666

DATA FAX Number: DSN 746-7611 Commercial (205) 876-7611

	Name	Telephone Number
From: AASAI- TMDE- SR	STEVE ROGERS	SEE ABOVE
To: AASIO- DMW	GARY BACKROF	PHONE DSN 788-2789 FAX DSN 793-2788
# Pages 8 + HDR	Remarks:	

GARY - HOPE THIS WILL SUFFICE.

3 February 1997

MEMORANDUM FOR Commander, Industrial Operations Command, ATTN:  
AMSIO-DMW (Gary Backrop), Rock Island, IL  
61299-6000

SUBJECT: Calibration of Survey Meters

1. General guidance and procedures for U.S. Army TMDE Activity calibration of RADIAC instrumentation may be found in TB 9-6665-285-15, "Army Calibration Program for RADIAC Meters." For ACTIVE (day-to-day health and safety use) survey meters, two calibration points per scale are provided, the higher point at 75 to 80 percent of full scale and the lower at 20 to 25 percent of full scale. The tolerance at each point is +/- 10 percent of the standard's calculated value.
2. The Army's standard for gamma calibration is cesium-137. In this case, however, since the survey meters would be used to detect promethium-147, that isotope would be the calibration standard. Survey meter calibrations would be performed at the U.S. Army Primary Standards Laboratory Nucleonics section, Redstone Arsenal, AL. NRC license information is attached.
3. Point of contact is the undersigned, DSN 788-8597 or DSN 746-1943.

Encl



STEVE ROGERS  
Team Leader, Nucleonics Sctn



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W., SUITE 2900  
ATLANTA, GEORGIA 30323-0193

April 4, 1996

Department of the Army  
United States Army Missile Command  
ATTN: AMXTM-SR  
Radiation Standards and  
Dosimetry Laboratory  
Redstone Arsenal, AL 35898-5400

SUBJECT: TRANSMITTAL AND EXPLANATION OF MATERIALS LICENSE  
(REFERENCE CONTROL NO. 256410; DOCKET NO. 030-12630)

Gentlemen:

Enclosed is Amendment No. 17 to License No. 01-00126-16 issued in response to your letters dated April 2, 1996. Revisions to your license are printed in **BOLD** typeface. As stated in License Condition 18, you are not authorized to use the J.L. Shepherd Model 81-22T Irradiator until the facilities and equipment are constructed and installed as described in your application and letters listed in this condition. Please review this document carefully and be sure that you understand all of its provisions.

If you have questions about this letter or your license, please call me at (404) 331-0344.

Sincerely,

A handwritten signature in cursive script that reads "Jay L. Henson".

Jay L. Henson  
Materials License Reviewer  
Division of Nuclear Materials Safety

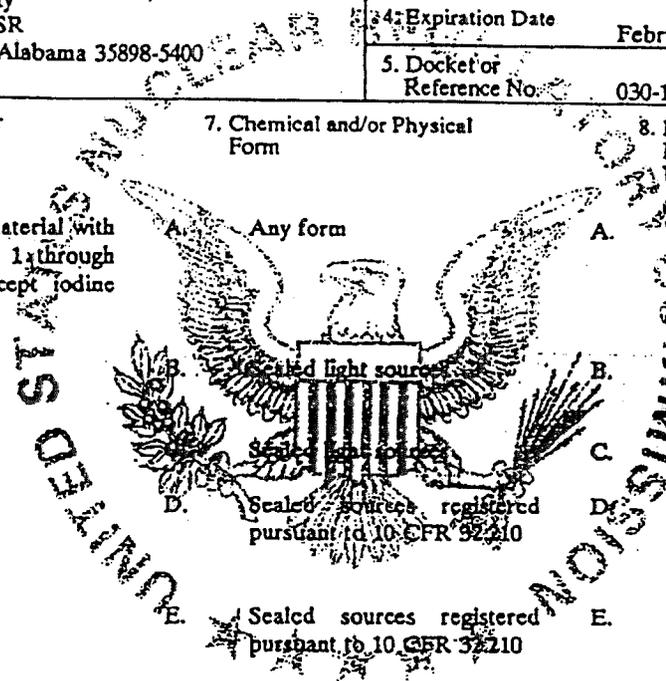
Enclosure: Amendment No. 17

MATERIALS LICENSE

Amendment No. 17

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with the letter dated April 2, 1996	
1. Department of the Army Director, U.S. Army Test, Measurement, and Diagnostic		3. License Number	01-00126-16
2. Equipment Activity ATTN: AMXTM-SR Redstone Arsenal, Alabama 35898-5400		is amended in its entirety to read as follows:	
		4. Expiration Date	February 28, 2002
		5. Docket or Reference No.	030-12630
6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License	
A. Any byproduct material with Atomic numbers 1 through 83, inclusive, except iodine 129	A. Any form	A. Not to exceed the quantities specified in 10 CFR 33.100, Schedule A, Column II	
B. Hydrogen 3	B. Sealed light source	B. Not to exceed 50 curies per source and 150 curies total	
C. Carbon 14	C. Sealed sources	C. 500 millicuries	
D. Cesium 137	D. Sealed sources registered pursuant to 10 CFR 32.210	D. One source not to exceed 2 curies and one source not to exceed 200 curies	
E. Cobalt 60	E. Sealed sources registered pursuant to 10 CFR 32.210	E. One source not to exceed 0.5 curies and one source not to exceed 50 curies	
F. Cesium 137	F. Sealed sources registered pursuant to 10 CFR 32.210	F. Three sources not to exceed 400 curies per source and three sources not to exceed 130 millicuries per source	
G. Americium 241	G. Any form	G. Not to exceed 10 microcuries per source and 25 microcuries total	
H. Nickel 63	H. Any form	H. Not to exceed 10 millicuries per source and 20 millicuries total	
I. Thorium 230	I. Any	I. 50 microcuries	



**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License Number	01-00126-16
Docket or Reference Number	030-12630
Amendment No. 17	

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
J. Thorium 228	J. Any	J. No single source to exceed 370 kBq (10 microcuries), nor 1.85 MBq (50 microcuries) total
K. Thorium 232	K. Any	K. No single source to exceed 370 kBq (10 microcuries), nor 1.85 MBq (50 microcuries) total
L. Depleted Uranium	L. Any	L. No single source to exceed 370 kBq (10 microcuries), nor 1.85 MBq (50 microcuries) total
M. Any licensed material	M. Analytical samples	M. Not applicable
N. Strontium 90	N. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	N. No single source to exceed 2.0 millicuries
O. Strontium 90	O. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	O. No single source to exceed 50.0 millicuries
P. Thallium 204	P. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	P. No single source to exceed 0.5 millicuries
Q. Promethium 147	Q. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	Q. No single source to exceed 14.0 millicuries
R. Curium 244	R. Sealed sources	R. No single source to exceed 37 kBq (1 microcurie), nor 370 kBq (10 microcuries) total
S. Strontium 90	S. Sealed sources (U.S. Nuclear Corporation Type 320)	S. No single source to exceed 13 GBq (35 millicuries), nor 13 GBq (350 millicuries) total

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License Number	01-00126-16
Docket or Reference Number	030-12630
Amendment No. 17	

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
T. Strontium 90	T. Sealed sources (Nuclear Chicago Model RG-31)	T. No single source to exceed 37 MBq (1 millicuries), nor 444 MBq (12 millicuries) total
U. Uranium	U. Natural uranium metal	U. 4 kilograms
V. Californium 252	V. Sealed sources (Amersham Model CVN series)	V. No single source to exceed 40 micrograms, nor 80 micrograms total
W. Cobalt 60	W. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	W. 37 TBq (1000 curies)
X. Cesium 137	X. Any sealed source registered pursuant to 10 CFR 32.210 and contained in a compatible device specified in Item 9 of this license.	X. 148 TBq (4000 curies)

9. Authorized Use:

- A. For possession and use in the calibration and testing of radiation detection systems, as counting standards, as check sources, and research and development purposes.
- B. and C. For possession and use in the evaluation and testing of self-luminous sources.
- D. and E. For possession and use in J. L. Shepherd Model 81-16Q quadruple source device to perform instrument calibration and research and development.
- F. For possession and use in three (3) J. L. Shepherd Model 89-400 shielded calibration ranges for instrument evaluation, calibration and research and development.
- G. through L. For possession and use as calibration or reference sources.
- M. For collection and analysis of leak test samples from Army radioactive commodities.
- N. through Q. For possession and use of sealed sources contained in a beta calibration range which has been registered pursuant 10 CFR 32.210 and distributed in accordance with an NRC or Agreement State License for use by persons named in Condition 12 for the calibration of radiation instrumentation and the irradiation of dosimeters.

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License Number

01-00126-16

Docket or Reference Number

030-12630

Amendment No. 17

## 9. Continued

- R. For possession and use in a Far West Technology, Inc. tissue equivalent proportional counter.
- S. For use in Model TS-784 A/PD Radiac Calibrators used for calibration of instruments and dosimeters.
- T. For use in Model AN/FJW-1 Radiation Detection and Alarm System and in Victoreen Model 712 Remote Area Monitoring Systems.
- U. For use as beta standards in the calibration of personnel dosimeters.
- V. For use in J. L. Shepherd Model 149 series neutron calibrator for calibration of dosimeters and radiation detection instruments.
- W. and X. For possession and use in J. L. Shepherd Model 81-22T Irradiator/calibrator.

## CONDITIONS

10. A. Licensed material may be used and stored only at Buildings 5435, 5437, and 5417, Redstone Arsenal, Alabama.
- B. Notwithstanding Item 10. A., the sources specified in Item 7. T. may also be used and stored at temporary job sites of the licensee anywhere in the United States.
- C. The sources specified in Items 7. W. and X. may only be used and stored in the J. L. Shepherd Model 81-22T irradiator/calibrator at Building 5417, Redstone Arsenal, Alabama.
11. The Radiation Protection Officer for the activities authorized by this license is Jerry D. Gray, or in his absence, Patrick J. Kuykendall, Stephen C. Rogers, William S. Harris, Jr., Gregory R. Komp, Paul O. Pittman, A. Edward Abney, or Steven V. Howard.
12. Licensed material shall be used by, or under the supervision of, William S. Harris, Jr., Patrick J. Kuykendall, Stephen C. Rogers, Jerry D. Gray, Gregory R. Komp and Paul O. Pittman, A. Edward Abney, Steven V. Howard, or individuals trained according to the application dated July 8, 1991 and the letter dated January 29, 1992. The licensee shall maintain records of individuals designated as authorized users and their qualifications.
13. A.(1) The source(s) specified in Item 7 shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.
- A.(2) Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License Number

01-00126-16

Docket or Reference Number

030-12630

Amendment No. 17

## CONDITIONS

Continued -

13. A.(3) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.
- B. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.
- C. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region II, Division of Radiation Safety and Safeguards, Nuclear Material Licensing Section, 101 Marietta Street, Suite 2900, Atlanta, Georgia 30323. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources containing licensed material shall not be opened by the licensee.
15. The licensee is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal in ordinary trash provided:
- A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.
- B. Before disposal as normal waste, radioactive waste shall be surveyed to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
16. The licensee shall maintain records of information important to safe and effective decommissioning at the location specified in Condition 10 in accordance with the provisions of 10 CFR 30.35(g) until this license is terminated by the Commission.
17. In addition to the possession limits in item 8, the licensee shall further restrict the possession of licensed material as follows:
- A. For unsealed sources to quantities less than  $10^4$  times the applicable limits in Appendix C, 10 CFR 20 as specified in 10 CFR 30.35(d) and
- B. For sealed sources, to quantities less than  $10^{10}$  times the applicable limits in Appendix C, 10 CFR 20 as specified in 10 CFR 30.35(d).

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License Number	01-00126-16
Docket or Reference Number	030-12630
Amendment No. 17	

CONDITIONS

Continued -

18. The licensee may not use the materials authorized in Item 6. W. and X. until:
- A. The licensee has constructed the facilities and obtained and installed the equipment associated with the use of the J.L. Shepherd Model 81-22T Irradiator as described in the application dated December 15, 1994, and the letters dated April 20, 1995, February 2, 1996, and April 2, 1996, and supporting documentation; and
  - B. The licensee has notified the U.S. Nuclear Regulatory Commission, Region II, ATTN: Chief, Nuclear Materials Licensing and Inspection Branch 2, 101 Marietta Street NW, Suite 2900, Atlanta, Georgia 30323-0199, in writing, that the activities authorized by Item 9. W. and X. will be initiated.
19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application date July 8, 1991
  - B. Letter dated January 29, 1992
  - C. Letter dated February 8, 1993 [Modification of possession limits, new beta calibration range]
  - D. Letter dated June 4, 1993 [Supplemental information]
  - E. Application dated April 13, 1994 [Additional sources]
  - F. Application dated December 15, 1994 [Additional sources and device]
  - G. Letter dated February 23, 1995 [Request to delete panoramic irradiator from amendment]
  - H. Letter dated September 12, 1995 [Request to add sources and panoramic irradiator for storage only]
  - I. Facsimile (FAX) dated September 19, 1995 [Request to add Californium 252 source]
  - J. Letter dated April 20, 1995 [Additional information on irradiator/calibrator installation]
  - K. February 2, 1996 [Retraction of exemption request and commitment to test control circuits and interlocks]
  - L. Letter dated April 2, 1996 [Request to change RSO]
  - M. Letter dated April 2, 1996 [Commitment to install required irradiator controls]

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

JAY L. HENSON

DATE 4/2 11 1996

BY

*Jay L. Henson*

Region II, Nuclear Materials Licensing Section  
101 Marietta Street, N.W., Suite 2900  
Atlanta, GA 30323-0199

N:\MLICENSE\01-00126.A17

Author: "Lowman; Richard" <rLOWMAN@NOCLANT.NAVY.MIL> at SMTP-DDN  
Date: 3/25/97 5:13 PM  
Priority: Normal  
BCC: GBUCKROP at ri3505s1  
TO: GBUCKROP@RIA-EMH2.ARMY.MIL at SMTP-DDN  
CC: KCROOKS@RIA-EMH2.ARMY.MIL at SMTP-DDN  
Subject: Army Response Letter To NRC

Reply to the message of Monday March 24, 1997 14:42 -0500  
-----

Gary

Recommend the following for NAVY/USMC calibration:

The Navy RADIAC Program is managed by Commander, Naval Sea Systems Command (SEA04R). The Marine Corps RADIAC Program is managed by Commander, Marine Corps Systems Command (Code CSLE). Under the authority of the Navy Master Materials License, 45-23465-01NA, there are presently seventeen Navy and three Marine Corps activities, worldwide, which calibrate all Navy and Marine Corps RADIACS. Each of the twenty calibration activities are authorized to possess and use appropriate calibration sources, under the auspices of individual Navy Radioactive Materials Permits, to conduct standardized calibration of RADIACS.

Dick

Encl 10

Author: manning\_l@msa04.brooks.af.mil at SMTP-DDN  
Date: 3/26/97 11:07 AM  
Priority: Normal  
BCC: GBUCKROP at ri3505s1  
TO: <gbuckrop@ria-emh2.army.mil> at SMTP-DDN  
Subject: laws

The USAF Radioisotope Committee requires that all radiation detection and measurement equipment, used for the purpose of determining compliance with the requirements of Title 10 Code of Federal Regulations, be calibrated by an organization authorized by an Air Force or Navy radioactive materials permit, or a Nuclear Regulatory Commission or Agreement State license to perform such activities.

JOSEPH J. DONNELLY, Lt Col, USAF, BSC  
Chief, USAF Radioisotope Committee Secretariat  
Office of the Surgeon General

Encl 11



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION III  
801 WARRENVILLE ROAD  
LISLE, ILLINOIS 60532-4351

JAN 0 8 1997

Thomas F. Springer  
Colonel, GS  
Chief of Staff  
Department of the Army  
U.S. Army Armament, Munitions  
and Chemical Command  
Rock Island, IL 61299-6000

Dear Colonel Springer:

We have reviewed your application dated March 28, 1995 requesting renewal of NRC License Number 12-00722-07 and find that we will need additional information as follows:

1. Radioactive Material

Specify a total possession limit for your license. As described in 10 CFR Part 30, Section 30.35, financial assurance is required if your license will authorize greater than 100,000 curies of promethium-147 in sealed form. Enclosed is Regulatory Guide 3.66 which describes acceptable format and content of financial assurance mechanisms.

2. Authorized Use

From a review of your application it appears that the purpose of use of the sources will be for the receipt back of used LAW rockets and the removal of sights containing promethium-147, followed by storage and final disposition. Please confirm and/or clarify.

3. Physical Inventory

Describe how each of the depots and the headquarters office conducts physical inventory of sources they have in their possession, frequency of conduct of inventory, and methodology for reporting results to the headquarters (HQ) office. Provide a current status of inventory for each depot and HQ, both in the form of unused rockets and sights removed from rockets that are in storage.

4. Leak-Testing

Item 9.5 on page 3 of your application states that random leak testing of sources will be "performed whenever possible." Leak-testing of sealed sources must be conducted at specified intervals. Please modify your leak-testing frequency to a minimum of every 6 months. Also, specify the name and the license number of the independent laboratory that will analyze your smears.

5. Security of Material

- A. Confirm that sources are not stored with explosives (other than the LAW rocket itself), and are stored under lock and key at each depot and HQ.
- B. Describe placarding of secured storage locations and forms of security employed. Describe security training provided to individuals responsible for assuring sources are stored safely.

6. Audit Program

Each depot storing material should be audited on a periodic basis. Develop and submit an audit program conducted by HQ radiation safety staff. Audits should be conducted, at a minimum, on an annual basis. Audits should include, but not be limited to, a review of inventory records, interviews of responsible individuals at each depot, checks on security, HQ conduct of independent surveys, and written reports of findings and suggested corrective actions, etc.

7. Survey Program

Describe the type of surveys performed by each local Commander as referenced on page 4, Item 6.C.(2) of your application. Include type(s) of instruments used and action levels that require decommissioning, etc.

8. Instrumentation

Describe procedures and sources used for the calibration of survey meters. If meters are calibrated by an outside company, please provide their name and NRC or Agreement State License number to verify they are licensed to provide the service.

9. Waste Disposal

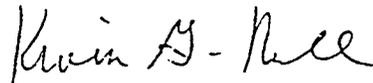
- A. Describe how promethium sights are removed from rockets, and submit a copy of your procedures for packaging and shipping sources back to depots or HQ for storage pending final disposition. Are sources ultimately returned to the manufacturer of the source? How long are they in storage before they are sent back, or does the Army ship used sources directly to a final disposal site, e.g. Barnwell? Please note that unless you do not have access to a final disposal site, storage of material for long-term decay is not considered acceptable to the NRC. Storage of radioactive material for decay at this time is only applicable to material with half lives of 120 days or less. Please address these issues.

- B. On page 5 of your application reference is made to "burial site criteria" and "land burial." Please note that unless specifically authorized pursuant to 10 CFR 20, Section 20.2002, burial of material as a means of disposal is not acceptable. Please confirm that you are not burying radioactive waste. Furthermore, please indicate if you have buried material in the past, and if so, identify each location, date of burial, and quantity and type of radioactive material buried.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 98359.

If you have any questions or require clarification on any of the information stated above, you may contact us at (630) 829-9887.

Sincerely,



Kevin G. Null  
Nuclear Materials Licensing Branch

License No. 12-00722-07  
Docket No. 030-14796

Enclosures: 1. 10 CFR Parts 20 & 30  
2. Regulatory Guide 3.66

April 4, 1995

Department of the Army  
U.S. Armament Munitions and  
Chemical Command  
ATTN: Kelly Crooks  
Radiation Safety Officer  
Rock Island, IL 51299-6000

SUBJECT: LICENSE RENEWAL APPLICATION

Dear Ms. Crooks:

This is to acknowledge receipt of your application for renewal of the material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding the renewal application should reference the control number specified and your license number.

Sincerely,

Original Signed By  
Marianne Meenan, Chief  
Nuclear Materials Support Section

License No.: 12-00722-07  
Control No.: 398359

DOCUMENT NAME: M:\03014796.DT5

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	DRSS/RIII								
NAME	MMEENAN:jaw								
DATE	04/ /05								

OFFICIAL RECORD COPY

DT

29 MAR 1995

Rec'd  
by

Safety Office

Administrator  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Dear Sir:

Request renewal of By-product Material License 12-00722-07, issued to the U.S. Army Armament, Munitions and Chemical Command, for the possession and use of promethium-147 on the front sight of the light antitank weapon system. Application is enclosed.

The license remains the same with respect to how the radioactive material is used. License changes are administrative only. These changes are explained in the following paragraphs.

The Executive Summary now states that a request for license termination will be made in the future, based on the relatively short half-life of promethium-147 and the length of time since the sight units were attached to the rest of the weapon system.

The following are newly designated: Mr. Glenn Leach as License Manager, Mr. Kelly Crooks as Radiation Safety Officer, and Mr. Gary Buckrop as Alternate Radiation Safety Officer. Their resumes are included in the application.

Enclosure 5 to the application, Description of Radiation Safety Program for U.S. Army Armament, Munitions and Chemical Command Commodities, has been updated to reflect organizational changes.

This license renewal action has been coordinated with and approved by Mr. John Manfre, U.S. Army Materiel Command Safety Office; his telephone number is (703) 274-9340.

The points of contact are Mr. Gary Buckrop,  
(309) 782-2969, Mr. Kelly Crooks, (309) 782-0338, and  
Mr. Glenn Leach, (309) 782-2989.

Sincerely,

~~SIGNED~~

Thomas F. Springer  
Colonel, GS  
Chief of Staff

Enclosure

Copy Furnished (without enclosure):

Commander, U.S. Army Materiel Command, Attention:  
AMCSF-P, 5001 Eisenhower Avenue, Alexandria,  
VA 22333-0001  
AMSMC-DS

(10-94)  
10 CFR 30, 32, 33  
34, 35, 36, 39 and 40

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 9 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. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

### APPLICATION FOR MATERIAL LICENSE

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

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

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

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

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 18406-1415

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

NUCLEAR MATERIALS LICENSING SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION II  
101 MARIETTA STREET, NW, SUITE 2900  
ATLANTA, GA 30323-0199

IF YOU ARE LOCATED IN:

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

MATERIALS LICENSING SECTION  
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 BML12-00722-07

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

Commander, U.S. Army Armament, Munitions and Chemical Command  
ATTN: AMSMC-RW  
Rock Island, IL 61299-6000

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

U.S. Department of Defense job sites worldwide

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.

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

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

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

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE 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.

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

THOMAS F. SPRINGER  
Colonel, GS, Chief of Staff

SIGNATURE

DATE

28 MAR 95

#### FOR NRC USE ONLY

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

NRC LICENSE FORM 313  
SUPPLEMENTAL INFORMATION

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ITEM 6	PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED	1
ITEM 7	INDIVIDUALS RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE	1
ITEM 8	TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS	2
ITEM 9	FACILITIES AND EQUIPMENT	3
ITEM 10	RADIATION PROTECTION PROGRAM	4
ITEM 11	WASTE MANAGEMENT	5
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Enclosure 2	Safety Evaluations and Results	
Enclosure 3	Device Drawings	
Enclosure 4	Resumes	
Enclosure 5	Description of Radiation Safety Program for U.S. Army Armament, Munitions and Chemical Command (AMCCOM) Commodities	
APPENDIX A	RECORD OF ENVIRONMENTAL CONSIDERATION	

## EXECUTIVE SUMMARY

Headquarters, U.S. Army Armament, Munitions and Chemical Command (HQ, AMCCOM), submits the following application for renewal of BML 12-00722-07. This license covers the possession and use of promethium-147 (Pm-147) for use in the front sight of the M72 series light antitank weapon (LAW) system.

Although no additional LAW sights containing Pm-147 are being procured, request renewal of the license to cover those fielded items which have not been turned in for disposal.

It is anticipated that termination of this license will be requested in approximately 5 years. At that time, the Pm-147 used in LAW sight units will have decayed below the license exempt quantity of 10 microcuries as stated in 10 CFR 30.18 and 30.71, schedule B. This determination will be made due to the half-life (2.62 years) of Pm-147, the small amount of Pm-147 originally used in the LAW sight (3 millicuries), and the date the last of these sights were attached to the LAW launcher tube (1979).

This renewal application contains essentially the same information as the original and its subsequent amendments. The only changes are:

a. Updated information in the enclosure titled "Description of Radiation Safety Program for U.S. Army Armament, Munitions and Chemical Command (AMCCOM) Commodities".

b. New designations for the License Manager, Radiation Safety Officer, and Alternate Radiation Safety Officer.

Item 5. Radioactive Material.

- a. Element and mass number: Promethium-147 (Pm147).
- b. Chemical and physical form: The Pm147 ceramic microspheres (3M Company) are laminated into the transparent plastic sights of the M72A1 and M72A2 Light Antitank Weapon (LAW) rocket systems. Drawings of the source configurations are at enclosure 1.
- c. Maximum amount which will be possessed at any one time: No single source to exceed 3 millicuries. One source per rocket.

Item 6. Purpose for which Licenses Material will be Used.

1. Purpose.

The Pm147 is locked in inert spherical ceramic microspheres with diameters ranging from 5-60 microns. These spheres are soluble to less than 0.1 percent and are mixed with a self-luminous paint. The front sight of the LAW is painted with the promethium self-luminous paint and appears as described in Government drawings and specifications contained at enclosure 3. These sources are used to illuminate the front sight of the M72A1 and M72A2 versions of the LAW rocket.

2. Inventories.

Physical inventories and individual records for the radioactive items covered by this license are not centrally maintained by this Command. Accountability is maintained by each individual installation Accountable Property Officer for the radioactive items involved.

Item 7. Individuals Responsible for Radiation Safety Program and their Training and Experience.

Mr. Glenn S. Leach, Chief, AMCCOM, Safety Office, is designated as License Manager. Mr. Kelly Crooks, AMCCOM Senior Health Physicist, is the Radiation Safety Officer (RSO). Mr. Gary Buckrop, AMCCOM Health Physicist, is the Alternate Radiation Safety Officer (ARSO).

Resumes are at enclosure 4.

Item 8. Training for Individuals Working in or Frequenting Restricted Areas.

1. Users of AMCCOM radioactive devices are provided with published technical manuals. These publications apprise the user of the presence of radioactive material and specify precautions that must be taken. This information is sufficiently broad in scope to cover the use of the device throughout its entire life cycle.

2. The user installations within the Department of Defense authorized to possess and use the LAW systems containing radioactive sights will have either an appointed Chemical, Biological, Radiological Officer (CBR), Radiation Safety Officer, or an accountable individual to ensure local compliance with the requirements of this license.

3. The RSOs at depots should have, as a minimum, 80 hours formal training in the following areas:

- a. Principles and Practices of Radiation Protection.
- b. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments.
- c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity.
- d. Biological Effects of Radiation.

Successful completion of U.S. Army Radiological Safety Course (7K-F3) at Fort McClellan satisfies this requirement. Alternate training must be evaluated and approved by the AMCCOM RSO.

Item 9. Facilities and Equipment.

1. The LAW rocket is a single shot weapon and once fired is considered expendable. Although maintenance may be required on the system, any maintenance on the radioactive sight is strictly prohibited. After the weapon has been fired or if any damage occurs to the sight, the sight will be removed and disposed as radioactive waste.

2. All depot storage operations and procedures will be conducted under the supervision of the installation RSO or his designate. The RSO will have the authority to immediately halt operations if he feels a safety hazard is present. The following installations are currently designated as depot storage facilities:

- Anniston Army Depot  
Anniston, AL
- Lexington-Blue Grass Army Depot Activity  
Lexington, KY
- Letterkenny Army Depot  
Chambersburg, PA
- Pueblo Army Depot  
Pueblo, CO
- Red River Army Depot  
Texarkana, TX
- Seneca Army Depot  
Romulus, NY
- Sierra Army Depot  
Herlong, CA
- Tooele Army Depot  
Tooele, UT

3. Each depot storage area will be placarded to indicate the presence of radioactive material.

4. Individual users do not require radiac instrumentation due to the low level of radiation (less than 0.03 mR/hr) emitted from each sight. Depots possess, as a minimum, beta-gamma radiation detection instruments capable of detecting Promethium-147.

5. Random leak testing at depots will be performed whenever possible. Due to the configuration of the source in the weapon, this can only be done after the LAW has been fired. The samples will be taken by the depot RSO and forwarded to an independent testing laboratory for analysis.

Item 10. Radiation Protection Program.

a. The HQ, AMCCOM Radiation Protection Program is at enclosure 6.

b. Department of Defense User Installations Organizational Responsibilities.

(1) Users of items containing promethium illumination devices are required to utilize and maintain each device in accordance with military regulations and technical manuals issued.

(2) Tampering with the sight in the field is prohibited by Federal Law. If a sight is crushed or broken, the user will notify the local Radiation Protection Officer and those damaged sights will be disposed as radioactive waste.

c. U.S. Army Depot Storage Installations Organizational Responsibilities.

Local Commanders at Depot Storage Installations will be responsible for:

(1) Ensuring that radiation safety efforts at bulk storage locations conform with the requirements of this license, military regulations and NRC Title 10 CFR.

(2) Ensuring depot storage areas are surveyed quarterly. Results will be furnished to the AMCCOM RSO immediately upon the discovery of any abnormal condition or upon request. Records of surveys will be kept available for NRC inspection teams.

(3) Ensuring that inventory and computer records of radioactive material at their installation is accurate and up-to-date.

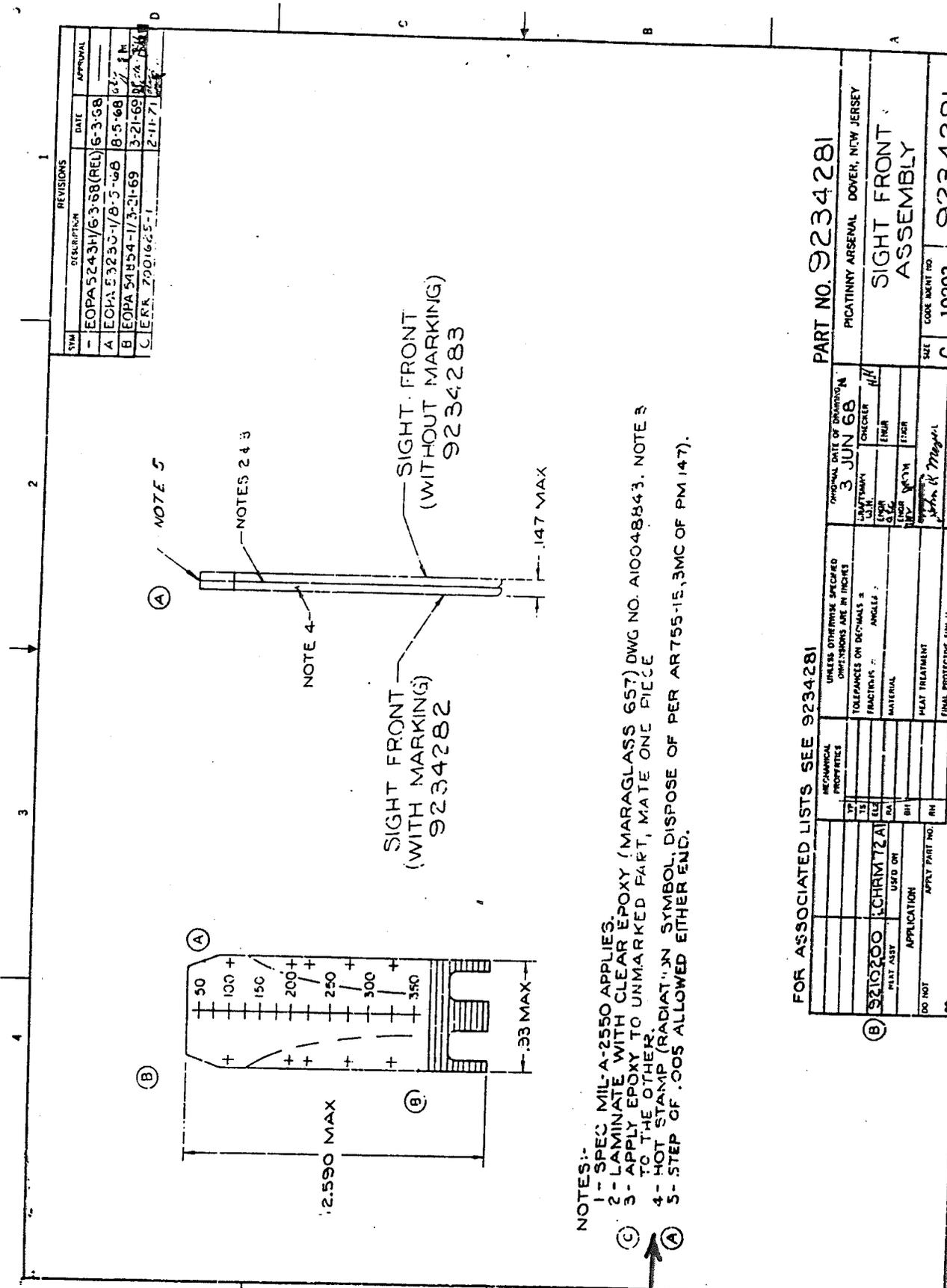
Item 11. Waste Management.

1. Radioactive waste generated by military users is disposed of in accordance with current NRC and Department of Transportation (DOT) regulations. Currently, this headquarters is the program manager and issues instructions to all military users on proper packaging and marking of shipments of radioactive waste. This headquarters also conducts on-site audits of prospective radioactive waste shipments. The shipments are audited for full compliance with DOT, NRC and burial site criteria.

2. Unwanted devices containing promethium sources covered by this license will be packaged in containers acceptable to a commercial burial site for land burial. These containers will be shipped in accordance with DOT and NRC regulations.

ENCLOSURE 1  
SOURCE DRAWINGS

REVISIONS		
SYM	DESCRIPTION	DATE
-	EOPA 5243H/6368(REL)	6-3-68
A	EOPA 5323G-1/B.5-68	8-5-68
B	EOPA 54R54-1/3-21-69	3-21-69
C	EOPA 7001625-1	2-11-71

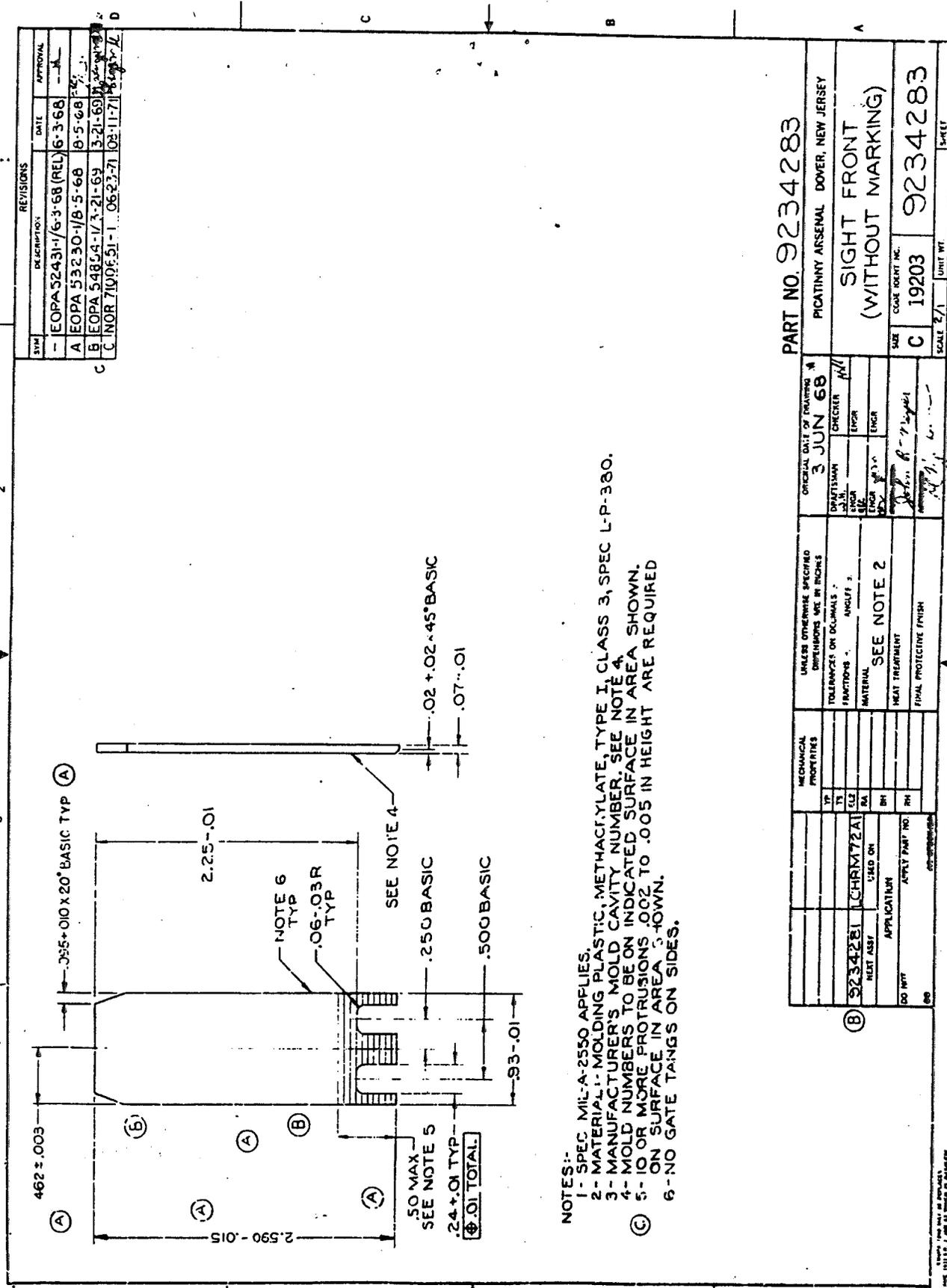


NOTES:-  
 1- SPEC MIL-A-2550 APPLIES.  
 2- LAMINATE WITH CLEAR EPOXY (MARAGLASS 657) DWG NO. A10048843. NOTE 3  
 3- APPLY EPOXY TO UNMARKED PART, MATE ONE PIECE TO THE OTHER.  
 4- HOT STAMP (RADIATION SYMBOL, DISPOSE OF PER ART55-1E, 3MC OF PM 147).  
 5- STEP OF .005 ALLOWED EITHER END.

PART NO. 9234281	
PICATINNY ARSENAL DOVER, NEW JERSEY	
SIGHT FRONT ASSEMBLY	
SIZE	CODE IDENT NO.
C	19203
9234281	

FOR ASSOCIATED LISTS SEE 9234281	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	ORIGINAL DATE OF DRAWING 3 JUN 68
MECHANICAL PROPERTIES	DESIGNER
TOLERANCES ON DIMENSIONS	U.S.M.
FRACTIONS ON DIMENSIONS	ENGR
ANGLES	ETCH
MATERIAL	NEW YORK
HEAT TREATMENT	APPROVED BY
FINAL PROTECTIVE FINISH	DATE
MECHANICAL PROPERTIES	APPLY PART NO.
TEMP	APPLY PART NO.
STRENGTH	APPLY PART NO.
ELONGATION	APPLY PART NO.
MODULUS	APPLY PART NO.
POISSON'S RATIO	APPLY PART NO.
IMPACT	APPLY PART NO.
WELDING	APPLY PART NO.
SPALL RESISTANCE	APPLY PART NO.
COMPRESSION	APPLY PART NO.
TENSILE	APPLY PART NO.
TEAR	APPLY PART NO.
STRETCH	APPLY PART NO.
RESILIENCE	APPLY PART NO.
SHOCK RESISTANCE	APPLY PART NO.
WEAR	APPLY PART NO.
SCOUR	APPLY PART NO.
CRACK RESISTANCE	APPLY PART NO.
DISINTEGRATION	APPLY PART NO.
SPALL RESISTANCE	APPLY PART NO.
WEAR	APPLY PART NO.
SCOUR	APPLY PART NO.
CRACK RESISTANCE	APPLY PART NO.
DISINTEGRATION	APPLY PART NO.





REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	EOPA 52431-1/6-3-68 (REL)	6-3-68	
A	EOPA 53230-1/8-5-68	8-5-68	
B	EOPA 54854-1/3-21-69	3-21-69	
C	INOR 7100651-1 0623-71	02-11-71	

- NOTES:-
- 1- SPEC MIL-A-2550 APPLIES.
  - 2- MATERIAL- MOLDING PLASTIC, METHACRYLATE, TYPE I, CLASS 3, SPEC L-P-380.
  - 3- MATERIAL- MOLDING PLASTIC, METHACRYLATE, TYPE I, CLASS 3, SPEC L-P-380.
  - 4- MANUFACTURER'S MOLD CAVITY NUMBER, SEE NOTE 4.
  - 5- MOLD NUMBERS TO BE ON INDICATED SURFACE IN AREA SHOWN.
  - 6- NO GATE TANGS ON SIDES.

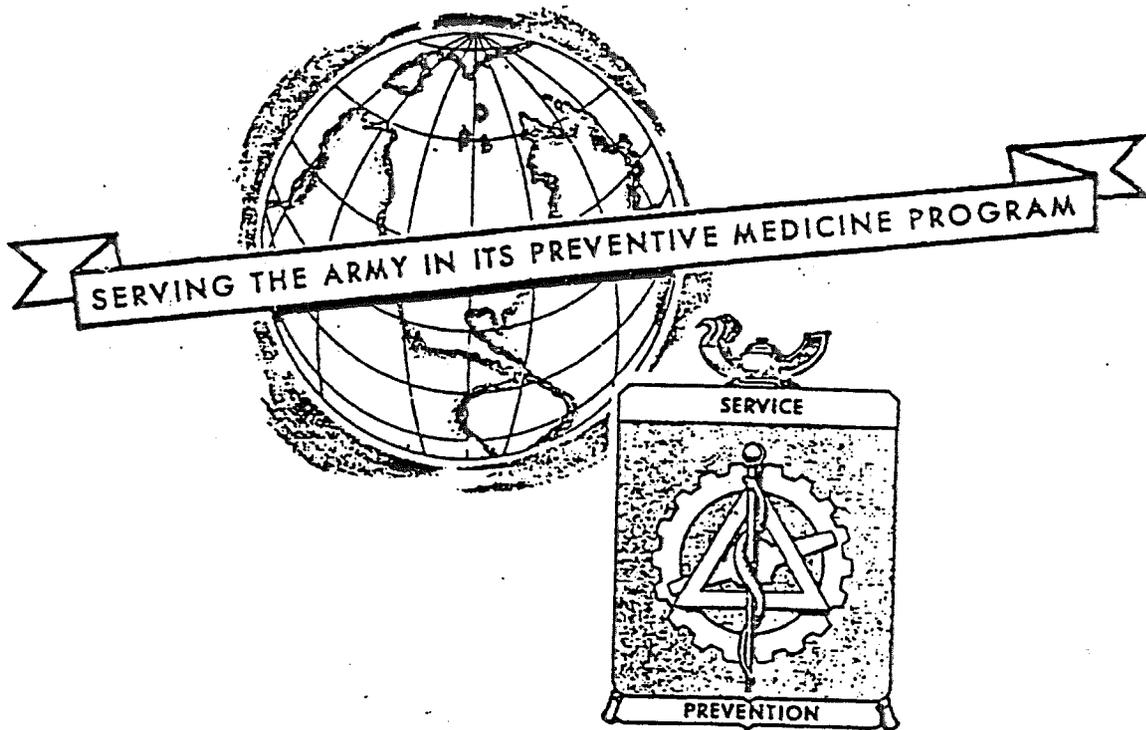
PART NO. 9234283

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ORIGINAL DATE OF DRAWING	PICATINNY ARSENAL DOVER, NEW JERSEY
TOLERANCES ON DIMENSIONS		3 JUN 68	
FUNCTIONS		DRAWN	
MATERIAL		CHECKER	
HEAT TREATMENT		INSP	
FINAL PROTECTIVE FINISH		ENGR	
MECHANICAL PROPERTIES		APPROVED	
TEMP		DATE	
TENSILE		BY	
YIELD		BY	
ELONGATION		BY	
HARDNESS		BY	
PART NO.		APPLY PART NO.	
9234281 (CHRM72A)		9234283	
HEAT ASSY		HEAT ASSY	
APPLICATION		APPLICATION	
DO NOT		DO NOT	
END		END	
SCALE 2/1		UNIT WT	
C		9234283	
COGE DEPT INC.		SHEET	
19203		117	

ENCLOSURE 2

SAFETY EVALUATIONS AND RESULTS

RADIOLOGICAL HYGIENE SPECIAL STUDY NO. 5365R27-67, PART II  
EVALUATION OF MATERIAL  
FRONT SIGHT OF LAW MISSILE LAUNCHER  
CONTAINING PROMETHIUM-147  
5-13 December 1966



US ARMY  
ENVIRONMENTAL HYGIENE AGENCY  
EDGEWOOD ARSENAL, MD. 21010



DEPARTMENT OF THE ARMY  
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY  
EDGEWOOD ARSENAL, MARYLAND 21010

IN REPLY REFER TO:  
USAEHA-RB

1 FEB 1967

RADIOLOGICAL HYGIENE SPECIAL STUDY NO. 5365R27-67, PART II  
EVALUATION OF MATERIAL  
FRONT SIGHT OF LAW MISSILE LAUNCHER  
CONTAINING PROMETHIUM-147  
5-13 December 1966

1. Introduction.

a. This study was performed under the provisions of Chapter V, AR 40-5 and FONECON, Colonel Redmond, Preventive Medicine Division, OTSG and Colonel Hilcken, USAEHA, 15 August 1966.

b. The purpose of this study was to determine the extent of removable promethium-147 contamination on the surfaces of the front sight of the LAW missile launcher and leakage from the sight, if any, and the potential hazard to user personnel.

c. Twenty-four, each, front sights for the LAW missile launcher were received from Mr. LaCosta, Warhead Division, US Army Munitions Command, Picatinny Arsenal, New Jersey. These 24 sights represent three different prototypes in which the promethium-activated phosphor was applied in three different configurations and in varying amounts of radioactive material.

d. The sights, manufactured by the 3-M Company, St Paul, Minnesota, are fabricated from a transparent plastic material. The luminous markings are laminated between two pieces of the plastic material. Each sight is 2-15/16"x1-3/8"x3/8" in size. The following is a description of the markings of each type of sight and USAEHA Laboratory Numbers:

(1) Luminous markings in the form of two crosses. Activity of promethium from 0.13 mCi to 3.0 mCi, USAEHA Laboratory Numbers FM-224 thru FM-231. FM-231 is mounted in a sight holder.

(2) Luminous markings in the form of two lines. Activity of promethium from 0.10 mCi to 3.0 mCi, USAEHA Laboratory Numbers FM-232 thru FM-239. FM-239 is mounted in a sight holder.

(3) Luminous marking in the form of two circles. Activity of promethium from 0.13 mCi to 3.0 mCi, USAEHA Laboratory Number FM-240 thru FM-247. FM-247 mounted in sight holder.

2. Procedures and Findings.

a. The surfaces of each sight were wiped with a Metrical filter

USAEHA-RB Radl Hyg Spec Study No. 5365R27-67, Part II, Eval of Material,  
Front Sight LAW Missile Launcher Containing Promethium-147,  
5-13 Dec 66

moistened with distilled water. The filter was then counted by liquid scintillation on a counter calibrated with a standard promethium-147 solution.

b. The sights, less the three mounted units, were placed in individual beakers, covered with distilled water, and allowed to stand at room temperature. After 24 hours, an aliquot of water was counted by liquid scintillation.

c. The beta-gamma activity emanating from the sights was measured on contact and at six inches with a side window Geiger counter with the beta window open.

d. Results of all tests are shown in Table 1.

### 3. Conclusions.

a. Removable contamination on these prototype sights is insignificant.

b. These sights, in their present condition do not present a hazard to user personnel.

### 4. Recommendations.

a. The sights should be visually checked after use to determine the integrity of the plastic.

b. The sights should be wipe-tested periodically during test period to determine if there is leakage of promethium with use.

c. Leaking or damaged sources should be disposed of in accordance with applicable regulations.

*Alphus L. Jones*  
ALPHUS L. JONES  
Chief, Bioassay Division

*Martin W. Herman*  
MARTIN W. HERMAN  
SFC E7, AMEDS

APPROVED:

*John A. Hilcken*  
JOHN A. HILCKEN  
Colonel, MSC  
Director, Radiation Services

USAEHA-RB Radl Hyg Spec Study No. 5365R27-67, Part II, Eval of Material,  
 Front Sight LAW Missile Launcher Containing Promethium-147  
 5-13 Dec 66

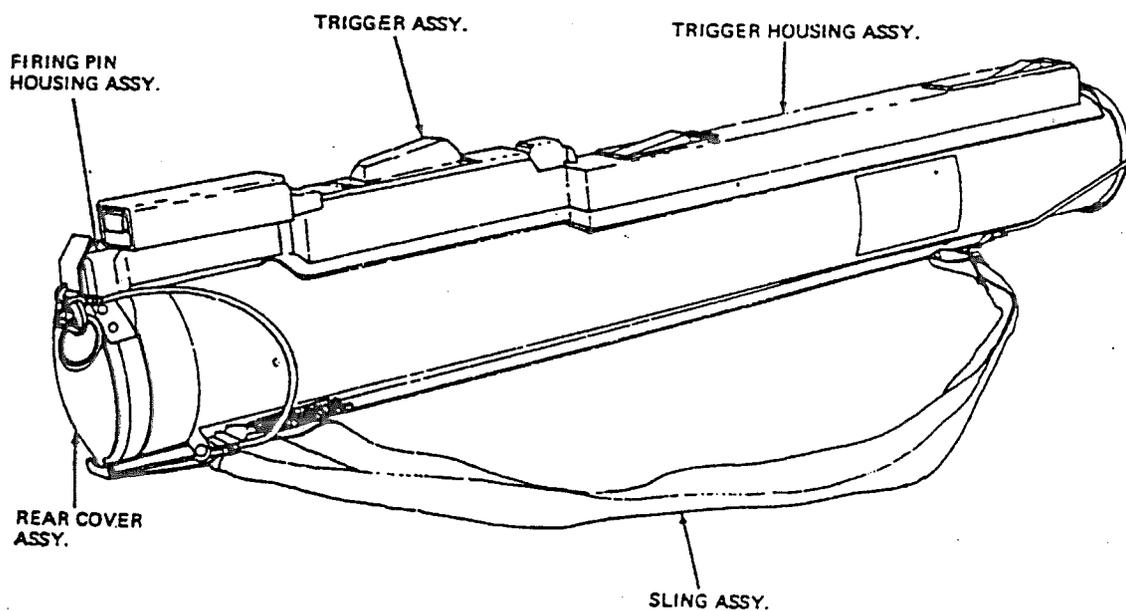
TABLE 1

RESULTS OF TESTS ON LAW MISSILE SIGHTS

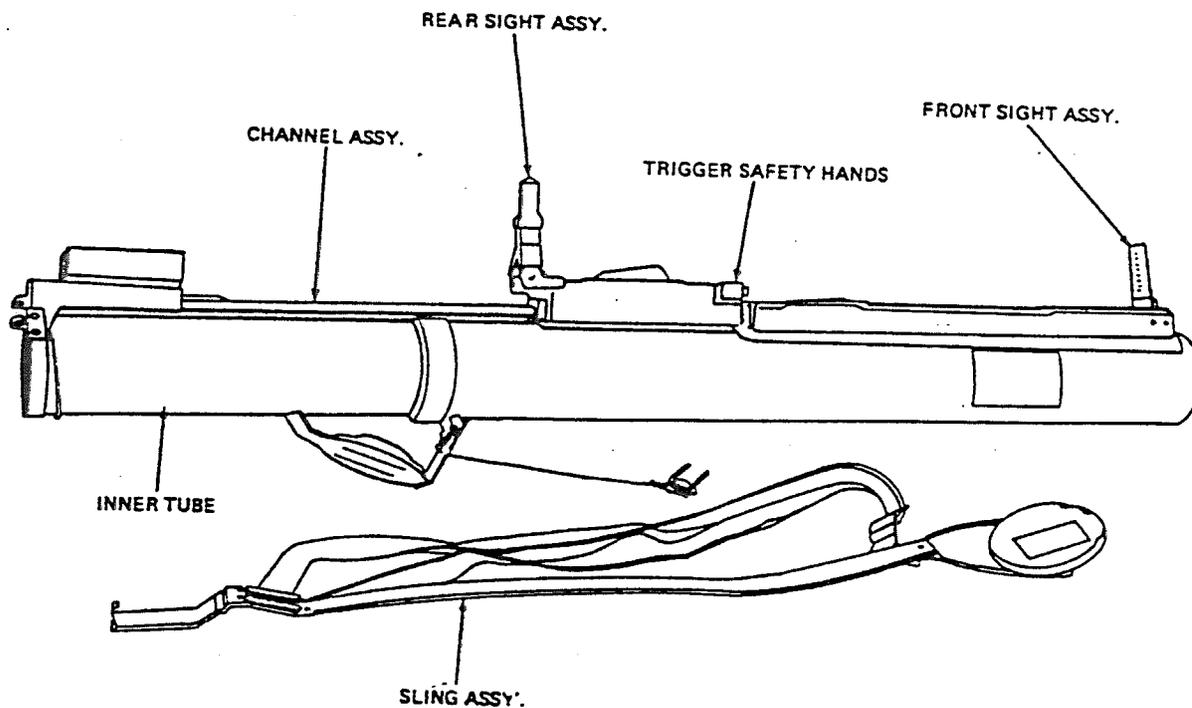
Lab No.	Activity Pm-147 mCi	Beta-Gamma Activity on contact mR/hr	Activity at 6" mR/hr	Wipe Test DPM	Submersion Test DPM
FM-224	0.13	0.11	0.05	15.8	331
FM-225	0.5	0.13	0.06	23.1	268
FM-226	0.5	0.10	0.06	11.5	211
FM-227	2.0	0.14	0.06	7.2	197
FM-228	2.5	1.0	0.05	11.9	239
FM-229	2.5	0.9	0.06	15.2	295
FM-230	2.5	1.1	0.06	56.9	254
FM-231	3.0	0.5	0.05	13.1	
FM-232	0.10	0.08	0.05	113	183
FM-233	0.10	0.08	0.05	91.7	331
FM-234	0.4	0.08	0.05	23.0	367
FM-235	2.0	0.5	0.05	156	204
FM-236	2.0	0.7	0.05	16.6	338
FM-237	2.0	0.8	0.06	66.6	218
FM-238	2.0	0.8	0.07	135	331
FM-239	3.0	0.5	0.06	13.1	
FM-240	0.13	0.15	0.06	99.4	176
FM-241	0.13	0.14	0.04	14.7	162
FM-242	0.5	0.12	0.04	69.7	443
FM-243	0.5	0.4	0.05	17.9	183
FM-244	2.5	2.5	0.07	51.6	225
FM-245	2.5	2.0	0.05	69.4	295
FM-246	2.5	2.5	0.08	40.3	281
FM-247	3.0	0.6	0.05	43.1	

**ENCLOSURE 3**  
**DEVICE DRAWINGS**

LIGHT ANTITANK WEAPON (LAW) SYSTEM M72 SERIES



ARD80-0504A



ARD80-0504B

ENCLOSURE 4

RESUMES

Resume of Training and Experience  
Glenn S. Leach  
Acting Chief, Safety Office, AMCCOM

1. General Educational Background:

Bachelor of Science, 1965, University of Illinois, Urbana, IL. Major: Zoology; Minor: Physics/Chemistry (Split minor).

2. Radiation Safety and Related Training:

a. Phase I, AMC Safety Intern Program, May 1965 - Dec 1965.  
US Army AMC Field Safety Agency, Charlestown, IN  
Nuclear Weapons Safety - 40 hours  
Industrial Health and Hygiene - 40 hours  
(Remainder industrial and explosives safety topics)

b. Radiological Safety (Correspondence Course)  
US Army Chemical Center and School,  
Ft. McClellan, AL  
Jan 1967

c. Basic Radiological Health (80 hours)  
National Center for Radiological Health  
US Public Health Service  
Rockville, MD  
April 1967

d. Occupational Radiation Protection (80 hours)  
National Center for Radiological Health  
US Public Health Service  
Rockville, MD  
Sept 1967

e. Standards for Protection Against Radiation (16 hours)  
R.E. Alexander Corp.  
Presented at Ft. Belvoir, VA  
September 1993

3. Experience with Radionuclides:

Performed basic analysis of tagged mitochondria while laboratory assistant, University of Illinois.

Handling of radioisotopes contained within military items of issue, including ammunition.

4. General Health Physics Background:

a. Served as assistant to the US Army Material Command chief health physicist, responding to license holders for virtually all radioisotopes incorporated into Army items of issue. Performed license management functions under the

direction of the senior health physicist. April 1967 through September 1969.

b. As Chief of the Industrial Safety Office, Kwajalein Missile Range, Marshall Islands, served as radiological protection officer for check sources and electron tubes and similar items.

c. Served as Acting Chief, Safety Office, AMCCOM, from July 1992 to present, with responsibility for supervision of health physicists assigned to the office.

Resume of Training and Experience  
 Kelly W. Crooks  
 AMCCOM Health Physicist

1. General Educational Background:

Bachelor of Science, 1982, University of Iowa, Iowa City, Iowa. Major: Civil Engineering

Graduate Study, 1983, University of Iowa; Civil Engineering.

2. Radiation Safety and Related Training:

Categories of Experience and Training:

- A. Principles and Practices of Radiation Protection.
- B. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments.
- C. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity.
- D. Biological Effects of Radiation.

<u>Category</u>	<u>Course</u>	<u>Duration</u>	<u>Completion</u>
C	Engineering Calculus 1-4, Differential Eqns, Statistics, Linear Algebra, Physics University of Iowa	30 credit hours	1978-82
A B C D	Industrial X-Ray and Gamma Radiation Protection Fort Belvoir, VA	40 hours	Aug 86
A B C D	Radioactive Material Shipping Regulatory Awareness Columbia, SC	40 hours	Nov 86
A C D	Laser Microwave Hazards Aberdeen Proving Ground, MD	40 hours	Apr 87
A B C D	Radiological Safety I U.S. Army Institute of Professional Development	13 hours	Oct 87
A B C D	Depleted Uranium Safety Fort Belvoir, VA	40 hours	Nov 87
A B C D	Radiological Safety Fort McClellan, AL	120 hours	Jan 88

<u>Category</u>	<u>Course</u>	<u>Duration</u>	<u>Completion</u>
A B D	Health Physics Instrumentation and Air Sampling Fort Belvoir, VA	40 hours	Apr 88
A	Radiation Protection Internal Review Fort Belvoir, VA	40 hours	Aug 88
A B C D	DOD Radioactive Waste Guidance Rock Island Arsenal, IL	40 hours	Apr 89
A B C D	Senior Officer Nuclear Accident Course Kirtland AFB, NM	40 hours	Jun 89
A B C D	Nuclear Accident/Incident Response Force Training Rock Island Arsenal, IL	40 hours	Apr 90
A D	OSHA Hazardous Materials Barnwell, SC	40 hours	Feb 92
A B C D	LLRW Packaging, Transportation and Disposal Las Vegas, NV	40 hours	May 92
A B C D	Applied Health Physics Oak Ridge, TN	200 hours	Apr 93
A B C D	LLRW Packaging, Transportation and Disposal Hilton Head, SC	40 hours	May 94

3. Experience with Radioisotopes:

Am241 Cs137 Soil density gauges, Alpha Testing, Dallas, TX, 1984-86

Am241 Co60 H3 Ni63 Pm147 Ra226 Th232 U238 Quality assurance testing, license management, packing and shipping of radioactive and mixed waste, and project management of radioactive and mixed waste remediations, U.S. Army Armament, Munitions and Chemical Command, Rock Island, IL, 1986-present

4. General Health Physics Background:

Health Physicist for Headquarters, U.S. Army Armament, Munitions and Chemical Command (AMCCOM), July 1986 to present. Includes advising Command Group on radiological safety matters; preparing Nuclear Regulatory Commission (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 U.S. Army regulations; providing certification and direction on the packaging, marking, labeling, and shipment of U.S. Army-generated radioactive waste for processing/storage/disposal; providing project management of remedial activities.

**Resume of Training and Experience**  
**Gary W. Buckrop**  
**AMCCOM Health Physicist**

1. General Educational Background:

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

2. Radiation Safety And Related Training

a. January 26 - February 15, 1994, U.S. Army Radiological  
Safety Course (7KF3) at the U.S. Army Chemical School, Fort  
McClellan, Alabama.

b. November 17 - 19, 1992, Basic Radiation Protection and  
Tritium Illumination Devices. This course was held at the Brady  
Street Holiday Inn, Davenport, Iowa, and presented by Health  
Physics Technical Services, Allied Technology Group, Inc.

c. January 1988 - April 1989, Ammunition Manager  
Internship at the U.S. Army Defense Ammunition Center and School,  
Savanna Army Depot, Illinois. This internship consisted of 19  
courses in the management of conventional ammunition and 1 course  
on Nuclear Weapons Familiarization.

3. Experience with Radionuclides

None.

4. General Health Physics Background

November 1992 - present. U.S. Army Armament, Munitions  
and Chemical Command, Safety Office, Rock Island, Illinois,  
Health Physicist. Worked on licensing and radiation safety  
issues mostly related to the Army's war reserve depleted uranium  
(U-238) ammunition stockpile.

**ENCLOSURE 5**

DESCRIPTION OF RADIATION SAFETY PROGRAM FOR  
U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND (AMCCOM)  
COMMODITIES

DESCRIPTION OF RADIATION SAFETY PROGRAM FOR  
U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND (AMCCOM)  
COMMODITIES

	Paragraph
Purpose .....	1
Applicability .....	2
Explanation of Terms .....	3
Policy .....	4
Responsibilities .....	5

1. Purpose.

This document describes the Ionizing Radiation Safety Program for AMCCOM radioactive commodities required by AR 385-11, 1 May 1980, Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety).

2. Applicability.

This document applies to the following elements of HQ, AMCCOM:

- Safety Office (AMSMC-SF)
- Office of the Command Surgeon (AMSMC-SG)
- Ammunition and Industrial Base Procurement Directorate (AMSMC-PA)
- Production Directorate (AMSMC-PD)
- Product Assurance and Test Directorate (AMSMC-QA)
- Weapon System Management Directorate (AMSMC-AS)
- Security Assistance Management Directorate (AMSMC-IL)
- Environmental Quality Directorate (AMSMC-EQ)
- Office of Counsel (AMSMC-GC)
- Defense Ammunition Directorate (AMSMC-DS)
- Transportation and Traffic Management Directorate (AMSMC-TM)
- Radioactive Waste Disposal Office (AMSMC-RW)

3. Explanation of Terms.

Definitions of technical terms in AR 385-11 will apply to this document.

4. Policy.

All AMCCOM directorates and organizations involved in the procurement, storage, distribution, and use of AMCCOM radioactive commodities will ensure Nuclear Regulatory Commission (NRC) license conditions and applicable Federal, State, and Army radiation safety requirements are met for AMCCOM radioactive commodities.

5. Responsibilities.

a. The Chief, Safety Office, HQ, AMCCOM, will:

(1) Exercise staff supervision of the AMCCOM Ionizing Radiation Safety Program.

(2) In coordination with the Procurement Directorate, Product Assurance and Test Directorate, and Production Directorate, prepare safety requirements to be included in the Procurement Work Directives, solicitations, and contracts for radioactive commodities.

(3) Incorporate safety-related instructions, cautions, and warnings, based on hazards involved and regulatory requirements, into technical literature.

b. The NRC License Manager will:

(1) Coordinate, obtain, administer, review, amend, and maintain necessary NRC licenses for radioactive commodities managed by AMCCOM.

(2) Provide information and guidance to the AMCCOM Commanding General (CG) with respect to limitations, constraints, and conditions which affect each radioactive commodity.

(3) Assure licensed material is not transferred to unauthorized persons or organizations.

(4) Chair the HQ, AMCCOM, Ionizing Radiation Control Committee (IRCC).

c. The HQ, AMCCOM, Radiological Protection Officer (RPO) will:

(1) Provide the CG, AMCCOM, the IRCC, and users of radioactive material with advice and assistance in all matters pertaining to radioactive commodities.

(2) Implement the radiation safety program for AMCCOM commodities.

(3) Review existing and proposed radiological operations and procedures, field reports, test results, and surveys to ensure compliance with radiation safety regulations.

(4) Ensure the required radiation surveys are performed. The accuracy of such surveys, if performed by others, remains the responsibility of the RPO.

(5) Act as the POC on all matters pertaining to the NRC license and conditions imposed by the license during the life cycle of radioactive commodities.

(6) Monitor the life cycle of radioactive commodities to ensure NRC license conditions are met.

(7) Initiate the action necessary to correct any deviation from license conditions and requirements of the NRC, Department of the Army, U.S. Army Materiel Command, and AMCCOM on radioactive materials.

(8) Provide technical support for the radioactive waste program.

d. The Command Surgeon, HQ, AMCCOM, will provide medical information concerning potential health hazards of ionizing radioactive material as used in AMCCOM commodities.

e. The Director, Defense Ammunition Directorate, HQ, AMCCOM, will:

(1) Ensure specific instructions on handling, storing, and disposal of radioactive commodities are incorporated in the technical publications and instructions to the field.

(2) Provide training, as required, to other Army agencies for maintenance, rebuild, and rework of AMCCOM radioactive commodities.

(3) Obtain concurrence of AMCCOM RPO on above actions.

(4) Maintain records of total quantities of radioactive commodities managed within the wholesale system, excluding level I and II managed items.

f. The Director, Ammunition and Industrial Base Procurement Directorate, HQ, AMCCOM, will:

(1) Ensure the contract for purchase of radioactive commodity is identified as a hazardous material contract. Ensure a preaward safety survey is performed.

(2) Ensure clauses for safety, transportation, and product assurance acceptance procedures are included in the solicitation.

(3) Ensure the technical data package (TDP) and the solicitation have been coordinated with AMSMC-SF.

g. The Radioactive Waste Disposal Office, HQ, AMCCOM, will:

(1) Administer and keep records of the Army radioactive waste program, including radioactive material, isotope, quantity, where generated, and where and when disposed.

(2) Obtain AMSMC-SF and AMSMC-TM concurrence prior to authorizing shipments of radioactive waste.

h. The Director, Product Assurance and Test Directorate, HQ, AMCCOM, will:

(1) Provide adequate and proper inspection and test requirements for AMCCOM radioactive commodities when involved in specifications and technical Quality Assurance Provisions (QAPs).

(2) Implement the specifications and technical QAPs for AMCCOM radioactive commodities throughout the life cycle.

(3) Ensure that during acceptance inspection, the Government inspector rejects the lot of material represented by the sample if any defect is encountered regarding the radioactive material.

(4) Implement a surveillance program for verification of the integrity of the radioactive material, both in use and storage, for the entire life cycle of the radioactive commodity, with analysis performed by an independent test laboratory.

(5) Make available to the AMCCOM RPO all records of testing, inspection, and pertinent information.

i. The Commanders of development organizations (U.S. Army Armament Research, Development and Engineering Center and U.S. Army Edgewood Research, Development and Engineering Center) will provide TDPs/drawings and will coordinate research and development activities with the AMCCOM RPO, for systems under their management, to ensure input is provided for timely preparation of the commodity NRC licenses.

j. The Director, Weapon System Management Directorate, HQ, AMCCOM, will:

(1) Coordinate and manage all activities for level II systems, as necessary, to ensure that input is provided to the AMCCOM RPO for timely preparation of NRC license applications.

(2) Provide guidance and assistance to the AMCCOM RPO regarding enforcement and compliance with NRC license conditions.

k. The Director, Security Assistance Management Directorate, HQ, AMCCOM, will staff all foreign military sales cases involving the sale of radioactive material through the AMCCOM RPO.

l. The Director, Environmental Quality Directorate, HQ, AMCCOM, will provide guidance in the development of environmental documentation for NRC license applications.

m. The Office of Counsel, HQ, AMCCOM, will provide legal interpretations and guidance for all matters pertaining to radioactive licensing.

n. The Director, Transportation and Traffic Management Directorate, HQ, AMCCOM, will provide guidance on all matters concerning transportation of radioactive commodities and radioactive waste.

APPENDIX A  
RECORD OF ENVIRONMENTAL CONSIDERATION

RECORD OF ENVIRONMENTAL CONSIDERATION

**PROJECT TITLE:** Renewal of Nuclear Regulatory Commission License Number BML12-00722-07.

**BRIEF DESCRIPTION:** Renewal of license BML12-00722-07 is required for the continued possession and use of the M72 series Light Anti-tank Weapon (LAW) system.

**ANTICIPATED DATE AND/OR DURATION OF PROPOSED ACTION:**  
Duration is April 1995 to April 2000.

**REASON FOR USING RECORD OF ENVIRONMENTAL CONSIDERATION:**

Is categorically excluded under the provisions of CX A-29, of AR 200-2, Environmental Effects of Army Actions, Appendix A, December 23, 1988, (and no extraordinary circumstances exist as defined in AR 200-2, paragraph 4-2) because the issuance of this license permits use of Department of Army property by Department of Defense personnel and is predicated upon compliance with the NEPA.

Signed Glenn S. Leach Date 3/23/95  
Glenn S. Leach  
Acting Chief AMCCOM Safety Office

Signed Robert J. Radkiewicz Date 3/24/95  
HQ AMCCOM Environmental  
Coordinator

RJR  
24 MAR 95