ITEM 5. Radioactive Material.

1. Elements and mass numbers: Hydrogen-3, Promethium-147.

2. Chemical and physical form:

a. Tritium gas is sealed with phosphor in glass ampoules containing less than 1 percent tritium oxide. Drawings of current configurations of the sources are at enclosure 1.

b. Promethium-147 is bound in ceramic microspheres sealed with phosphor in glass ampoules. Drawings of current configurations of the sources are at enclosure 1.

3. Maximum amount that will be possessed at any one time:

a. Hydrogen-3.

(1) Fire Control Devices: 1.5×10^{6} curies tritium total. Maximum activity per source is 10 Curies +/- 10%.

(2) Tritium Rifle Sights: 9 millicuries per sight; 9 curies total.

b. Promethium-147: 1 Millicurie per sight, 1 Curie total.

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

1. Hydrogen-3 will be used to excite a phosphor contained in sealed sources. The sealed sources are used to illuminate scales, counters, level vials, reticules, and aiming posts for optical fire control devices. The U.S. Army active, National Guard components and U.S. Marine Corps will use these devices on Department of Defense (DOD) installations and temporary job (field) sites throughout the United States and the world.

a. The fire control devices are used for sighting and firing weapon systems including artillery, tanks, mortars and howitzers. Drawings for the devices are provided at enclosure 2.

b. The byproduct material will be used as phosphor exciters contained in sealed sources on rifle sights. These sealed sources are used in the front post sight of the M16A1 rifles. Drawings for the devices are provided at enclosure 2.

2. Promethium-147. The byproduct material is used as phosphor exciters contained in sealed sources on rifle sights. These sealed sources are used in the front post sight of the M16A1 rifles. Specification Drawings are provided at enclosure 2.

Note: The rifle sights described in Items 6.1.b and 6.2 are no longer issued. We request that the U.S. Army, active, reserve and National Guard components and U.S. Marine Corps be authorized to possess these sources only until they are located on equipment at which time they will be removed from the rifles, and held for disposal as unwanted radioactive material.

3. Information about the devices in this license is summarized in a table identifying the devices by model number, NRC registration number, number of sources, source drawing number, and total curies per device is at enclosure 3.

4. Specific locations of use, storage, repair and maintenance. The Department of the Army is requesting one bulk storage location for licensed tritium fire control devices: Rock Island Arsenal, Rock Island, Illinois. All other storage locations are under the Defense Logistics Agency, which maintains its own NRC license: 37-30062-01.

Item 7. Individuals Responsible for Radiation Safety Program and their training and experience.

1. The radiation safety program is administered under the technical supervision of the TACOM-RI health physicists. Mr. Jeffrey Havenner is designated as the Radiation Safety Officer (RSO). Mr. Tim Mohs is designated as the Alternate Radiation Safety Officer (ARSO).

2. Resumes for the health physicists are at enclosure 4.

3. The camp, post, and installation RSO’s are responsible for the local radiation safety program. The Installation RSO’s duties are described in Item 10.

Item 8. Training For Individuals Working In Or Frequenting Restricted Areas.

1. User/Maintainer Level

a. Individual User. Users of TACOM-RI tritium fire control devices are those individuals who place in operation or operate the devices. The individual user is authorized possession, use and performance of operational checks and services only as specified in unit level technical manuals. Unit commanders are required to insure that soldiers using the devices do so in compliance with the appropriate technical manuals.

b. Direct Support Maintenance. Direct Support Maintenance Personnel are responsible for repair of TACOM-RI tritium fire control devices above the level of authorized operational checks and services performed by users of the devices. Direct Support Maintenance personnel will receive initial radiation safety training that includes safe handling procedures; recognition of damaged sources in the devices and handling procedures for devices with potentially damaged sources. Training will be provided either by the U.S. Army Ordnance Center and School or through on the job training under the supervision of a school graduate.

The Minimum qualifications of those who provide “on the job training” (OJT) is MOS training through the Army Ordnance Center and School or previous supervised OJT as a Shop supervisors or senior maintenance individual.

c. Installation RSO. The installation RSO is required to have training prior to assuming their duties and will have at least one examination during the course to assess the adequacy of the RSO's understanding of the training material. The training shall include; hazards and biological effects of tritium in fire control devices located at the installation; emergency procedures; detection and measurement of radioactivity; calculations based on measurements; and good radiation program practices (storage, monitoring, decontamination, and disposal).

(1) RSO Instruction. The Army’s schools for preparing installation RSO’s are presently the US Army Chemical School at Fort Leonard Wood, Missouri and the US Army Medical Department Center and School at Fort Sam Houston, Texas. These schools have qualified instructors trained in health physics. The Army may also employ individuals from the Navy who have successfully completed that service’s RSO School in Yorktown, Virginia. In addition, The U.S. Army Communications Electronics Command (CECOM), Directorate for Safety "Radiation Safety Officer

Training Course" meets the acceptable requirements for the radiation safety officer training. Finally an interactive compact disk entitled "Radioactive Material Handling Safety that we have produced will be acceptable training for installation RSO's responsible for the material covered by this license.

(2) RSO Refresher Training. The TACOM-RI will provide continuing training opportunities to installation RSO's. Refresher training opportunities are provided in the form of Internet based training and interactive training using the compact disk entitled "Radioactive Material Handling Safety".

2. Depot.

a. Depot Level Maintenance Personnel. The depot RSO provides awareness training to these individuals prior to their assuming duties and refresher training every two years thereafter. They are informed that they will be working with tritium in sealed sources in controlled areas and are subject to the dose limits of 10 CFR part 20.1201 for occupational workers (Not to exceed the TEDE limit of 5 rem per year). Exposure and dose limits to employees will be controlled ALARA. Records of personnel training will be maintained, a list of persons who received this instructions, and the date presented.

The instruction will include:

(1) Emergency action and notification procedures.

(2) Safe working techniques and proper use of protective equipment.

(3) Proper transportation procedures.

b. Depot RSO.

(1) The Depot RSO is required to have a minimum of 80 hours training in the following material:

(a) Principles and practices of radiation protection.

(b) Radioactivity measurement standardization, monitoring techniques, and instrumentation.

(c) Mathematics and calculations basic to the use and measurement of radioactivity.

(d) Biological effects of radiation.

(2) The Army’s schools for preparing RSO’s are presently the US Army Chemical School at Fort Leonard Wood, Missouri and the US Army Health Service Academy at Fort Sam Houston, Texas.

These schools are staffed with instructors trained in health physics. Students from these schools must pass examinations to demonstrate mastery of the information prior to graduation. The Army may also employ individuals from the Navy who have successfully completed that service’s RSO School in Yorktown, Virginia. We will also accept training from comparable civilian sources.

Item 9. Facilities and Equipment.

1. Operator and Unit Use.

a. Security and Control. Users of tritium fire control devices are required to secure the devices from unauthorized access or removal when in storage. Users must safeguard tritium Fire Control Devices when not in storage from loss or theft. Users must handle tritium Fire Control Devices in accordance with published technical manuals to avoid damage to the sources.

b. Tritium Fire Control Device User Storage areas. User storage areas will be so located as to be as free as possible from the danger of flooding under normally predictable conditions. Tritium Fire Control Devices will be stored outside the danger radius of flammable materials and explosives. In addition, tritium Fire Control Device storage areas will have adequate ventilation to prevent undue exposure to personnel entering area or working in the facility. User storage facilities for tritium fire control devices will be wipe test surveyed at least once per quarter.

c. All tritium fire control device storage areas will be posted as follows:

(1) Warning Signs. Signs stating "No eating, drinking, or smoking" will be posted in tritium fire control device storage and maintenance areas. Exceptions to this requirement are controlled areas such as motor pools and storage yards. These areas need not be posted when the fire control devices are attached to the end item or are inside a carrying case attached or closely associated with the end item in "war ready" configuration. (i.e. artillery, howitzers, and tracked vehicles)

(2) In accordance with 10 CFR part 20: 1903(c)"Caution, Radioactive Material(s)" signs need not be posted in rooms where tritium, in sealed sources, is the only radioactive material present.

(3) User storage areas will be posted with copies of the following:

(a) NRC Form 3.

(b) Copies of 10 CFR Parts 19, 20, 21.*

(c) Copy of the TACOM-RI NRC License.*

(d) Section 206 of the Energy Reorganization Act.

*In lieu of actually posting these two documents, a notice may be posted that describes the above documents and where on the installation the documents may be examined.

2. Direct Support Tritium Fire Control Maintenance Shops.

a. Security and Control. Fire Control Device Maintenance shops are required to be secured from unauthorized access or removal of tritium fire control devices in the shop. When licensed material is out of storage and in the shop work area it will be safe guarded against loss, theft or damage.

b. Storage Areas for Tritium Fire Control Device at Direct Support Maintenance Shops. Maintenance storage areas will be so located as to be free as much as possible from danger of flooding under normally predictable conditions. Maintenance storage areas must be outside the danger radius of flammable materials and explosives. Tritium Fire Control Device storage areas are not for regular occupation by maintenance workers. These areas will have adequate ventilation to prevent build up of tritium oxide contamination and undue exposure to personnel entering the area. Quarterly wipe test surveys of the storage areas will be performed to ensure that tritium oxide contamination is not accumulating.

c. Posting Warning Signs.

(1) "No eating, drinking, or smoking" signs will be posted in indoor work and storage areas where tritium fire control devices are located.

(2) In addition, Direct Support Maintenance shop tritium fire control device work and storage areas will be posted with copies of the following:

(a) NRC Form 3.

(b) Copies of 10 CFR Parts 19, 20, 21.*

(c) Copy of the TACOM-RI NRC License.*

(d) Section 206 of the Energy Reorganization Act.

*In lieu of posting these two documents, a notice will be posted that describes the above documents and where the documents may be examined.

d. Direct Support Maintenance work areas for tritium fire control devices will be wipe test surveyed at least quarterly.

3. Depot Level Tritium Fire Control Maintenance Shops: The Licensee will maintain in its files a list of approved Depot-Level Tritium Fire Control Device Maintenance Shops. The licensee approves such facilities in accordance with the following criteria:

(a) Air Monitoring. Each depot level tritium fire control maintenance shop will have a working, properly calibrated tritium air monitor set to alarm at no higher than 5x10-6 micro curie/ml.

(b) Fume Hoods. All actions on devices with broken sources will be performed inside an exhaust hood. The hood will have an average face velocity of at least 100 linear feet per minute with the shield in the operating position.

(c) Storage. Storage of items awaiting repair will be in areas separate from the tritium fire control device repair room. Storage area posting requirements apply for these areas.

(d) Ventilation. Tritium work areas must have adequate ventilation to prevent undue exposure to personnel.

(e) Surveys. Routine area surveys are required of all Depot level tritium fire control device repair workrooms and storage areas for devices under repair. Wipe test surveys will be performed monthly to insure that tritium oxide contamination is not building up.

4. Tritium Fire control device Depot Storage locations. Army Depot installations that are authorized to receive, store and ship bulk quantities of tritium fire control devices will comply with the following requirements:

a. Surveys. Area wipe test surveys will be taken quarterly. Wipe tests survey samples will be analyzed with the appropriate counting system.

b. Air Monitoring. Air monitoring in Depot tritium fire control storage areas is no longer required.

c. Storage. Tritium fire control devices will be stored in areas that are not intended for prolonged periods of human occupation. Specific storage areas will be designated only for storage of radioactive items and physically separated from nonradioactive material storage areas by walls or caged areas with controlled access. The storage areas will be so located as to be free from danger of flooding under predictable conditions and outside the radius of flammable materials and explosives.

d. Ventilation. Depot level Tritium fire control storage areas must have adequate ventilation to dissipate tritium off gassing from sealed sources.

5. Posting Warning Signs. Depot Level indoor storage and maintenance areas will be posted with "No eating, drinking, or smoking" signs. "Caution, Radioactive Material(s)" signs will not be required to be posted in rooms and areas, unless, personnel, or their representatives, request that such postings be applied as enhanced safety notification (10 CFR 20.1903(c)). In addition, bulk storage areas will also post copies of the following:

(a) NRC Form 3.

(b) Copies of 10 CFR Parts 19, 20, 21.*

(c) Copy of the TACOM-RI NRC License.*

(d) Section 206 of the Energy Reorganization Act.

*In lieu of posting these two documents, a notice may be posted that describes the above documents and where the documents may be examined.

6. Instrument Calibration.

(1) Air monitors used under this license are calibrated at intervals not to exceed one year.

(2) Liquid scintillation counters will be calibrated per the manufacturer's instructions.

Item 10. Radiation Safety Program.

1. The U.S. Army Tank-automotive and Armaments Command – Rock Island (TACOM-RI) is responsible for management and support of all tritium fire control devices covered by this license. Responsibilities include license management functions performed by the TACOM-RI safety staff (Item 7), and operation of the radiation safety program. The tritium fire control devices covered by this application are issued to United States Army, active, Army National Guard and United States Marine Corps units at locations worldwide.

a. Management: The TACOM-RI safety staff is assisted in executing the radiation safety program for its NRC licenses by supply management specialists, equipment specialists, engineers and procurement personnel within the command who are assigned to the management of the various tritium fire control devices.

b. Radiation Safety Inspection Program.

(1) The TACOM-RI safety staff conducts a regular program of license compliance inspections at depots, posts, camps and stations where tritium fire control devices are used, stored and/or maintained under this license. Other Army Materiel Command radioactive commodity license holders in the performance of their inspections assist the TACOM-RI in inspecting for this license. In addition the Army Center for Health Promotion and Preventive Medicine (CHPPM) at Aberdeen Proving Ground, Maryland, is authorized to conduct radiation safety inspections under the provisions of this license and provides reports to the TACOM-RI Safety Office. Each camp, post or station with TACOM-Rock Island tritium fire control is inspected at least once every five years.

(2) The TACOM-RI Radiation Safety Program is reviewed at least annually in accordance with 10 CFR 20.1101.

(3) The Inspectors are trained and well versed in the regulatory issues pertaining to this license application and the Army radiation program in general.

c. Incident Reporting: The Licensee (TACOM-Rock Island) will report incidents of tritium contamination arising from breakage of tritium fire control sealed sources and of loss of tritium fire control sealed sources in accordance with 10 CFR Parts 20.2201 and 30.50.

2. Radiation Safety Supervision.

a. Commanders of installations that receive, store, ship, use, transport, maintain and/or dispose of material covered under this license are responsible for appointing a properly trained radiation safety officer and for assuring compliance with the provisions of this program at the installation. For use and maintenance of tritium fire control devices, applicable Technical Manuals and officially issued supplementary technical instructions will be followed. "Officially issued supplementary technical instructions" are limited to approved Technical Manual changes, Safety of Use Messages and Ground Precautionary Messages.

b. The installation Radiation Safety Officer (RSO) at user locations and depots act as the licensee's representative, ensuring that license conditions are fulfilled at the site where materials are located. The task of the RSO at every depot, installation, or State National Guard Organization is to ensure the safe handling, storage and maintenance of tritium fire control devices. In addition the installation RSO is responsible for the following:

(1) Inventory. Every camp, post or station is required to accomplish annual physical inventories. These inventories are entered into Army logistics databases. Copies of the inventory of tritium fire control devices is available to the installation Radiation Safety Officer and will be made available as part of inspections of the program for that facility.

(2) Training. Ensure that training for individuals Maintaining tritium fire control devices is accomplished and records are available at the installation.

(3) Incident response: Respond to and report to the licensee regarding incidents involving tritium fire control devices on the installation:

(a) The installation RSO responds to incidents or accidents involving potential release of tritium or loss tritium fire control devices at that installation. This includes ensuring that any release is identified and contained, that potentially exposed individuals are identified and steps to determine any doses are initiated.

(b) When loss of licensed materials is suspected, the installation RSO coordinates immediate efforts to recover the material using resources from the installation. Such losses will be reported to TACOM-Rock Island in accordance with locally established chain of command notification procedures.

(4) Surveys. The installation RSO insures that regular inspections and routine radiation monitoring are conducted at the installation and properly documented. Frequency of surveys and area wipe tests is described in Item 9 of this application.

(5) Records. Radiation safety records for surveys, inventories, calibration and training are maintained for 3 years. The records will be retained at the installation level. This is an RSO responsibility. "Survey" records as specified in 10 CFR 20.2103 are required to be maintained until license termination.

(6) Maintenance Procedures. In shops where maintenance on tritium fire control devices is performed under this license, personnel will comply with approved Technical Manuals, technical manual changes, applicable Safety of Use Messages and Ground Precautionary Messages.

(7) Radioactive Waste. The Installation RSO will accept, store and maintain a current inventory of unwanted radioactive materials. The RSO will request disposition of the unwanted radioactive materials from the Army program office for low-level radioactive waste disposition, located at the Operations Support Command, Rock Island, IL, who will manage the removal and disposal.

3. Surveys. The installation RSO shall perform surveys to ensure removable contamination levels are maintained as low as reasonably achievable (ALARA).

a. Wipe test surveys for removable contamination shall be maintained less than 10,000 dpm/100cm^2 and as close to background as reasonably achievable.

b. Work surfaces on which radioactive devices are repaired, shall be covered to protect from contamination. The covering shall be replaced when it is torn or following a release of radioactive material. The material should be bagged, labeled as low-level radioactive waste unless a wipe test survey demonstrates that no contamination was present. The installation RSO will store the material in a designated holding area until it can be properly released or disposed as required.

c. Records, shall be maintained in accordance with 10 CFR 20.2103.

4. Damaged tritium fire control devices shall be isolated to prevent the spread of contamination. Damage will be assessed by performance of a test for illumination and wipe test. Damaged

devices will be double wrapped in plastic bags and tagged for disposal as radioactive waste by the installation RSO. The RSO will notify the licensee of the incident by telephone followed by a written report.

5. Shipping. The shipper is responsible for ensuring that every package complies with shipping requirements found in both 49 CFR and 10 CFR.

6. Receiving and Opening Packages. Incoming packages containing radioactive material are surveyed in accordance with 10 CFR 20.1906. The RSO or a designee trained in accordance with item 8 1 (b) inspects damaged packages.

7. Dosimetry: The tritium fire control devices covered by this license do not constitute external radiation hazards therefore no external dosimetry program is established.

8. Tritium Bioassay Program.

a. Users and maintainers of tritium fire control devices will be considered for bioassay if an incident occurs resulting in the release of tritium gas. The Installation RSO in conjunction with medical personnel will determine the need for a special bioassay. Personnel determined to have a high likelihood of receiving an uptake will be directed to local medical facilities for collection of bioassay samples.

b. Depot Level Tritium Fire Control Maintenance personnel will have a monthly bioassay to substantiate that doses are ALARA. A baseline and termination bioassay will also be taken for depot level maintenance workers. Depot tritium fire control maintenance personnel are held to the annual limits of 10 CFR 20.1201.

c. Bioassay samples will be forwarded to a certified laboratory for analysis. The Army uses the laboratory at the Center for Health Promotion and Preventive Medicine at Aberdeen Proving Ground Maryland to analyze bioassay samples taken from military and Department of Defense civilian personnel.

Item 11. Radioactive Waste

The Operations Support Command, as the Army program office for Low- Level Radioactive Waste is the designated manager for disposal of Army low-level radioactive waste. The office ensures the radioactive waste generated under the license issued for this application is packaged shipped and disposed in accordance with current Army, NRC and DOT regulations and disposal facility criteria through:

a. Compliance with Operations Support Command procedures for packaging and shipping unwanted radioactive materials.

b. On-site management of removal of contaminated material and/or unwanted devices containing radioactive sources.

c. Detailed instructions to installations for making shipments of contaminated material and/or unwanted devices containing radioactive sources.