DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
WEST POINT, NY 10996

REPLY TO
ATTENTION OF

Br. 2

MADN-PNE

28 November 2016

MEMORANDUM FOR U.S. Nuclear Regulatory Commission - Region I, ATTN: LAT, 2100 Renaissance Blvd., Suite 100, King of Prussia, PA 19406-2713

SUBJECT: Amendment to US Nuclear Regulatory Commission License BML 31-02102-02, Docket No. 030-00897

1. Request that US Nuclear Regulatory Commission License BML 31-02102-02 issued to the Department of Physics and Nuclear Engineering, US Military Academy, be amended as follows:

Remove requirement for leak-testing canned uranium slugs as 10 CFR 40 does not require leak testing of source material.

2. The United States Military Academy (USMA) is a public undergraduate educational institution, accredited by the Middle States Association of Colleges and Schools, offering programs of instruction leading to the bachelor's degree. The USMA is an activity of the United States Army and is supported by appropriated funds. As such it appears to meet your definition of a "nonprofit educational institution" (10 CFR 171.5). Request that USMA be exempted from any fees for this action.

3. Point of contact for licensing in the Department of Physics is Dr. Daniel Schultz, Radiation Safety Officer, (845) 938-5009, or daniel.schultz@usma.edu.

Encl
1. NRC Form 313
2. Items 5-11 for NRC Form 313

EDWARD P. NAESSENS, JR
COL, PR, USMA
Head of the Department of Physics and
Nuclear Engineering

NRC FORM 313 **U.S. NUCLEAR REGULATORY COMMISSION**
(05-2012)
10 CFR 30, 32, 33,
34, 35, 36, 39, and 40

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 **EXPIRES: (05/31/2015)**

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Information Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

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

SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

IF YOU ARE LOCATED IN:

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

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

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

SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

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 31-02102-02
- ☐ C. RENEWAL OF LICENSE NUMBER

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

United States Military Academy
Department of Physics and Nuclear Engineering
Room 480, Bartlett Hall, Building 753
West Point NY 10996-1790

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

United States Military Academy
Building 753, Bartlett Hall
West Point NY 10996-1790

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Dr. Daniel B. Schultz

BUSINESS TELEPHONE NUMBER	BUSINESS CELLULAR TELEPHONE NUMBER
(845) 938-5009	

BUSINESS EMAIL ADDRESS
daniel.schultz@usma.edu

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

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

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

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

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

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY 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 CONTANED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.
WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A C RIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Edward Naessens, Department Head		11/28/2016

FOR NRC USE ONLY

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

BML Amendment Items 5-11

ITEMS 5 AND 6: RADIOACTIVE MATERIALS AND PURPOSE(S) OF USE

Radioisotope	Chemical/Physical Form	Maximum Possession Limit	Proposed Use
Any byproduct material with atomic numbers 1-83	Any	15 microcuries per source and 100 millicuries total	Teaching and training of students; instrument calibration
Any byproduct material with atomic numbers 84-95	Any	10 microcuries total	Teaching and training of students; instrument calibration
Cobalt 57	Sealed source (WEB Research Co. Model MCo7.122)	12.0 millicuries per source and 16.0 millicuries total	Mossbauer experiment
Cobalt 60	Sealed Source (J. L. Shepherd Model 7810)	50 millicuries total	Teaching and training of students; detector characterization studies
Cobalt 60	Sealed Source (Eckert & Ziegler Model CO03011/40001M)	1.5 millicuries total	Teaching and training of students; detector characterization studies
Cesium 137	Sealed source (General Radioisotope Products, Inc. Model 850233)	50 millicuries total	Compton scattering experiment
Cesium 137	Sealed source (Eckert & Ziegler Model 193 series or HEG-XXX series)	1.3 millicuries total	Teaching and training of students; detector characterization studies
Cesium 137	Sealed source (QSA Global CDC.711M)	1.15 curies per source and 2.3 curies total	Teaching and training of students; detector characterization studies
Barium 133	Sealed source (Eckert & Ziegler Model 193 series or HEG-XXX series)	9 millicuries total	Teaching and training of students; detector characterization studies
Barium 133	Sealed source (Eckert & Ziegler Model GF-133-D)	0.13 millicuries total	Teaching and training of students; detector characterization studies
Plutonium 239	Sealed Neutron Sources (Monsanto)	80 grams total	Teaching and training of students; light water moderated subcritical assembly

BML Amendment Items 5-11

Radioisotope	Chemical/Physical Form	Maximum Possession Limit	Proposed Use
Americium 241	Calibration Source (Eberline Services Model DNS-17SA)	0.5 microcuries per source and 1 microcurie total.	Calibration of alpha instruments.
Americium 241	Sealed source (Amersham-Searle, Model AMC 2084)	10 millicuries per source and 40 millicuries total	X-ray studies and demonstrations
Californium 252	Sealed Source (Frontier Technology Corporation Model 10 or Model 100 Series)	5 millicuries per source and 9 millicuries total.	Teaching and training of students; detector characterization studies
Natural Uranium (Source Material)	Cylindrical canned aluminum slugs	2,500 kg	Teaching and training of students; light water moderated subcritical assembly
Natural Uranium (Source Material)	Natural Uranium in the form of cylindrical canned aluminum ½-slug	15 kilograms	Teaching and training of students

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

1. Radiation Safety Officer (RSO):

   Dr. Daniel Schultz, Ph.D. (See Annex A for Training and Experience)

2. Authorized Users (AUs):

   a. Dr. Daniel Schultz, Ph.D. (See Annex A for Training and Experience)

   b. LTC Kenneth S. Allen, Ph.D. (See Annex B.1 for Training and Experience)

   c. MAJ Andrew W. Decker (See Annex B.2 for Training and Experience)

   d. MAJ Samuel A. Heider (See Annex B.3 for Training and Experience)

   e. MAJ Dean A. Mathis (See Annex B.4 for Training and Experience)

   f. MAJ Joshua J. Molgaard (See Annex B.5 for Training and Experience)

   g. Dr. Brian Moretti, Ph.D. (See Annex B.6 for Training and Experience)

   h. LTC David P. Morrow (See Annex B.7 for Training and Experience)

   i. COL Edward P. Naessens, Ph.D. (See Annex B.8 for Training and Experience)

   j. Mr. Nsikak P. Okosi (See Annex B.9 for Training and Experience)

   k. LTC Christopher D. Pitcher (See Annex B.10 for Training and Experience)

   l. LTC Robert D. Prins (See Annex B.11 for Training and Experience)

   m. LTC Chad C. Schools, Ph.D. (See Annex B.12 for Training and Experience)

ITEM 8: TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

1. Qualifications of Instructors.

a. The RSO or Assistant RSO (ARSO) will conduct radiation safety training for Authorized Users (AU).

b. The RSO, ARSO, or AUs will conduct radiation safety training for occupationally exposed workers and Department of Physics and Nuclear Engineering staff and faculty.

c. Department of Physics and Nuclear Engineering staff and faculty approved by the RSO may provide radiation safety training to the following individuals:

(1) Cadets who are not on dosimetry who may use radioactive materials, in amounts greater than exempt quantities, incident to their course work in the Department of Physics and Nuclear Engineering.

(2) Ancillary personnel (i.e., emergency medical service personnel, military police, custodians, maintenance workers, etc.) who require access to a restricted area.

2. Frequency and Method of Training. The table below outlines the method and frequency of training for the appropriate group.

Group	Method of training	Frequency
RSO, ARSO, and AUs	Lectures, video-taped presentations, demonstrations, or PowerPoint presentation	Before assuming duties with, or in vicinity of, RAM, annually, & when changes occur
Occupationally Exposed Workers	Lectures, video-taped presentations, demonstrations, or PowerPoint presentation	Before assuming duties with, or in vicinity of, RAM, annually, & when changes occur
Department of Physics and Nuclear Engineering Staff and Faculty (not on dosimetry)	Lectures, video-taped presentations, demonstrations, or PowerPoint presentation	Before assuming duties with, or in vicinity of, RAM, annually, & when changes occur
Cadets (not on dosimetry) using RAM, in excess of exempt quantities	Lectures, video-taped presentations, demonstrations, or PowerPoint presentation	Before using RAM
Emergency Medical Service and Military Police	Memorandum outlining location of RAM and associated hazards	Annually & when changes occur
Mail/Distribution Center and Warehouse personnel	Memorandum outlining procedures to follow if RAM arrives at their locations	Annually & when changes occur

Group	Method of training	Frequency
Other Ancillary Personnel (i.e., custodians, maintenance)	Lectures, video-taped presentations, demonstrations, or PowerPoint presentation	Before entering restricted area, if training is deemed necessary by the RSO
Visitors touring restricted areas	Training not required	Training not required

3. Topics of Instruction.

a. Radiation safety training will be tailored to the needs of the individuals in attendance.

b. Occupationally exposed workers and Department of Physics and Nuclear Engineering staff and faculty will receive training on the topics below:

(1) Applicable regulations and license conditions

(2) Areas where radioactive material is used or stored

(3) Potential hazards associated with radioactive material in each area where the individuals will work

(4) Appropriate radiation safety procedures (i.e., ALARA concept and use of time, distance, and shielding to minimize exposure)

(5) In-house work rules

(6) Each individual's obligation to report unsafe conditions to the RSO

(7) Appropriate response to emergencies or unsafe conditions

(8) Worker's right to be informed of occupational radiation exposure, if applicable

(9) Location where the RSO has posted or made available notices, copies of pertinent regulations, and copies of pertinent licenses and license conditions, as required by 10 CFR Part 19.

(10) RSO name and phone number

(11) Procedures for ordering, receiving, and opening radioactive materials packages

(12) Biological effects of ionizing radiation

(13) Current occupational dose limits

(14) Right to communicate directly with the NRC

(15) Right to declare pregnancy

(16) Question and answer period

c. Cadets who are not on dosimetry who may use radioactive materials in amounts in excess of exempt quantities will receive training on select topics from paragraph 2. The training will be commensurate with the associated hazards of their coursework, as determined by the RSO.

d. Emergency medical service and military police personnel will receive a memorandum from the Department of Physics and Nuclear Engineering that outlines the location of radioactive materials and their associated hazards.

e. Other ancillary personnel (i.e., custodians and maintenance personnel) will not have unaccompanied entry to restricted areas. When access is required, the RSO will determine, based on the required scope of work, if radiation safety training is required. If required, ancillary personnel will receive radiation safety training concerning the radiation hazards in the area and appropriate precautions. The RSO or RSO-approved individual will then escort ancillary personnel into restricted areas.

f. Occasionally, cadets and other visitors tour the restricted areas to see the subcritical assembly and the radiation laboratory. Radiation safety training is not required for individuals touring the restricted area.

4. Assessment of Training. No formal assessment of radiation safety training is required.

5. Documentation of Training. Records will include a brief outline of instruction and a list of personnel trained.

ITEM 9: FACILITIES AND EQUIPMENT

1. Room B50B, Bartlett Hall

a. Primary Use of B50B. B50B is a basement laboratory room, and it is the primary RAM use and storage site for all sources licensed to the Department of Physics and Nuclear Engineering. Room B50 is also used for laboratory instruction, primarily for cadets who are participating in experiments that use the neutron howitzer or the subcritical assembly.

b. Security. B50B is a controlled access area. Access to the room is restricted by a lockable door that can only be accessed through an alcove to B50B and B50A with a lockable door. Additionally, if the subcritical assembly is operating and is to be left unattended by the authorized user, B50B is secured with an additional locked grate.

c. Configuration. B50B is surrounded on the north and west sides by hallways, and on the south side by the Radiation Safety Officer Laboratory (B50A), and on the east side by a classroom and a latrine. There is a window between B50B and B50A. Above B50B is a large

chemistry laboratory classroom, while below B50B is an area with plumbing equipment and a chemical engineering laboratory classroom. See Figure 1 for a diagram of B50.

d. Specifics. B50B contains the subcritical assembly, the neutron howitzer, a uranium slug shipping crate, the RAM storage safe, and a lab room area.

(1) Subcritical Assembly. The subcritical assembly was manufactured by the Universal Nuclear Corporation of New York. It contains approximately 2400 kg of natural uranium fuel in the form of canned aluminum slugs, and it uses light water as a moderator. Its effective multiplication is 0.86 ± 0.01.

(2) Neutron Howitzer. The neutron howitzer was manufactured by the Nuclear Chicago Corporation (Model NH 3). It contains five each 1-curie PuBe sources. It uses paraffin as a moderating medium and is cadmium shielded. The access lid is key-locked, and only the RSO, ARSO, and AUs have access to the key. The entire neutron howitzer is secured by chain and is bolted to the floor.

(3) Uranium Slug Shipping Crate. Natural uranium fuel slugs that are not in use are stored in a wooden shipping crate inside the controlled access area. The crate is key-locked, and only the RSO, ARSO, and AUs have access to the key.

(4) RAM Storage Safe. The RAM storage safe contains all of the department's RAM except for the PuBe sources in the neutron howitzer and the natural uranium slugs in the subcritical assembly or shipping crate.

(5) Lab room Area. Instrumentation is set up for research, experiments, and demonstrations in the lab room area.

2. Room B50A, Bartlett Hall.

a. Primary Use of B50A. B50A is the Radiation Safety Officer laboratory and office. The RSO uses this room to conduct analysis of wipe tests and to store radiation safety records.

b. Security. B50A is a controlled access area. Access to the room is restricted by a lockable door that can only be accessed through an alcove to B50B and B50A with a lockable door.

c. Configuration. B50A is surrounded to the north by Room B50B (Subcritical Assembly), east by a latrine, south by a hallway, and west by the alcove and hallway. Above B50A is part of a General and Advanced Chemistry Laboratory; while below B50A is part of the Chemical Engineering Lab. See Figure 1 for a diagram of B50A.

d. Specifics. B50A. B50A has a temporary storage container for radioactive sources used in B50A. Any licensed source may be used in B50A. Upon completion of the task requiring the source(s), the source(s) will be returned to storage in the safe in B50B.

3. Room B47, Bartlett Hall.

a. Primary Use of B47. B47 is laboratory and classroom. It is used for teaching and training students and performing detector characterization studies.

b. Security. B47 is a controlled access area. Access to the room is restricted by two lockable doors. Additionally, if necessary the doors to B47 are secured with additional locked grates.

c. Configuration. B47 is surrounded to the north, east and south by hallways and to the west by a physics classroom (south half) and pipe shaft (north half). A storage room boarders the southwest corner of the room. Above B47 is a staircase (northwest corner) and a large chemistry laboratory, while below it is plumbing (northeast), data communications (northwest), and Chemical Engineering laboratory (south). See Figure 1 for a diagram of B47.

d. Specifics. B47 has a temporary source storage container for sources in B47. Any licensed sealed source may be used in B47 for student education and training and detector characterization studies. Upon completion of the task the source(s) were removed from storage for, they will be returned to the safe in B50B.

4. Room B52, Bartlett Hall.

a. Primary Use of B52. B52 is a laboratory. It is used for student education and training, faculty and student research, and the Mossbauer experiment.

b. Security. B52 is a controlled access area. Access to the room is restricted by a lockable door. Additionally, if necessary the door to B52 is secured with an additional lock and grate.

c. Configuration. B52 is surrounded to the north by a hallway, to the east by a lavatory (northern third) and outside wall, to the south by an outside wall, and to the west by overhead areas to the Chemical Engineering and NMR sub-basement labs. Above B52 is a General Chemistry storage and preparation room. Below B52 is the NMR control room and Chemical Engineering laboratory. See Figure 1 for a diagram of B52.

d. Specifics. B52 has a temporary source storage container for sources in B52. Any licensed sealed source may be used in B52. Upon completion of the task the source(s) were removed from storage for, they will be returned to the safe in B50B.

5. Room B49, Bartlett Hall.

a. Primary Use of B49. B49 is laboratory. It is used for student education and training and faculty and student research.

b. Security. B49 is a controlled access area. Access to the room is restricted by a lockable door. Additionally, if necessary the door to B49 can be secured with an additional locked grate.

c. Configuration. B49 is surrounded to the north and east by Room B47, to the south by a hallway, and to the west by an Introductory Physics laboratory. Below Room 49 is the Contained Ventilated Bay of the Chemical Engineering Laboratory. Above Room B49 is a hallway (west) and part of a General and Advanced Chemistry Laboratory (east). See Figure 1 for a diagram of B49.

d. Specifics. B49 has a temporary source storage container for sources in B49. Any licensed sealed source sources may be used in B49. Upon completion of the task the source(s) were removed from storage for, they will be returned to the safe in B50B.

6. Room B66B, Bartlett Hall.

a. Primary Use of B66B. B66B is laboratory. It is used for student education and training and faculty and student research.

b. Security. B66B is a controlled access area. Access to the room is restricted by a lockable door with cypher lock to the hallway and a lockable double door to B66A (a classroom).

c. Configuration. B66B is surrounded to the south Room B66A, to the east by a hallway, to the north by Room B70 (the accelerator laboratory) and to the west by soil. The grade is approximately six feet above the floor of B66B. Above Room B66B is a stairwell (north) and Room 168, a classroom (south). See Figure 2 for a diagram of B66B.

d. Specifics. B66B has a temporary source storage container for sources in B66B. Any licensed sealed source sources may be used in B66B. Upon completion of the task the source(s) were removed from storage for, they will be returned to the safe in B50B.

7. Range 11, United States Military Academy (USMA)

a. Primary Use and Location of Range 11. Range 11 is located at the United States Military Academy. Range 11 affords the opportunity for long-range standoff testing under military field conditions and will be used to perform radiation detection technology testing. Range 11 is located on the United States Military Academy reservation on Route 293 at Longitude: 74 01.965W and Latitude: 41 21.595N (Military Grid reference System WL80904 79164). Travelling from the east, Range 11 is approximately one mile passed the USMA Range Control complex on the south side of Route 293 (immediately after Long Pond). Travelling from the west, Range 11 is approximately one mile passed the USMA Motorpool complex on the south side of Route 293 (prior to Long Pond). Figure 3a shows the location of the Range 11 complex.

b. Security. Range 11 is a controlled access area, under the supervision of the USMA Range Control office. While in use for testing activities, access to Range 11 is restricted by a locked gate. All sources used in this facility will be secured within a Type A shipping container. Within the Range 11 complex, an Ammo Point will be used to store the Type A shipping container where it will be under double lock and key when not in use. While in use for testing activities, an AU listed on the license (who will also serve as the range officer in charge) will possess keys to the range complex, the Ammo Point and the Type A shipping container. The AU will maintain

positive control of the source at all times while in use including responsibility and direct supervision. The AU will ensure that the source is properly secured when it is at Range 11 but not in use.

c. Configuration. Range 11 is an approximately 500 meter by 225 meter outdoor training range. The range is surrounded by a ridgeline with an elevation of approximately 300 meters. All areas of Range 11 are controlled by USMA Range Control. The Ammo Point sits near the center of the complex. When not secured in the Ammo Point, sources will be used in controlled radiation areas between the zero meter and 300 meter lines. See Figure 3b for a diagram of Range 11.

d. Specifics. Sources used on Range 11 may include the General Radioisotope Products, Inc. Model 850233 Cs-137 source, the Eckert and Ziegler Model 193 series or HEG-XXX series Cs-137 source, the QSA Global CDC.711M Cs-137 source, the J. L. Shepherd Model 7810 Co-60 source, the Eckert & Ziegler Model CO03011/40001M Co-60 source, the Eckert & Ziegler Model 193 series or HEG-XXX series Ba-133 source, the Eckert & Ziegler Model GF-133-D Ba-133 source, and the Amersham-Searle Model AMC2084 Am-241 sources.

e. Source Handling. Sources will be moved outside of room B50 only while inside a Type A shipping container. Sources will never be touched by hand and will only be handled with tongs when outside of a Type A shipping container. A calibrated monitoring device will be immediately available whenever the source is removed from a Type A shipping container and appropriate radiation area controls will be employed to ensure the protection of workers.

f. Transportation. Sources will be transported from Bartlett Hall to Range 11 and from Range 11 to Bartlett Hall in accordance with applicable regulations (NRC (10 CFR 71), Department of Transportation (DOT) (49 CFR) and DOD 4500.9-R) for shipping, packaging and labeling.

g. Surveys. Adequate surveys will be done to ensure members of the public are not exposed above public limits while a source is stored or in use at Range 11. If there is any reason to believe the seal on a source has been breached, appropriate contamination surveys will be done.

h. Other procedures: Specific operating procedures, including emergency procedures, for using radioactive sources at Range 11 will be documented in the radiation safety standing operating procedures.

8. Camp Shea, United States Military Academy (USMA)

a. Primary Use and Location of Camp Shea. Camp Shea is located at the United States Military Academy. Camp Shea affords the opportunity for testing under military field conditions and will be used to perform radiation detection technology testing. Camp Shea is located on the United States Military Academy reservation on Mine Torne Road at Longitude: 74 01.05W and Latitude: 41 19.329N (Military Grid reference System WL82150 74984) approximately 3 miles from the USMA Motorpool complex. Figure 4a shows the location of Camp Shea.

b. Security. Camp Shea is a controlled access area, under the supervision of the USMA Range Control office. While in use for testing activities, access to Camp Shea is restricted by a locked gate. All sources used in this facility will be secured within a Type A shipping container. While in use for testing activities, an AU listed on the license (who will also serve as the range officer in charge), will possess keys to the range complex and the Type A shipping container. The AU will maintain positive control of the source at all times while in use including responsibility and direct supervision. The source will never be left unattended at Camp Shea.

c. Configuration. Camp Shea is an approximately 100 meter by 75 meter outdoor urban training facility. All areas of Camp Shea are controlled by USMA Range Control. There is a storage connex sits near the centerline of the complex and near the entrance to the complex. Sources will be used in Camp Shea buildings #1-5 and in the "streets" around the buildings. See Figure 4b for a diagram of Camp Shea.

d. Specifics. Sources used at Camp Shea may include the General Radioisotope Products, Inc. Model 850233 Cs-137 source, the Eckert and Ziegler Model 193 series or HEG-XXX series Cs-137 source, the QSA Global CDC.711M Cs-137 source, the J. L. Shepherd Model 7810 Co-60 source, the Eckert & Ziegler Model CO03011/40001M Co-60 source, the Eckert & Ziegler Model 193 series or HEG-XXX series Ba-133 source, the Eckert & Ziegler Model GF-133-D Ba-133 source, and the Amersham-Searle Model AMC2084 Am-241 sources.

e. Source Handling. Sources will be moved outside of room B50 only while inside a Type A shipping container. Sources will never be touched by hand and will only be handled with tongs when outside of a Type A shipping container. A calibrated monitoring device will be immediately available whenever the source is removed from a Type A shipping container and appropriate radiation area controls will be employed to ensure the protection of workers.

f. Transportation. Sources will be transported from Bartlett Hall to Camp Shea and from Camp Shea to Bartlett Hall in accordance with applicable regulations (NRC (10 CFR 71), Department of Transportation (DOT) (49 CFR) and DOD 4500.9-R) for shipping, packaging and labeling.

g. Surveys. Adequate surveys will be done to ensure members of the public are not exposed above public limits while a source is stored or in use at Camp Shea. If there is any reason to believe the seal on a source has been breached, appropriate contamination surveys will be done.

h. Other procedures: Specific operating procedures, including emergency procedures, for using radioactive sources at Camp Shea will be documented in the radiation safety standing operating procedures.

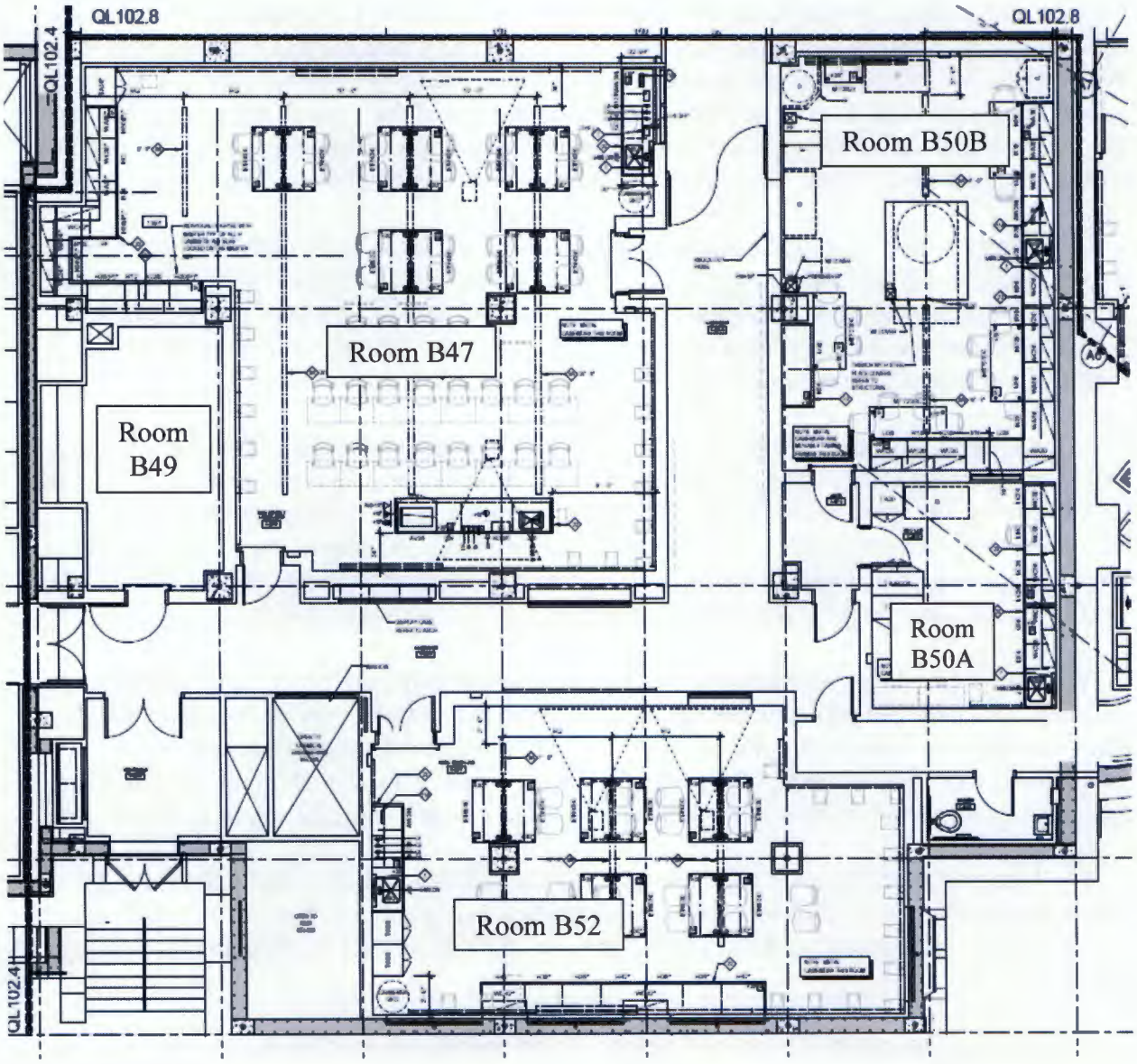

Figure 1. Architectural drawing of Rooms B47, B49, B50B, B50A, and B52. Note that furniture is moveable and may not remain in places indicated on drawing.

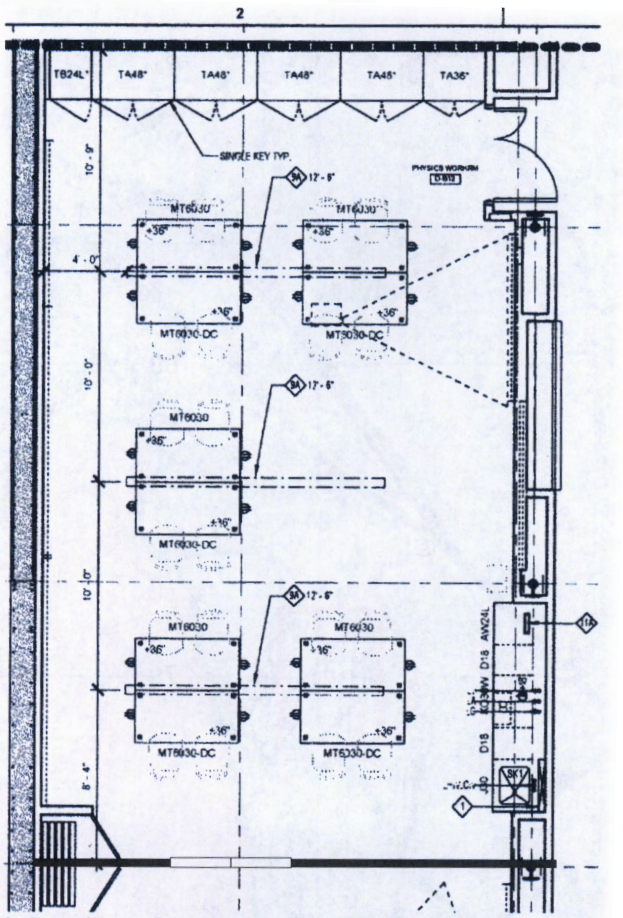

Figure 2. Architectural drawing of Room B66B. The originally planned moveable wall was replaced with a permanent wall with lockable double doors. Note that furniture is moveable and may not remain in places indicated on drawing.

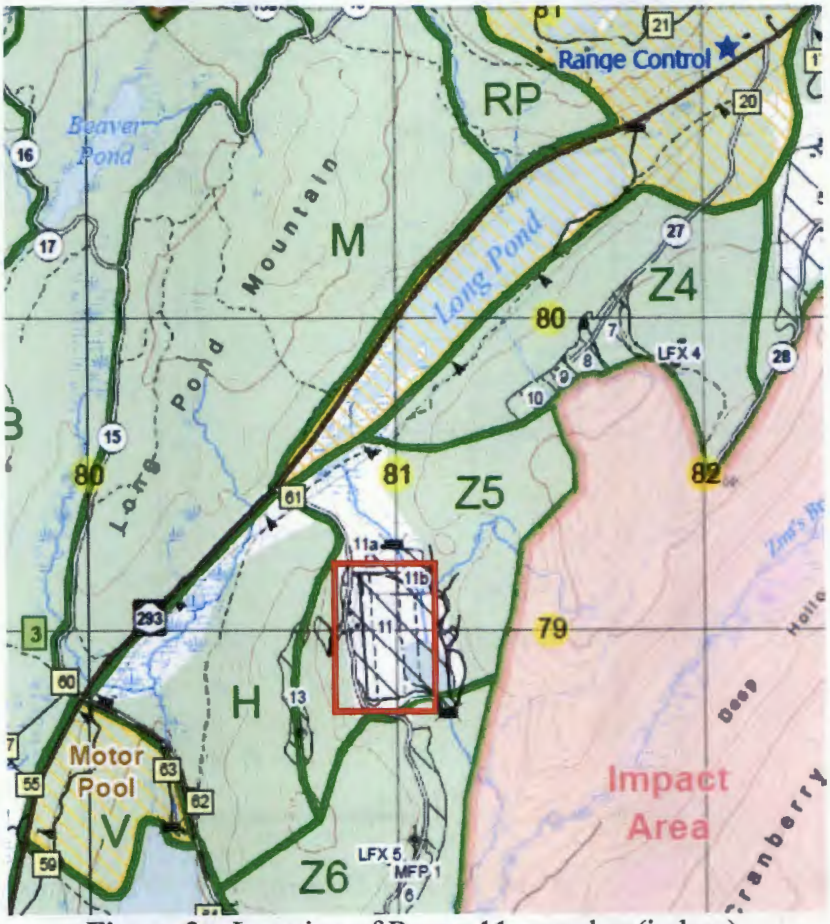

Figure 3a. Location of Range 11 complex (in box).

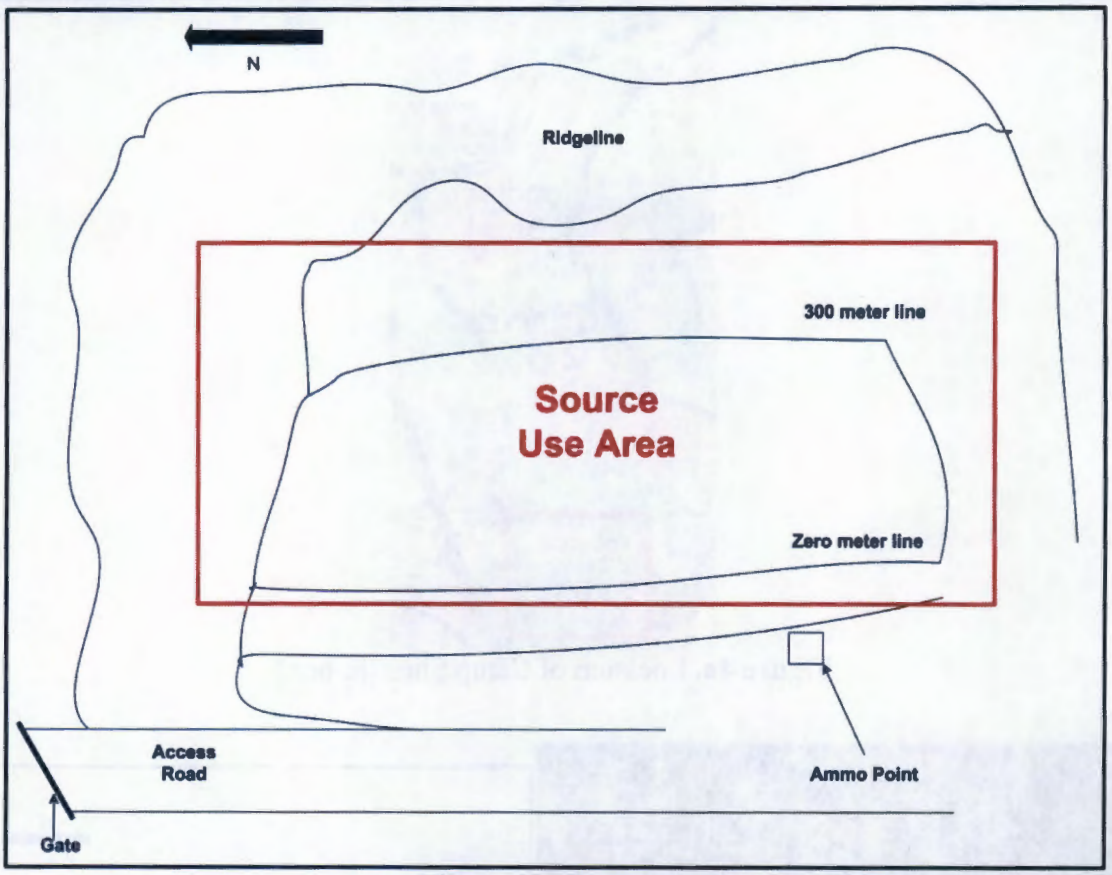

Figure 3b. Range 11

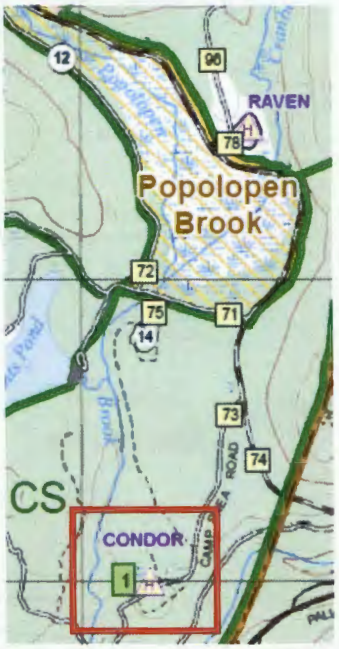

Figure 4a. Location of Camp Shea (in box)

Figure 4b. Camp Shea

ITEM 10: RADIATION SAFETY PROGRAM

ITEM 10.1: AUDIT PROGRAM

The Radiation Safety program in the Department of Physics and Nuclear Engineering will be audited every calendar year.

ITEM 10.2: RADIATION MONITORING INSTRUMENTS

1. Radiation Monitoring Instruments.

a. The Department of Physics and Nuclear Engineering shall possess, or have access to through licensed services, calibrated count rate meters, exposure rate meters, and neutron detectors necessary to perform required surveys.

b. The Department of Physics and Nuclear Engineering shall use instruments that meet the radiation monitoring instrument specifications published in Appendix M to NUREG – 1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Laboratory Licenses of Limited Scope,' dated December 1999. The Department reserves the right to upgrade its survey instruments as necessary.

2. Instrument Calibration.

a. All instruments used to perform health and safety surveys will be calibrated at least annually. Calibration will be performed by the US Army Test, Measurement, and Diagnostic Equipment Activity (USATA), the instrument manufacturer, or a commercial calibration service.

b. Instruments used only for classroom demonstration and instruction do not need to be calibrated.

ITEM 10.3: MATERIAL RECEIPT AND ACCOUNTABILITY

1. We have developed and will maintain procedures for ensuring material accountability.

2. Physical inventories will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license, with the following exceptions:

a. The PuBe sources in the neutron howitzer are high activity sources. Their removal from the neutron howitzer is documented in a log book. Often, these sources are only used once per year. It is contrary to ALARA practices to remove these sources from the neutron howitzer for an inventory. Therefore, these sources will be inventoried at intervals not to exceed 6 months by two different measurements:

(1) Confirming the distance from the top Pu-Be source to the top of the tube that holds the sources. We will have on hand a plastic cylinder that is marked such that when the cylinder

rests on top of the Pu-Be sources, the mark will be at the top of the tube. If the mark falls below the top of the tube we will know that one or more of the sources are not in the howitzer.

(2) Taking exposure measurements outside the neutron howitzer. Exposure measurements consistent with previously established values will serve to confirm the presence of the material.

b. The canned aluminum natural uranium slugs in the crates are extremely difficult to remove. Removal can cause significant deformation of the uranium slugs. Therefore, these sources will be inventoried at intervals not to exceed 6 months by taking exposure measurements outside the each of the wooden crates. Exposure measurements consistent with previously established values will serve to confirm the presence of the material.

ITEM 10.4: OCCUPATIONAL DOSE

The Department of Physics and Nuclear Engineering will monitor individuals in accordance with the criteria in the section entitled 'Radiation Safety Program - Occupational Dose' in NUREG - 1556, Vol. 7, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Academic, Research and Development and Other Licenses of Limited Scope,'" dated December 1999.

ITEM 10.5: PUBLIC DOSE

The Department of Physics and Nuclear Engineering will ensure that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual limit for members of the public.

ITEM 10.6: SAFE USE OF RADIONUCLIDES AND EMERGENCY PROCEDURES

Procedures have been developed for safe use and security of radionuclides and emergency procedures. Procedures may be revised only if 1) the changes are reviewed and approved by the licensee management and the RSO in writing; 2) the licensee staff is provided training in the revised procedures prior to implementation; 3) the changes are in compliance with the NRC regulations and the license; and 4) the changes do not degrade the effectiveness of the program.

ITEM 10.7: SURVEYS

1. Surveys. The Department of Physics and Nuclear Engineering will survey its facility and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Appendix Q to NUREG -1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999.

2. Leak Tests. Leak tests will be performed by an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization authorized by NRC or an Agreement State to provide leak test kits to

other licensees and according to the sealed source or plated foil manufacturer's (distributor's) and kit supplier's instructions. As an alternative, we will implement the model leak test program published in Appendix R to NUREG - 1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licensees of Limited Scope,' dated December 1999.

3. Natural Uranium: We will not regularly leak test natural uranium source material, as 10 CFR 40 does not require leak testing of source material.

ITEM 10.8: TRANSPORTATION

The Department of Physics and Nuclear Engineering will meet applicable regulations for the transportation of RAM.

ITEM 10.9: MINIMIZATION OF CONTAMINATION

The Department of Physics and Nuclear Engineering will ensure that facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.

ITEM 11: WASTE MANAGEMENT

The Department of Physics and Nuclear Engineering will dispose of radioactive waste by transferring it to an authorized recipient.

ANNEX A: Training and Experience of Radiation Safety Officer, Dr. Daniel Schultz.

Education:

B.A. in Physics from the Pennsylvania State University, University Park, PA, [redacted]
B.A. in Astronomy from the Pennsylvania State University, University Park, PA, [redacted]
M.S. in Physics from the University of Wisconsin–Madison, Madison, WI [redacted]
Ph.D. in Space Physics, University of Wisconsin–Madison, Madison, WI [redacted]

Training: Training and experience at the United States Military Academy under the supervision of COL Edward Naessens, Ph.D., LTC Mark Visosky, Ph.D., Dr. Brian Moretti, Ph.D., and MAJ David Phillips, M.S., in classes, laboratories, and on the job from 2007-2008. ORAU RSO Training Course 6/22/2009 - 6/26/2009. Colorado State University Health Physics Exam Review (2013FA-NCT-EDLL-2005-200) 09/2013-01/2014. Certified Health Physicist 2014.

Area 1: Radiation Protection Principles
Area 2: Characteristics of Ionizing Radiation
Area 3: Units of Radiation Dose and Quantities
Area 4: Radiation Detection Instrumentation
Area 5: Biological Hazards of Exposure to Radiation
Area 6: NRC Regulatory Requirements and Standards
Area 7: Hands-on Use of Radioactive Materials

Area	*Date/Duration*	*Type of Training*
1	22-25 July 2008	Seminar/On-the Job
2	Aug 2007-Feb 2008	Classroom
3	14-27 Feb 2008	Classroom
4	Aug 2007-Jan 2008	Laboratory
5	10 Mar-14 Apr 2008	Classroom
6	22-25 July 2008	Seminar/On-the Job
7	Nov 2007-present	Laboratories and On-the-job

Experience with Isotopes, 2007-Present

ISOTOPE	*MAXIMUM ACTIVITY*	*TYPE OF EXPERIENCE*
Natural Uranium	2500 kg	Light Water Moderated Subcritical Assembly
Pu-239	80 g	Sealed neutron source
Cs-137	1 Ci	Compton Experiment, radiation detection experiments
Co-57	10 mCi	Mossbauer Experiment
Am-241	10 mCi	X-ray Studies
Ba-133	7 μCi	Check Source
Bi-207	5.2 μCi	Check Source
C-14	10 μCi	Check Source
Cd-109	8 nCi	Check Source
Cl-36	9.1 μCi	Check Source
Co-60	5 μCi	Check Source

ISOTOPE	*MAXIMUM ACTIVITY*	*TYPE OF EXPERIENCE*
Eu-152	5 μCi	Check Source
Gd-148	0.2 μCi	Check Source
Kr-85	0.2 μCi	Check Source
Mn-54	0.1 μCi	Check Source
Na-22	0.7 μCi	Check Source
Nb-94	0.14 μCi	Check Source
Ni-63	15 mCi	Fluorescence Spectroscopy
Pa-234	9 nCi	Check Source
Pb-210	0.1 μCi	Check Source; Milliken Oil Drop Experiment; alpha spectroscopy experiment
Pm-147	6 nCi	Check Source
Po-210	0.1 μCi	Check Source
Ra-266	5 nCi	Check Source
Sr-90	5.3 μCi	Check Source
Tc-99	0.2 μCi	Check Source
Th-230	16 nCi	Check Source
Tl-204	0.32 μCi	Check Source
U-238	5 nCi	Check Source
Zn-65	0.9 μCi	Check Source (Mixed with Cs-137)

Annex B.1: Training and Experience of Authorized User, LTC Kenneth S. Allen.

Education:

B.S. in Civil Engineering from the United States Military Academy, West Point, NY, [redacted]
M.S. in Nuclear Engineering from University of Florida, Gainesville, FL, [redacted]
Ph.D. in Nuclear Engineering from University of South Carolina, Columbia, SC, [redacted]

Training: Training and experience at Armed Forces Radiobiological Research Institute (AFRRI) as a Licensed Senior Reactor operator of the 1.1 MW TRIGA reactor. Conducted annual training on radiation safety and protection. Served as the team leader for the radiation spill response team. As team leader, organized and conducted quarterly training drills for spill responses in the reactor and lab. Trained junior enlisted and noncommissioned officers from Army, Navy, and Air Force on radiation protection measures in the reactor facility.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E, F	Department of Nuclear Engineering, University of FL	2001-2003	Classes & Laboratory
A, B, C, D, E, F	Armed Forces Radiobiological Institute	2006-2008	On the job, Classes & Laboratory
A, B, C, D, E	University of South Carolina	2008 - 2011	Classes, & Laboratory

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Uranium	2500 kg	2006-2008	TRIGA Reactor
Pu-239	80 g	2001-2003	Sealed neutron source
Cs-137	50 mCi	2001-2003	Shielding Experiment
Co-60	500 Kg	2006-2006	Cobalt Irradiator
Am-241	80 g	1992-1996, 2007-2008	Sealed neutron source
Various isotopes with atomic numbers 1 through 95	Nominal activity	2001-2003, 2006-2008, 2008-2011	Check Sources

Annex B.2: Training and Experience of Authorized User, MAJ Andrew W. Decker.

Education.

B.S. in Psychology from the United States Military Academy, West Point, NY, [redacted]
M.S. in Nuclear Engineering from AFIT, Dayton, OH, [redacted]

Training. Training and experience at AFIT under the supervision of Dr. Jim Petrosky and LTC Stephen McHale, which included safety procedures and shielding requirements for high energy neutron accelerators.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E, F	Department of Nuclear Engineering, AFIT	2012-2014	Classes & Laboratory

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
PuBe	4.89 Ci	2014	Part of AFIT M.S. Thesis research
Cs-137	1.2 Ci	2012	Survey Experiment
Fe-55	Nominal	2013	Various Experiments
Am-241	Nominal	2013	Various Experiments
Cd-109	Nominal	2013	Various Experiments
Various isotopes with atomic numbers 1 through 95	Nominal activity	2012-2014	Check Sources

Annex B.3: Training and Experience of Authorized User, MAJ Samuel A. Heider.

Education.

B.A. in Physics from the University of Nebraska at Lincoln, Lincoln, NE, [redacted]
M.S. in Nuclear Engineering from Kansas State University, Manhattan, KS, [redacted]

Training. Training and experience at Kansas State University under the supervision of Doctors William Dunn, J. Kenneth Shultis, and Douglas S. McGregor included safety procedures and shielding requirements for gamma-ray and thermal neutron beams.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, E, F	D/Physics, University of Nebraska, Lincoln NE	2003-2004	Classes & Laboratory
A, B, C, D, E, F	Department of Nuclear Engineering, Kansas State University	2010-2012	Classes & Laboratory

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Various isotopes with atomic numbers 1 through 95	Nominal activity	2003-2004, 2010-2012	Check Sources
Deuterium-Tritium Neutron Generator	$1x10^6$ Neutrons per second	2012	IED Detection Experiments

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Annex B.4: Training and Experience of Authorized User, MAJ Dean A. Mathis.

Education.

B.S. in Nuclear Engineering from United States Military Academy, West Point, NY, [redacted]
M.S. in Nuclear Engineering from Texas A&M University, College Station, TX, [redacted]

Training. Training and experience at USMA under the supervision of COL Edward Naessens and at TAMU under the supervision of Dr. Pavel V. Tsvetkov. Training included experimentation with USMA's subcritical assembly, and TAMU's research reactor at the Nuclear Science Center.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E	D/Physics, US Military Academy, West Point, NY	2002-2005	Classes & Laboratory
A, B, C, D, E, F	Department of Nuclear Engineering, TAMU	2012 - 2014	Classes & Laboratory
A, B, C, D, E, F	D/Physics, US Military Academy, West Point, NY	2014 - present	On the job, Classes, & Laboratory

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Uranium (natural)	2500 kg	2003-2005	Light Water Moderated Subcritical Assembly
Cs-137	5 μCi	2002-2005, 2012-2015	Source identification / Detector efficiency laboratory
Uranium (20% enriched)	159 kg U	2012-2014	U-ZrH fueled, 1MW reactor.
Various isotopes with atomic numbers 1 through 95	Nominal activity	2013-2014	Neutron Irradiation Experimentation

Annex B.5: Training and Experience of Authorized User, MAJ Joshua J. Molgaard.

Education.

B.S. in Physics from Bob Jones University, Greenville, SC, [redacted]
M.S. in Physics from Clemson University, Clemson, SC, [redacted]
M.S. in Nuclear Engineering from the University of Tennessee, Knoxville, TN, [redacted]

Training. Training and experience at the University of Tennessee (UT) under the supervision of Dr. Howard Hall and at Oak Ridge National Laboratory (ORNL) under the supervision of Dr. Joseph Birdwell included safety procedures, shielding requirements, dosimeter use, and formal Radiation Worker II training.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E, F	D/Nuclear Engineering, UT	2012 – 2014	Classes & Laboratory
A, B, C, D, E, F	ORNL	2012 – 2014	Classes & Laboratory
A, B, C, D, E, F	D/P&NE, USMA	2014 – present	On the job, Classes, & Laboratory

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Uranium	500 g	2012 – 2014	Surrogate Nuclear Melt Glass production at UT
Cs-137	50 mCi	2012 – present	Radiation Detection Labs
Co-60	60 mCi	2012 – present	Radiation Detection Labs

Annex B.6: Training and Experience of Authorized User, Dr. Brian Moretti.

Education:

B.S. General Science from United States Military Academy, West Point, NY, [redacted]
M.E. Engineering Physics from University of Virginia, Charlottesville, VA, [redacted]
Ph.D. Nuclear Engineering and Science from Rensselaer Polytechnic Institute, Troy, NY, [redacted]

Training: Training and experience at USMA under the supervision of COL Robert Cherry included calibration procedures and radiation safety procedures and requirements.

Category A: Principles and Practice of Radiation Protection
Category B: Radioactivity Measurement Standardization and Monitoring
Category C: Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
Category D: Biological Effects of Radiation
Category E: Radioactive Waste Disposal

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A,B,C,D,E	Department of Nuclear Engineering, Rensselaer Polytechnic Institute, NY	1993-1996	Classes/Laboratory Experience
A,B,C,D	Department of Nuclear Engineering and Engineering Physics, University of Virginia, VA	1982-1984	Classes/Laboratory Experience
A,B,C,D	United States Military Academy	1974-1976; 1984-1987 and 1996-present	Class/Experiments

Experience with Isotopes

ISOTOPE	*TYPE OF EXPERIENCE*	*MAXIMUM ACTIVITY*	*DURATION OF EXPERIENCE*
Uranium	Light Water Moderated Subcritical Assembly	2500 kg	1974-1976; 1984-1987 and 1996-present
Any byproduct material with atomic numbers 1-91	Sealed Sources	Not to exceed 10 mCi/source and 200 mCi total	1974-1976; 1984-1987 and 1996-present
Cesium 137	Sealed Sources	50 mCi total for a single source	1974-1976; 1984-1987 and 1996-present
Plutonium 239	Sealed solid neutron sources (Monsanto)	80 grams total in 5 sealed containers; 1000 mCi each	1974-1976; 1984-1987 and 1996-present
Americium 241	Sealed Source	10 mCi	1974-1976; 1984-1987 and 1996-present
Cadmium 109	Sealed Source	25 mCi	1974-1976; 1984-1987 and 1996-present
Iron 55	Sealed Source (Isotope Products Laboratories Mdl AN-55-25)	25 mCi	1974-1976; 1984-1987 and 1996-present

Annex B.7: Training and Experience of Authorized User, LTC David P. Morrow.

Education.

B.S. in Physics from the United States Military Academy, West Point, NY, [redacted]
M.S. in Nuclear Engineering from Air Force Institute of Technology (AFIT), [redacted].
Ph.D. in Applied Physics, Naval Postgraduate School (NPS), [redacted]

Training. Training and experience at AFIT under the supervision of Dr. James Petrosky and Dr. Vince Jodoin included safety procedures and shielding requirements for check sources of all types (α, β, γ, neutron) commonly found in nuclear engineering laboratories.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E, F	D/Physics, US Military Academy, West Point, NY	1987-1991	Classes & Laboratory
A, B, C, D, E, F	Air Force Institute of Technology	2003-2005	Classes & Laboratory
A, B, C	Naval Postgraduate School	2009-2012	Classes & Laboratory
A, B, C	Lawrence Livermore National Laboratory	2010-2012	On the job

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Uranium	2500 kg	1990-1991	Light Water Moderated Subcritical Assembly
Pu/Be neutron source	1 Cu	1990-1991	Light Water Moderated Subcritical Assembly
Various isotopes with atomic numbers 1 through 95	Nominal activity	2001-2003	Check Sources

Annex B.8: Training and Experience of Authorized User, COL Edward P. Naessens, Ph.D

Education:

B.S. United States Military Academy, West Point, NY, [redacted]
M.S. Physics from Rennselaer Polytechnic Institute, Troy, NY, [redacted]
Ph.D. Nuclear Engineering and Science from Rensselaer Polytechnic Institute, Troy, NY, [redacted]

Training: Training and experience at USMA under the supervision of MAJ John Cuellar included calibration procedures and radiation safety procedures and requirements.
Training and experience at Rensselaer Polytechnic Institute under the supervision of Dr. George Xu included radioactivity measurement standardization, calibration procedures and radiation safety procedures and requirements.

Category A: Principles and Practice of Radiation Protection
Category B: Radioactivity Measurement Standardization and Monitoring
Category C: Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
Category D: Biological Effects of Radiation
Category E: Radioactive Waste Disposal

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A,B,C,D,E	Rensselaer Polytechnic Institute	1996-1999	Classes/Laboratory Experience
A,B,C,D,E	United States Military Academy	1999-present	Class/Experiments

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DURATION OF EXPERIENCE*	*TYPE OF EXPERIENCE*
Uranium	2500 kg	1996- present	Light Water Moderated Subcritical Assembly
Pu-239	80 g	1996- present	Sealed neutron source
Cs-137	Nominal Activity	1996- present	Check Sources
Co-57	Nominal Activity	1996- present	Check Sources
Co-60	100 µCi	1996-1999	Calibration
Am-241	5 Ci	1996-present	Calibration
Cs-137	5 Ci	1996-present	Calibration

Annex B.9: Training and Experience of Authorized User, Mr. Nsikak P. Okosi

Education.

B.S. in Physics from the University of Calabar, Calabar - FRN, [redacted]

M.S. in Radiation Biophysics from Ahmadu Bello University, Zaria, FRN (in collaboration with Justus Liebig Universitat, Giessen, Germany (DAAD Fellow)), [redacted]

M.A. in Bioimaging, Boston University School of Medicine, [redacted]

Training. Training and experience at: Institute fur Biophysik and Zentrale fur Biophysik of Justus Liebig Universitat, Giessen, Germany under the supervision of Drs. Eckart Schneider and Georg Seibold (included laboratory techniques and utilization of radiation and nuclear biology); at Center for Energy Research & Training, Ahmadu Bello under the supervision of Dr. S. P. Mallam (included radiation risk assessment and radiation protection); and Center for Biomedical Imaging; Boston University School of Medicine under the supervision of Dr. Hernan Jara (included biological effects of ionizing radiation).

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E	Ahmadu Bello University, Zaria, FRN	1995, 1998	Classes, Laboratory, Field Work and Practicum
A, B, E, F	Justus Liebig Universitat, Giessen, Germany	1995 - 1998	Classes & Laboratory
A, B, E	Army Medical Department & Schools Fort Sam Houston, San Antonio, TX	2006-2007	On the job
A, B, C, D, E	Boston University School of Medicine	2009-2010	Practicum, Classes, & Laboratory
F	D/Chemistry, United States Naval Academy, Annapolis, MD	2012	On the job
D, F	D/Physics and Nuclear Engineering, United States Military Academy	2013-present	On the job

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Cs-137; Cs-134	Food contaminants of unspecified activity	1995-1998	Measurement of internal contamination of subjects using whole body counter
Co-60	555TBq	1994-1998	used for sterilization or reagent containers
Am-241	185 MBq	1995-1998	Dosimetry; Characterization & Irradiation Research Work
H-3	Nominal activity	1997	Scintillation Counter Probes
C-14	Nominal activity	1997	Scintillation Counter Probes
Na-22	Nominal activity	1997	Scintillation Counter Probes
K-40	Nominal activity	1997	Scintillation Counter Probes
I-125	Nominal activity	1997	Scintillation Counter Probes
P-32	Nominal activity	1997	Scintillation Counter Probes
S-35	Nominal activity	1997	Scintillation Counter Probes
Pb-210	Nominal activity	2012	Demonstrations for counting statistics

Annex B.10: Training and Experience of Authorized User, LTC Christopher D. Pitcher

NRC FORM 313A (RSO) (10-2006) U.S. NUCLEAR REGULATORY COMMISSION

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION [10 CFR 35.50]

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 10/31/2008

Name of Proposed Radiation Safety Officer

Christopher David Pitcher

Requested Authorization(s) *The license authorizes the following medical uses (check all that apply):*

[X] 35.100 [X] 35.200 [X] 35.300 [X] 35.400 [ ] 35.500 [ ] 35.600 (remote afterloader)

[X] 35.600 (teletherapy) [ ] 35.600 (gamma stereotactic radiosurgery) [ ] 35.1000 ( )

PART I – TRAINING AND EXPERIENCE
(Select one of the four methods below)

*Training and Experience, including board certification, must have been obtained within the 7 years preceding the date of application or the individual must have obtained related continuing education and experience since the required training and experience was completed. Provide dates, duration, and description of continuing education and experience related to the uses checked above.

[ ] **1. Board Certification**

a. Provide a copy of the board certification.

b. Use Table 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.

c. Skip to and complete Part II Preceptor Attestation.

OR

[ ] **2. Current Radiation Safety Officer Seeking Authorization to Be Recognized as a Radiation Safety Officer for the Additional Medical Uses Checked Above**

a. Use the table in section 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for the additional types of medical use for which recognition as RSO is sought.

b. Skip to and complete Part II Preceptor Attestation.

OR

[X] **3. Structured Educational Program for Proposed Radiation Safety Officer**

a. Classroom and Laboratory Training

Description of Training	Location of Training	Clock Hours	Dates of Training*
Radiation physics and instrumentation	University of Florida, Gainesville, FL	285	Aug '89 – Dec '95
Radiation protection	University of Florida, Gainesville, FL	210	Aug '89 – Dec '95
Mathematics pertaining to the use and measurement of radioactivity	University of Florida, Gainesville, FL	330	Aug '89 – Dec '95
Chemistry of byproduct material for medical use	University of Florida, Gainesville, FL	165	Aug '89 – Dec '95
Radiation biology	University of Florida, Gainesville, FL	45	Aug '89 – Dec '95
	Total Hours of Training:	1035	

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(10-2006)

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

b. Supervised Radiation Safety Experience
(If more than one supervising individual is necessary to document supervised work experience, provide multiple copies of this section.)

Description of Experience	Location of Training/ License or Permit Number of Facility	Dates of Training*
Shipping, receiving, and performing related radiation surveys	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Using and performing checks for proper operation of instruments used to determine the activity of dosages, survey meters, and instruments used to measure radionuclides	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Securing and controlling byproduct material	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Using administrative controls to avoid mistakes in administration of byproduct material	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Using procedures to prevent or minimize radioactive contamination and using proper decontamination procedures	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Using emergency procedures to control byproduct material	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Disposing of byproduct material	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06
Licensed Material Used (e.g., 35.100, 35.200, etc.)+ 35.100, 35.200, 35.300, 35.400, 35.500 (Teletherapy)	Martin Army Community Hospital, Fort Benning, GA Walter Reed Army Medical Center, Washington, D.C.	Jan '99 - Aug '01 Aug '04 - Aug '06

+ Choose all applicable sections of 10 CFR Part 35 to describe radioisotopes and quantities used: 35.100, 35.200, 35.300, 35.400, 35.500, 35.600 remote afterloader units, 35.600 teletherapy units, 35.600 gamma stereotactic radiosurgery units, emerging technologies (provide list of devices).

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RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

b. Supervised Radiation Safety Experience (continued)

(If more than one supervising individual is necessary to document supervised work experience, provide multiple copies of this section.)

Supervising Individual	License/Permit Number listing supervising individual as a Radiation Safety Officer
Mark A. Melanson	NRC License # 08-01738-02

This license authorizes the following medical uses:

[X] 35.100	[X] 35.200	[X] 35.300	[X] 35.400
[ ] 35.500	[ ] 35.600 (remote afterloader)		[X] 35.600 (teletherapy)
[ ] 35.600 (gamma stereotactic radiosurgery)			[ ] 35.1000 ( )

c. Describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.

Description of Training	Training Provided By	Dates of Training*
Radiation safety, regulatory issues, and emergency procedures for 35.100, 35.200, and 35.500 uses	COL Mark A. Melanson, CHP, PhD, Radiation Safety Officer	Apr '05 Aug '06
Radiation safety, regulatory issues, and emergency procedures for 35.300 uses	COL Mark A. Melanson, CHP, PhD, Radiation Safety Officer	Apr '05 – Aug '06
Radiation safety, regulatory issues, and emergency procedures for 35.400 uses	COL Mark A. Melanson, CHP, PhD, Radiation Safety Officer	Apr '05 – Aug '06
Radiation safety, regulatory issues, and emergency procedures for 35.600 - teletherapy uses	COL Mark A. Melanson, CHP, PhD, Radiation Safety Officer	Apr '05 – Aug '06
Radiation safety, regulatory issues, and emergency procedures for 35.600 - remote afterloader uses	N/A	
Radiation safety, regulatory issues, and emergency procedures for 35.600 - gamma stereotactic radiosurgery uses	N/A	
Radiation safety, regulatory issues, and emergency procedures for 35.1000, specify use(s):	N/A	

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RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

c. Training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license (continued)

Supervising Individual *If training was provided by supervising RSO, AU, AMP, or ANP. (If more than one supervising individual is necessary to document supervised training, provide multiple copies of this page.)*	License/Permit Number listing supervising individual
Mark A. Melanson	NRC License # 08-01738-02

License/Permit lists supervising individual as:

[X] Radiation Safety Officer [ ] Authorized User [ ] Authorized Nuclear Pharmacist
[ ] Authorized Medical Physicist

Authorized as RSO, AU, ANP, or AMP for the following medical uses:

[X] 35.100 [X] 35.200 [X] 35.300 [X] 35.400
[ ] 35.500 [ ] 35.600 (remote afterloader) [X] 35.600 (teletherapy)
[ ] 35.600 (gamma stereotactic radiosurgery) [ ] 35.1000 ( )

d. Skip to and complete Part II Preceptor Attestation.

OR

[ ] **4. Authorized User, Authorized Medical Physicist, or Authorized Nuclear Pharmacist identified on the licensee's license**

a. Provide license number.

b. Use the table in section 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.

c. Skip to and complete Part II Preceptor Attestation.

PART II – PRECEPTOR ATTESTATION

Note: This part must be completed by the individual's preceptor. The preceptor does not have to be the supervising individual as long as the preceptor provides, directs, or verifies training and experience required. If more than one preceptor is necessary to document experience, obtain a separate preceptor statement from each.

First Section
Check one of the following:

[ ] **1. Board Certification**

[ ] I attest that _____ has satisfactorily completed the requirements in
Name of Proposed Radiation Safety Officer

10 CFR 35.50(a)(1)(i) and (a)(1)(ii); or 35.50 (a)(2)(i) and (a)(2)(ii); or 35.50(c)(1).

OR

[X] **2. Structured Educational Program for Proposed Radiation Safety Officers**

[X] I attest that Christopher D. Pitcher has satisfactorily completed a structural educational
Name of Proposed Radiation Safety Officer

program consisting of both 200 hours of classroom and laboratory training and one year of full-time radiation safety experience as required by 10 CFR 35.50(b)(1).

OR

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RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

Preceptor Attestation (continued)

First Section (continued)
Check one of the following:

☐ 3. **Additional Authorization as Radiation Safety Officer**

☐ I attest that _____ is an
Name of Proposed Radiation Safety Officer

☐ Authorized User ☐ Authorized Nuclear Pharmacist

☐ Authorized Medical Physicist

identified on the Licensees license and has experience with the radiation safety aspects of similar type of use of byproduct material for which the individual has Radiation Safety Officer responsibilities

AND

Second Section
Complete for all *(check all that apply)*:

☒ I attest that Christopher D. Pitcher has training in the radiation safety, regulatory issues, and
Name of ProposedRadiation Safety Officer
emergency procedures for the following types of use:

☒	35.100	
☒	35.200	
☒	35.300	oral administration of less than or equal to 33 millicuries of sodium Iodide I-131, for which a written directive is required
☒	35.300	oral administration of greater than 33 millicuries of sodium Iodide I-131
☒	35.300	parenteral administration of any beta-emitter, or a photon-emitting radionuclide with a photon energy less than 150 keV for which a written directive is required
☒	35.300	parenteral administration of any other radionuclide for which a written directive is required
☒	35.400	
☐	35.500	
☐	35.600	remote afterloader units
☒	35.600	teletherapy units
☐	35.600	gamma stereotactic radiosurgery units
☐	35.1000	emerging technologies, including:

_____
_____
_____

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RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

AND

Third Section
Complete for ALL

[X] I attest that Christopher D. Pitcher has achieved a level of radiation safety knowledge
Name of Proposed Radiation Safety Officer

sufficient to function independently as a Radiation Safety Officer for a medical use licensee.

Fourth Section
Complete the following for Preceptor Attestation and signature

I am the Radiation Safety Officer for Walter Reed Army Medical Center, Washington, D.C.
Name of Facility

License/Permit Number: 08-01738-02

Name of Preceptor	Signature	Telephone Number	Date
Mark A. Melanson, CHP, PhD		(202) 356-0060	15 Aug 2006

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Amendment No. 79

MATERIALS LICENSE

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
   Walter Reed Army Medical Center

2. 6900 Georgia Avenue, NW
   Washington, D.C. 20307-5001

In accordance with the application dated May 21, 2004 and the letter dated April 15, 2005,

3. License number 08-01738-02 is amended in its entirety to read as follows:

4. Expiration date April 30, 2015

5. Docket No. 03001317
   Reference No. 08-01738-03

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	A. Any	A. 400 millicuries per radionuclide and 26 curies total
B. Hydrogen 3	B. Any	B. 2 curies
C. Phosphorus 32	C. Any	C. 1 curie
D. Strontium 90	D. Sealed Sources (Isotope Products, Inc. Model BF 90T Series [labeled as 67-850], Tracerlab Models RA-1A and RA-2A, Nuclear Enterprises Model 2503)	D. 500 millicuries
E. Molybdenum 99	E. Any	E. 23 curies
F. Technetium 99m	F. Any	F. 23 curies
G. Iodine 131	G. Any	G. 2 curies
H. Xenon 133	H. Any	H. 2 curies
I. Cesium 137	I. Sealed Sources (3M Health Physics Service Model Series 6500 [formerly 6D6C-CA])	I. 2 curies

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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. Gadolinium 153	J. Sealed Sources (Isotope Products Laboratories Models NES-8424 and HEGL-0120, AEA Technology, Model GD.LIN2)	J. 6 curies
K. Iridium 192	K. Any	K. 2 curies
L. Cesium 137	L. Sealed Sources (3M Health Physics Service Model Series 6500 [formerly 6D6C-CA])	L. 50 millicuries
M. Americium 241	M. Sealed Source (Monsanto Agricultural Company Model 2704)	M. 1.1 curies
N. Plutonium 239	N. Any	N. 0.01 millicuries
O. Americium 241	O. Any	O. 0.01 millicuries
P. Depleted Uranium	P. Metal	P. 400 kilograms
Q. Cesium 137	Q. Sealed Sources (J.L. Shepherd & Associates Model 6810; ORNL Model A-0096; Amersham Corporation (Reviss Services Limited) Models CDC.PE1, CDC.PE2, CDC.PE3 (R6000), CDC.PE4 (R6010), CDC.PE5 (R6020), CDC.PE6 (R6030), CDC.PE7 (R6040), CDC.PE8 (R6050))	Q. No single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State
R. Cobalt 60	R. Sealed Sources (J. L. Shepherd & Associates Model 7810)	R. No single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State

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9. Authorized use:

A. through K. Medical diagnosis, therapy and research in humans. Research and development as defined in 10 CFR 30.4, including animal studies; instrument calibration; student instruction; and in-vitro studies.

L. through O. Calibration and checking of the licensee's instruments. Teaching and training of students.

P. Shielding in linear accelerators.

Q. and R. For irradiation of materials in self-shielded irradiator devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and which have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.

CONDITIONS

10. Licensed material may be used or stored only at the licensee's facilities located at Walter Reed Army Medical Center (WRAMC), Washington, D.C.; WRAMC Forest Glen Section and Annex, Silver Spring, Maryland; Rickman Building, 13 Taft Court, Rockville, Maryland; and The Gillette Building, 1413 Research Boulevard, Rockville, Maryland.

11. A. The use of licensed material in or on humans shall be by an authorized user as defined in 10 CFR 35.2.

B. Individuals designated to work as authorized users, authorized nuclear pharmacists or authorized medical physicists, as defined in 10 CFR 35.2, shall meet the training, experience, and recentness of training criteria established in 10 CFR Part 35, and shall be designated, in writing, by the licensee's Radiation Safety Committee.

C. Licensed material in items 6.A. through 6.P. for other than human use shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.

D. Licensed material in items 6.Q. and 6.R. shall be used by, or under the supervision of, individuals who have received the training described in the revised application appended to the letter dated January 10, 2005, and have been designated, in writing, by the Radiation Safety Officer. The licensee shall maintain records of individuals designated as users for 3 years following the last use of licensed material by the individual.

E. The Radiation Safety Officer for this license is Lieutenant Colonel Mark Melanson, Ph.D.

12. In addition to the possession limits in item 8, the licensee shall further restrict the possession of licensed material at a single location to quantities below the limits specified in 10 CFR 30.72 which require consideration of the need for an emergency plan for responding to a release of licensed material.

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13. The licensee shall not use licensed material in field applications where it is released except as provided otherwise by specific condition of this license.

14. Experimental animals, or the products from experimental animals, that have been administered licensed materials shall not be used for human consumption.

15. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.

16. The licensee shall conduct a physical inventory every six months, or at other intervals approved by the U.S. Nuclear Regulatory Commission, to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory and shall include the radionuclides, quantities, manufacturer's name and model numbers, and the date of the inventory.

17. For sealed sources not associated with 10 CFR Part 35 use, the following conditions apply:

    A. Sealed sources shall be tested for leakage and/or contamination at intervals not to exceed six months or at the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or under equivalent regulations of an Agreement State.

    B. Notwithstanding Paragraph A of this Condition, sealed sources designed to primarily emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

    C. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.

    D. In the absence of a certificate from a transferor indicating that a leak test has been made within the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or under equivalent regulations of an Agreement State, prior to the transfer, a sealed source received from another person shall not be put into use until tested and the test results received.

    E. Sealed sources need not be tested if they contain only hydrogen-3; or they contain only a radioactive gas; or the half-life of the isotope is 30 days or less; or they contain not more than 100 microcuries of beta- and/or gamma-emitting material or not more than 10 microcuries of alpha-emitting material.

    F. Sealed sources need not be tested if they are in storage and are not being used; however, when they are removed from storage for use or transferred to another person and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

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G. The leak test shall be capable of detecting the presence of 0.005 microcurie (185 becquerels) of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie (185 becquerels) or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(c)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations.

H. Tests for leakage and/or contamination, including leak test sample collection and analysis, shall be performed by the licensee or by other persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

I. Records of leak test results shall be kept in units of microcuries and shall be maintained for 5 years.

18. Maintenance, repair, cleaning, replacement, and disposal of foils contained in detector cells shall be performed only by the device manufacturer or other persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

19. A. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents the foil temperatures from exceeding that specified in the certificate of registration referred to in 10 CFR 32.210.

B. When in use, detector cells containing a titanium tritide foil or a scandium tritide foil shall be vented to the outside.

20. The licensee shall not repair, remove, replace, or alter any of the following: electrical and mechanical systems that control source or shielding movement, the irradiator's shielding or sealed source, safety interlocks, or any component that may affect safe operation of the irradiator. These activities shall be performed by a person specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

21. For each J. L. Shepherd and Associates, Mark I or Model 81-22, cesium-137 irradiator installed and used, the licensee shall:

A. Permit the use of the irradiator only when a calibrated and operable radiation survey meter or room monitor is available; and

B. Permit the irradiator door to be opened only after the operator has checked visual indicators to verify that the source has returned to its safe storage position; and

C. Have room monitors installed that will:

(i) Operate at all times when the irradiator is in use; and
(ii) Activate a visible and audible alarm when radiation exceeds 2 millirems per hour; and

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(iii) Detect any radiation leaking from the irradiator door; and
(iv) Be visible to the irradiator user when the user is next to the irradiator; or

D. If a room monitor is not installed, have available a calibrated and operable survey meter which will be used to:

(i) Determine the radiation level at the irradiator door when the door is closed; and
(ii) Check for any increase in radiation levels each time the irradiator door is opened.

E. If abnormal radiation levels or any malfunctions of the irradiator are detected at any time, the licensee shall cease using the irradiator, restrict access to the area housing the irradiator, immediately notify the Radiation Safety Officer, and submit all reports required under 10 CFR Parts 20, 21, or 30.

F. Not repair or authorize repairs of the irradiator except by the manufacturer or other persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

22. The procedures contained in the manufacturer's instruction manual for the irradiator authorized by this license, shall be followed, and a copy of this manual shall be made available to each person using or having responsibility for the use of the device.

23. The licensee is authorized to hold byproduct material with a physical half-life of less than or equal to 120 days for decay-in-storage before disposal without regard to its radioactivity if the licensee:

A. Monitors byproduct material at the surface before disposal and determines that its radioactivity cannot be distinguished from the background radiation level with an appropriate radiation detection survey meter set on its most sensitive scale and with no interposed shielding; and

B. Removes or obliterates all radiation labels, except for radiation labels on materials that are within containers and that will be managed as biomedical waste after they have been released from the licensee; and

C. Maintains records of the disposal of licensed materials for 3 years. The record must include the date of disposal, the survey instrument used, the background radiation level, the radiation level measured at the surface of each waste container, and the name of the individual who performed the disposal.

24. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

25. Notwithstanding the requirements of License Condition 26, the licensee is authorized to make program changes and changes to procedures specifically identified in the condition, which were previously approved by the U.S. Nuclear Regulatory Commission and incorporated into the license without prior Commission approval as long as:

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A. The proposed revision is documented, reviewed, and approved by the licensee's Radiation Safety Committee in accordance with established procedures prior to implementation.

B. The revised program is in accordance with regulatory requirements, will not change the license conditions, and will not decrease the effectiveness of the Radiation Safety Program.

C. The licensee's staff is trained in the revised procedures prior to implementation.

D. The licensee's audit program evaluates the effectiveness of the change and its implementation.

26. 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. This license condition applies only to those procedures that are required to be submitted in accordance with the regulations. Additionally, this license condition does not limit the licensee's ability to make changes to the radiation protection program as provided for in 10 CFR 35.26. 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. Letter dated January 10, 2005, enclosing revision of application dated May 21, 2004 [ML050650027]
B. Letter dated March 28, 2005 [ML050930009]

For the U.S. Nuclear Regulatory Commission

Date April 24, 2005 By *Original signed by Sandra Gabriel*

Sandra Gabriel
Medical Branch
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

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Amendment No. 45

MATERIALS LICENSE

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 June 20, 2000
1. Department of the Army Martin Army Community Hospital	3. License No. 10-08493-02 is amended in its entirety to read as follows:
2. ATTN: HSXB-PM-HP Fort Benning, Georgia 31905-6100	4. Expiration date: July 31, 2005
	5. Docket No. 030-01351

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 identified in 10 CFR 35.100	A. Any radiopharmaceutical identified in 10 CFR 35.100	A. As needed
B. Any byproduct material identified in 10 CFR 35.200	B. Any radiopharmaceutical identified in 10 CFR 35.200	B. As needed
C. Any byproduct material identified in 10 CFR 31.11	C. Prepackaged Kits	C. As needed

9. Authorized Use:

A. Medical use described in 10 CFR 35.100.
B. Medical use described in 10 CFR 35.200.
C. In vitro studies.

CONDITIONS

10. Location for use: Martin Army Community Hospital
Fort Benning, Georgia

11. Radiation Safety Officer: CPT Christopher D. Pitcher and, in his absence, LTC Ronald W. Wong, MC

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MATERIALS LICENSE **SUPPLEMENTARY SHEET**	License Number 10-05493-02
	Docket or Reference Number 030-01351
	Amendment No. 45

12. A. The use of licensed materials in or on humans shall be by a physician as defined in 10 CFR 35.2

B. Notwithstanding the provisions of 10 CFR 35.13(b), the licensee may designate physicians, who meet the training criteria established in 10 CFR Part 35, Subpart J and have been designated by the licensee's Radiation Safety Committee, to use licensed material in or on humans. The licensee shall maintain records of individuals designated as users for 3 years after the individual's last use of license material.

C. Notwithstanding the requirements of 10 CFR 35.14(a); and 10 CFR 35.14(b)(1) regarding authorized users, the licensee is not required to notify the Commission of the selection of or the permanent discontinuation of services by authorized users.

13. In addition to the possession limits in item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35 for establishing decommissioning financial assurance.

14. Sealed sources containing licensed material shall not be opened by the licensee.

15. 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, except for minor changes in the medical use radiation safety procedures as provided in 10 CFR 35.31. 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 dated April 21, 1995
B. Application and letter dated January 26, 1996 (change Radiation Safety Officer)
C. Letters dated:
   1. April 17, 1997 [physical changes layout including floor diagram]
   2. March 24, 1999 [Change of Radiation Safety Officer]
   3. October 15, 1999 [notification of auth user selection]
   4. March 14, 2000 [add alternate RSO]
   5. **October 6, 2000 [add additional locations of use within the hospital]**
   6. **June 20, 2000 [change Radiation Safety Officer]**

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

MICHAEL L. FUELER

DATE OCT 23 2000

BY

Region II, Division of Nuclear Materials Safety
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303-8931

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Annex B.11: Training and Experience of Authorized User, LTC Robert D. Prins

Education.

B.A. in Engineering Physics from the United States Military Academy, West Point, NY, [redacted]

M.S. in Medical Physics (Therapy), Vanderbilt University, Nashville, TN, [redacted]
Ph.D. in Medical Health Physics, Columbia University, New York, NY, [redacted]

Training. Training and experience at Brooke Army Medical Center, Fort Sam Houston, Texas, under the supervision of COL Casmere Taylor and COL John Cuellar included calibration procedures, radioactivity measurement standardization, and radiation safety procedures and requirements.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, E	D/Physics, US Military Academy, West Point, NY	1988-1993	Classes & Laboratory
A, B, C, D, E, F	Vanderbilt University, Nashville, Tennessee	1999-2001	Classes/Laboratory Experience
A, B, C, D, E, F	Various (see curriculum vitae)	1996-1999	Classes / On the job
A, B, C, D, E, F	D/Physics, US Military Academy, West Point, NY	2001-2005	On the job, Teaching Classes
A, B, C, D, E, F	Army Materiel Command	2005-2008	On the job
A, B, C, D, E, F	Columbia University/Memorial Sloan Kettering Cancer Center	2008-2011	Classes/Research
A, B, C, D, E, F	D/Physics and nuclear Engineering	2013-Present	On the job, Teaching Classes

Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Uranium	2500 kg	1992-1993, 2001-2005	Light Water Moderated Subcritical Assembly
Pu-239	80 g	1992-1993, 2001-2005	Sealed neutron source
Cs-137	Nominal Activity	1999-present	Check Sources & Brachytherapy Sources
Co-57	Nominal Activity	1992-1993, 2001-2005	Check Sources
Co-60	Nominal Activity	1999-2001	Teletherapy Unit

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Various isotopes with atomic numbers 1 through 83	10 mCi	1996-1999, 2001-present	Sealed Sources
Tc-99m	Ci Generator	1996-1999	Nuclear Medicine Pharmacy doses
I-131	Nominal Activity	1996-1999, 2001 – 2011	Nuclear Medicine Pharmacy, Check sources
I-125	Nominal Activity	1999-2001	Prostate Seed Implants
Ir-192	Nominal Activity	1999-2001	Brachytherapy Sources

Annex B.12: Training and Experience of Authorized User, LTC Chad C. Schools, Ph.D.

1. **Education**.
   B.S. in Physics from Worcester Polytechnic Institute (WPI), Worcester, MA, [redacted]
   M.S. in Engineering Management from Missouri University of Science and Technology, Rolla, MO, [redacted]
   M.S. in Nuclear Engineering from Air Force Institute of Technology (AFIT), Dayton, OH, [redacted]
   Ph.D. in Nuclear Engineering from Massachusetts Institute of Technology (MIT), Cambridge, MA, [redacted]

2. **Training**. I conducted Compton scatter and other standard radiation detection experiments at AFIT under the guidance of Dr. Larry Burggraf. I conducted neutron detection experiments at MIT under the guidance of Dr. Richard Lanza. My AFIT and MIT education included nuclear science laboratories and health physics classes. My duties at the Defense Threat Reduction Agency in the Post-Detonation Nuclear Forensics and the Military Applications of Radiation Detection offices required a wide range of training and experiences including: Radiation Worker II Training and opportunities to measure the radiation from various quantities and shapes of special nuclear materials. These and other related activities were conducted at various locations including the Device Assembly Facility (Nevada National Security Site), Idaho National Laboratory, Los Alamos National Laboratory, Y-12 National Security Complex, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratory, and Savannah River National Laboratory.

Category A: Radiation Protection Principles
Category B: Characteristics of Ionizing Radiation
Category C: Units of Radiation Dose and Quantities
Category D: Radiation Detection Instrumentation
Category E: Biological Hazards of Exposure to Radiation
Category F: Hands-on Use of Radioactive Materials

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
A, B, C, D, F	D/Physics, WPI, Worcester, MA	1993-1994	Physics Laboratory
A, B, C, D, E, F	Air Force Institute of Technology, Dayton, OH	2003-2005	Classes, Laboratory & Research
A, B, C, D, E, F	D/Physics, US Military Academy, West Point, NY	2005-2008	Classes & Laboratory
A, B, C, D, E	Defense Nuclear Weapons School, Kirtland AFB, NM	2008	Nuclear and Counterproliferation (FA52) Course
A, B, C, D, E, F	Various Department of Energy Facilities	2008-2011	On the job
A, B, C, D, E	Los Alamos National Laboratory, NM	2010	Los Alamos National Laboratory Radiation Worker II
A, B, C, D, E	Los Alamos National Laboratory, NM	2010	Device Assembly Facility Required Safety Training
A, B, C, D, E, F	D/Nuclear Science and Engineering, MIT, Cambridge, MA	2011 - 2014	Classes, Laboratory & Research
A, B, C, D, E, F	D/Physics, US Military Academy, West Point, NY	2014 - present	On the job, Classes, & Laboratory

3. Experience with Isotopes

ISOTOPE	*MAXIMUM ACTIVITY*	*DATE/DURATION*	*TYPE OF EXPERIENCE*
Special Nuclear Material	Various quantities	2008-2011	Various testing of radiation detection equipment for Department of Defense applications
Cf-252	10 mCi	2011-2014	Neutron detection experiments
Various isotopes	Nominal activity	1993-1994, 2003-2014	Check Sources

NRC FORM 532
(05-2016)

U.S. NUCLEAR REGULATORY COMMISSION

ACKNOWLEDGEMENT - RECEIPT OF CORRESPONDENCE

Name and Address of Applicant and/or Licensee

Department of the Army
ATTN: Edward P. Naessens, Jr., COL, PR,
Head of the Department of Physics
& Nuclear Engineering
Department of Physics & Nuclear Engineering
Room 480, Bartlett Hall, Building 753
West Point, NY 10996-1790

Date
December 14, 2016

License Number(s)
31-02102-02

Mail Control Number(s)
592508

Licensing and/or Technical Reviewer or Branch
Commercial, Industrial,, R&D, & Academic Branch (Branch 2)

This is to acknowledge receipt of your: ☑ **Letter and/or** ☐ **Application** **Dated:** 11/28/2016

The initial processing, which included an administrative review, has been performed.

☑ **Amendment** ☐ **Termination** ☐ **New License** ☐ **Renewal**

☑ **There were no administrative omissions identified during our initial review.**

☐ **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.**

☐ **Your application for a new NRC license did not include your taxpayer identification number. Please complete and submit NRC Form 531, Request for Taxpayer Identification Number, located at the following link:** http://www.nrc.gov/reading-rm/doc-collections/forms/nrc531.pdf

Follow the instructions on the form for submission.

☐ **The following administrative omissions have been identified:**

Your application has been assigned the above listed MAIL CONTROL NUMBER. When calling to inquire about this action, please refer to this control number. Your application has been forwarded to a technical reviewer. Please note that the technical review, which is normally completed within 180 days for a renewal application (90 days for all other requests), may identify additional omissions or require additional information. If you have any questions concerning the processing of your application, our contact information is listed below:

Region I
U. S. Nuclear Regulatory Commission
Division of Nuclear Materials Safety
2100 Renaissance Boulevard, Suite 100
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