

NRC FORM 313
(3-2009)
10 CFR 30, 32, 33,
34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0120

EXPIRES: 3/31/2012

APPLICATION FOR MATERIALS LICENSE

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 Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.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:

IF YOU ARE LOCATED IN:

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

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

Br 2

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:

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:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
612 E. LAMAR BOULEVARD, SUITE 400
ARLINGTON, TX 76011-4125

03031110

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1 THIS IS AN APPLICATION FOR (Check appropriate item)

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER

C. RENEWAL OF LICENSE NUMBER 19-00294-24

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

Commander
US Army Medical Research Institute of Chemical Defense
3100 Ricketts Point Road
Aberdeen Proving Ground, MD 21010-5400

3 ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Any USAMRICD research building/room that is properly permitted.

4 NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Benjamin F. Casole, III
TELEPHONE NUMBER
(410) 436-1780

RECEIVED REGION 1
2011 FEB 24 AM 11:02

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

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

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

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

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

9 FACILITIES AND EQUIPMENT

10. RADIATION SAFETY PROGRAM.

11 WASTE MANAGEMENT.

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

FEE CATEGORY **N/A** AMOUNT ENCLOSED \$

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

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF

WARNING 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE
Peter J. Schultheiss, Colonel, US Army, Commanding

SIGNATURE
Peter J. Schultheiss

DATE
16 FEB 2011

FOR NRC USE ONLY

TYPE OF FEE FEE LOG FEE CATEGORY AMOUNT RECEIVED CHECK NUMBER COMMENTS

\$

APPROVED BY

DATE

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US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT A

(Item 5 NRC Form 313)

LICENSED MATERIAL

	Element & Mass No.	Form	Maximum Amount
(1)	Hydrogen-3 (non-volatile)	Any	10 curies
(2)	Carbon-14	Liquid	2 curies
(3)	Nickel-63	Plated Metallic Foil, Sealed	15 millicuries per foil. 3.5 curies total.
(4)	Calcium-45	Any	0.5 curie
(5)	Sulfur-35	Any	2 curies
(6)	Phosphorous-32	Any	2 curies
(7)	Iodine-125 (non-volatile)	Any	1 curie
(8)	Phosphorous-33	Any	2 curies

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
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SUPPLEMENT B

(Item 6, NRC Form 313)

USE OF LICENSED MATERIAL

Material will be used in research and development as defined in 10 CFR 30.4. The material is not for human use. Following are examples of uses:

1. Hydrogen 3, - any form, line no. (1)
 - a. In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using laboratory animals or tissue.
 - b. Metallic foils for use in gas chromatographs and similar instruments.
 - c. Sealed sources for use in trace gas analyzers and similar instruments.
 - d. Labeling/synthesis (Wilzbach process) using bound isotope.
2. Carbon 14 - Any form, line no. (2) - In-vivo and in-vitro tracer studies, functional studies, metabolism research, and research involving elimination and distribution of toxic chemical agents using laboratory animals (mostly rodents) or tissue.
3. Nickel 63 - line no. (3) - Plated metallic foils in laboratory instruments used in Research and Development.
4. Calcium-45 - Line No. (4)
 - a. In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using laboratory animals (mostly rodents) or tissues.
 - b. Metallic foils for use in gas chromatographs and similar instruments.
 - c. Sealed sources for use in trace gas analyzers and similar instruments.
 - d. Labeling/synthesis (Wilzbach process) using bound isotope.

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5. Sulfur-35 - Line No. (5)

In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using animals (mostly rodents) or tissues.

6. Phosphorus-32 - Line No. (6)

In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using laboratory animals (mostly rodents) or tissues.

7. Iodine-125 - Line No. (7)

In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using laboratory animals (mostly rodents) or tissues.

8. Phosphorus-33 - Line No. (8)

In-vivo and in-vitro tracer studies, functional studies, radiation effects studies, biological studies of metabolism, elimination and distribution of toxic chemical agents using laboratory animals (mostly rodents) or tissues.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
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SUPPLEMENT C

(Item 7 Form 313)

INDIVIDUALS RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM AND
THE TRAINING AND EXPERIENCE OF THE RSO

The US Army Medical Research Institute of Chemical Defense (USAMRICD) Radiation Safety Committee (RSC) is appointed by the Commander to advise him on policy and actions necessary to ensure safety of personnel and property from hazards of ionizing radiation. Responsibilities include reviewing radiation protection aspects of proposed new uses of radioactive material and establishing protective measures as necessary and reviewing reports of radiation accidents and incidents to determine the cause and recommend appropriate actions to the Commander. The Radiation Safety Officer (RSO) is responsible for administering the program. Outlines of training and experience of the RSC members and the RSO and designated alternates are attached.

Use of radioactive material is controlled by a local radiological permit system that is administered by the RSO. Permits are issued on the basis of proposed use. Procedures for the safe use, transport, handling, storage and disposal of the material within limitations of terms and conditions of the NRC licenses, rules and regulations and Army regulatory requirements, facility capabilities, equipment, radiation protection instruments, and personnel training.

Qualifications of individuals to use radioactive material authorized by the permits are reviewed under radiation worker classification procedures. The procedures ensure adequate prior experience and training, and include dosimeter assignment through review and approval of the RSO and the Occupational Health Physician, after a medical examination.

Radiation Safety Officer

See section C-1 for the appointment orders for the RSO and alternates. Section C-2 gives the resume of the RSO. The RSO is authorized to stop radiologically unsafe operations. The RSO has sufficient time to perform radiation safety duties and responsibilities.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

Radiation Safety Committee

See attachment C-3 for the appointment orders for the RSC. Licensed material shall be used by, or under the supervision of individuals designated by the Radiation Safety Committee. The current Chairman is Dr. David E. Lenz. Section C-4 gives the resume of Dr. Lenz.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

ATTACHMENT C-1

ORDERS APPOINTING THE RADIATION SAFETY OFFICER AND
ALTERNATES

MCMR-UV-AJ

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Duty Appointment/Assignment

1. Effective 28 July 2004, the following personnel of the U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD 21010-5400 are designated Radiation Safety Officers:

Primary: Mr. Benjamin F. Casole, III
Alternate RSO: Mr. Paul Madairy
Alternate RSO: Mr. Dana R. Anderson
Alternate RSO: Mr. Harry Schwartzer

2. Authority: AR 11-9.

3. Purpose: To advise the Commander of the hazards to health and safety from radioactive materials or radiation producing devices and to staff supervise the USAMRICD Radiation Safety Program.

4. Period: Indefinite.

5. Special Instructions: None.

6. This memorandum supersedes all previous memoranda on this subject.

FOR THE COMMANDER:

Signature Authenticated by ApproveIt, 
Approved by: Matthew A. Moser,
on: 29 July 2004 at 8:32:36

MATTHEW A. MOSER
CPT, MS
Adjutant

DISTRIBUTION:

B

Individual concerned

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

ATTACHMENT C-2

RESUME OF THE RADIATION SAFETY OFFICER

RADIATION PROTECTION TRAINING AND EXPERIENCE
FOR
BENJAMIN F. CASOLE, III

Training:

B.S. - The Pennsylvania State University, 1974, Medical Technology

M.S. - Central Michigan University, 1987, Administration

Nuclear, Chemical, Biological Officer Course Program, via Army Correspondence Course Program, 1978 and 1979.

Analytical Chemistry (Chem 204), Harford Comm. College, 1978.

Environmental and Occupational Radiation Protection, Harvard School of Public Health, 1980.

Basic Use of Radionuclides in Research, Oak Ridge Associated Universities, 1981.

Basic Radiation Physics and Nuclear Instruments, USAEHA, 1982.

Laser Safety, ETI, Inc., 1983.

Low-Level Radioactive Waste Symposium, PSU, 1983.

Laser-Microwave Workshop, USAEHA, 1984.

Radioactive Waste Packaging, Transportation, and Disposal, HQ, AMCCOM with Chem-Nuclear Systems, Inc., 1985.

Radiological Hazards Associated with Depleted Uranium Munitions, USACSTA with Nuclear Metals, Inc., 1985.

Systems Safety, USACSTA, 1985.

Environmental Radiation Surveillance, Harvard School of Public Health, 1985.

Air Sampling for Radioactive Materials, Oak Ridge Associated Universities, 1987.

MEMBERSHIPS:

Health Physics Society, Plenary Member 1980 - 1995.

Appalachian Compact Users of Radioisotopes Association, member since 1991.

JOB EXPERIENCE:

Radioanalytical Chemist, USAEHA, 1976-1983.

Health Physicist, Radiation Protection Officer, USACSTA, 1983-1988.

Supervisory Chemist, Chief, Safety, Surety, Security, and Intelligence Office/Radiation Safety Officer, USAMRICD, 1988-Present.

RADIATION PROTECTION TRAINING AND EXPERIENCE
FOR
BENJAMIN F. CASOLE, III
CONTINUED

RADIOISOTOPE EXPERIENCE:

U-238, Kilogram quantities, 1983-1988.
U-235, Gram quantities, 1983-1988.
H-3, Curie quantities, 1976-Present.
Pu-239, Microcurie quantities, 1983-1988.
Ra-226/228, Millicurie quantities, 1976-1983.
Sr-90, Millicurie quantities, 1976-1983.
C-14, Millicurie quantities, 1976-Present.
Cs-137, Millicurie quantities, 1976-Present.
Am-241, Millicurie quantities, 1983-1988.
Pm-147, Millicurie quantities, 1976-1988.
Co-60, Millicurie quantities, 1976-1988.
Kr-85, Millicurie quantities, 1983-1988.
Mn-54, Millicurie quantities, 1983-1988.
Ni-63, Millicurie quantities, 1976-Present.
P-32, Millicurie quantities, 1988-Present.
S-35, Millicurie quantities, 1988-Present.
Ca-45, Millicurie quantities, 1988-Present.
Flash X-ray, 1 MeV, 320 KeV, 160 KeV, 1983-1988.
Industrial X-ray, 11 MeV, 4 MeV, 1 MeV, 400 KeV, 320 KeV, 160 KeV, 1983-1988.
Veterinary X-ray, 160 KeV, 1988-Present.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

ATTACHMENT C-3

ORDERS APPOINTING THE RADIATION SAFETY COMMITTEE

MCMR-CDZ-S

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Duty Appointment/Assignment

1. Effective 12 October 2010, the following personnel of the U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD 21010-5400 are designated as the USAMRICD Radiation Safety Committee:

Dr. David E. Lenz	Chairman/Commander's Representative
Mr. Benjamin F. Casole, III	RSO/Secretary
Mr. Paul Madairy	Alt. RSO
Mr. Dana R. Anderson	Vice Chairman/Alt RSO
Dr. Henry L. Meier	Member
Mr. Austin T. Swift	Member
Mr. John Statham	Member
SGT Zachary C. Phillips	Member
Dr. John P. Petrali	Member
Mr. Harry E. Schwartzer, III	Alt. RSO

2. Authority: AR 385-10 and DA PAM 385-24

3. Purpose: To advise the Commander on matters pertaining to radiation safety.

4. Period: Indefinite.

5. Special Instructions: None.

6. This memorandum supersedes all previous memoranda on this subject.

FOR THE COMMANDER:



KARLOTTA A. RICHARDS
LTC, MS
Adjutant

DISTRIBUTION:

B

Individual concerned

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

ATTACHMENT C-4

RESUME OF THE CHAIRMAN OF THE RADIATION SAFETY COMMITTEE

RADIATION PROTECTION TRAINING AND EXPERIENCE
FOR
DAVID E. LENZ, Ph.D.

Training:

B.S., Chemistry, Kenyon College.
M.A., Chemistry, DePauw University.
Ph.D., Chemistry, Boston University

40 Years OJT and annual radiation protection training in the following:

- a. Principles and Practice of Radiation Protection.
- b. Radioactivity Measurements, monitoring, and instrumentation.
- c. Mathematics and Calculations basic to the use and measurement of radioactivity.
- d. Biological effects of radiation.
- e. DePauw University, Principles and Practice of Radiation Protection, 48 hrs.
- f. De Pauw UNiversity, Mathematics and Calculations basic to the use and measurement of radioactivity, 48 hrs.
- g. Boston University, Biological effects of radiation, 32 hrs.

MEMBERSHIP: Member of the USAMRICD Radiation Protection Committee since 1979; as Chairman from 1989 to the present.

RADIOISOTOPE EXPERIENCE:

C-14, Millicurie quantities, 1969-1990, R & D Work.
H-3, Millicurie quantities, 1969-1990, R & D Work.
I-125, Millicurie quantities, 1983-1990, R & D Work.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT D

(Item 8, NRC Form 313)

TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED
AREAS

Training for individuals working in or frequenting restricted areas will conform to the requirements of 10 CFR 19.12. It will consist, as a minimum, of the following topics:

- (1) Principles and Practice of Radiation Protection.
- (2) Radioactivity measurement, standardization, and monitoring techniques and instruments.
- (3) Mathematics and calculations basic to the use and measurement of radioactivity.
- (4) Biological effects of, and the risks associated with, radiation.
- (5) Site-specific information regarding procurement, storage, use, and disposal of radioactive material.

Training will be presented annually for workers already in the program and the session consists of either classroom or on-line instruction. Newly appointed employees, with a potential for occupational exposure, will be given one-on-one introductory radiation safety briefings by the RSO or his/her appointed designee.

For additional information regarding the training, see Supplement F.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT E

(Item 9, Form 313)

LABORATORY FACILITIES

The facilities used in conducting radiological operations generally consist of chemical laboratory rooms equipped with standard fume hoods with exhaust systems.

For radiolabeled toxic chemical agents, work is done in comparable laboratory rooms with filtered fume hoods or biological safety cabinets approved and designated as surety-controlled laboratories. Fume hoods are filtered, at a minimum, with a prefilter, a HEPA filter, and a charcoal absorber.

Wastes are detoxified chemically before being placed in designated radioactive waste containers (liquid aqueous, liquid organic and solid) for collection and disposal. No liquid waste exceeding the limits set in 10CFR20 is disposed of through the sewerage system.

Since laboratories are permitted for use via a radiological permit system, as described in Supplement F, those laboratories are surveyed for permit retirement (decommissioning) prior to the retiring of the radiological permit. The results of these surveys have shown to be about the lower limit of detection for radiological contamination due to the nature of the work with radioactive materials, the education and experience of personnel conducting radiological operations, and the controls in place to minimize the chance of contamination. Retiring of permits is quick, effective, and not costly. Surveys from the process of decommissioning laboratory permits have been reviewed by NRC inspectors during their routine inspections, and no problems have surfaced.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT E

(Item 9 Form 313)

RADIATION DETECTION INSTRUMENTS

<u>INSTRUMENT/MAKE/MODEL</u>	<u>NUMBER</u>	<u>RADIATION DETECTED</u>
Beckman LS 6500 Liquid Scintillation Counter	1	Beta
Victoreen Model 450 Ion Chamber Survey Meter	1	Beta-Gamma
Eberline E-520 Survey Meter with HP 260 Probe	2	Beta-Gamma
Bicron MicroRem Meter	1	Beta-Gamma
Ludlum Model 3 Survey Meter, with Model 44-9 detector	3	Alpha, Beta, Gamma

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT F

(Item 10 NRC Form 313)

THE USAMRICD RADIATION SAFETY PROGRAM-USAMRICD MEMORANDUM
385-2

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
ABERDEEN PROVING GROUND, MARYLAND 21010-5400

MEMORANDUM
No. 385-2*

12 January 2011

Safety
RADIATION PROTECTION

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*This memorandum supersedes USAMRICD Memorandum 385-2, dated 10 Apr 07

1. PURPOSE. To prescribe policy, responsibilities, and procedures for the US Army Medical Research Institute of Chemical Defense (USAMRICD) Radiation Safety Program (RSP).
2. SCOPE. This memorandum applies to all elements of USAMRICD and is applicable to all others conducting work at or for USAMRICD. It does not include exposure from medical and dental application. This memorandum does not obligate the U.S. Government for any liability to contractor personnel at USAMRICD for any adverse health arising from radiation sources.

3. POLICY.

- a. The prevention of radiation accidents or incidents; protection of health; and the safe use, handling, storage, transfer, and disposal of radioactive materials and other sources of radiation will be primary considerations wherever any type radiation source is involved.
- b. ALARA Principle Statement: Exposure to radiation will be kept as low as is reasonably achievable.
- c. No radioactive material or radiation-producing device will be procured or received without approval of the RSO.
- d. Radioactive material will be controlled from receipt until disposal.
- e. Adequate facilities, equipment, protective clothing/devices, instrumentation, procedures, and trained personnel will be provided to assure safe use of radioactive materials and radiation-producing devices, as well as to minimize exposure of personnel to radiation and to prevent release of radioactive material to the environment.
- f. Branches procuring radiation-producing equipment will comply with requirements of Title 21, Code of Federal Regulations (CFR), chapter I, subchapter J (Radiation Control for Health and Safety Act of 1968).

4. RESPONSIBILITIES.

- a. Commander, USAMRICD will:
 - (1) Develop and implement an RSP IAW applicable regulations and directives.
 - (2) Provide adequate resources, such as qualified personnel, facilities, equipment, and instrumentation to assure effectiveness of the RSP.
 - (3) Appoint a principal and at least one alternate Radiation Safety Officer (RSO).

(4) Appoint, in writing, a Radiation Safety Committee (RSC). At a minimum, the RSC will consist of a Chairman to represent the Command Group, the Radiation Safety Officer, at least one representative from a research division, and at least one non-research division representative.

(5) Appoint, in writing, a Custodian of the Radiation Exposure Records (DD Forms 1141).

(6) Authorize the RSO and alternate direct access to the Commander in all matters concerning radiation safety.

b. RSO, for the Commander, USAMRICD will:

(1) Staff supervise and manage USAMRICD's US Nuclear Regulatory Commission license.

(2) Report directly to the Commander, USAMRICD, in situations where prompt command action is required to prevent a radiation accident or incident.

(3) Serve as a member of the USAMRICD Radiation Safety Committee.

(4) As the subject matter expert for USAMRICD, provide technical advice, consultation, and assistance pertaining to all aspects of radiation safety.

(5) Review radiological operation within USAMRICD for compliance with regulations, approved procedures, NRC licenses.

(6) Maintain a formal ionizing radiation source inventory.

(7) Ensure qualified personnel perform radiation surveys, monitoring, and leak tests.

(8) Investigate accidents and/or incidents involving radiation and properly report the findings.

(9) Ensure that radioactive material movements, shipments, and receipt functions are performed.

(10) Provide health physics orientations for occupationally exposed employees.

(11) Provide centralized issue, collection, control, and submission for processing dosimetry devices.

(12) Advise permit holders on proper radioactive waste procedures.

(13) Coordinate with appropriate medical activity personnel in the event of a suspected overexposure.

(14) Maintain exposure records for occupationally exposed employees.

(15) Record and review the exposure of all USAMRICD Occupationally Exposed Employees.

(16) Report, quarterly, to the USAMRICD RSC, the cumulative recorded exposure, the average exposure recorded, and the highest exposure recorded for the previous quarter.

(17) Review and evaluate the radiation protection aspects of proposed new uses of radiation sources (via the Radiological Permit System) and establish protective measures deemed necessary.

(18) Recommend to the Chairman of the RSC, the approval of the permit, prior to start of work.

(19) Delineate radiation controlled areas, radiation areas, and high radiation areas, in their areas of particular responsibility (i.e. laboratory). Post appropriate warning signs and notices and enforce compliance with their provisions.

c. The Radiation Safety Committee will:

(1) Recommend to the Commander policies on the safe use, handling, storage, transport, receipt, shipment, and disposal of sources of radiation.

(2) Review reports of radiation accidents and incidents to determine the cause and recommend appropriate action to the Commander.

(3) Meet at least quarterly. A quorum must be present at each RSC meeting. A quorum will be the chairman or vice-chairman, the RSO or one of the alternates, and at least one voting members.

(4) Make recommendations for the improvement of the program and recommend measures for improving effectiveness and compliance with regulatory requirements as necessary.

d. Each branch chief whose organization uses radioactive material or devices containing radioactive material or radiation producing devices will implement policies and procedures prescribed in this memorandum and will ensure the following:

(1) Adequate facilities, equipment, and radiation detection/measuring instrumentation are provided for use of radioactive materials and radiation-producing equipment.

(2) Adequate supervisory controls and procedures are established as to provide an effective Radiation Safety Program within his/her organization.

(3) Personnel who will be occupationally exposed to radiation are trained adequately and are approved as occupationally exposed employees.

(4) A representative is designated to serve as a member of the Radiation Safety Committee, if requested.

(5) Ensure and document that occupationally exposed employees attend the annual Radiation Protection Training session.

e. Principal Investigators/Laboratory Supervisors will:

(1) Request procurement of, use, or directly supervise the possession and use of radioactive materials or radiation-producing equipment IAW with procedures prescribed in this memorandum and the radioactive materials permit.

(2) Furnish necessary information for preparing requests for radiological permits and obtaining approval to procure, use, or transfer radioactive material.

(3) Inspect radioactive material, sources, equipment or components within the purview of NRC license or regulation for verification as free of defects, compliance with NRC requirements and conformance with technical requirements described in the procurement document and report defects/deviations to the RSO.

f. Each occupationally exposed employee will:

(1) Know and follow standing operating procedures, rules, and special instructions.

(2) Use protective clothing, equipment, and personnel monitors properly.

(3) Take precautionary measures to minimize exposure of himself/herself and others to radiation and radioactive contamination.

(4) Report to his/her supervisor any accident, unusual incident, personal injury, suspected overexposure, and/or suspected internal exposure as soon as possible after the occurrence, and cooperate in efforts to evaluate exposure.

(5) Know the location of all radiation sources for which he/she is responsible and maintain up-to-date inventory of radioactive material for which he/she is responsible.

(6) Survey work areas for misplaced unshielded sources, radioactive contamination, and leaking sources and decontaminate as necessary.

(7) Attend an annual radiation safety training session.

5. RADIATION EXPOSURE LIMITS. The occupational radiation exposure standards (permissible limits) are outlined in DA PAM 385-24 and 10 CFR Part 20, and are applicable to all personnel.

a. Standards. Radiation dose equivalent will be as low as is reasonably achievable. Basic radiation protection standards adopted by the Army are found in DA PAM 385-24. Embryo/fetus dose limits for declared pregnant females will be in accordance with DA PAM 385-24.

b. Bioassays.

(1) Personnel working routinely with unsealed isotopes, such as carbon-14, hydrogen-3, calcium-45, and sulfur-35 will submit baseline bioassay samples (i.e. urine samples) if using quantities greater than those specified by regulation or at the direction of the RSO.

(2) Routine bioassay for work with Iodine-125 may be required IAW USNRC Regulatory Guide 8.20.

(3) Routine bioassay for tritium is required when the quantity processed by an individual at any one time or the total amount processed per month exceed 10% of the following (routine bioassays are not required for <10%):

(a) As tritiated water (HTO) or other tritiated compounds on an open bench: 0.1 Ci.

(b) As HTO or other tritiated compounds carried out within a fume hood: 1 Ci.

(c) As HTO or other tritiated compounds carried out within a normally closed glovebox: 10 Ci.

c. Off-post Exposures.

(1) During visits to contractor and other off-post sites, personnel may be occupationally exposed to radiation that may or may not be connected with the purpose

of the visit. Where the possibility exists, plans must include measures to avoid or minimize exposures and to ensure that exposures are recorded.

(2) Personnel may be required to wear dosimeters at the off-post sites. Personnel who are currently in the program should wear the dosimeters issued to them at the visited site. Other personnel will be issued dosimeters for the visits. Upon return from the sites, personnel should inform the RSO of their exposure experience.

6. PERSONNEL DOSIMETRY.

a. Thermoluminescent Dosimeters (TLDs) will be used as the primary device to determine personnel exposure.

(1) Personnel will not tamper with dosimeters or cause them to indicate readings that are not indicative of the personnel exposure.

(2) Dosimeters will be stored only in the storage racks designated by the RSO, when the devices are not being worn. The RSO must approve all dosimeter storage locations.

(3) Dosimeters will not be used for any purpose other than personnel monitoring without prior approval of the RSO.

b. Issuing of TLDs.

(1) Each person who may receive an accumulated dose equivalent in excess of 10 percent of the applicable annual radiation standard specified in paragraph 6 will wear a TLD. This includes persons occupationally exposed to ionizing radiation and persons who periodically enter a radiation controlled area.

(2) Individuals who have received clearance as occupationally exposed employees will be issued TLDs permanently under the TLD exchange program.

c. Turn-in/Collection of TLDs. Permanently assigned TLDs will be collected/replaced by the RSO at the designated locations at the end of each wearing period. Dosimeters are to be left at the designated locations when not in use, not on laboratory coats in individual laboratories or offices.

d. Loss of TLDs. If a TLD is lost, the individual to whom it is assigned or his/her supervisor will notify the RSO as soon as the loss is discovered. The RSO will assign a substitute for the remainder of the wearing period, and estimate the exposure received up to the time of the loss.

e. Processing TLDs. The RSO will package and ship used TLDs to the Army dosimetry center.

f. Radiation exposure records. The RSO or designated alternate will prepare and maintain occupational radiation exposure records, review and evaluate reported exposures and bioassay reports, investigate unusual exposures and ensure appropriate remedial measures, inform occupationally exposed of their exposure history annually or when requested and submit reports as required.

7. OCCUPATIONALLY EXPOSED EMPLOYEE CLASSIFICATION AND TRAINING REQUIREMENTS.

a. Classification of personnel as an occupationally exposed employee.

(1) Supervisors of individuals whose work requires that they be exposed to radiation or has the potential for such exposure will:

(a) Request approval/classification as a occupationally exposed by a completed and signed DD Form 1952, Dosimeter Application and Record of Occupational Exposure.

(b) Ensure the employee receives basic radiation safety orientation specific to the work assignment and information concerning risks from occupational radiation exposure, and subjects listed in paragraph b(1) below.

(2) The RSO will:

(a) Obtain record of prior radiation exposure.

(b) Establish file for each individual DD Form 1141, Record of Occupational Exposure to Ionizing Radiation, if necessary, and incorporate past exposures.

(c) Assign/issue permanent TLD, if required.

(d) Confirm with supervisor approval for individuals as occupationally exposed.

b. Training and experience of personnel.

(1) Requirements for the designation as Principal Investigator for the purposes of the Radiation Safety Program:

(a) At least a bachelor's degree, preferably in one of the natural, biological, or physical sciences.

(b) At least two years of experience in the storage, use, and handling of radioactive material.

(2) Principal Investigators and other supervisory personnel will assure that personnel under their supervision and visitors who will be exposed to radiation and/or radioactive material are informed of the following prior to exposure:

- (a) The presence of radiation or radioactive material.
- (b) Health hazards associated with exposure to such materials and/or radiation.
- (c) Procedures and precautions to minimize exposures.
- (d) Applicable provisions of NRC licenses, DA authorizations, memoranda, and SOPs.
- (e) Emergency procedures.
- (f) Right to receive a report of exposure incurred.
- (g) Proper use of protective equipment and clothing.
- (h) Maximum allowable exposure and contamination levels.
- (i) Safety methods of performing work.
- (j) Procedures to minimize contamination and to secure sources of radiation from unauthorized use.

(3) Installation (i.e. APG) emergency and security personnel will be trained by the Installation RSO and equipped to cope with radiological hazards that may be encountered in the performance of their duties.

8. APPROVAL OF NEW RADIATION FACILITIES. A branch planning to construct new radiation facilities, modify existing radiation facilities, or modify existing facilities to incorporate radiological operation or radiation-producing equipment will (for operations other than normal laboratory work):

- a. Assure safety/radiation protection review and approval of plans for construction or modification of radiation facilities by the Radiation Safety Committee.
- b. Ensure that routine operation of the facility is deferred until a complete survey has been made by the RSO or independent experts as deemed necessary and routine operation is approved.
- c. Assure that employees have been trained adequately prior to assignment at the facility.

d. Assure that written SOP and emergency procedures have been established and approved by the RSO prior to start of operations.

9. LICENSES AND AUTHORIZATIONS.

a. NRC licenses. The USNRC is charged with responsibility for regulating receipt, possession and use of by-product material. Licenses and authorizations for radioactive material within USAMRICD will be obtained under the Radiation Safety Program managed by the RSO. A USAMRICD Radiological Permit will be issued only when a valid NRC license or authorization is held by USAMRICD.

b. Radiological permits. The USAMRICD radiological permit system is intended to assure conformance with established radiation protection standards and program requirements and to provide effective laboratory-wide control of radioactive materials as stipulated by the licenses issued to USAMRICD. A radiological permit is required for procurement, use, storage, and transfer of radioisotopes. Permits for use of radioactive materials will be issued to the responsible branch chief.

(1) Processing of Radiological Permits. Branches desiring to use radioactive materials will make a permit request IAW USAMRICD Memorandum 385-6. The RSO may concur with the permit and submit it to the Chairman, RSC for review/approval. The Chairman is authorized to act on behalf of the RSC. The action taken will be brought before the RSC at the next quarterly meeting. If the RSC votes against the permit, the action will be revoked.

(2) Radiological permits normally are issued for 2 years.

(3) Ionizing radiation-producing devices.

(4) Termination, suspension, and cancellation. A permit will be terminated by request to the RSO as soon as practical after the permit is no longer needed. The RSO may suspend authority of a permit where operating conditions or procedures do not conform to approved procedures and regulatory requirements and threaten the health and safety of employees, the general public, and/or property.

c. Plans for new devices will be coordinated with the RSO as early as practical in the planning stage to assure conformance with safety and radiation protection requirements.

d. Before a new ionizing radiation-producing device is placed in operation, the RSO will perform, or cause to be performed a radiation protection survey of the equipment, the facility, and environs during operation. Results of the survey will be recorded, with indications of approval or changes necessary to obtain approval. Operation will not begin until approval is obtained.

e. Changes to ionizing radiation-producing devices and facilities (operating characteristics, shielding, procedures) and occupancy of adjacent areas will not be made without prior approval of the RSO.

10. PROCUREMENT.

a. A branch desiring to obtain radioactive material, supplies, or equipment in which radioactive material is incorporated will:

(1) Obtain a radiological permit as described above.

(2) Obtain the approval of either the RSO or one of the alternates prior to submission of the purchase request.

(3) Submit purchase request/requisition to the Logistics Branch, and:

(a) Identify the material, supplies, or equipment as radioactive.

(b) Indicate whether the radiolabeled compound or radioactive material is a controlled substance, chemical surety material, biological material or toxins, or security-classified material.

(c) If the material/equipment does not meet the definition of commercial grade item (off-the-shelf or catalog item) and is subject to design or specification requirements unique to an NRC licensed activity or facility, specify that 10 CFR Part 21 (Reporting of Defects and Noncompliance) applies.

(d) Have materials listed in b delivered directly to the Institute's Receiving Section.

b. The RSO, alternate or Health Physicist will:

(1) Review the requisition for acceptability within radiological permit(s) and NRC license.

(2) If acceptable, identify the applicable NRC license and indicate radiation protection approval on the purchase request.

(3) Ensure proper training, handling, shielding, and dosimetry are available, if needed.

(4) Coordinate the purchase request/requisition with the Logistics Branch.

c. Procuring activities will procure radioactive material only after approval by the RSO or alternate.

d. The branch chief requesting procurement of ionizing radiation-producing equipment will request the RSO to perform or cause to be performed a comprehensive radiation protection survey, and, accomplish any recommended corrective measures prior to start of operation.

11. RECEIPT, TRANSFER, SHIPMENT OF RADIOACTIVE MATERIAL.

a. Receipt of radioactive material shipments. After initial package receipt in the Receiving Section of the Logistics Branch, shipments of radioactive material will be taken to the Health Physics Lab, room 34, Building E3100. Occasionally, shipments may be delivered to the branch requesting the material. Notify the RSO (410-436-4433) or the alternate (436-1116) immediately if unidentifiable, damaged, or leaking packages are received. No receipt survey is required for packages containing less than Type A quantities (10CFR 71.4 and Appendix A to 10CFR71), unless they appear to have been damaged in transit. The need for special precautions and decontamination will be based on survey findings compared with current permissible limits published by the US Department of Transportation (DOT) and Army regulations. Shipments requiring a survey received during normal working hours will be surveyed as soon as practicable after receipt, but not later than three hours after it is received. Shipments requiring a survey received after normal working hours will be surveyed during the next business day, but not later than three hours from the beginning of the next business day.

(1) If the package that is received is greater than the Type A quantity or appears damaged, radiation protection personnel will make an initial survey of the package after they are unloaded from the delivery vehicle. The survey will include an instrument survey (if applicable) and wipe test of package surfaces (if applicable). If permissible limits are exceeded, or the shipment is in otherwise unsatisfactory condition, they will establish measures for minimizing personnel radiation exposure, contamination control, and decontamination as necessary and notify the appropriate parties.

(2) The delivery of a box packaged IAW DOT regulations, does not warrant the need to survey the delivery vehicle. When required, radiation protection personnel will make an instrument survey (if necessary) and wipe test of the vehicle.

(3) Following initial surveys described above, radiation protection personnel will perform a survey of outer and inner containers of the shipment and prepare Radioactive Material Tracking Form entering pertinent information from shipping documents and the results of the surveys. Signatures are required on the form for the transfer of the package. They will then arrange delivery of the shipment to the purchaser.

(4) The receiving individual will inspect the material/item for verification as free of defects, compliance with NRC requirements and conformance with technical requirements, and report any defect/deviation to the RSO.

(5) Persons receiving radioactive shipments directly or outside normal delivery channels will notify the RSO immediately upon receipt. The RSO will perform the necessary surveys and complete and distribute the Radioactive Material Survey Forms.

(6) The RSO will report any packaging discrepancies, excessive radiation or removable contamination to the carrier, shipper, DOT and NRC as may be required.

b. Transfer of radioactive material within USAMRICD. Radioactive material may be transferred between radiological permits provided the receiver's permit authorizes the quantity, type, and use of the material to be received. The person making the transfer will notify the RSO of the proposed transfer and appropriate action will be taken.

c. Shipment of radioactive material from USAMRICD.

(1) Radioactive material will be transported as prescribed by 49 CFR, in addition to any other applicable Federal and State regulations.

(2) Permit holders desiring to ship radioactive materials from USAMRICD will coordinate with the RSO as early as practical before shipment is desired. The RSO will provide advice and assistance on procedural and packaging requirements and perform necessary surveys. The RSO or alternate will verify compliance with packaging and labeling requirements and furnish a completed radioactive materials movement form as part of the shipping documentation.

(3) Radioactive waste will be collected, packaged, and shipped by the RSO or health physics staff.

(4) Animal wastes that contain 0.05 microcurie/gram or less of tritium or carbon-14 in animal tissue averaged over the weight of the entire animal (10 CFR 20.2005(a)(2)) may be disposed of without regard to radioactivity.

(5) Radioactive material with a physical half life of <65 days may be held for decay-in-storage before disposal in the ordinary trash provided license conditions are complied with before disposal.

12. LABORATORY INSTRUMENTS. Laboratory instruments such as gas chromatographs may contain radioactive material as an integral part of an installed component. Operation of the instrument does not involve handling or manipulation of the radioactive source.

a. Requirements for accountability and inventory control apply.

b. The RSO will perform radiation/contamination surveys of the instruments on intervals not to exceed six (6) months.

c. The RSO will ensure that sealed sources are inventoried every six (6) months, concurrently with the survey.

d. Do not handle or remove sources. Refer maintenance, cleaning, replacement, or removal issues to the manufacturer. Contact the RSO for advice or assistance regarding sealed sources.

e. Notify the RSO of planned relocation or movement of instruments/equipment containing sealed radioactive components.

13. OPERATIONAL REQUIREMENTS, CONTAMINATION CONTROL, AND PROTECTIVE CLOTHING.

a. Supervisors will provide adequate facilities, physical safeguards, and procedural controls to insure the safe use of radioactive materials and radiation-producing devices.

(1) Areas, buildings, enclosures, packages, and containers will be posted conspicuously with radiation warning signs.

(2) The quantity of radioactive material stored within a work area will be limited amount listed on the permit.

(3) Radioactive material will be used, handled, and stored in such a manner to prevent exposure of unauthorized persons to radioactivity. When unattended, the material will be secured in a locked area, room, cabinet, or other suitable container in such a way to prevent access to and exposure of unauthorized persons. Radioactive sources contained in gas chromatographs are exempt from this requirement.

(4) Temporary or permanent shielding will be used to prevent excessive exposure to radiation.

b. Contamination control. Work surfaces will be protected from contamination to the extent possible.

c. Protective clothing and equipment, commensurate with the hazard expected, will be worn/used.

14. STORAGE. Radioactive materials, when not in use, shall be stored in such a manner as to preclude the possibility of inadvertent radiation exposure of individuals either from external radiation or from movement of the radioactive material from the container into the laboratory/work area air or onto surfaces. The materials will be secured in a locked area, building, room, cabinet, or other suitable container to prevent access to and exposure of unauthorized persons. Secondary containment should also

be used, if practical. Containers of radioactive material shall be properly labeled with caution/warning signs.

15. PERSONNEL DECONTAMINATION. Upon discovery of contaminated skin or hair, the individual should request assistance IMMEDIATELY from a fellow worker. Both the person assisting in decontamination and the contaminated person should wear suitable protective clothing such as surgeon's gloves and laboratory coats to prevent spread of contamination. Thorough washing with a nonabrasive soap and tepid water and rinsing with large quantities of water is the best general decontamination method for the hands and other parts of the body, regardless of the nature of the radioactive contaminants. DO NOT USE ORGANIC SOLVENTS. The RSO will be notified as soon as possible.

a. Localized contamination.

(1) Mask off the affected area and clean immediately to avoid spread of contamination to other skin areas, followed later if necessary by a general washing.

(2) If the contaminant is in a chemical solution that may react with the skin, immediately dilute it with water, using dampened swabs, pads, or cloth to minimize spread of the contaminant.

(3) If contamination is found in the eyes, the mouth, or an open wound, flush copiously with water and contact the Occupational Health Clinic immediately for further instructions.

(4) If the contamination is in the nose, clean nostrils with wet cotton swabs, blowing the nose frequently. If contamination still is present after such procedure, notify Occupational Area Health Clinic for possible nasal irrigation procedures.

(5) Decontaminate hair by repeated application of liquid soap and rinse water, using towels to keep water from running onto the face and shoulders. Thoroughly dry the hair before resurveying. If the contamination still is present and is no longer being reduced after three such washings, notify the Edgewood Area Health Clinic for instructions.

(6) Since the hands can become contaminated, give special attention to areas between fingers and around the nails. Use brushes with soft bristles to help remove the contaminant.

(7) If skin irritation develops after repeated washings, refer the individual to the Edgewood Area Health Clinic. Chemical decontaminants will be used only under the supervision of qualified medical personnel.

b. Widespread contamination.

(1) Shower generally with soap and water. Keep radioactive materials out of eyes, nose, and mouth and minimize spread to any clean area of the body.

(2) Dry thoroughly. Survey.

(3) If contamination is still widespread over the body, repeat the shower with scrubbing, taking care not to damage the skin.

(4) Repeat survey. If contamination still exists, select the most highly contaminated areas and start decontaminating as outlined in para A above, for localized areas.

16. EQUIPMENT AND AREA DECONTAMINATION. In the event of a spill or uncontrolled spread of radioactive material, operating personnel will notify the responsible investigator or supervisor, who will determine the need for emergency actions established in paragraph 21 and notify the RSO. The following method should be used in both emergency and non-emergency situations.

a. Care must be taken during decontamination to avoid further spread of the contaminant by:

(1) Working from area of least contamination toward the area of greatest contamination and frequently surveying decontaminated area.

(2) Taking precautions to prevent spread of contamination by protective clothing.

(3) Using a minimum amount of decontamination liquids, being aware that residue solutions, cloths, swabs, and brushes probably will be contaminated.

(4) Covering the work surfaces and floor with a temporary strippable plastic or paint if warranted.

b. Decontamination methods include:

(1) Wiping the area clean with a damp water-resistant paper swipe or cloth. The wiping surface of the material should be changed repeatedly to minimize spread of contaminant.

(2) Using a detergent solution over the area and wiping dry.

(3) Steam cleaning.

(4) Cleaning with solvents other than water.

(5) Removal by use of such material as chemicals, abrasives, ultrasonics, and blasting, and grinding. The chemical selected to remove the contaminant will depend on the chemical composition of the radionuclide.

17. RADIATION SURVEYS.

a. If determined to be necessary by the RSO, permit holders using or storing radioactive materials or using radiation-producing devices will provide or have access to appropriate radiation detection instruments for use by occupationally exposeds in monitoring/surveying their assigned work areas and their persons.

b. The RSO will perform or cause to be performed:

(1) Periodic surveys (generally monthly in those laboratories where radioactive material was used during the month), as required by degree of hazard, to determine conformance to regulations, external radiation levels, airborne radioactivity levels, radioactive contamination levels, and removable contamination. Surveys for storage areas, such as rooms in the BB Area, if applicable, will be made when the room(s) is/are accessible.

(2) Special surveys as requested or deemed necessary.

18. INVENTORIES AND LEAK TESTS.

a. Inventory records. Each Permit Holder will maintain records of all transactions involving radioactive material. Entries will be kept current and will indicate receipts, withdrawals, disposal, and related information. The RSO will prepare and submit inventory reports as required.

(1) Inventories of all radioactive materials will be submitted to or conducted by the RSO at least annually.

(2) Sealed sources containing byproduct material as defined by the NRC license will be inventoried semi-annually.

b. Leak test. The RSO will perform, or cause to be performed, leak tests of sealed sources within 5 days after receipt prior to initial use and as follows:

(1) Sources containing beta and/or gamma-emitting radioisotopes will be leak tested at intervals not to exceed 6 months.

(2) Sources in storage will be leak-tested prior to use, transfer, or shipment.

(3) A leak test will be performed prior to further use of any source that has been subject to treatment that could be expected to cause the capsule to rupture and on any source for which there is indication that the source may be leaking; for example,

contamination of equipment or area where the source has been used. The RSO will be notified of any such condition.

(4) A leak test result of 0.005 microcuries or greater contamination will require the withdrawal of the source from use. The source will not be returned to use until decontaminated, repaired, and negative leak test results are obtained following at least a 7-day storage.

19. INSTRUMENT CALIBRATION. All survey instruments and laboratory instruments used to evaluate radioactive material will be calibrated IAW Army standards.

20. DISPOSAL.

a. Serviceable equipment/sources. Unwanted serviceable equipment containing radioactive material, unwanted serviceable radioactive items of supply, and other unwanted serviceable radioactive sources will be disposed of through property disposal channels. Sources will be removed from the equipment before turn-in by the manufacturer. The user is not permitted to remove sources.

b. Unserviceable equipment. Unserviceable equipment containing radioactive material will be disposed of through property disposal channels. The manufacturer will remove the radioactive source(s) before turn-in. The user is not permitted to remove the source(s).

c. Laboratory waste.

(1) The RSO, alternate, or health physicist, will provide primary and secondary containers at each location as necessary for disposal of radioactive waste. Containers will be marked and used only for radioactive waste. Solid waste will be placed in containers with plastic bag liners and self-closing lids. Liquid radioactive waste will be segregated according to solution (aqueous and non-aqueous) and placed in separate labeled polyethylene (or equal) bottles. The RSO will ensure waste collection periodically, and provide replacement containers as necessary. At the time of collection, branches will furnish information as to type, form, chemical vehicle, and radioactivity of the material being disposed.

(2) Chemical agents containing radioactive material will be detoxified and neutralized by laboratory personnel prior to release to radioactive waste. Radioactive waste products containing chemical agents (for example, clean-up paper, gloves, and liquid residues) must be detoxified and neutralized by laboratory personnel prior to disposal in a radioactive waste container.

21. EMERGENCY PROCEDURES. The Appendix provides instructions for coping with emergencies in which radioactive material is involved. Standing operating procedures will incorporate emergency procedures, adopted from the instructions,

specific to the operation/work involving radioactive material and radiation-producing equipment.

Proponent for this memorandum is the Radiation Safety Officer. Users are invited to send comments and suggested improvements directly to the RSO.

FOR THE COMMANDER:



KARLOTTA A. RICHARDS
LTC, MS
Adjutant

APPENDIX A

EMERGENCY PROCEDURES

NOTE: THESE PROCEDURES APPLY TO EMERGENCIES INVOLVING RADIOACTIVE MATERIAL WHERE NO CHEMICAL AGENTS ARE INVOLVED. IF BOTH ARE INVOLVED THE CHEMICAL ACCIDENT/INCIDENT CONTROL PLAN - THE APG EMERGENCY RESPONSE PLAN - APPLIES.

1. General.

a. The objective of emergency action is to protect personnel from the hazards of radiation and contamination. Confinement of contamination and prevention of loss of materials or equipment during emergencies are secondary considerations.

b. Primary responsibility for the safety/radiation protection of personnel from radioactive materials and other radiation sources rests with the personnel working with the materials or sources and with the primary organizational element using the materials or sources. Therefore, the user and his first-line supervisor are responsible for the emergency actions necessary to minimize hazards created by the emergency condition and return to normal. Immediate action is required to prevent loss of life, personal injury, damage to property, and disruption of mission.

c. When the situation cannot be controlled or the source of the hazard cannot be identified immediately and precisely, activate emergency forces by notifying the Fire Department (dial 911) and by sounding the alarm at the nearest fire alarm box. Initial response by emergency forces is based largely on information furnished in the notification. If notifying by telephone describe the situation as fully as practical. Describe the nature of the emergency. Give exact location, building and room number, extent and nature of personal injuries, if any, the type, form and quantity of radioactive material, whether sealed or unsealed and if other hazardous materials such as explosives and flammables are involved. State clearly whether chemical agents are involved. Remain available near the on scene commander, and await arrival of Fire Department personnel.

d. Notify immediately the RSO at 436-4433, during normal duty hours, and furnish any available information regarding the emergency. During non-duty hours notify the Staff Duty Officer at 410-322-6822 and request that the RSO be notified. The RSO will report to the scene with appropriate instruments to supervise radiation protection procedures such as decontamination and monitoring. The RSO will request other assistance as necessary.

2. Injuries. MEDICAL CARE OF INJURED PERSONNEL MUST NOT BE DELAYED BECAUSE OF POSSIBLE CONTAMINATION.

a. Notify immediately the Kirk Army Health Clinic - Edgewood Area, 436-3001 (During non-duty hours notify the Aberdeen Area Health Clinic Emergency Room, 278-5251). Furnish all available information as to nature and extent of injury and contamination, ingestion, or inhalation. Follow directions of clinic personnel as to movement and decontamination of the injured person. Medical personnel may elect to come to the scene. Provide survey and decontamination assistance as directed.

b. If the wound is minor and medical personnel agree that the condition of victim allows, decontaminate in accordance with Paragraph 15, above.

3. Spills.

a. Notify all persons not involved with the spill to vacate the affected room or area.

b. If the spill is liquid and the hands are protected, right the container and take steps to contain the spillage. Use available absorbent materials to stop the spread of contamination.

c. If the spill is on the skin, flush thoroughly. Decontaminate as described in paragraph 15, above.

d. If the spill is on the clothing, discard outer or protective clothing at once. The RSO will provide advice as to decontamination of personal clothing. Hold protective clothing for decontamination or disposal as radioactive waste.

e. Under the guidance of the RSO:

(1) Decontaminate personnel (paragraph 15, above).

(2) Decontaminate the facility and area (paragraph 16, above).

(3) Survey all persons involved in the spill and cleaning operation to determine adequacy of decontamination. Permit no person to resume work until a survey is made and the location is cleared by the RSO.

f. Furnish information regarding the incident to the RSO for formal reporting purposes.

5. Fires.

a. If a fire occurs in a building where a radiation hazard exists, warn occupants by sounding the building fire alarm. Notify the Edgewood Area Fire Prevention and Protection Division by dialing 911.

b. Evacuate the area.

c. Remain near the on scene commander, to furnish emergency action personnel with information regarding location and characteristics of the radioactive material involved. Assist the RSO in monitoring if necessary.

APPENDIX B

LASERS

1. General

While there are no federal agencies that regulate the use of LASERS, Department of the Army Pamphlet (DA PAM) 385-24 requires that LASERS be managed in accordance with the applicable American National Standards Institute (ANSI) Standards. The Radiation Safety Officer (RSO) will serve as the LASER Safety Officer (LSO), unless otherwise delegated.

2. Control of Non-Ionizing Radiation Sources

a. The SOP process will be used for the control and use of non-ionizing radiation sources.

b. SOPs are not required for LASER systems that incorporate Class I, II, or IIIa LASERS only. SOPs and/or operating manuals developed by the manufacturer are acceptable for use in LASER operations

3. Inventory Management

a. Owners of LASERS will provide the RSO with an inventory, updated at least annually.

b. LASERS requiring SOPs must be reported.

c. Source inventory shall include the following information:

(1) Manufacturer and Model number

(2) Hazard Class, Type (lasing media)

(3) Owner and Location of Source (Building and Room#)

d. Transfer of LASERS shall be relayed to the RSO.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT G

(ITEM 10, Form 313)

CALIBRATION OF INSTRUMENTS

Instruments will be calibrated by either an Army Test Measurement and Diagnostic Equipment activity in accordance with procedures outlined in Army Regulation 750-43, Maintenance of Supplies and Equipment; Army Test, Measurement and Diagnostic Equipment Program or by a contractor certified/approved to perform calibrations.

Calibrations will be performed at intervals not to exceed 1 year using standards traceable to the National Institute of Standards and Technology.

US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
APPLICATION FOR MATERIAL LICENSE RENEWAL:
LICENSE NO. 19-00294-24

SUPPLEMENT H

WASTE MANAGEMENT

(Item 11, NRC Form 313)

All radioactive waste will be held at a temporary storage facility within the Institute, and turned-in/disposed of in accordance with Department of the Army Pamphlet 385-24.

No environmental releases, above the limits set in 10CFR20 will be permitted.

No disposal by incineration will be permitted, with the exception of laboratory animals under the applicable limits set in 10CFR20.2005(a)(2).

See Supplement F for further information on waste management.



DEPARTMENT OF THE ARMY
US ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
3100 RICKETTS POINT ROAD
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February 15, 2011

Office of the Commander

Licensing Assistance Team
Division of Nuclear Materials Safety
US Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19405-1415

License No.: 19-00294-24
Docket No(s): 03031110

Dear Sir:

Enclosed is the revised statement of financial assurance to accompany the application for renewal for the referenced Byproduct Material License.

As Commander of the US Army Medical Research Institute of Chemical Defense, I exercise express authority and responsibility to request from our higher headquarters, the US Army Medical Research and Materiel Command, funds for decommissioning activities associated with operations authorized by US Nuclear Regulatory Commission License No. 19-00294-24. The authority is established under Permanent Orders 8-1, Office of the Surgeon General (OTSG), Department of the Army, dated May 29, 1979 that assigns us as a major subordinate activity of the US Army Medical Research and Materiel Command on July 1, 1979.

Within this authority, I intend to request that funds be made available, when necessary, in the amount of \$41,353.84 to decommission the laboratories of the US Army Medical Research Institute of Chemical Defense, 3100 Ricketts Point Road, Aberdeen Proving Ground, Maryland 21010-5400. As the named licensee, I am authorized to represent the Institute in this transaction.

My point of contact for this submission is Benjamin F. Casole, III and he may be reached at (410) 436-1780 or e-mail at benjamin.f.casole@us.army.mil.

Sincerely,

A handwritten signature in cursive script that reads "Peter J. Schultheiss".

Peter J. Schultheiss
Colonel, US Army
Commanding

Enclosure

CERTIFICATION OF FINANCIAL ASSURANCE

Principal: Colonel Peter J. Schultheiss, Commander
U.S. Army Medical Research Institute of Chemical Defense
ATTN: MCMR-CDZ
3100 Ricketts Point Road
Aberdeen Proving Ground, MD 21010-5400

NRC License Number: 19-00294-24

Name and Address of Facility:
U.S. Army Medical Research Institute of Chemical Defense
3100 Ricketts Point Road
Aberdeen Proving Ground, MD 21010-5400

Issued to: U.S. Nuclear Regulatory Commission

I certify that Colonel Peter J. Schultheiss, Commander, U.S. Army Medical Research Institute of Chemical Defense is licensed to possess the following: sealed sources or plated foils with a half-life of greater than 120 days licensed under 10CFR Part 30 and unsealed byproduct material with half-lives both greater than and less than 120 days licensed under 10CFR Part 30 in the following amounts:

<u>Type of Material</u>	<u>Amount of Material</u>
Hydrogen-3	10 curies (max)
Carbon-14	2 curies (max)
Phosphorous-32	2 curies (max)
Phosphorus-33	2 curies (max)
Sulfur-35	2 curies (max)
Calcium-45	0.5 curie (max)
Iodine-125	1 curie (max)
Nickel-63	NTE 15 millicuries/ foil and 3.5 curies total

I also certify that financial assurance in the amount of \$41,353.84 will be obtained for the purpose of decommissioning as prescribed by 10CFR Part 30.

A handwritten signature in black ink that reads "Peter J. Schultheiss". The signature is written in a cursive style with a large initial "P".

Peter J. Schultheiss
Colonel, US Army
Commanding

February 15, 2011

This is to acknowledge the receipt of your letter/application dated

2/16/2011, and to inform you that the initial processing which includes an administrative review has been performed.

RENEWAL 19-00294-24
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 574513.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader