

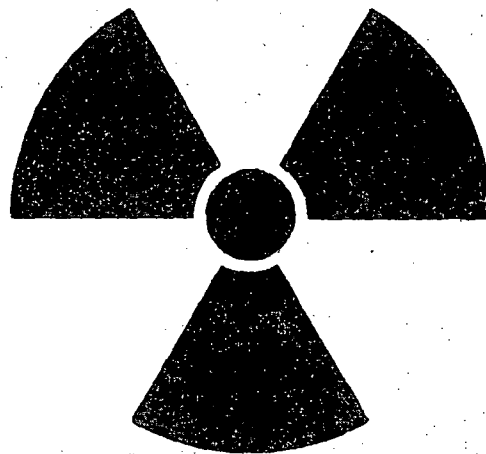
SUPPLEMENT D

RADIATION PROTECTION PROGRAM

WRAMC Regulation 40-10
Health Physics Regulations

nn/7/d

HEALTH PHYSICS REGULATIONS



**WALTER REED ARMY MEDICAL CENTER
WASHINGTON D.C., 20012**

Posted
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WR 40-10
C1

DEPARTMENT OF THE ARMY
HEADQUARTERS WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20012

WRAMC Regulation
No. 40-10
Change 1

17 June 1974

Medical Service

HEALTH PHYSICS REGULATIONS

WR 40-10, 15 June 1973, is changed as follows:

0. Page 3, para G, change to read as follows: Personnel Reliability Program.
2. Page 4, para L, change to read as follows: Accountability and Inventory of Radioactive Material and Machines Which Produce Ionizing Radiation.
3. Page A-1, para 3a, line 5, change to read as follows: nuclear material and source material.
4. Page B-5, para 27, change word "occupant" to read: user.
5. Page D-1, para 3, change to read: Definitions and Requirements for Controlled Areas.
6. Page D-1, para 3a(2), delete paragraph.
7. Page D-2, para 3c(2)(b), change to read: in accordance with 10CFR20.203 and 29CFR1910.96.
8. Page D-3, para 3d(1), delete: from para 3-1e, AR 385-30.
9. Page D-3, para 3e(1), delete: used for histological staining.
10. Page D-3, para 3e(3), delete last sentence of paragraph.
11. Page E-1, para 2c, delete paragraph.
12. Page E-2, para 3e, change word "Biodosimetric" to read: Bioassay.
13. Page E-2, para 3e(3), change to read: Breath analysis.
14. Page E-2, para 3e, add paragraph: (5) Fecal analysis.

- ✓ 15. Page E-2, para 4a, change word "Restricted", to read: Controlled.
- ✓ 16. Page E-2, para 4e, delete words: or replace.
- ✓ 17. Page I-3, para 5e, add paragraph: (3) Radioisotope Users Course.
- ✓ 18. Page I-3, para 5h, change word "Radioisotope" to read: Nuclear Medicine.
- ✓ 19. Page K-1, para 2c, change last sentence to read: USAEC Licenses are issued for byproduct material, source material and special nuclear material.
- ✓ 20. Page L-1, change subject to read: ANNEX L (ACCOUNTABILITY AND INVENTORY OF RADIOACTIVE MATERIAL AND MACHINES WHICH PRODUCE IONIZING RADIATION).
- ✓ 21. Page L-1, para 1a, delete the words: lasers and microwave equipment.
- ✓ 22. Page L-1, para 2d, delete the words: lasers and microwave equipment.
- ✓ 23. Page L-2, para 3a, delete the words: laser, microwave, or.
- ✓ 24. Page L-2, para 3b, change "DA Form 8-235 (Pharmacy, Drug and Narcotic Stock Record)" to read: DA Form 3862 (Controlled Substances Stock Record).
- ✓ 25. Page M-2, para 3b(5), delete paragraph and substitute: Will display DA Label 135 on dashboard.
- ✓ 26. Page M-4, para 4, add following paragraphs: (g) AR 700-52, (h) 49 CFR, and (i) 10 CFR.
- ✓ 27. Page N-2, para 3c(8), change the words "picked up by" to read: delivered to.
- ✓ 28. Page P-1, para 2a, delete the words: and will provide a written report of the survey to the Principal User.
- ✓ 29. Page R-1, para 2e, change the words "30 mCi" to read: 8 mCi.
- ✓ 30. Page R-11, para 2a, change the word "estimated" to read: evaluated.
- ✓ 31. Page R-15, para 6b(2), delete the words: of 5 mR/hr.
- ✓ 32. Page R-15, para 6c(2), change the words "is 2 mR/hr or less" to read: indicates a "no restriction" level of activity.
- ✓ 33. Page R-16, para 7a(1), change the words "30 millicuries" to read: 8 millicuries.
- ✓ 34. Page X-1, para 2b(4), add the following sentence: Contact Health Physics immediately if any shipment appears to have been damaged.

35. Remove old pages and insert new pages as indicated below:

REMOVE PAGES (15 June 1973)

INSERT PAGES (17 June 1974)

C-1, C-2, C-3 ✓

C-1, C-2, C-3 ✓

D-5, D-6 ✓

D-5, D-6, D-7, D-8 ✓

E-3, E-4 ✓

E-3, E-4 ✓

F-1, F-2, F-3, F-4, F-5, F-6 ✓

F-1, F-2, F-3, F-4, F-5 ✓

G-1, G-2, G-3, G-4 ✓

G-1, G-2 ✓

J-1, J-2 ✓

J-1, J-2 ✓

K-5, K-6 ✓

K-5, K-6 ✓

Q-1, Q-2, Q-3, Q-4, Q-5, Q-6, ✓
Q-7, Q-8

Q-1, Q-2, Q-3, Q-4, Q-5 ✓

R-13, R-14 ✓

R-13, R-14 ✓

U-3 ✓

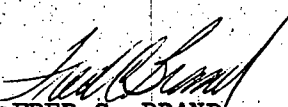
U-3 ✓

W-1, W-2, W-3, W-4, W-5, W-6, ✓
W-7, W-8

W-1, W-2, W-3, W-4, W-5, W-6, ✓
W-7, W-8

36. File this change in front of the publication for reference purposes. ✓

FOR THE COMMANDER:


FRED C. BRAND
LTC, MSC
Adjutant

DISTRIBUTION: 200 copies
Special (HPO)

DEPARTMENT OF THE ARMY
HEADQUARTERS WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20012

WRAMC Regulation
No. 40-10

15 June 1973

Medical Service

HEALTH PHYSICS REGULATIONS

	Paragraph
Purpose	1
Scope	2
Implementation	3
Organization Of These Regulations	4
Definitions	5
Annexes (See pages 3 - 5)	

1. PURPOSE. These Regulations:

a. Implement the applicable laws, regulations, conditions and restrictions under which radioactive materials and X-ray, microwave, or laser radiation-producing devices are used.

b. Promulgate the rules, direction, and guidance of the WRAMC Radioisotope Committee in the proper and safe handling of radioactive material and equipment which produces X-ray, microwave, or laser radiation.

c. Control the production, procurement, receipt, storage, use, repair, transfer and disposal of radioactive material and equipment which produce X-ray, laser, or microwave radiation.

d. Prescribe the radiation protection program for Walter Reed Army Medical Center.

2. SCOPE. These Regulations apply to all activities and organizations using radioactive material and/or equipment which produce X-ray, laser, or microwave radiation at Walter Reed Army Medical Center, 6825 16th Street, N.W., Washington, D.C. 20012; Forest Glen Annex, Walter Reed Army Medical Center, Montgomery County, Maryland; medical units of the Departmental Medical Activities, WRAMC (DMEDA); and USAMRIID, Fort Detrick, Maryland.

* This Regulation supersedes WR 40-10 (30 July 1969) with changes 1 & 2, HR 40-40 (8 Mar 66) and HR 40-53 (29 Jul 65).

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3. IMPLEMENTATION. The Health Physics Officer, WRAMC, is the principal staff officer responsible for the implementation of these Regulations. Temporary minor exceptions to specific provisions of these Regulations may be granted on an individual basis by the Health Physics Officer providing such exceptions do not jeopardize radiological safety or violate law, regulation, the conditions of USAEC Licenses or the provisions of DA Authorizations to use radioactive materials.

4. ORGANIZATION OF THESE REGULATIONS. To facilitate the use and understanding of these Regulations, the contents have been divided into separate annexes, each dealing with a specific topic. Therefore, it is necessary to consult only the annex dealing with the specific matter in question to find the pertinent information.

5. DEFINITIONS. As used in these Regulations, the following definitions apply:

a. Shall, Will infer a standard, condition, or procedure which must be met if one is to be in compliance with this and other Regulations.

b. May, Should, Is Recommended infer a standard, condition, or procedure from which one may deviate for good and sufficient reason without violating this or other Regulations. Decisions to deviate from the accepted procedures in these Regulations warrant the careful consideration of the Principal User or other responsible individuals in a supervisory capacity.

6. The proponent agency of this Regulation is the Office of the Commander (MEDEC-YHP). Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications) to CDR, WRAMC, ATTN: MEDEC-A, Washington, D.C. 20012.

FOR THE COMMANDER:



FRED C. BRAND
LTC, MSC
Adjutant

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15 June 1973

WR 40-10

ANNEXES
to WR 40-10 (Health Physics Regulations)

SECTION I - ADMINISTRATION

A. WRAMC Radioisotope Committee Authorization to Use Radioactive Material

APPENDIX 1. WRAMC FL 0962(OT), Request for Authorization to Use Radioactive Material - Non-Human Use

APPENDIX 2. WRAMC FL 0963(OT), Training and Experience of Users of Radioisotopes

APPENDIX 3. WRAMC FL 0964(OT), Request for Authorization to Use Radioactive Material - Human Use

APPENDIX 4. WRAMC FL 0965(OT), Training and Experience of Human Users

APPENDIX 5. Non-Routine Medical Uses of Radioactive Material

B. Responsibilities of Principal Users of Radioactive Material

APPENDIX. Recommended Rules of Laboratory Safety for Radiation Workers

C. Role of WRAMC Health Physics

D. Control Measures and Protection Standards for Radiation Exposure

E. Personnel Monitoring

F. Medical Evaluation of Radiation Workers

G. ~~Human~~ **PERSONNEL** Reliability Program

H. Pregnancy Surveillance Program

I. Training and Experience of Users of Radioisotopes and X-Ray Workers

J. References

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K. Receipt, Transfer and Shipment of Radioactive Material

APPENDIX. Sample Purchase Request

L. Accountability and Inventory of Radioactive Material and Machines Which Produce ~~X-Ray, Laser and Microwave Radiation~~ **IONIZING RADIATION.**

M. Transportation of Radioactive Materials

APPENDIX 1. Emergency Procedures to Follow on Vehicle Accident/Incident

APPENDIX 2. DD Form 836, Special Instructions for Motor Vehicle Drivers

APPENDIX 3. DD Form 626, Inspection Report

N. Radioactive Waste

APPENDIX. Waste Disposal Sink Limits

O. Leak Testing Sealed Sources

SECTION III - SUPPORT OF ACTIVITIES

P. Survey of Working Areas

Q. Machine-Produced Radiation

APPENDIX 1. General Safety Precautions for Laser Operations

APPENDIX 2. General Safety Precautions for Microwave Ovens

R. Health Physics Aspects of Patient Care

APPENDIX 1. Health Physics Aspects of Nursing Care of Radiation Therapy Patients with Sealed Sources

APPENDIX 2. Health Physics Aspects of Nursing Care of Radiation Therapy Patients with Non-Sealed Sources

APPENDIX 3. Death - Health Physics Aspects

APPENDIX 4. Health Physics Aspects of Surgery and Autopsy

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APPENDIX 5. Health Physics in the Therapeutic Administration of Radioactive Material

S. Management of Radioactive and Contaminated Patients

T. Health Physics Work Permits

U. Contamination Control and Decontamination Operations

APPENDIX. Permissible Levels of Radioactive Contamination

V. Health Physics Aspects of Fire Fighting

APPENDIX. Instructions to Firemen

SECTION IV - EMERGENCY PROCEDURES

W. Radiological Emergencies

APPENDIX. Appendix C, 10 CFR 20

X. Health Physics Support After Duty Hours

APPENDIX 1. Health Physics Instructions to Military Police

APPENDIX 2. Instructions to Duty Officers

APPENDIX 3. Instructions to Health Physics Personnel

APPENDIX 4. Instructions to Principal Users

ANNEX A (AUTHORIZATION TO USE RADIOACTIVE MATERIAL)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of this ANNEX is to describe the administrative policies and procedures relating to the use of radioactive material.

2. GENERAL. Walter Reed Army Medical Center has been issued various USAEC Licenses and DA Authorizations to permit the receipt, possession, storage, use, transfer, and disposal of radioactive material within the installation. No individual may be licensed by the AEC to use radioisotopes at WRAMC. Accordingly, the possession and use of radioactive materials by individuals at WRAMC is permitted only when specifically authorized by the WRAMC Radioisotope Committee.

3. DEFINITIONS.

a. US Atomic Energy Commission License. A license issued to WRAMC which permits the receipt, possession, storage, utilization, transfer, and disposal of certain radioactive material at WRAMC subject to specific conditions. USAEC Licenses are issued for byproduct material, special nuclear material, ~~etc~~ **SOURCE MATERIAL**

C-1

b. Department of the Army Authorizations. An authorization issued by Department of the Army to WRAMC which permits the receipt, possession, storage, utilization, transfer, and disposal of naturally-occurring and accelerator-produced radioactive material at WRAMC.

c. WRAMC Radioisotope Authorization. An authorization issued by the WRAMC Radioisotope Committee to an individual within the authority of the USAEC License and DA Authorization held by WRAMC to receive, possess, store, use, transfer, and dispose of radioactive material. WRAMC Radioisotope Authorizations are subject to the conditions of the USAEC Licenses, the Code of Federal Regulations, Department of Army Regulations, and these WRAMC Health Physics Regulations.

d. Human Use of radioactive materials refers to the diagnostic or therapeutic application of radioactive material to a human being.

e. Non-human Use of radioactive materials refers to those applications in which radioactive material is not applied or injected into human beings. In-vitro studies of human tissues are included in this category providing none of the product material is to be administered to humans.

f. Principal User is an individual who, by virtue of his training and experience with radioactive material, has been authorized by the

WRAMC Radioisotope Committee to possess and use radioactive material for a given purpose. A Principal User bears the responsibility for the safe handling of the material and for proper precautionary measures to protect himself and others from unwarranted exposure to radiation. He may dictate such rules, procedures, or other restrictions as he deems necessary to effect the proper handling of the radioactive material. He is directly responsible to the WRAMC Radioisotope Committee.

g. Co-worker is an individual who possesses adequate training and experience with comparable radioactive material or equipment to qualify him as a Principal User. A Co-worker performs such duties under the Authorization of the Principal User as directed. A Co-worker is responsible to the Principal User for safe and proper handling of radioactive materials.

h. Trainee is an individual who does not possess adequate training and experience to be authorized as a Principal User himself. He is assigned to this category so that he may obtain the necessary experience under the direct supervision of the Principal User and Co-workers. It is the aim of the Trainee to obtain suitable training and experience to become qualified as a Principal User or Co-worker.

i. Technician is an individual who, under the supervision of the Principal User and/or Co-worker, performs certain routine duties involving the use of radioactive material. He does not possess suitable training and experience to be classified as a Principal User or Co-worker, and is not undergoing such training as would qualify him to attain that status. Technicians must be trained in the safe handling of radioactive material, contamination control, and precautionary measures which may be taken to protect themselves and others from unwarranted exposure to radiation.

j. Health Physics is a profession devoted to the protection of man and his environment from unwarranted radiation exposure.

4. PROCEDURES FOR INITIALLY OBTAINING WRAMC RADIOISOTOPE COMMITTEE AUTHORIZATION TO USE RADIOACTIVE MATERIAL.

a. The Principal User prepares in final form the following documents (The appropriate forms and assistance in their preparation will be furnished by Health Physics upon request):

(1) Non-human Use

(a) WRAMC FL 0962, Request for Authorization to Use Radioactive Material - Non-human Use (one (1) copy; see APPENDIX 1 to this ANNEX).

(b) WRAMC FL 0963, Training and Experience of Users of Radioisotopes

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(one (1) copy for each individual listed on WRAMC FL 0962; see APPENDIX 2 to this ANNEX).

(2) Human Use

(a) WRAMC FL 0964, Request for Authorization to Use Radioactive Material - Human Use (one (1) copy; see APPENDIX 3 to this ANNEX).

(b) WRAMC FL 0963, Training and Experience of Users of Radioisotopes (one (1) copy for each individual listed on WRAMC FL 0964; see APPENDIX 2 to this ANNEX).

(c) WRAMC FL 0965, Training and Experience of Human Users of Radioisotopes (one (1) copy for each physician listed on WRAMC FL 0964; see APPENDIX 4 to this ANNEX).

(d) If the contemplated use is not listed in the Appendix to AR 40-37, or if the contemplated dosage range exceeds the range shown in that Appendix, the Principal User must submit a protocol for Non-routine Medical Use of Radioactive Material. This protocol is an adaptation of Appendix F, AEC Licensing Guide - Medical Programs. Detailed information will be provided from Health Physics upon request (see APPENDIX 5 to this ANNEX). Patient dose calculations and literature reprints should accompany the protocol.

(e) If the contemplated use involves the use of human volunteers, the provisions of AR 70-25, "Use of Volunteers as Subject of Research", apply. It is the responsibility of the Principal User to obtain the required approval, through Command channels, from the Secretary of the Army. A copy of this approval will be forwarded with the request.

b. The Principal User obtains administrative approval from the individual occupying the next higher command position, i.e., Division Chief's Authorization will be approved by the Director, etc. The documents are then forwarded to the following:

(1) Non-human Use Authorization request:

Health Physics
Room 3, WRAIR

(2) Human Use Authorization request:

NCOIC, Health Physics
Radiation Therapy, WRAMC

c. The responsible Health Physics Technician will conduct an

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initial survey of the contemplated laboratory facility to evaluate potential occupational hazards. A report of his findings and recommendations will be made to the Health Physics Officer.

d. The documentation forwarded to Health Physics will be referred to a member of the appropriate Subcommittee of the Radioisotope Committee. The procedure and qualifications of the workers will be evaluated to insure adequate training and experience in the safe handling of radioisotopes. In the case of Human Uses involving non-routine medical uses of radioisotopes, the protocol will be evaluated from a professional standpoint to determine the medical acceptability of the procedure.

e. After approval by the Subcommittee Member, the documentation is forwarded to the Chief, Radioactive Material Control Section, Health Physics. He will verify the presence of all documents, attach additional documents as needed, and insure that procedure, radioisotope and activity requested may be allowed within the limitations of USAEC Licenses and DA Authorizations issued to WRAMC. The file is then forwarded to the Health Physics Officer.

f. The Health Physics Officer reviews the request for adherence to safe practices and for full compliance with all requirements. If conditions are required to insure the above, they will be developed with the concurrence of the other Subcommittee Member who approved the request.

g. Following approval, the Authorization will be recorded, a number assigned, and distribution effected.

h. The actions of the Subcommittees are reviewed at the regular meetings of the WRAMC Radioisotope Committee.

5. AMENDMENT OF WRAMC RADIOISOTOPE AUTHORIZATIONS TO USE RADIOACTIVE MATERIAL. If at any time the applicant desires to deviate from the procedure, the radioisotope, or the specified investigation as described on the approved Authorization, he shall request an amendment to his Authorization by submitting a Disposition Form (DA Form 2496) describing the proposed changes to his WRAMC Radioisotope Authorization through the Health Physics Officer to the WRAMC Radioisotope Committee. Routing amendments through the appropriate Health Physics Survey Section (para 4b, above) expedites processing. Amendments will be formally reviewed by the appropriate Subcommittee at the discretion of the Health Physics Officer.

6. REVIEW AND RENEWAL OF AUTHORIZATIONS. Current Authorizations will be reviewed at least annually and at other times as deemed appropriate by the Health Physics Officer. After review, Authorizations are renewed, discontinued, or revised in accordance with current requirements.

7. APPENDICES:

a. WRAMC FL 0962(OT), Request for Authorization to Use Radioactive Material - Non-Human Use.

b. WRAMC FL 0963(OT), Training and Experience of Users of Radioisotopes.

c. WRAMC FL 0964(OT), Request for Authorization to Use Radioactive Material - Human Use.

d. WRAMC FL 0965(OT), Training and Experience of Human Users.

e. Non-routine Medical Uses of Radioactive Material.

REQUEST FOR AUTHORIZATION TO USE RADIOACTIVE MATERIAL NON-HUMAN USE (WRAMC Regulation 40-10)			Use supplemental sheets where necessary. Use accepted chemical symbols and abbreviations wherever possible.
THRU: Health Physics Officer, Health Physics Survey Section Room #3, WRAIR	FROM: <i>(Principal User & Organization)</i>	DATE PHONE	
TO: Radioisotope Committee, WRAMC	<i>(Principal User & Organization)</i>		
List all CO-WORKERS w/grade & org. Attach comp WRAMC 421 a&b if not on file w/ WRAMC HPO.	List all TRAINEES w/grade & org. Attach compl WRAMC 421 a&b if not on file w/ WRAMC HPO.	List all TECHNICIANS who will work w/ Rada Mtl under this Authorization.	
RADIOACTIVE MATERIAL WILL BE USED IN		<input type="checkbox"/> UNSEALED SOURCE	
RADIOACTIVE MATERIAL WILL BE STORED IN		<input type="checkbox"/> SEALED SOURCE	
DESCRIPTION OF USE			
RADIOISOTOPE	CHEMICAL AND/OR PHYSICAL FORM	POSSESSION LIMIT	USE
I acknowledge my responsibilities as PRINCIPAL USER as defined in WRAMC Regulation 40-10: _____ <i>(Signature of Principal User)</i>		ADMINISTRATIVE APPROVAL: _____ <i>(Signature of C of Svc, Dept, or Div)</i>	
WRAMC RADIOISOTOPE COMMITTEE APPROVAL			
APPROVED: _____ HEALTH PHYSICS OFFICER WRAMC	APPROVED: _____ MEMBER, SUBCOMMITTEE FOR NON-HUMAN USE, RADIOISOTOPE COMMITTEE, WRAMC	AUTHORIZATION NO. _____ REVIEW DATE _____	

TRAINING AND EXPERIENCE OF USERS OF RADIOISOTOPES

DATE

NAME, RANK, BRANCH, SERVICE NUMBER, SOCIAL SECURITY ACCOUNT NUMBER

PHONE

1. FORMAL EDUCATION: Total Number of Years of Formal Schooling _____

	Higher Educational Institutions Attended	Type of Program Pursued and Dates of Attendance	Degree, Diploma or Certificate Received and Date
a.	_____	_____	_____
b.	_____	_____	_____
c.	_____	_____	_____
d.	_____	_____	_____

2. TRAINING IN THE USE OF RADIATION PRODUCING SOURCES AND DEVICES

I have received the following training in the subjects listed below:

HOURS	Formal/On-the-Job Training	Subject Area	Identify where trained by Institution Letter from above and indicate any additional
_____ of _____		in PRINCIPLES & PRACTICES OF RADIATION PROTECTION	_____
_____ of _____		in RADIOACTIVITY MEASUREMENT	_____
_____ of _____		in STANDARDIZATION	_____
_____ of _____		in MONITORING TECHNIQUES	_____
_____ of _____		in INSTRUMENTATION	_____
_____ of _____		in MATHEMATICS & CALCULATIONS BASIC TO THE USE & MEASUREMENT OF RADIOACTIVITY	_____
_____ of _____		in BIOLOGICAL EFFECTS OF RADIATION	_____

(Use additional sheets or reverse of this form to describe any other training received in the use of radiation producing sources and devices.)

3. EXPERIENCE IN THE USE OF RADIATION PRODUCING SOURCES AND DEVICES. (Show Actual Use of Radioisotopes or Equivalent Experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

REQUEST FOR AUTHORIZATION TO USE RADIOACTIVE MATERIAL HUMAN USE (WRAMC Regulation 40-10)		<i>Use supplemental sheets where necessary. Use accepted chemical symbols and abbreviations wherever possible.</i>		
THRU: Health Physics Officer Health Physics Survey Section Room #3, WRAIR		FROM: _____ (Principal User & Organization)		
		DATE		
		PHONE		
TO: Radioisotope Committee, WRAMC				
List all CO-WORKERS w/grade & org. Attach compl WRAMC #21a&b if not on file w/ WRAMC HPO.	List all TRAINEES w/grade & org. Attach compl WRAMC #21 a&b if not on file w/ WRAMC HPO.	List all TECHNICIANS who will work w/ Rada Mtl under this Authorization.		
RADIOACTIVE MATERIAL WILL BE USED IN _____		<input type="checkbox"/> UNSEALED SOURCE		
RADIOACTIVE MATERIAL WILL BE STORED IN _____		<input type="checkbox"/> SEALED SOURCE		
BYPRODUCT MATERIAL	CHEMICAL AND/OR PHYSICAL FORM	POSSESSION LIMIT	USE	DOSAGE RANGE
CHECK ONE BLOCK IN EACH SECTION				
1	<input type="checkbox"/> I HAVE COMPLIED WITH THE PROVISIONS OF AR 40-7 (Clinical Use of Investigational Drugs) AND ALL OTHER APPLICABLE ADMINISTRATIVE REQUIREMENTS.			
	<input type="checkbox"/> AR 40-7 DOES NOT APPLY.			
2	<input type="checkbox"/> I HAVE COMPLIED WITH THE PROVISIONS OF AR 70-25 (Use of Volunteers as Subjects of Research), AND REPORTING REQUIREMENTS OF AR 40-37 (Radioisotope License Program (HUMAN USE)).			
	<input type="checkbox"/> HUMAN VOLUNTEERS WILL NOT BE USED UNDER THIS AUTHORIZATION.			
<i>I acknowledge my responsibilities as PRINCIPAL USER as defined in WRAMC Regulation 40-10:</i> _____ (Signature of Principal User)			ADMINISTRATIVE APPROVAL: _____ (Signature of C of Svc, Dept, or Div)	
WRAMC RADIOISOTOPE COMMITTEE APPROVAL				
APPROVED: _____ HEALTH PHYSICS OFFICER WRAMC		APPROVED: _____ MEMBER, SUBCOMMITTEE FOR HUMAN USE RADIOISOTOPE COMMITTEE, WRAMC		AUTHORIZATION NO. _____
				REVIEW DATE _____

TRAINING AND EXPERIENCE OF PHYSICIANS
(CR 40-10)

1. USING PHYSICIAN'S NAME, RANK, SERVICE NUMBER, SSAN

GRADE

2. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 1 ABOVE

(A) ISOTOPE	(B) CONDITIONS DIAGNOSED OR TREATED	(C) NO. CASES OBSERVED	(D) NO. CASES INVOLVING PERSONAL PARTICIPATION
I-131 and/or I-125	Diagnosis of thyroid function		
	Dilution studies		
	Excretion studies		
	Brain tumor localization		
	Scanning studies		
I-131	Treatment of hyperthyroidism		
	Treatment of cardiac conditions		
	Treatment of thyroid carcinoma		
P-32 Soluble	Treatment of polycythemia		
	Treatment of leukemia		
	Treatment of bone metastases		
	Tumor localization		
	Intracavitary treatment		
Au-198	Intracavitary treatment		
	Interstitial treatment		
	Scanning studies		
Cr-51	Blood determinations		
	Scanning studies		
Co-58 or Co-60	Diagnosis of pernicious anemia		
Co-60	Interstitial treatment		
Ir-192	Intracavitary treatment		
Co-60 or Cs-137	Teletherapy treatment		
Sr-90	Treatment of superficial diseases of the eye		
Other Isotopes			

3. CLINICAL RADIOISOTOPE TRAINING AND EXPERIENCE

<u>DATES</u>	<u>HOURS</u>	<u>NAME & ADDRESS OF INSTITUTION</u>	<u>SUPERVISING PHYSICIAN</u>

(SIGNATURE)

APPENDIX 5 (NON-ROUTINE MEDICAL USES OF RADIOACTIVE MATERIAL)
to ANNEX A (AUTHORIZATION TO USE RADIOACTIVE MATERIAL)

1. Experimental and non-routine medical uses of byproduct materials include all human uses not specified in the Appendix to AR 40-37. Such uses may be classified into one of two phases of development:

a. Clinical Research applies to a new use of radioactive material in humans. Little or nothing is known about the procedure and little or nothing has been published on the subject. The basis for proceeding with the new use in humans is derived from knowledge obtained from animal studies. This phase of development includes the initial introduction into humans and initial trials on a limited number of patients.

b. Clinical Evaluation applies to the planned testing of a new diagnostic or therapeutic procedure in an appropriate series of control and diseased humans. The procedure and results of clinical research will ordinarily have been reported in the literature or at meetings. If adequate information has not been published, the applicant should have spent sufficient time with those who developed the test to be thoroughly familiar with the details.

2. The clinical research phase of experimental or non-routine medical use of radioactive material is normally limited to physicians who have broad experience in the use of radioisotopes and who have appropriate facilities and equipment available to conduct research. The individual physician to be designated as the authorized user should normally have broad and varied experience in the use of radioisotopes and in clinical research investigation.

3. The clinical evaluation phase of experimental or non-routine medical use of radioactive material is normally limited to physicians under the supervision of an individual physician with broad experience in clinical evaluation and the use of radioisotopes and under the guidance of a radioisotope committee representing a number of disciplines. Adequate resources to conduct the trials shall be available.

4. Applications for experimental or non-routine uses of radioactive material in humans are reviewed by the WRAMC Radioisotope Committee. Applications should be supported by a research protocol which includes:

- a. Title of study
- b. The purpose for conducting the study. Indicate whether the study is to be clinical research or clinical evaluation and explain why.
- c. The plan of investigation in sufficient detail to permit a critical

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evaluation of the methods for conducting the experiments and the controls established.

d. A statement as to whether any planned complementary drug or radioisotope administration is contemplated in conjunction with the study.

e. A statement about the expected fate of the isotope administered and, if the procedure is for therapy, a statement about the expected effects.

f. If the application is for clinical research, an outline of related work conducted by the applicant or others in laboratory animals and in humans, including data on localization, effective half-life, and radiation dosage. If no work has been conducted in animals, explain why. Pertinent references and a brief abstract prepared by the applicant of published or unpublished material should be submitted (The brochure of a commercial supplier is not a satisfactory authority for this purpose).

g. If the application is for clinical evaluation, pertinent references and a brief abstract prepared by the applicant of published or unpublished material, including information on localization, effective half-life, and radiation dosage should be submitted (The brochure of a commercial supplier is not a satisfactory authority for this purpose).

h. If volunteers are to be used as human subjects of research, the provisions of AR 70-25 apply, and the applicant must include the written consent of the Secretary of the Army secured in accordance with that regulation.

i. If investigational drugs are to be used clinically in the project on human subjects, the provisions of AR 40-7 apply, and the applicant must include the written approval of the Army Investigational Drug Review Board obtained in accordance with that regulation. Investigational drugs are defined as: "A new drug, not yet approved by the Commissioner of Food and Drugs, Department of Health, Education, and Welfare for general use by the public as a safe and efficacious drug, and that is proposed for clinical study under Department of Army auspices after adequate preclinical information has been obtained".

j. A description of human subjects to be studied:

(1) Persons without manifest disease - number, method of selection, age range.

(2) Persons with manifest disease - number, nature of pathology, method of selection, age range.

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(3) Pregnant women shall ordinarily be excluded from any test not involving the condition of the pregnancy itself. Specify whether or not pregnant women will be tested and if so, explain why.

ANNEX B (RESPONSIBILITIES OF PRINCIPAL USERS OF RADIOACTIVE MATERIAL)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of this ANNEX is to delineate the responsibilities and authority of a Principal User of radioactive material.

2. DEFINITIONS.

a. Principal User. See definition, para 3f, ANNEX A to these Regulations.

b. Co-worker. See definition, para 3g, ANNEX A to these Regulations.

c. Trainee. See definition, para 3h, ANNEX A to these Regulations.

d. Technician. See definition, para 3i, ANNEX A to these Regulations.

3. SPECIFIC RESPONSIBILITIES.

a. Become thoroughly familiar with the contents of these Regulations prior to the use of radiation sources.

b. Obtain and use radiation sources only as authorized by these Regulations.

c. Take adequate precautionary measures to protect himself and others from unwarranted exposure to radiation.

d. Seek advice and assistance from the Health Physics Officer when in doubt concerning the safety of an operation.

e. Prescribe rules, procedures, SOPs, or protocols for the use of radioactive materials under his control to insure their proper and safe use. These will be made available to any radiation worker in that area and will be furnished to Health Physics upon request. (See the APPENDIX to this ANNEX for a list of radiation laboratory safety rules).

f. Insure that all personnel working under his Authorization or in his area of responsibility are familiar with the specific practices to be followed or avoided in the interest of radiological safety. Health Physics will assist in providing instruction in radiation safety upon request.

g. Preclude the misuse of radioisotopes and radiation-producing devices by unstable or irresponsible personnel who might endanger themselves or others by their conduct.

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h. Insure that all rules, procedures, and practices of radiological safety are vigorously followed in the work area.

i. Seek the assistance of the appropriate supervisors if assistance in obtaining cooperation and compliance is needed. Although Health Physics is available to provide necessary technical advice on matters of radiological safety, enforcement of regulations and rules is basically the responsibility of the immediate supervisor. All disputes should be resolved at the lowest possible level.

j. The Principal User shall promptly report to the Health Physics Officer all known or suspected overexposures to radiation. The overexposed individual shall cooperate in any and all attempts to evaluate his radiation exposure.

k. Maintain a current inventory of the curiage of radioactive material on hand to be readily available to the Health Physics Officer upon request.

l. Provide information and assistance to Health Physics personnel which is necessary for the completion of adequate radiation protection surveys. If classified or sensitive information must be discussed, it must be clearly identified so that it will not become subject to compromise.

m. The Principal User is directly responsible to the WRAMC Radioisotope Committee for violations of these Regulations by personnel working under his Authorization. The Health Physics Officer will report all cases of this nature to the Committee whenever appropriate corrective actions are not initiated by the Principal User or when violations are repeated or flagrant. The Principal User will be invited to the meeting at which the matter is discussed.

n. Additional specific responsibilities are described in:

- | | |
|--------------------------|-------------------------|
| (1) ANNEX H, para 2 | (5) ANNEX P, para 2b |
| (2) ANNEX K, para 4b | (6) ANNEX U, para 2b |
| (3) ANNEX L, para 1c | (7) ANNEX W, para 3 |
| (4) ANNEX N, para 2b, 2c | (8) ANNEX X, APPENDIX 4 |

APPENDIX (RECOMMENDED RULES OF LABORATORY SAFETY FOR RADIATION WORKERS)
to ANNEX B (RESPONSIBILITIES OF PRINCIPAL USERS OF RADIOACTIVE MATERIAL)

1. No eating, drinking, smoking or applying cosmetics in any area where radioisotopes are stored or used.
2. Do not bring food or drink into areas where radioisotopes are used or stored, even if it is to be eaten elsewhere.
3. Do not store food (lunch bags, soft drinks, etc.) in cabinets, refrigerators, etc., which are used or have been used for radioactive material.
4. Do not use laboratory glassware or equipment for the preparation or consumption of food or drink.
5. Wear protective gloves, aprons, laboratory coats, etc., whenever there is a possibility of contaminating oneself.
6. Protect all breaks in the skin with waterproof material, e.g., rubber gloves, whenever handling radioactive materials.
7. Wash hands thoroughly, including under fingernails, with mild soap and water and a soft brush after handling any radioisotope and monitor hands with a suitable detector before going about any other work and whenever leaving the laboratory for meals, coffee-breaks, etc., and especially before eating, drinking, smoking or applying cosmetics.
8. Never wash hands with solvent materials; use mild soap and water and a soft brush if needed.
9. Eliminate all sharp objects, e.g., broken glassware, from areas where radioactive materials are used.
10. Wear film badges (dosimeters, if issued) at all times during duty hours, except for medical and dental appointments.
11. When leaving the work area for the day or for medical or dental appointment, leave the film badge (and dosimeter, if issued) in a controlled low background area where it will not be exposed. Do not take film badge home without permission from Health Physics.
12. Do not tamper with film badges or dosimeters. Protect them from damage.
13. Mark all radiologically contaminated, or potentially contaminated containers, and equipment clearly with radioactive marking tape.

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14. At the conclusion of each run of the experiment using radioactive material; decontaminate areas, change absorbent paper, clean up equipment, etc., to avoid buildup of contamination.
15. Do not wear lab coats which were worn during the use of radioactive material for other work or outside the lab. Contamination on the coat may be spread, absorbed or ingested if care is not taken.
16. Never pipet by mouth, even water. Bad habits, once formed, are not easily broken.
17. Report all known or suspected exposures, contamination, spills, inhalations, ingestions, absorptions, or injections of radioactive materials IMMEDIATELY to Health Physics, Ext. 5107, and to your immediate supervisor. No punitive action will be taken against individuals who are accidentally exposed to radiation, for the accident or for prompt reporting.
18. Dispose of radioactive waste only in the receptacles provided. Do not mix radioactive and non-radioactive waste.
19. If a radioactive waste sink is available, follow the posted instructions for use. Be sure to complete the log book entry.
20. Keep work areas where radioactive materials are used free from unnecessary materials and equipment.
21. Where practical, use absorbent paper to limit the spread of contamination.
22. Use common sense.
23. Do not handle telephone, reports, etc., with contaminated hands or while using protective gloves.
24. Keep fingernails short and clean.
25. Personnel working with radioactive materials will report IMMEDIATELY any cuts or skin abrasions occurring during the working hours.
26. The following procedures are followed in the event of a wound incurred while working with radioactive materials:
 - a. Wash the injured area at once with running water. Time is important; even a few seconds may make a considerable difference.

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b. Notify the appropriate superior and Health Physics (Ext. 5107).

c. Self-treatment or antiseptics shall not be employed until the wound has been checked by a Medical Officer.

c-1 27. To preclude the buildup of contamination, the laboratory will be surveyed by the ~~occupants~~ **USER** daily with the survey instrument provided.

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ANNEX C (ROLE OF WRAMC HEALTH PHYSICS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To delineate the general responsibility of the Health Physics Officer pertaining to these Regulations.
2. RESPONSIBILITIES OF THE HEALTH PHYSICS OFFICER.
 - a. A more complete and detailed description of the organization, function and responsibilities of Health Physics may be found in the WRAMC Organizational and Functional Manual.
 - b. Advises the Commander, WRAMC on the control of radiation hazards.
 - c. Directs all Health Physics activities at WRAMC.
 - d. Serves as principal WRAMC Staff Officer for control of radioactive material and sources of radiation including X-ray, microwave, and laser.
 - e. Acts as executive agent for all USAEC Licenses and DA Authorizations for the possession, storage, and use of radioactive material at WRAMC.
 - f. Acts as the custodian of all radioactive materials at WRAMC.
 - g. Provides advice, assistance, and support of all activities using radioactive material or machine-produced radiation on matters of radiation safety.
 - h. Conducts and administers education and training programs in the use of radioactive material.
 - i. Furnishes technical support to activities with specific requirements which exceed their capabilities.
 - j. Performs missions which can be effectively consolidated to free individual users and enable them to more effectively utilize their resources toward the accomplishment of their primary objectives. Among these are the following:
 - (1) Performs radiation protection surveys.
 - (2) Administers the photodosimetry and bioassay programs.
 - (3) Radioactive Material Control including:

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(a) Maintains inventory of radioactive material and machines which produce X-ray, laser, or microwave radiation at WRAMC.

(b) Insures compliance with possession limits, etc., of USAEC Licenses and DA Authorizations.

(c) Renders required administrative reports.

(d) Keeps necessary and required records to insure compliance with law and regulations.

(e) Monitors incoming shipments of radioactive material to avoid contamination of the user's facilities and to insure compliance with federal packaging, labeling, and shipping requirements.

(f) Receives, processes, and ships radioactive waste generated at WRAMC.

(g) Transports radioactive material throughout WRAMC.

(h) Ships radioactive material from WRAMC in compliance with Federal and Department of the Army Regulations.

(4) Services, repairs, and calibrates portable survey instruments used at WRAMC, tenant units, and USAMRIID.

(5) Provides full-range Health Physics support for all users of ionizing and nonionizing radiation sources and devices at WRAMC and USAMRIID.

(6) Maintains an around-the-clock emergency response capability to meet any contingency involving radiation, radioactive material, or personnel exposure.

(7) Supplies users with certain specialized Health Physics equipment needed for the control of radiological hazards.

(8) Administers the Personnel Reliability program for WRAMC.

(9) Develops and tailors radiation protection programs to meet the needs of individual users.

(10) Assists radiation workers in avoiding unwarranted exposure to radiation through close and continuous support.

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(11) Conducts the environmental radiation surveillance program for WRAMC.

(12) Provides full-range Health Physics support for the DORF reactor.

3. ORGANIZATION. Health Physics is composed of an administrative section and two operational branches.

a. The Reactor and Survey Branch has the mission of providing close and continuing support to the users of radioactive materials and devices which produce X-ray, laser, and microwave radiation. The sections of this Branch are:

- (1) WRAMC Hospital Health Physics Section.
- (2) Health Physics Section for WRAIR, AFIP, and MDW.
- (3) USAMRIID Health Physics Section.
- (4) Diamond Ordnance Radiation Facility (DORF) Health Physics Section.

b. The Nuclear Laboratory and Technical Services Branch has the mission of providing specialized services and support to the Reactor and Survey Branch. The sections of this Branch are:

- (1) Radioactivity Analysis Laboratory.
- (2) Radioactive Material Control Section.
- (3) Instrument Repair and Calibration Section.
- (4) Personnel Dosimetry Section.
- (5) Supply Section.

4. RADIOLOGICAL EMERGENCY MEDICAL TEAM (REMT). AR 40-13, "Radiological Emergency Medical Teams", together with other directives, assigns the responsibility for maintaining a Primary REMT, augmented by qualified alternate REMT Members, at WRAMC. In conjunction with the Director, Force Development, WRAMC, the Health Physics Officer is responsible for coordination and dispatch of the REMT on request.

ANNEX D (CONTROL MEASURES AND PROTECTION STANDARDS FOR RADIATION EXPOSURE)
to WR 40-10 (Health Physics Regulations)

1. REFERENCES.

- a. Title 10, Code of Federal Regulations, Part 20, U. S. Atomic Energy Commission Rules and Regulations.
- b. AR 40-14, Control and Recording Procedures, Occupational Exposure to Ionizing Radiation.
- c. AR 385-30, Safety Color-code Markings and Signs.

2. APPLICABILITY. The definitions and limitations stated in this ANNEX are peacetime standards for occupational exposure of personnel to ionizing radiation. Occupational exposure to ionizing radiation is that exposure incurred as a result of an individual's employment or duty. No portion of this ANNEX shall be interpreted as limiting the intentional exposure of an individual to radiation for the purpose of medical diagnosis or medical therapy of that individual.

~~C-1~~ 3. DEFINITIONS AND REQUIREMENTS FOR ~~RESTRICTED~~ AREAS.

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a. Restricted Area.

(1) Definition:

(a) Any area to which access will be limited by Health Physics and in which precautionary measures are taken for the purpose of protecting individuals from exposure to ionizing radiation and/or radioactive materials.

(b) Any area so designated by the Health Physics Officer.

(2) Requirements:

(a) Restricted Areas will be posted by Health Physics.

(b) The Restricted Area sign will read:

"RESTRICTED AREA"

"Persons who occupy this area for more than 10 hours per week must be registered with the Health Physics Officer"

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b. Radiation Area.

(1) Definition: Any area, accessible to personnel, in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose equivalent in excess of 2 millirem, or in any five (5) consecutive days a dose equivalent in excess of 100 millirem.

(2) Requirement: Each Radiation Area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"RADIATION AREA"

c. High Radiation Area.

(1) Definition: Any area accessible to personnel in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose equivalent in excess of 100 millirem.

(2) Requirements:

(a) A High Radiation Area shall not be established without the approval of the Health Physics Officer or his representative except in an emergency.

(b) Each High Radiation Area established for more than 30 days shall be equipped with control devices in accordance with ~~para 20.203(e)(2), 10 CFR 20.10 CFR 20.10 CFR 20.203 AND 29 CFR 1910.96~~ ^{c-1}

(c) Except in an emergency, no individual shall enter a High Radiation Area until the area has been monitored by Health Physics and approval for his entry has been given by Health Physics.

(d) No individual shall enter or remain in a High Radiation Area unless personnel are immediately available in the vicinity to render assistance.

(e) Each High Radiation Area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"HIGH RADIATION AREA"

d. Airborne Radiation Area.

(1) Definition: Any room, enclosure, or operating area in which

airborne radioactive materials exist in concentrations in excess of amounts specified in Appendix B, Table 1, Column 1, Title 10, Code of Federal Regulations, Part 20, or any room, enclosure, or operating area in which airborne radioactive material exists in concentrations which, averaged over a number of hours in any week during which individuals are in the area, exceed 25 percent of the amounts specified in the above referenced Code of Federal Regulations ~~(from para 3-1e, AR 385-30)~~. C-1

(2) Requirements:

(a) An Airborne Radioactivity Area shall not be established without approval of the Health Physics Officer or his representative except in an emergency.

(b) The Health Physics Officer shall direct the use of respiratory protective devices, ventilation control measures, and other appropriate actions within Airborne Radioactivity Areas.

(c) Each Airborne Radioactivity Area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"AIRBORNE RADIOACTIVITY AREA"

e. Areas Where Radioactive Material is Present.

(1) The provisions of this paragraph apply to materials which have been procured and are useful because of their radioactive component including natural Uranium or Thorium compounds ~~used for histological staining.~~ C-1

(2) Each area or room and principal container in which radioactive material is stored or used shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"RADIOACTIVE MATERIAL(S)"

(3) Samples, working solutions, laboratory standards, check sources, etc., must be labeled, segregated, or otherwise identified in such a manner that all personnel in the area recognize that radioactive material is present in the object. Radioactive marking tape may be used for this purpose. ~~However, beakers, flasks, test tubes, and other laboratory containers used transiently in laboratory procedures are exempt from labeling requirements.~~ C-1

f. Contaminated Areas.

(1) Definition: Any area, including work areas, which are contaminated with radioactive material to levels in excess of values published in the APPENDIX to ANNEX U of this regulation (Contamination Control and Decontamination Operations).

(2) Requirements.

(a) Any area which may routinely become contaminated during experimental procedures may be posted conspicuously with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"POTENTIALLY CONTAMINATED AREA"

(b) Any area which is contaminated may be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"CAUTION"
"CONTAMINATED AREA"

(c) All areas designated as "Contaminated Areas" or "Potentially Contaminated Areas" will always be regarded as heavily contaminated and must be surveyed by Health Physics following use and decontamination in order to be considered free of contamination.

g. Special Areas of Concern.

(1) At the discretion of the Health Physics Officer, dose rates may be posted for informational purposes at any point.

(2) Specially-designated sinks through which radioactive material may be discharged into the sanitary sewer system shall be conspicuously posted with the radiation caution symbol and the words:

"CAUTION"
"RADIOACTIVE MATERIAL DISPOSAL SINK"

(3) All laboratory receptacles for radioactive waste shall be conspicuously posted with the radiation caution symbol and the words:

"CAUTION"
"RADIOACTIVE WASTE"

(4) Equipment containing or likely to contain radioactive material, and equipment requiring special precautions to perform specific tasks,

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will be posted with a sign stating that approval of the Health Physics Officer is required before any maintenance or repair of this item is initiated.

(5) Reactor Areas are those areas adjacent to nuclear reactors, access to which is controlled by the reactor staff and/or Health Physics.

4. RADIATION PROTECTION STANDARDS. Every effort will be made to maintain the radiation dose equivalent as far below the following Radiation Protection Standards as practicable. Positive efforts will be carried out to fulfill this objective; and, determination of necessity will be weighed against the benefits to be expected.

a. Basic Radiation Protection standards adopted for the control of occupational exposures to ionizing radiation include:

(1) The accumulated dose equivalent of radiation to the whole-body; head and trunk; active blood-forming organs; gonads; or lens of the eye will not exceed:

(a) 1.25 rem in any calendar quarter, nor

(b) 5 rem in any 1 calendar year.

(2) The accumulated dose equivalent of radiation to the skin of the whole-body (other than hands and forearms); cornea of the eye; and bone will not exceed:

(a) 7.50 rem in any calendar quarter, nor

(b) 30 rem in any 1 calendar year.

(3) The accumulated dose equivalent of radiation to the hands and wrists or the feet and ankles will not exceed:

(a) 18.75 rem in any calendar quarter, nor

(b) 75 rem in any 1 calendar year.

(4) The accumulated dose of radiation to the forearms will not exceed:

(a) 10 rem in any calendar quarter, nor

(b) 30 rem in any 1 calendar year.

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(5) The accumulated dose equivalent or radiation to the thyroid; other organs; tissues; and organ systems will not exceed:

(a) 5 rem in any calendar quarter, nor

(b) 15 rem in any 1 calendar year.

(6) Individual(s) under 18 years of age, females known to be pregnant, and occasionally exposed individual(s) will not be exposed to a whole-body dose equivalent of more than:

(a) 2 millirem in any 1 hour, nor

(b) 100 millirem in any 7 consecutive days, nor

(c) 500 millirem in any 1 calendar year, nor

(d) more than 10 percent of the values in (2), (3), (4), and (5) above, for other areas of the body.

(7) Individuals over 18 years of age but who have not yet reached their 19th birthday may be occupationally exposed to ionizing radiation provided that they do not exceed 1.25 rem dose equivalent to the whole-body in any calendar quarter, nor 3 rem in the 12 consecutive months prior to their 19th birthday.

(8) Women of reproductive capacity should be occupationally exposed only under conditions where the dose equivalent to the abdomen will not exceed:

(a) 1.25 rem in any calendar quarter, nor

(b) 5 rem in any 1 calendar year.

(9) Females known to be pregnant will not be occupationally exposed to ionizing radiation more than 6a(6) above. It is the responsibility of the female employee to advise her employer of the fact that she is pregnant.

b. Radiation Protection Standards adopted for the control of planned occupational exposures to ionizing radiation under emergency situations include:

(1) Life Saving:

(a) The accumulated dose equivalent of radiation to the whole-body should not exceed 100 rem.

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(b) The accumulated total dose equivalent of radiation to the hands and forearms should not exceed 300 rem.

(2) Less Urgent:

(a) The accumulated dose equivalent of radiation to the whole-body should not exceed 25 rem.

(b) The accumulated total dose equivalent of radiation to the hands and forearms should not exceed 100 rem.

c. Radiation Protection Standards adopted for the control of non-occupational exposures to ionizing radiation include limiting the use of sources of ionizing radiation such that the accumulated dose equivalent of radiation to the whole-body for an individual in the general population (exclusive of natural background and medical and dental exposures) will not exceed 0.5 rem in any 1 calendar year.

d. Alternate Radiation Protection Standards, less restrictive than those prescribed in 6a above, may be used in special circumstances, when approved by the Surgeon General of the military department concerned.

(1) Proposals for the use of alternate standards will contain complete justification and will describe the procedures by which the alternate standards will be implemented.

(2) Alternate radiation protection standards will not be considered for individuals under 19 years of age, females known to be pregnant, occasionally exposed individuals, women of reproductive capacity or non-occupational exposure to ionizing radiation.

e. When dosimetry indicates that an individual may have received greater than 400 millirem per month whole-body exposure; exposure to unusual concentrations of airborne radioactive material; or the individual believes he may have been exposed to excessive ionizing radiation Health Physics will investigate the circumstances of the exposure. A written report of the investigation will be prepared.

f. When it is determined that an individual may have received a dose of ionizing radiation in excess of the limits stated in para 4 above, or has been exposed to airborne concentrations of radioactive material in excess of 25% of the amounts specified in Appendix B, Table 1, Column 1, 10 CFR 20, when averaged over the number of hours in any week, a report of the findings will be made to the WRAMC Radioisotope Committee.

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for recommendation for corrective action to be taken. Reports of investigation of overexposures and corrective action will be submitted through Health Services Command, Fort Sam Houston, Texas, to the Surgeon General and the USAEC in compliance with pertinent directives.

g. The exemption of medical exposure from consideration relative to permissible exposure limits of this ANNEX apply only to the patient. All other personnel, such as physicians and technicians administering exposures are subject to the permissible exposure limits listed above.

5. ACCIDENTAL EXPOSURE TO IONIZING RADIATION. The specific procedures and responsibilities relating to the accidental exposure of personnel to known or suspected overexposures are delineated in ANNEX W to this Regulation.

a. Internal Exposure. All persons who are known or suspected to have been internally exposed to quantities of radioactive material in excess of the amounts specified in ANNEX W of this Regulation shall be reported to the Health Physics Officer.

b. External Exposure. All persons who are known or suspected to have been externally exposed to radiation levels in excess of those listed in para 4 above, shall be reported IMMEDIATELY to the Health Physics Officer.

ANNEX E (PERSONNEL MONITORING)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of the personnel monitoring program is to:

a. Quantitatively estimate the magnitude of the exposure of individuals to sources of ionizing radiation.

b. Detect hazardous conditions relating to ionizing radiation exposure not found during radiation protection surveys.

2. SELECTION OF PARTICIPANTS. Personnel selected for personnel monitoring will include:

a. Individuals who are likely to be exposed to sufficient radiation from all occupational exposures to receive an accumulated dose in excess of ten (10) percent of the applicable quarterly basic Radiation Protection Standard (See ANNEX D to these Regulations).

b. Those other individuals selected by the Health Physics Officer.

~~c. Individuals less than 18 years of age who may be occupationally exposed to radiation.~~

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3. DEVICES AND METHODS FOR PERSONNEL MONITORING.

a. A film badge is the primary dosimetric device for personnel monitoring in the Army. It consists of a packet of radiosensitive photographic film in a plastic holder. The following types of film badges are available:

(1) Whole body badge. Sensitive to beta, X-ray, and gamma radiation and worn to measure the exposure received by the whole body.

(2) Wrist badge. Same as the whole body badge except that it is provided with a wrist band so that it can be used to measure the dose to the hands.

(3) Neutron badge. Sensitive to neutron radiations and worn to measure exposure of the whole body to neutrons.

b. Pocket chambers provide a means of obtaining rapid indications of the accumulated dose over short periods of time. The direct reading personnel dosimeter enables individuals to monitor their own accumulated dose.

c. Various audible pocket ratemeters and integrating dosimeters are

also available. These are useful for personnel intermittently exposed to high intensity X-ray or gamma radiation fields.

d. Thermoluminescent dosimeters are useful for dose measurements where other devices are too cumbersome or are otherwise unsuitable.

c-1 e. **BIOASSAY**
~~Biodosimetric~~ methods may be employed in some cases to assess the quantity of certain radioisotopes which are present within the body. Available techniques include:

- (1) Whole body counting.
- (2) Selective organ scanning.
- (3) ~~Random~~ breath analysis.
- (4) Urinalysis.

c-1 **(5) FECAL ANALYSIS**
4. GENERAL GUIDELINES.

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a. Each person, except those being exposed to a radiation source for medical purposes, who occupies a ~~Restricted Area~~ for more than one (1) day, will wear a film badge unless specifically exempted by the Health Physics Officer.

b. Film badges will not be used for any purpose other than personnel monitoring without the approval of the Health Physics Officer.

c. Only those film badges issued by WRAMC Health Physics shall be acceptable in meeting the requirements of this paragraph for persons coming under the scope of these Regulations.

d. WRAMC film badges shall not be worn by WRAMC personnel when occupationally exposed at other facilities without the consent of the Health Physics Officer, WRAMC. When military or civilian personnel assigned to WRAMC are exposed to ionizing radiation at an installation outside the jurisdiction of WRAMC, they shall insure that the required exposure information is furnished to the custodian of his DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation). Health Physics maintains these records at WRAMC.

c-1 e. Other dosimetric devices and methods may be employed to supplement ~~or replace~~ the film badge under certain circumstances. The Health Physics Officer will designate those individuals authorized to substitute another device or method for the film badge based upon the occupational hazards to which they are exposed.

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f. Film badges will be stored in controlled, low dose rate areas when not being worn by the individual.

g. Film badges used for personnel dosimetry will not be worn during medical and dental X-ray exposures or when the individual is to receive a radioisotope treatment. Clearance will be obtained from Health Physics before wearing the film badge after completion of radioisotope treatment procedures.

h. Film badges will not be worn off duty.

i. The film badge will not be intentionally exposed, tampered with, or damaged.

j. Whenever a film badge is thought to have been lost, damaged, accidentally exposed, etc., the Health Physics Officer will be promptly notified. A replacement badge will be issued immediately.

k. The whole body badge should be worn on the torso, fully exposed.

l. The whole body film badge will be worn under the lead apron and the wrist badge under the lead glove when these protective items are worn.

m. The wrist badge should be worn on the side of the wrist facing the radiation source.

n. Film badges should never be carried in the pocket, subjected to mechanical stress, chemical fumes, heat, humidity, or direct sunlight since these can damage the film and give false results.

o. Film badges will be worn only by the individual to whom they are issued.

5. ADMINISTRATION.

a. Application for film badge service will be made to the Health Physics Officer on WRAMC Form 1119 (Film Badge Application and Record of Occupational External Radiation Exposure).

b. Personnel on permanent personnel monitoring service will be subject to medical examinations in accordance with ANNEX F to these Regulations.

c. Health Physics will exchange film badges and transmit the film packets, along with photodosimetry reports, to Lexington-Bluegrass

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Depot for monthly development and exposure evaluation.

d. Records of exposures will be maintained as follows:

(1) The Lexington-Bluegrass Army Depot maintains permanent records of all exposure readings and returns the Photodosimetry Report (DA 3484) to the WRAMC Health Physics Officer.

(2) The WRAMC Health Physics Officer maintains DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation) for all military and civilian personnel assigned or attached to WRAMC who are participants in the WRAMC Personnel Monitoring Program in accordance with AR 40-14.

(3) When a DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation) is maintained on an individual by the Health Physics Officer, the jacket of his medical record will be annotated, "Film Badge Wearer, Call Ext. 5107 for information regarding DD Form 1141" and a copy of WRAMC FL 396 (DD Form 1141 Locator) will be placed on the left side of the jacket by the custodian of the individual's medical record.

(4) Records so annotated will NOT be released to the individual when they are clearing post until they have obtained their DD Form 1141 from the Health Physics Office.

(5) The Health Physics Officer will send the photodosimetry reports on non-WRAMC employees (i.e., those persons for whom no DD Form 1141 is maintained by WRAMC, and former WRAMC employees whose DD Form 1141 has been forwarded) to the appropriate custodian of the medical record of each monitored individual at intervals not to exceed a calendar quarter. Reports of zero exposure will not be furnished to monitored visitors, unless requested by the visitor or the custodian of his exposure record.

(6) The "Record of Occupational Exposure to Ionizing Radiation" and records of bioassay results on WRAMC personnel shall be made available to the individual or his superiors upon request to the Health Physics Officer.

(7) The results of bioassay, whole body radioactivity measurements, or estimation of internal exposure to persons registered in the WRAMC Personnel Monitoring Program, shall be sent to the Health Physics Officer who is responsible for posting data to the DD Form 1141 and other dosimetry files.

e. Discontinuation of personnel monitoring will be accomplished by

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completion of WRAMC Form 606 (Request for Discontinuation of Film Badge Service) when an individual departs or is assigned duties which, in the opinion of the Health Physics Officer, do not warrant continuation.

6. INVESTIGATIONS.

a. Health Physics personnel will inquire into all excessive, unusual, or unanticipated exposure results.

b. All lost film badges and film badge readings in excess of 200 millirem will be investigated by Health Physics and a written record of the findings will be prepared.

c. When exposures greater than the limits specified in AR 40-14 are found, a formal investigation will be conducted and a brief explanation of the probable cause of the overexposure will be entered on the individual's DD Form 1141 by the Health Physics Officer.

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~~ANNEX F (MEDICAL EVALUATION OF RADIATION WORKERS)
to WR 40-10 (Health Physics Regulations)~~

1. GENERAL. It is necessary to periodically evaluate the health of radiation workers in order to provide baseline data for future comparisons, supplement the radiation protection program, provide for timely detection of developing medical problems, and for medicolegal reasons. The references cited in paragraph 7 of this ANNEX provide guidelines needed for evaluation of individuals. In order to insure that all radiation workers at WRAMC receive timely and appropriate medical evaluations, a comprehensive program is needed for this installation.

2. PURPOSE. It is the purpose of this Regulation to promulgate the medical evaluation procedures for radiation workers at Walter Reed Army Medical Center based upon applicable regulations, guidelines, and the professional opinions of the members of the Radioisotope Committee.

3. RESPONSIBILITIES.

a. WRAMC Radioisotope Committee is responsible for providing guidance and rendering professional opinions regarding suitable medical evaluation procedures for radiation workers at Walter Reed Army Medical Center.

b. Subcommittee for Medical Evaluation of Radiation Workers of the Radioisotope Committee is responsible for determining medical examination policy for all personnel occupationally exposed to ionizing radiation at WRAMC and determining specific parameters for examination in event of a suspected or actual overexposure to ionizing radiation.

c. Health Physics Officer:

(1) Classifying individual workers at WRAMC into the categories given in para 4 of this Regulation.

(2) Providing up-to-date notification of this classification to the Preventive Medicine Officer, Military Personnel, and the Physical Examination Section, WRAMC.

(3) Detecting working conditions which could result in the accidental ingestion, inhalation, injection, or absorption of radioisotopes by workers, taking action to reduce such hazards, and calling the areas of hazard to the attention of the Preventive Medicine Officer.

d. Preventive Medicine Officer:

(1) Determining the nature of special studies, organ function tests,

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and bioassays which might be of benefit in the medical evaluation of workers who are exposed to potential hazards from the use of radioisotopes.

(2) Evaluating the results of such directed studies which are not a part of a routine medical examination.

(3) Insuring that the Physical Examination Section implements the decisions made and considers the results of such studies, assays, and tests as part of the medical examination of these specific workers.

(4) Providing advice and guidance to examining physicians concerning the scope and conduct of medical examination for radiation workers.

(5) Seeking the advice of specialists and/or members of the Radioisotope Committee in any instance where such advice might assist in determining the exact nature of the hazard, the critical organ, and the nature and usefulness of the studies to be undertaken.

4. CATEGORIES OF PERSONNEL. Personnel working with radiation will be divided into five major categories according to the hazard to which they are exposed. The categories are mutually exclusive in most instances; however, some individuals may fall into more than one category. Such individuals should be examined in accordance with requirements of both categories.

a. Personnel Exposed to an External Radiation Hazard. Those individuals who are potentially exposed to X-ray or gamma radiation emanating from X-ray machines, sealed gamma sources, etc.

b. Reactor Workers and Personnel Exposed to Neutron Hazard. This group includes those individuals whose duties could potentially result in exposure to neutron fluxes emanating from reactors and/or neutron sources. The group includes reactor staff members, Health Physics personnel, and experimenters who frequently work with the reactor. A participant in the Army Nuclear Power Program (e.g., Reactor Staff Member, Health Physics Technician, etc.), who has been previously accepted under the provisions of TB MED 267, is included in this group.

c. Personnel Exposed to an Internal Radiation Hazard. This group includes those individuals who, by virtue of their duties, routinely are in the proximity of unsealed radioactive material and, therefore, potentially subject to inhalation, ingestion, absorption, or injection of such material into their bodies.

d. Personnel Exposed to Laser Radiation Hazard. This group includes

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those individuals who, by virtue of their duties, routinely are in the proximity of hazardous laser devices.

e. Personnel Exposed to Microwave Radiation Hazard. This group includes those individuals who, by virtue of their duties, routinely are in the proximity of designated hazardous microwave areas.

5. MEDICAL EVALUATIONS.

a. Initial Examination. Preplacement/pre-employment medical examinations are required.

(1) For workers exposed to ionizing radiation hazards, this examination should include a routine medical examination using SF 88 and 89 for military personnel and SF 78 for civilian personnel, a review of prior occupational exposure, and a description of any unusual exposure to ionizing radiation resulting from previous occupations, accidents, or diagnostic procedures. Any therapeutic exposure will be listed by the dosage and the areas treated. This information in diagnostic and therapeutic radiation will be recorded as a portion of the history, but will not be entered on DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation). Sufficient blood counts (white cell count with differential, and, hemoglobin) to establish a baseline will be performed. The following additional examinations will be performed for the groups indicated:

(a) Reactor Workers and Personnel Exposed to a Neutron Hazard will receive a specific ophthalmological examination to include corrected visual acuity for vision; slit lamp examination of the lens with the pupil dilated; examination of the fundus with an ophthalmoscope with the pupil dilated; survey for visual field defects when abnormal fundus findings, which are deemed capable of causing such defects, are detected; fundus photography, if available, of all abnormal fundus finding. A test for color vision will also be administered.

(b) Personnel Exposed to an Internal Radiation Hazard may receive whole body count, bioassay studies, selective organ scans and/or other appropriate additional studies if directed for that individual by the Preventive Medicine Officer.

(2) Personnel Exposed to Laser Radiation Hazards shall have a preplacement medical examination, a termination of employment examination, and be included in an occupational vision conservation program which encompasses thorough general ophthalmologic examinations at regular intervals. Such examinations shall include: Recording visual acuity with correction (if below 20/40, check for improvement with pin-hole or + 0.50 spheres and 125 X-cyl); Dilating pupil and examining fundus care-

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fully; Photographing or carefully describing or drawing any lesions seen; Performing slit lamp examination if the individual is potentially exposed to infrared or ultraviolet laser radiation.

(3) Personnel Exposed to Microwave Radiation Hazard. In consideration of possible biological effects from excessive exposure to microwave fields of power densities greater than 10 mW/cm², a specific preplacement and periodic medical examination program is desired for potentially exposed personnel, both military and civilian. For this purpose, the examination should consist of a routine physical examination, plus a comprehensive ophthalmological examination, including evaluation of ocular motility, media and fundus, corrected visual acuity for near and far vision, and slit lamp examination of the lens with the pupil widely dilated.

The decision as to the acceptability of the individual into the occupational program will be rendered by the examining physician(s). The examining physician(s) may defer the decision as to the acceptability of an individual by referring the results of his examination to the Subcommittee for Medical Evaluation of Radiation Workers for final decision.

b. Periodic Examination.

(1) Routine physical examinations for all radiation workers exposed to an ionizing radiation hazard, whether military or civilian, are to be administered on the basis of applicable regulations for military personnel every 3 years.

(2) For workers exposed to microwave fields of power densities greater than 10 mW/cm², periodic eye examinations will be conducted every 2 years at such other times as there is reason to believe that eye damage may have occurred.

(3) For workers exposed to laser radiation, periodic eye examinations will be conducted every two years or at such other times as there is reason to believe that eye damage may have occurred.

c. Special Examinations. Routine bioassay, scanning, whole body counting, or other special studies of personnel will be restricted to those tests specifically designated on an individual basis at the discretion of the Commander or his representative.

d. Final Examination. At the termination of assignment of an individual to a position which warrants classification as a radiation worker, a final examination will be conducted, primarily for medicolegal considerations.

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6. MEDICAL SURVEILLANCE OF OCCUPATIONALLY EXPOSED PERSONNEL.

a. Special Cases. If the Health Physics Officer identifies areas of particular hazard from radioisotopes, especially areas of potential internal hazard from radioisotopes, he will take appropriate action to minimize the hazard and will advise the Preventive Medicine Officer of the hazard. The Preventive Medicine Officer, seeking whatever consultation he deems necessary, will direct the appropriate additional studies, organ function tests, bioassays, whole body counts and/or selective organ scans which might be of medical benefit in the evaluation of suspected exposure of the individual. He will insure that such studies are conducted and that the results are evaluated by well-trained professional personnel.

b. Consultation. Professional advice in the area of radiation exposure is available from Chief, Ophthalmology; Chief, Radiation Therapy; and/or Chief, Nuclear Medicine Clinic. Any physician engaged in the evaluation of radiation workers may seek the advice of any of these individuals to assist in such evaluations.

c. Reports. Abnormal medical findings discovered during medical examinations of radiation workers will be IMMEDIATELY reported to the Subcommittee for appropriate action. The Health Physics Officer (Ext. 5107/5161) will coordinate such reporting.

7. REFERENCES.

- a. AR 40-5, Preventive Medicine.
- b. AR 40-14, Control and Recording Procedures, Occupational Exposure to Ionizing Radiation.
- c. AR 40-46
- d. AR 40-501, Standards of Medical Fitness.
- e. AR 40-583
- f. AR 50-5, Nuclear Surety.
- g. TB MED 270, Control of Hazards to Health from Microwave Radiation.
- h. TB MED 279, Control of Hazards to Health from Laser Radiation.
- i. Medical Supervision of Radiation Workers, FAEA STI/Pub 201.

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ANNEX G (PERSONNEL RELIABILITY PROGRAM)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of this ANNEX is to implement the Human Reliability Program at Walter Reed Army Medical Center.

2. APPLICABILITY. This ANNEX is applicable only to those individuals who are assigned to WRAMC to fill nuclear duty positions.

3. DEFINITIONS. For the purpose of this ANNEX, the following definitions apply:

a. Nuclear Duty Position. Includes those duty positions directly involved with the operation of Army nuclear reactors and those duty positions filled by personnel who are trained as nuclear reactor operators.

b. Unit Commander. The military or civilian supervisor of a unit, organization, activity, or depot.

c. Personnel Reliability Program. A program designed to insure that only personnel who meet high standards of suitability are assigned to nuclear duty positions to preclude degradation of system reliability of nuclear reactor systems.

4. RESPONSIBILITIES.

a. The Health Physics Officer is assigned staff responsibility for the implementation of the Human Reliability Program at WRAMC.

b. The Unit Commander will:

(1) Obtain the assistance and advice of the Health Physics Officer when technical proficiency is required to accomplish actions, formulate policy, or make decisions relative to personnel filling nuclear duty positions.

(2) Provide the continuing evaluation of, and accomplish those administrative actions for, personnel assigned to nuclear duty positions in accordance with the procedure described in AR 50-5.

(3) Implement temporary or permanent disqualification action as appropriate upon recommendation of the Health Physics Officer.

c. The Director, Force Development, WRAMC, will provide the Unit Commander or immediate supervisor, as appropriate, any adverse information that is available to him which potentially affects the human reliability of an individual assigned to a nuclear duty position.

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d. The Attending Surgeon's Office and Physical Examination Section will review records in accordance with para 2-4a(2), AR 40-403, and will carefully screen the records to evaluate the individual's medical history in relation to criteria for nuclear duty assignment (Chapter 3, AR 50-5), and will provide the Unit Commander or immediate supervisor, as appropriate, any information available to them concerning an individual which may affect his human reliability.

e. The Chief, Military Personnel Branch, WRAMC, will forward to the Unit Commander for appropriate consideration any adverse information which may be prejudicial to assignment of an individual to a nuclear duty position, and will assure compliance with AR 50-5.

5. REFERENCES.

- a. AR 40-403, Health Records
- b. AR 50-5, Nuclear Surety
- c. AR 385-80, Nuclear Reactor Health and Safety

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ANNEX H (PREGNANCY SURVEILLANCE PROGRAM)
to WR 40-10 (Health Physics Regulations)

1. Female radiation workers are subject to the pregnancy surveillance program. It is the responsibility of both the individual and her supervisor to notify the Health Physics Officer, WRAMC, immediately upon learning of a confirmed pregnancy.
2. In cases where the pregnant employee is exposed to ionizing radiation, the Preventive Medicine Officer and the Health Physics Officer will survey the working environment and will, in conjunction with the employee's personal physician, determine the advisability of her continuing work in this environment for the duration of her pregnancy.
3. The Preventive Medicine Officer will make specific recommendations to the appropriate personnel branch for a change in working environment during pregnancy when it is considered medically desirable in individual cases.

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ANNEX I (TRAINING AND EXPERIENCE OF RADIOISOTOPE USERS AND X-RAY WORKERS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of this ANNEX is to establish the standards of training for all personnel who work with radioisotopes and X-ray at Walter Reed Army Medical Center.

2. GENERAL. The standards of training for personnel working with radioisotopes and X-ray at WRAMC have been established by the Radioisotope Committee. The training outlined below, or its equivalent, is considered prerequisite for individuals who work in categories described. Exception to these requirements may be granted on an individual basis by, and at the discretion of, the WRAMC Radioisotope Committee.

3. DEFINITIONS.

- a. Human Use - See definition, para 3d, ANNEX A to these Regulations.
- b. Non-human Use - See definition, para 3e, ANNEX A to these Regulations.
- c. Principal User - See definition, para 3f, ANNEX A to these Regulations.
- d. Co-worker - See definition, para 3g, ANNEX A to these Regulations.
- e. Trainee - See definition, para 3h, ANNEX A to these Regulations.
- f. Technician - See definition, para 3i, ANNEX to these Regulations.
- g. Health Physics - See definition, para 3j, ANNEX A to these Regulations.

4. COURSES OF INSTRUCTION OFFERED AT WRAMC.

a. Health Physics Aspects of Radioisotope Use. This course of instruction is designed to be given to all personnel who work with radioisotopes. It provides the minimum training required for the safe handling of radioisotopes and protection of the individual from external and internal sources of ionizing radiation. A working knowledge is provided of the principles and practices of radiation protection, the biological effects of radiation, basic terminology, mathematics and calculations used in measurement of radioactivity, nuclear instrumentation, personnel monitoring devices and techniques, AEC and Department of Army Regulations governing radiation protection, and the role of WRAMC Health Physics. This course will be conducted by WRAMC Health Physics.

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b. Radioisotope Users Course. This is an advanced course of instruction designed for physicians and researchers who will be responsible for determining the methods and techniques for the use of radioactive materials. This course of instruction, or its equivalent, is considered essential to the qualifications of a Principal User or Co-worker. Experience is obtained with dose calculations, calculations based on the rates of radioactive decay, shielding determinations, laboratory and experimental design, statistical considerations of radioactive decay, formulation of laboratory rules and safe working practices, and the role of a Principal User of radioactive materials at WRAMC. This course will be conducted at WRAMC Health Physics, and will be attended by all Principal Users for whom proof of equivalent training has not been filed with Health Physics, WRAMC.

c. Radiation Instrumentation and Specialized Instruction. This consists of a series of subcourses, each of which is designed around a particular type of radiation instrumentation. Those subcourses dealing with detection systems present the basic principles of the system to be investigated and practical experience through one or more laboratory exercises which are performed by the student to demonstrate certain aspects of the detector system which is investigated. A laboratory report is provided for evaluation by Health Physics to insure that the student has obtained an understanding of those principles involved. These subcourses will be monitored by WRAMC Health Physics and are available to physicians, researchers, and technicians. Individual instruction is provided as needed.

d. Clinical Practical Experience. This is comprised of a series of subcourses concerned with different clinical studies. Each of these is obtained under the direct supervision of a Principal User engaged in that type study. Each is organized as needed and has as a corequisite the subcourses of the Radiation Instrumentation and Specialized Instruction phase which pertain to the instrumentation used in the determination. These courses are provided only for physicians. As many subcourses may be taken as are needed by the respective physician.

e. X-ray Protection Instruction. This instruction is administered annually to those personnel who work with X-ray sources of ionizing radiation. The biological effects of radiation and selected aspects of radiation protection which are particularly important to the X-ray operator are described. The instruction is mandatory for all personnel who operate X-ray producing devices and is optional for other personnel working with X-ray machines. This instruction will be presented by WRAMC Health Physics.

5. TRAINING AND EXPERIENCE REQUIRED OF INDIVIDUALS.

a. All individuals working with radioisotopes will have received the

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Health Physics Aspects of Radioisotope Use course or its equivalent.

b. All individuals operating X-ray machines will receive instruction in X-ray protection or its equivalent.

c. Technicians working with radioisotopes will receive the Health Physics Aspects of Radioisotope Use course and such subcourses of the Radiation Instrumentation and Specialized Instruction as required by their supervisors or the Principal Users under whose authorization they work.

d. Principal Users, Co-workers, Trainees, and Technicians whose only use of radioactive material is as sources in gas chromatography will receive the following, or their equivalent:

(1) Health Physics Aspects of Radioisotope Use.

(2) Radiological Hazards and Protective Techniques Associated with Gas Chromatographs (a subcourse of Radiation Instrumentation and Specialized Instruction).

e. Principal Users, Co-workers, and Trainees (Non-human Use) will receive the following, or their equivalent:

(1) Health Physics Aspects of Radioisotope Use.

(2) Radiation Instrumentation and Specialized Instruction (as required).

(3) RADIOISOTOPE USERS COURSE

f. Principal Users, Co-workers, and Trainees (Human Use) will receive the following, or their equivalent: C-1

(1) Health Physics Aspects of Radioisotope Use.

(2) Radioisotope Users Course.

(3) Clinical Practical Experience in the specific studies for which they are being trained, to include as corequisites those subcourses from the Radiation Instrumentation and Specialized Instruction phase which are applicable to the instrumentation used in the determinations for which they are being trained.

g. Residents and interns receive only familiarization instruction in the use of radioisotopes and are exempted from the provisions of this ANNEX. The training received does not qualify them for independent use of radioisotopes.

h. Physicians in training at WRAMC to become Chiefs of ~~Radioisotope~~

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Clinics require training of broader scope and greater depth than that provided at Walter Reed Army Medical Center. These physicians may receive, as part of their training, the 4 week Medical Radioisotope Course at Oak Ridge Associated Universities, Oak Ridge, Tennessee; Medical Officers Course in Radioisotope Technique and Nuclear Medicine (8 weeks) at National Naval Medical Center, Bethesda, Maryland; or equivalent training.

6. QUALIFICATION AND CERTIFICATION.

a. Personnel may become qualified in the use of radioisotopes through the receipt of training at WRAMC or through constructive credit granted by the Radioisotope Committee for previous training and experience which parallels the comparable WRAMC training.

b. Certification of satisfactory completion of appropriate training which is conducted under the auspices of Health Physics will be made by that organization.

c. In the case of physicians, evidence of satisfactory completion of the clinical practical experience will be provided to Health Physics by the Principal User under whom the experience is obtained.

d. Records of training and experience of radioisotope workers will be maintained by Health Physics.

e. Upon the completion of the blocks of instruction, appropriate Department of Army Certificates of Training will be issued. Appropriate entries will be made in Personnel Records.

7. REFERENCES.

a. APPENDIX C, USAEC Licensing Guides - Medical Programs.

b. TR 31 - Training in Radiological Protection: Curricula and Programming, International Atomic Energy Agency, Vienna, 1964.

c. 10 CFR 30 - Rules of General Applicability to Licensing of By-product Material, Rules and Regulations of the US Atomic Energy Commission.

d. TB MED 62 - Diagnostic X-ray Protection.

e. NBS Handbook Number 93.

f. NCRP Reports Numbered: 8, 22, 28, 30, 33, 34, 35, 36, and 40.

g. ICRU Reports Numbered: 10c, 10d, and 10e.

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ANNEX J (REFERENCES)
to WR 40-10 (Health Physics Regulations)

The following listed references are general in nature and pertain to these Regulations as a whole; additional references which are more specific are cited in the ANNEXES.

- AR 11-21 Environmental Pollution Abatement
- AR 40-7 Use of Investigational Drugs in Humans
- AR 40-13 Radiological Emergency Medical Team
- AR 40-14 Control and Recording Procedures, Occupational Exposure to Ionizing Radiation
- AR 40-27 Personnel Radiation Exposure
- AR 40-37 Radioisotope License Program (Human Use)
- AR 40-44 Microwave Oven Radiation Protection Program
- AR 40-46 Control of Health Hazards From Lasers and Other High Intensity Optical Sources
- AR 40-61 Medical Materiel Policies and Procedures
- AR 40-403 Health Records
- AR 50-5 Nuclear Surety
- AR 55-55 Transportation of Radioactive and Fissile Materials Other Than Weapons
- AR 55-355 Military Traffic Management Regulation
- AR 70-25 Use of Volunteers as Subjects of Research
- AR 385-30 Safety Color-Code Markings and Signs
- AR 385-80 Nuclear Reactor Health and Safety Program
- AR 700-52 Licensing and Control of Sources of Ionizing Radiation
- AR 700-58 Report of Packaging and Handling Deficiencies
- AR 700-64 Radioactive Commodities in the DOD Supply Systems
- AR 725-1 Special Authorization and Procedures for Issue, Sales, and Loans
- AR 755-15 Disposal of Unwanted Radioactive Material
- SB 11-206 Film Badge (Photodosimetry) Supply and Service for Technical Radiation Exposure Control
- TB MED 62 Diagnostic X-Ray, Therapeutic X-Ray and Gamma Beam Protection for Energies Up to 10 Million Electron Volts
- TB MED 223 Respiratory Protective Devices
- TB MED 232 Protective Measures for Radioactive Material Used in Self-Luminous Light Sources
- TB MED 249 Protection Against Radiations from Sealed Gamma Sources
- TB MED 267 Guidelines for Medical Evaluation of Applicants and Personnel in the Army Nuclear Power Program
- TB MED 270 Control of Hazards to Health from Microwave Radiation
- TB MED 279 Control of Hazards to Health from Laser Radiation
- TB 750-237 Identification of Radioactive Items in the Army Supply System

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TM 3-220 Chemical, Biological, and Radiological (CBR) Decontamination

TM 3-261 Handling and Disposal of Unwanted Radioactive Material

TM 55-315 Transportability Guidance for Safe Transport of Radioactive Materials

Title 10 Code of Federal Regulations - Rules and Regulations of the USAEC

Title 49 Code of Federal Regulations - Rules and Regulations of the DOT

Reports of the Federal Radiation Council (FRC)

Reports of the National Council on Radiation Protection and Measurement (NCRP)

Reports of the International Commission on Radiation Units and Measurements (ICRU)

Handbooks of the National Bureau of Standards (NBS)

Recommendations of the International Commission on Radiological Protection (ICRP)

ANSI N44.2 - 1973 American National Standard of Leak-testing Radioactive Brachytherapy Sources

ANNEX K (RECEIPT, TRANSFER AND SHIPMENT OF RADIOACTIVE MATERIAL) to WR 40-10 (Health Physics Regulations)

1. PURPOSE: The purpose of this ANNEX is to familiarize Principal Users and other personnel with the Health Physics aspects of radioactive material procurement, receipt, transfer, and shipment.

2. DEFINITIONS: For the purpose of this ANNEX the following definitions apply:

a. Radioactive material. Any material which undergoes spontaneous nuclear disintegration with emission of corpuscular or electromagnetic radiations. Radioactive material includes naturally-occurring isotopes, special nuclear material, byproduct material, accelerator-produced isotopes, source material, and items contaminated with radioactive material.

b. Radioactive Commodity. An item of US Government property to which a Federal Stock Number (FSN) has been assigned, composed in whole, or in part, of radioactive material.

c. US Atomic Energy Commission License. A License issued to WRAMC which permits the receipt, possession, use, transfer, storage, and disposal of certain radioactive material at WRAMC subject to specific conditions. USAEC Licenses are issued for byproduct material, source material, special nuclear material, etc.

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d. Department of the Army Authorizations. An Authorization issued by the Department of the Army to WRAMC which permits the receipt, possession, use, transfer, storage, shipment, and disposal of naturally-occurring and accelerator-produced radioactive material at WRAMC.

e. WRAMC Radioisotope Authorization. An Authorization issued by the WRAMC Radioisotope Committee to an individual within the authority of the USAEC Licenses and DA Authorizations held by WRAMC to receive, possess, use, transfer, store, and dispose of radioactive material. Radioisotope Authorizations are subject to the conditions of the USAEC Licenses, the Code of Federal Regulations, Department of the Army Regulations, and WRAMC Health Physics Regulations.

3. GENERAL:

a. The Health Physics Officer has custodial responsibility for all radioactive material at WRAMC.

b. The Health Physics Officer, in coordination with the WRAMC Transportation Officer, controls the movement of all radioactive material onto,

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off of, and within the installation.

c. The Health Physics Officer, in coordination with the Director of Logistics, controls the procurement, receipt, and transfer of all radioactive material at WRAMC.

d. Questions concerning procurement, receipt, transfer, and shipment should be directed to the Chief, Radioactive Material Control Section, Health Physics, WRAMC, Ext. 5104 or 5107.

4. PROCUREMENT OF RADIOACTIVE MATERIAL.

a. General.

(1) A Principal User may procure for use at WRAMC only those radioisotopes currently authorized for his use by the WRAMC Radioisotope Committee, subject to the limitations of his Authorization.

(2) The maximum quantity which may be ordered at any one time is limited by the maximum activity of that radioisotope which the User is authorized to possess unless arrangements have been made with the Health Physics Officer.

(3) Receipt and/or transfer of gifts containing radioactive material shall not be accomplished without prior approval of the Health Physics Officer. This has particular application in those instances where normal supply channels are not utilized. All gifts will be delivered to the locations shown in para 4c(3), below.

b. Principal Users.

(1) The Principal User shall submit a completed DA Form 14-115 (Purchase Request and Commitment) through his supply channels for the procurement of all radioactive materials.

(2) In addition to the information required by WR 715-2, each DA Form 14-115 (See the APPENDIX to this ANNEX for Sample) shall contain the following:

(a) Radionuclide, chemical form, and total activity (Activity is given as microcurie (uCi), millicurie (mCi), curie (Ci), microgram (ug), milligram (mg), gram (g), or milligram-radium equivalent (mg Ra eq), as appropriate).

(b) WRAMC Radioisotope Authorization Number.

(c) Date required or delivery date.

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(d) Instructions to the vendor to ship to the locations shown in para 4c(3).

(e) The requesting activity (Principal User) SHALL NOT indicate the USAEC License Number or DA Authorization Number. The Chief, Radioactive Material Control Section, Health Physics, will designate the applicable USAEC License or DA Authorization Number for the radioactive material being procured.

(3) With regard to the procurement or disposal of radioactive commodities, the Principal User and/or Supply Control Branch will coordinate with the Health Physics Officer prior to the submission of DA Form 2765 or 2765-1 (Request for Issue or Turn-in).

c. Purchasing.

(1) Prior to placing any orders for radioactive material, purchasing personnel will request approval from the Health Physics Officer or his authorized representative.

(2) In order to obtain approval, Health Physics must be furnished with the following information from the DA Form 14-115:

- (a) WRAMC Authorization Number.
- (b) Identity of the radioisotope(s) being requested.
- (c) Total activity of the radioisotope desired.
- (d) Delivery date of the requested radioactive material.

(3) After approval has been granted, the authorized purchasing personnel will place the order and request delivery by the required date, with instructions for the vendor to ship to the following address (unless specifically exempted as authorized by the Health Physics Officer):

- (a) For any item destined for any organization located at WRAMC:

1 For items to be delivered by mail:

Health Physics Officer
Bldg 188, Forest Glen Section
Walter Reed Army Medical Center
Washington, D. C. 20012

2 For items to be delivered by all other means:

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Health Physics Officer
Bldg 188, 2681 Linden Lane
Forest Glen Section
Walter Reed Army Medical Center
Silver Spring, Maryland 20910

- (b) For any item destined for USAMRIID; Fort Detrick, Maryland:

Transportation Officer
US Army Medical Research Institute of Infectious Diseases
Fort Detrick, Maryland 21701

- (c) For any item destined for Andrew Rader Clinic, Fort Myer, Virginia:

Andrew Rader Army Clinic
Bldg 525
Fort Myer, Virginia 22211

- (d) Any item requiring special handling or pick-up by Health Physics, WRAMC, must be coordinated with the Health Physics Officer.

(4) The personnel authorized to order radioactive material will, unless otherwise instructed by the Health Physics Officer, furnish Health Physics with copy #3 of the DA Form 14-115 or a facsimile having the following additional information, as appropriate:

- (a) Charge Accounts:

- 1 Name of person placing order
- 2 Purchase Request number
- 3 Call number
- 4 Purchase/Delivery Order number

- (b) Non-charge Accounts

- 1 Name of person placing order
- 2 Purchase Request number
- 3 Purchase/Delivery Order number

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5. RECEIPT OF RADIOACTIVE MATERIAL.

a. All incoming shipments will be received in Controlled Areas. The following procedures will be followed:

(1) Primary containers will be monitored with appropriate precautions for leakage, dose rates, total activity, packing material contamination and labeling. This process will be accomplished by visual inspections, smears and radiation detection equipment.

(2) The labeling of the package, the packing slip, and other documents will be compared with the DA Form 14-115 or DA Form 2765 to insure the accuracy of the shipment.

(3) The exposure rate at one (1) foot from the primary unshielded container and at one (1) foot from the primary container enclosed in the protective shield supplied by the vendor will be recorded on WRAMC Form 682 (Health Physics Inspection and Receipt Tag).

(4) The shipment is then transported to the appropriate Health Physics Section for delivery to the user.

(5) Appropriate entries are made in the Radioactive Material Receipt Files and Inventory Records.

b. If shipments are found to be contaminated, they will be decontaminated to acceptable levels by Health Physics prior to delivery to the user.

c. Under no circumstances will an incoming shipment of radioactive material be refused when delivered.

d. The user should note the exposure rate measurements posted on the WRAMC Form 682 and govern his handling and storage of the radioactive material accordingly. If no protective shield is furnished, then NS (No Shield) is posted on the WRAMC Form 682.

e. The Health Physics inspection does not constitute an assay or an evaluation of the pharmaceutical quality of the radionuclide. Special arrangements may be made with the Health Physics Officer to have radioactive material assayed.

f. The Radioactive Material Control Section, Health Physics, operates during normal WRAMC duty hours. After duty hours, radioactive material is to be received only by the Military Police Detachment, Forest Glen Section, WRAMC.

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g. Health Physics does not routinely provide special delivery of incoming shipments of radioactive material (i.e., after duty hours delivery, or non-routine deliveries during duty hours). Therefore, the Principal User must notify the Health Physics Officer if an urgent or specially refrigerated shipment is expected. The Health Physics Officer will insure the prompt inspection and survey of the shipment so that the delivery will not be unduly delayed. Routine delivery of radioisotope shipments are made at 1100 hours and 1430 hours each duty day by Health Physics to the users at WRAMC.

6. TRANSFER OF RADIOACTIVE MATERIAL.

a. Transfer of radioactive material within WRAMC shall be accomplished only between persons authorized to use those radioisotopes by the WRAMC Radioisotope Committee.

b. Transfer of radioactive material between Principal Users at WRAMC and other activities or agencies outside the jurisdiction of WRAMC (e.g., NIH, NBS, NNMC, VA Hospital, etc.) shall be coordinated with the Health Physics Officer. The Principal User, in coordination with the appropriate Health Physics Section, will prepare a DA Form 2791-R (Radioactive Material Movement) for the transport of radioactive material. Health Physics must have proof in writing that the recipient is licensed or authorized to possess the radioactive material, by the USAEC or other authority, before the transfer is accomplished.

c. Transfer of all adapted or experimental items of equipment containing radioactive material that are to be returned to a vendor for repair, return or replacement, and/or disposal shall be processed in the following manner:

(1) The item containing the radioactive material shall not be removed from its normal location without the approval of the Health Physics Officer.

(2) The Principal User shall contact the Radioactive Material Control Section, Health Physics, Ext. 5104 or 5107, for instructions.

(3) The Principal User shall prepare a DA Form 2496 (Disposition Form) addressed to the Health Physics Officer, WRAMC, which shall contain the following information:

(a) A statement requesting that the equipment be returned to the appropriate vendor for repair and return, or returned to the vendor for replacement and/or disposal.

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(b) Complete address of the vendor, e.g.:

Jarrell-Ash Company
590 Lincoln Street at Route 128
Waltham, Massachusetts 02154
ATTN: Mr. Reed

(c) Make and model number of the equipment, e.g.:

Argon-Diode Detector, Model 28-752

(d) Serial number of the equipment and/or the radioactive source.

(e) The radionuclide present, e.g.: 90-Sr, 3-H, 226-Ra, etc.

(f) The total activity of the source (uCi, mCi, Ci, ug, mg, g, or mg Ra eq, as appropriate).

(4) The Principal User shall coordinate with his Supply and Service Division in the preparation of a DA Form 2407 (Maintenance Request - MR) to be submitted to the Combined Maintenance Branch (CMB), WRAMC. It is imperative that the MR contain the make, model, serial number, Federal Stock Number (FSN) of the item, radioisotope, total activity, and description of the work to be performed.

(5) It is the responsibility of the Combined Maintenance Branch and Purchasing and Contracting (P&C) Branch, WRAMC, to coordinate with the Supply Control Branch (SCB) in completing the necessary documents for shipment of the equipment. These documents are:

(a) Shipping Document. DD Form 1348-1 or DD Form 1149-4 with fund citation and Purchase Order number.

(b) DD Form 1155. Order for Supplies and Services.

(6) The CMB, WRAMC, shall notify the Chief, Radioactive Material Control Section, Health Physics (Ext. 5104 or 5107), to coordinate the pick-up of the shipping documents from CMB, WRAMC, and the equipment from the Principal User.

(7) All adapted or experimental equipment containing radioactive material being returned to WRAMC by the vendor shall be shipped to the address given in para 4c(3)(a)1, above.

7. SHIPMENT OF RADIOACTIVE MATERIAL.

a. Health Physics will process all outgoing shipments identified as

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containing radioactive material and returnable containers for radioactive material departing WRAMC.

b. The Principal User shall coordinate with his Supply and Service Division and SCB in the preparation of the Shipping Document.

c. The Chief, Radioactive Material Control Section, Health Physics, or his representative will insure that the container is properly identified, described, packaged, and labeled in accordance with existing regulations and that the shipping documents and instructions are properly forwarded.

d. The Chief, Radioactive Material Control Section, Health Physics, will coordinate the shipment with the Transportation Officer.

8. REFERENCES.

a. Title 10, Code of Federal Regulations, Rules and Regulations of the US Atomic Energy Commission.

b. Title 42, Code of Federal Regulations, Rules and Regulations of the US Public Health Service, Department of Health, Education and Welfare.

c. Title 49, Code of Federal Regulations, Rules and Regulations of the Department of Transportation.

d. AR 37-108, General Accounting and Reporting for Finance and Accounting Offices.

e. AR 710-2, Materiel Management for Using Units, Support Units and Installations.

f. TM 38-750, The Army Maintenance Management Systems.

g. WR 40-19, Radioisotope Committee.

h. WR 750-1, Maintenance of Supplies and Equipment.

i. WR 750-2, Purchasing and Contracting Services.

j. WR 55-1, Transportation and Travel.

k. WR 40-610, The Medical Care Support Equipment Program (MEP).

PURCHASE REQUEST AND COMMITMENT <i>(AR 37-106)</i>				PURCH INSTRUMENT NUMBER	REQUISITION NUMBER	DATE	PAGE OF PAGES						
					X318-200-XX	XX Nov XX							
TO: Purchasing and Contracting Officer			THRU: C, Materiel Branch, Log Div, WRAMC		FROM: W71PEC-X318-200-XX-X-XXXX								
IT IS REQUESTED THAT THE SUPPLIES AND SERVICES ENUMERATED BELOW OR IN ATTACHED LIST BE: (ALL "X's" REPRESENT A NUMBER)													
PURCHASED FOR INITIATING ACTIVITY				DELIVERED TO * SEE BELOW			NOT LATER THAN (Date) SPECIFIC DATE ITEM REQUIRED						
THE SUPPLIES AND SERVICES LISTED BELOW CANNOT BE SECURED THROUGH NORMAL SUPPLY CHANNELS OR OTHER ARMY SUPPLY SOURCES IN THE IMMEDIATE VICINITY, AND THEIR PROCUREMENT WILL NOT VIOLATE EXISTING REGULATIONS PERTAINING TO LOCAL PURCHASES FOR STOCK; THEREFORE, LOCAL PROCUREMENT IS NECESSARY FOR THE FOLLOWING REASON: <i>(Check appropriate box and complete item)</i>													
LOCAL PURCHASES AUTHORIZED AS THE NORMAL MEANS OF SUPPLY FOR THE FOREGOING BY AR 40-61			REQUISITIONING DISCLOSES NONAVAILABILITY OF ITEMS AND LOCAL PURCHASE IS AUTHORIZED BY										
EMERGENCY SITUATION PRECLUDES USE OF REQUISITION CHANNELS FOR SECURING ITEM.					NAME AND TELEPHONE NUMBER OF PERSON TO CALL FOR ADDITIONAL INFORMATION								
ITEM	DESCRIPTION OF SUPPLIES OR SERVICES	QUANTITY	UNIT	ESTIMATED		a	b	c	d	e	f	g	h
				UNIT PRICE	TOTAL COST								
79	FEDERAL SUPPLY CLASS												
	NOMENCLATURE, DESCRIPTION, MAKE, MODEL, CATALOG #, ETC.												
	SUGGESTED SOURCE: MANUFACTURER DISTRIBUTOR DEALER												
	*SHIP TO: Health Physics Officer Bldg 168, 2681 Linden Ln. Forest Glen Section Walter Reed Army Medical Center Silver Spring, MD 20910												
APPROVED: NAME AND GRADE OF INITIATING ACTIVITY PROPERTY OFFICER													
APPROVED: NAME AND GRADE OF DIVISION DIRECTOR													
THE FOREGOING ITEMS ARE REQUIRED NOT LATER THAN AS INDICATED ABOVE FOR THE FOLLOWING PURPOSE:													
NAME OF PATIENT, ON-GOING PROJECT OR PROGRAM/FUNDS ARE AVAILABLE					DISCOUNT AVAILABLE								
DATE	TYPED NAME AND GRADE OF INITIATING OFF. PROPERTY BOOK OFFICER OR C, SUP & SVC DIV TELEPHONE NO.	SIGNATURE			DELIVERY SCHEDULE								
DATE	TYPED NAME AND GRADE OF SUPPLY OFF.	SIGNATURE			PURCHASE ORDER NUMBER								
C, MATERIEL BRANCH													

APPENDIX to ANNEX K

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ANNEX L (ACCOUNTABILITY AND INVENTORY OF RADIOACTIVE MATERIAL AND MACHINES WHICH PRODUCE ~~X-RAY, LASER, AND MICROWAVE RADIATION~~)
to WR 40-10 (Health Physics Regulations) **IONIZING** C-1

1. RESPONSIBILITIES.

a. The Health Physics Officer is responsible for the physical inventory and accountability for all radioactive material, ionizing radiation producing devices, ~~lasers, and microwave equipment~~ in accordance with AR 700-52 and AR 40-61. C-1

b. The Health Physics Officer is responsible for insuring that the total inventory of any radioisotope on hand at any one time does not exceed the possession limitations imposed for that isotope by the USAEC Licenses or DA Authorizations, as appropriate.

c. Each Principal User is responsible for the control, security, and inventory of all radioactive material in his possession at all times. He will insure that the maximum quantity which he has on hand at any one time does not exceed the possession limit stated in his WRAMC Radioisotope Authorization. Quantities in excess of his possession limits will be returned to Health Physics for storage until needed.

2. PROCEDURES.

a. Inventory records will be updated on a quarterly basis at WRAMC.

b. Inventory of radioisotopes used under Non-Human Use Authorizations will be performed as part of one radiation protection survey performed during the quarter. Chief, Radioactive Material Control Section, Health Physics, will consolidate this inventory and Chief, Reactor and Survey Branch, Health Physics, will verify the accuracy of the inventory.

c. Inventory of radioisotopes used under Human Use Authorizations will be inventoried quarterly as of the last working day of the quarter. Chief, Radioactive Material Control Section, will consolidate this inventory quarterly and the Chief, Reactor and Survey Branch, will verify the accuracy of the inventory.

d. Machines and devices which produce ionizing radiation, ~~laser, and microwave radiation~~ will be registered with the Chief, Radioactive Material Control Section, Health Physics, who will maintain a registry in accordance with AR 700-52. This registry will be updated as needed and verified semi-annually. C-1

3. RECORDS.

a. All WRAMC radioisotope inventory records and registry of devices and machines which produce ~~laser, microwave, or~~ ionizing radiation will be maintained by the Chief, Radioactive Material Control Section, Health Physics, in accordance with pertinent directives.

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b. Other files and records deemed necessary to effect control of radioisotopes and insure compliance with limits of USAEC Licenses, DA Authorizations, and WRAMC Radioisotope Authorizations are authorized, except that no form may be used at the local level to supplement or replace the ~~DA Form 8 235 (Pharmacy, Drug and Narcotic Stock Record)~~ prescribed in para 3-5; AR 40-61 (Medical Materiel Policies and Procedures).

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DA FORM 3862 (CONTROLLED SUBSTANCE STOCK RECORD)

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ANNEX M (TRANSPORTATION OF RADIOACTIVE MATERIALS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To prescribe general guidelines for the transportation of radioactive material within and from WRAMC and to implement the provisions of AR 55-55 and 49 CFR 171-178.

2. RESPONSIBILITIES.

a. The Transportation Officer, WRAMC is responsible for providing the means by which radioactive materials are transported.

b. The Health Physics Officer is responsible for:

(1) Controlling all radioactive material at WRAMC to include location, transfer, and transportation.

(2) Insuring that packaging meets standards of 49 CFR 173.24 and other pertinent directives.

(3) Insuring that all packaging and accessories which have previously been used for shipments of radioactive materials and are being shipped empty conform to 49 CFR 173.29 and other pertinent directives.

(4) Verifying that removable radioactive contamination does not exceed the limits specified in 49 CFR 173.397.

(5) Assigning Transport Group classifications and the Transport Index to shipments of radioactive materials in accordance with 49 CFR 173.390 and 173.389(i).

(6) Labeling of packages of radioactive materials in the manner prescribed in 49 CFR 173.399, 173.402, and 173.414 and other pertinent directives.

(7) Preparing and/or advising on the preparation of shipping documents for shipment of radioactive material as required.

(8) Releasing shipments to carriers after verifying that the vehicle intended for transport is suitable, in a proper state of repair, placarded in accordance with 49 CFR 177.823(a)(1), and free from any obvious condition which could reasonably impair the safe transport of the cargo. Vehicles not meeting these tests will be immediately reported to the Transportation Officer.

(9) Surveying military vehicles which have been used to transport

radioactive materials for dose rate at any accessible surface and removable radioactive surface contamination in accordance with 49 CFR 177.843 and 173.397 and other pertinent directives.

3. POLICIES.

a. All shipments and transportation requirements for radioactive material will be coordinated with the Health Physics Officer and the Transportation Officer.

b. Vehicles transporting radioactive materials:

(1) Will be placarded front, rear, and on each side while it contains radioactive materials with the word "RADIOACTIVE" (Black letters on yellow background, letters not less than 4 inches high using approximately a 5/8-inch stroke and the placard larger than lettering by at least one inch on each side) whenever radioactive material requiring "Radioactive Yellow - III" label is transported and also when radioactive cargo not requiring this label is transported but, in the opinion of the Health Physics Officer, such placards should be displayed.

(2) Will not carry flammables, Class A explosives, pyrotechnics, vegetables, fruit, bagged grains, or other contaminable foodstuffs, with any radioactive material.

(3) Will not be left unattended on a public highway.

(4) Will be subject to inspection prior to loading and must conform to the provision of DD Form 626 (Inspection Report).

(5) Will display ~~a notice on the dash board which states:~~ **A DA LABEL IS ON THE DASHBOARD.**

~~WARNING
THIS VEHICLE IS CARRYING
RADIOACTIVE MATERIAL~~

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~~When damaged, the package(s) are safe to handle for short periods. In case of accident notify: WRAMC Health Physics, 576-5107.~~

(6) Will carry a copy of DD Form 836 (Special Instructions for Motor Vehicle Drivers) and a copy of the APPENDIX to this ANNEX (Emergency Procedures to follow in Accident and/or Incident Situations).

(7) Will be loaded in such a fashion that the distance between the packages and the driver or any passenger in the cab of the vehicle will

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not be less than the distances given in Table 6, paragraph 13b(13), TM 55-315.

(8) Will be loaded such that the load is not likely to become damaged or dislodged during transit.

(9) Will have all packages of radioactive material contained within the cargo portion of the vehicle, i.e., no tailgate loading.

(10) Will be surveyed and decontaminated, if necessary, to the levels prescribed in 49 CFR 177.843 and 173.397, and other pertinent regulations, prior to being returned to general use.

(11) Will be equipped with a portable survey instrument in operating condition during operation to assist in contamination control in event of accident or incident.

(12) Will be operated at a safe speed in conformity with local conditions, but will not exceed posted speed limits under normal operating conditions. During adverse weather or road conditions, the speed of the vehicle will be reduced to that safe for the existing conditions.

c. Passenger-carrying vehicles, including POV and motor vehicles which carry passengers for hire, will NOT be used to transport radioactive materials unless there is no other practicable means of transportation available and then only with the expressed consent of the Health Physics Officer and the Transportation Officer. When passenger-carrying vehicles are authorized for use in transporting radioactive materials, the requirements in para 3b above will be met (49 CFR 177.870).

d. The U.S. Mail and Parcel Post will not be used for shipment of radioactive material except in case of emergency, or for the movement of radioisotopes which meet the requirements specified in 39 CFR 125.2 and para 5a(4), TM 55-315. All such shipments must be coordinated with the Health Physics Officer (para 3-13b, AR 55-55).

4. REFERENCES.

- a. AR 55-38 - Reporting of Transportation Discrepancies in Shipment
- b. AR 55-55 - Transportation of Radioactive and Fissile Material Other Than Weapons.
- c. AR 385-40 - Accident Reporting and Records.
- d. 39 CFR, Rules and Regulations of the Postal Service.

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e. WR 55-1 - Transportation and Travel.

f. WR 385-2 - Accident Reporting.

g. AR 700-52

h. 49 CFR

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i. 10 CFR

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APPENDIX (EMERGENCY PROCEDURES TO FOLLOW FOR VEHICLE ACCIDENT/INCIDENT)
to ANNEX M (TRANSPORTATION OF RADIOACTIVE MATERIALS)

1. GENERAL. A radiological emergency is any unplanned event which could adversely affect the safe movement of radioactive materials. A severe emergency could result from collision, fire, explosions, or loss of control, e.g., theft, spillage, leakage, and misplacement of the radioactive material. Your first aim should be to protect yourself and others from overexposure and contamination. Second, efforts should be made to confine the contamination to the local area. Although no set of rules is available to handle every conceivable incident, the proper adaptation of the more specific guidance furnished below will minimize the danger to persons and property. In the event there is reason to believe that personnel may have been contaminated and/or overexposed, efforts will be directed toward locating those persons so that any necessary decontamination and medical assistance may be furnished.

2. DEFINITIONS.

a. Accident - Includes any physical damage to the container(s); any overexposure of personnel; or contamination of personnel and equipment in detectable amounts.

b. Incidents - Unexpected events which are not accidents as defined above, but which may increase in hazard severity or, if the unsafe practice or condition is not corrected, may result in a future accident. Incidents include errors committed in handling operations; malfunctions of transport equipment which might result in danger to the loading, if not corrected; malfunction of the container or associated equipment components which degrade safety.

3. STATEMENTS TO CIVIL AUTHORITIES. If queried by civil authorities concerning contents of the vehicle, the operator will state only that the vehicle was transporting small quantities of well-contained radioactive material, either radioisotopes or waste, as the case may be. He will refer all additional questions of this nature to the Health Physics Officer, WRAMC, or his representative.

4. EMERGENCY ACTION IN THE EVENT OF FIRE, EXPLOSION, LEAKAGE OR SPILL.

a. Immediate Action by Vehicle Operator:

(1) Pull out of the line of traffic; DO NOT LEAVE VEHICLE UNATTENDED UPON A PUBLIC HIGHWAY.

(2) Extinguish fire; use dry chemical fire extinguisher.

(3) In case of leakage, try to control spread of liquid by the most practical means.

b. Utilize on-site personnel in order to:

(1) Isolate the area. If necessary, increase the distances indicated on the DD Form 836 to keep personnel out of smoke, leakage, spillage and mists. Establish an exclusion area to protect the general public from exposure to radiation in excess of 2 mR/hr and all detectable contamination.

(2) Render first aid.

(3) Notify the Health Physics Officer, WRAMC (Ext. 576-5107 or 5161).

(4) Notify the Military Police, WRAMC (Ext. 576-2511 or 5348).

(5) Control personnel who may have contacted the fumes, spillage, smoke or dust.

(a) Obtain names and addresses of witnesses and affected individuals.

(b) Discourage smoking, eating, drinking, and leaving until Health Physics personnel arrive.

c. Subsequent Action by the Operator:

(1) Assist the Health Physics personnel as required.

(2) Document the accident. The operator will make out an accident report as soon as possible at the scene of the accident or incident. Accident reports will consist of completion of Motor Pool issued accident forms. An incident will cover all things which may occur which are not categorized as vehicular accidents and to include delays enroute. The incident report will consist of a brief but concise written narrative covering "What Happened", "Where It Happened", "When It Happened", and "What Persons or Objects Were Involved".

5. PROCEDURES IN CASE OF THEFT OR LOSS.

a. Notify the Health Physics Officer, WRAMC (Telephone: 576-5161) who in turn will notify the Military Police.

b. Attempt to recover in case of loss.

SPECIAL INSTRUCTIONS FOR DRIVERS		DATE:						
TO: (Carrier's Name and Trailer Number)		FROM: (Station Issuing Instructions)						
BILL OF LADING NUMBER	THIS TRUCK IS LOADED WITH (commodity description)							
PLACARDS (specified by I.C.C. reg)								
GENERAL PRECAUTIONS		IN CASE OF FIRE						
<ol style="list-style-type: none"> 1. Protect the public from the hazards of the cargo. 2. Do not allow smoking or the use of matches or lighters in or near the vehicle. 3. Obey all state and local traffic regulations. 4. Do not exceed posted speed limits. 5. While operating over public roads keep at least 300 feet from trucks loaded with explosives or other dangerous articles. 6. Stop at all railroad crossings. 7. Use designated routes; wherever possible avoid congested residential or business areas. 8. Do not permit unauthorized persons to ride in/on vehicles. 9. At other than carrier rest stops or interchange points, select safe parking space at stopping locations designated by the carrier. Vehicles carrying explosives should not group together at these stopping locations. 10. Deliver shipment to receiving installation during normal working hours and only to persons authorized to accept it. 		<ol style="list-style-type: none"> 1. If any part of the truck, excluding contents, catches fire, take truck to a clear or uninhabited area, if practicable, and/or attempt to put fire out immediately with hand extinguishers. 2. If fire reaches contents of truck or gets out of control, warn nearby persons and request notification of police and fire departments. 3. If in convoy, other trucks proceed to safe distance. 4. You can use water to fight this cargo fire. 5. Firemen should not approach closer than _____ * feet from fire. 6. Persons should not approach closer than _____ * feet from truck. 7. Fire fighting apparatus should be kept at least _____ * feet or operating distance from fire. 8. As soon as practical notify the nearest military installation for instructions. 						
IN CASE OF BREAKDOWN		IN CASE OF ACCIDENT						
<ol style="list-style-type: none"> 1. Do not tow loaded vehicle. 2. Post flags by day, and red electric lanterns or reflectors by night to warn traffic approaching from each direction. 		<ol style="list-style-type: none"> 1. Set brake and block vehicle to prevent movement. 2. Post flags by day, and red electric lanterns or reflectors by night to warn traffic approaching from each direction. 3. Call for ambulance, if necessary. 4. Notify nearest police. 						
NOTIFY (by phone or wire as soon as possible)								
OTHER SPECIFIC PRECAUTIONS								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px; vertical-align: top;"> <i>These instructions must be transferred to each subsequent driver for turn-in at final destination. If more than 3 drivers are involved the additional signatures should be made on an extra sheet and attached hereto.</i> </td> <td style="width: 35%; padding: 5px;">SIGNATURE OF SHIPPER REPRESENTATIVE</td> <td style="width: 35%; padding: 5px;">SIGNATURE OF FIRST DRIVER</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px;">SIGNATURE OF SECOND DRIVER</td> <td style="padding: 5px;">SIGNATURE OF THIRD DRIVER</td> </tr> </table>			<i>These instructions must be transferred to each subsequent driver for turn-in at final destination. If more than 3 drivers are involved the additional signatures should be made on an extra sheet and attached hereto.</i>	SIGNATURE OF SHIPPER REPRESENTATIVE	SIGNATURE OF FIRST DRIVER		SIGNATURE OF SECOND DRIVER	SIGNATURE OF THIRD DRIVER
<i>These instructions must be transferred to each subsequent driver for turn-in at final destination. If more than 3 drivers are involved the additional signatures should be made on an extra sheet and attached hereto.</i>	SIGNATURE OF SHIPPER REPRESENTATIVE	SIGNATURE OF FIRST DRIVER						
	SIGNATURE OF SECOND DRIVER	SIGNATURE OF THIRD DRIVER						
* The distances shown are minimums; greater distances should be used whenever possible.								

APPENDIX 3 to ANNEX m (Transportation of Radioactive Materials) to WR 40-10

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIAL)	DATE	HOUR	REPORT CONTROL SYMBOL
	REPORTING INSTALLATION		CHECK ONE <input type="checkbox"/> ORIGIN <input type="checkbox"/> DESTINATION
NAME OF CARRIER Hillside 12000 1st St. Dallas, Texas	SHIPMENT RECEIVED FROM		ENTERING <input type="checkbox"/> EMPTY <input type="checkbox"/> LOADED
NAME OF DRIVER John S. Sutton 12000 1st St. Dallas, Texas	DRIVER'S STATE PERMIT NO.	GBL NO.	DOCTOR'S CERTIFICATE DATED:

VEHICLE			
TYPE OF VEHICLE <input type="checkbox"/> TRUCK <input type="checkbox"/> TRUCK AND FULL TRAILER <input type="checkbox"/> TRACTOR AND DOUBLE TRAILERS <input type="checkbox"/> TRACTOR AND CLOSED SEMI-TRAILER <input type="checkbox"/> TRACTOR AND FLAT-BED TRAILER	TRUCK LICENSE NUMBER	TRAILER(S) NUMBER	SLEEPER CAB <input type="checkbox"/> YES <input type="checkbox"/> NO
	I.C.C. NUMBER	LICENSE(S) NUMBER	VALID LEASE <input type="checkbox"/> YES <input type="checkbox"/> NO

NOTE: All of the following items shall be checked on empty equipment prior to loading. Items with an asterisk (*) shall be checked on incoming loaded equipment.

ITEM NO.	CHECK APPROPRIATE COLUMN (See reverse side for explanatory notes)	SATIS- FAC- TORY	UNSAT- ISFAC- TORY	REMARKS (Explain unsatisfactory items; use reverse side if necessary.)
1	ENGINE, BODY, CAB AND CHASSIS CLEAN			
2	STEERING MECHANISM			
3	HORN OPERATIVE			
4	WINDSHIELD AND WIPERS			
5	SPARE ELECT. FUSES AVAILABLE			
6	REAR VIEW MIRRORS INSTALLED			
7	HIGHWAY WARNING EQUIPMENT			
*8	FULL FIRE EXTINGUISHERS (2) INSTALLED			
9	LIGHTS AND REFLECTORS OPERATIVE			
10	EXHAUST SYSTEM			
*11	FUEL USED (LP Gas Prohibited)			
*12	FUEL TANK, LINE AND INLET			
13	COUPLING DEVICES - KINGPIN LOCK			
*14	ALL BRAKES OPERATIVE			
*15	LANDING GEAR ASSEMBLY OPERATIVE			
16	SPRINGS AND ASSOCIATED PARTS			
*17	TIRES			
18	CARGO SPACE			
*19	ELECTRIC WIRING			
*20	TAIL GATE AND DOORS SECURED			
*21	FIRE AND WATER RESISTANT TARPULIN			
22	ANY OTHER DEFECTS (Specify)			

APPROVED (If rejected give reasons on reverse side, under "Remarks." Equipment shall be approved if deficiencies are corrected prior to loading.)

REJECTED

SIGNATURE (of Inspector)

ITEMS TO BE CHECKED PRIOR TO RELEASE OF LOADED VEHICLE				CHECK
23	MIXTURES OF MATERIAL PROHIBITED BY DOT REGS. ARE NOT LOADED ONTO THIS VEHICLE			
24	LOAD IS SECURED TO PREVENT MOVEMENT			
25	WEIGHT IS PROPERLY DISTRIBUTED AND VEHICLE IS NOT OVERLOADED			
26	SEAL(S) APPLIED TO CLOSED VEHICLE. FIRE AND WATER RESISTANT TARPULIN APPLIED ON OPEN VEHICLE			
*27	SPECIAL INSTRUCTIONS (DD Form 836) RECEIVED BY DRIVER			
*28	COPY OF VEHICLE INSPECTION (DD Form 626) FURNISHED DRIVER			
*29	PROPER PLACARDS APPLIED			
*30	SHIPMENT MADE UNDER DOT SPECIAL PERMIT NUMBER 888			

SIGNATURE (of Inspector)

SIGNATURE (of Driver)

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ANNEX N (RADIOACTIVE WASTE)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To prescribe the policies and procedures to be followed in the management of radioactive waste at WRAMC in order to insure compliance with pertinent laws and regulations.

2. RESPONSIBILITIES.

a. The Health Physics Officer is responsible for the management and control of radioactive waste to include effluents released to the unrestricted environment.

b. Principal Users are responsible for segregation, packaging and delivery of radioactive wastes generated under their control to the areas designated by the Health Physics Officer.

c. Individual users are responsible for:

(1) Keeping the inventory of radioactive waste in their possession to a practical minimum.

(2) Providing containers for their radioactive waste.

(3) Properly identifying the contents of their waste, to include radioisotope, approximate activity, date, and Authorization number in the manner prescribed by Health Physics.

3. POLICIES AND PROCEDURES.

a. Radioactive waste is excess or surplus unwanted radioactive material and material contaminated with radioisotopes, including sources and special waste, and property which, while originally non-radioactive, has become contaminated to such an extent that it is economically unsound to decontaminate, or the contamination cannot be reduced to an acceptable level for its intended use.

b. Radioactive waste must be classified and segregated into the following classes:

(1) Solid, combustible.

(2) Solid, non-combustible.

(3) Liquid, combustible.

- (4) Liquid, non-combustible.
- (5) Gas, combustible.
- (6) Gas, non-combustible.
- (7) Animal carcasses and/or animal waste.

c. Procedures to be followed by users of radioactive material include:

- (1) Segregation of radioactive waste into the above categories.
- (2) Limit the non-radioactive waste which is intermixed with the radioactive waste to a practical minimum.
- (3) Solid waste shall be placed in magenta plastic bags or a receptacle lined with a magenta plastic bag. The bag, when filled and delivered for disposal, will be taped closed. If plastic bags are used for radioactive waste containing Tritium, they will be placed inside a kraft paper bag.
- (4) Liquid waste that is retained for disposal should be collected in plastic bottles or sealed cans to diminish the breakage hazard. However, liquid waste that will chemically react with plastic and liquid waste containing Tritium should be placed in glass bottles. All bottle caps should be taped when presented for disposal.
- (5) All radioactive waste containers shall be properly marked with the radiation caution symbol and the words "Caution - Radioactive Waste" and/or "Caution - Radioactive Material."
- (6) The inventory of radioactive waste in the possession of individual users will be kept to a practical minimum.
- (7) Radioactive waste will be controlled by the user to prevent unauthorized disposal by the custodial service. Maximum use of the magenta plastic bags for radioactive waste is encouraged.
- (8) Animal carcasses will be packed in two plastic bags of suitable size and strength and kept frozen until ~~picked up~~ by Health Physics.

d. Disposal of Radioactive Waste.

- (1) Radioactive waste will be collected by the user and disposed of in accordance with instructions received from Health Physics.
- (2) Excreta from patients undergoing medical diagnosis or therapy

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may be disposed of in the usual manner, providing the toilet is operated twice each time excreta is released during the first 48 hours after administration of therapeutic doses of unsealed radioisotopes. This procedure is necessary to insure complete removal of the material from the ward plumbing, and adequate dilution of the material.

(3) Radioactive material will not be disposed of by incineration or burial in the soil at WRAMC.

(4) Radioactive materials will not be released from holding tanks into the sanitary sewage system without the specific approval of the Health Physics Officer, except as provided in para 3d(2), above.

(5) Individual users may be permitted to dispose of radioactive waste via laboratory sinks into the sanitary sewage system under the following conditions:

(a) The user obtains permission from the Health Physics Officer.

(b) The sink through which the material is discharged is conspicuously posted with a sign bearing the Radiation Caution symbol and the words "Caution - Radioactive Material Disposal Sink."

(c) The sink is posted with a notice to the user that the radioactive material discharged through the sink must be readily soluble or dispersible in water and does not contain any substances which are hazardous to health or will result in substantial harm to domestic animals, fish, shellfish, or wildlife.

(d) A record of the identity and activity of material discharged through the sink is maintained by the user.

(e) The material is essentially neutral, i.e., pH of 6 - 8.

(f) The quantity of any material released by the user in any one day does not exceed ten (10) times the amount specified in the APPENDIX to ANNEX W of these Regulations. Alternate limits prescribed in 10 CFR 20.303 may be employed only with prior approval of the Health Physics Officer, such approval to be valid only for that specific release.

(e) Ultimate disposal of radioactive waste will be accomplished by the Health Physics Officer in accordance with AR 755-15 and other pertinent directives.

APPENDIX (RADIOACTIVE WASTE DISPOSAL SINK DUMP LIMITS)
to ANNEX N (RADIOACTIVE WASTE)

THE RADIOACTIVE MATERIAL DISCHARGED THROUGH THIS SINK MUST BE READILY SOLUBLE OR DISPERSIBLE IN WATER. THE QUANTITIES OF THE COMMONLY-USED RADIONUCLIDES DISCHARGED THROUGH THIS SINK IN ANY ONE DAY MUST NOT EXCEED TEN (10) TIMES THE AMOUNT SPECIFIED BELOW (For isotopes not listed, call Ext. 3481 for limits).

<u>Material</u>	<u>Microcuries</u>	<u>Material</u>	<u>Microcuries</u>
Antimony-124-----	10.00	Iron-59-----	10.00
Arsenic-74-----	10.00	Krypton-85-----	100.00
Barium-133-----	10.00	Manganese-54-----	10.00
Barium-140-----	10.00	Manganese-56-----	10.00
Bismuth-210-----	1.00	Mercury-197-----	100.00
Bromine-82-----	10.00	Mercury-203-----	10.00
Cadmium-109-----	10.00	Molybdenum-99-----	100.00
Cadmium-115-----	100.00	Nickel-63-----	10.00
Calcium-45-----	10.00	Phosphorous-32-----	10.00
Calcium-47-----	10.00	Potassium-42-----	10.00
Carbon-14-----	100.00	Radium-226-----	0.01
Cerium-141-----	100.00	Rubidium-86-----	10.00
Cerium-144-----	1.00	Selenium-75-----	10.00
Cesium-131-----	1000.00	Sodium-24-----	10.00
Cesium-137-----	10.00	Strontium-85-----	10.00
Chlorine-36-----	10.00	Strontium-89-----	1.00
Chromium-51-----	1000.00	Strontium-90-----	0.10
Cobalt-58-----	10.00	Sulphur-35-----	100.00
Cobalt-60-----	1.00	Tantalum-182-----	10.00
Copper-64-----	100.00	Technetium-99m-----	100.00
Fluorine-18-----	1000.00	Technetium-99-----	10.00
Gold-198-----	100.00	Thallium-204-----	10.00
Hydrogen-3-----	1000.00	Thorium (natural)-----	50.00
Indium-113m-----	100.00	Tin-113-----	10.00
Iodine-125-----	1.00	Uranium (natural)-----	50.00
Iodine-129-----	0.10	Xenon-133-----	100.00
Iodine-131-----	1.00	Zinc-65-----	10.00
Iridium-192-----	10.00	Zinc-69m-----	100.00
Iron-55-----	100.00	Zirconium-95-----	10.00

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ANNEX O (LEAK TESTING SEALED SOURCES)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To delineate responsibilities for leak testing of sealed sources of radioactive material at WRAMC.

2. DEFINITIONS.

a. Sealed Sources, for the purpose of this ANNEX, are those which meet all of the following criteria:

(1) Radioactive material, other than Tritium.

(2) Half-life greater than thirty (30) days.

(3) In any physical form other than gas.

(4) In a quantity which is greater than 100 microcuries of beta and/or gamma-emitting material or greater than 10 microcuries of alpha-emitting material.

(5) Inclosed in, and is intended to be used in, a container of durable (not fragile) material in a manner intended to prevent leakage or escape of the radioactive material or any of its daughter products.

b. Leak Test. A nondestructive test in which a sample is taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semi-permanently mounted or stored, on which one might expect contamination to accumulate. Leak tests may be taken by any of a variety of techniques depending on the source, the radioisotope, the method of analysis, the mounting, etc.

3. RESPONSIBILITY. The Health Physics Officer is responsible for performance, analysis, and posting of records of all leak tests performed at WRAMC to satisfy the requirements of AR 700-52, USAEC License conditions, and DA Authorizations for the Use of Radioisotopes.

4. CRITERIA FOR LEAK TESTING.

a. Leak tests, when required, will be performed at intervals not to exceed six (6) months, except that each source of alpha-emitting radioisotope will be tested at intervals not to exceed three (3) months.

b. If a source requiring leak testing is supplied with a certificate from the vendor indicating that a leak test has been made within six (6) months (three (3) months for alpha-emitting sources), the source need not

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be retested until six (6) months (three (3) months for alpha-emitting sources) from the date of the last test and may be issued for immediate use.

c. If no documentary evidence is available to substantiate that a given source has been leak tested within six (6) months (three (3) months for alpha-emitting sources), the source will not be issued until it has been leak tested and the results evaluated.

d. The leak test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample.

e. Sealed sources will be considered contaminated if a leak test removed 0.005 microcuries of radioactive material of an identifiable quantity of the radioisotope contained within the capsule.

f. All sealed sources found to be contaminated will be immediately withdrawn from use by the Health Physics Officer, who will determine whether or not the source is leaking. If it is leaking, he shall direct that it be resealed or disposed of. He shall also render any required reports.

g. The Health Physics Officer shall be notified prior to fabrication of a sealed source so that the required leak testing may be accomplished.

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ANNEX P (SURVEY OF WORKING AREAS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. The purpose of this ANNEX is to delineate the responsibilities for survey of working areas where radioactive materials are used.

2. RESPONSIBILITIES.

a. Health Physics will perform a formal radiation protection survey in each area where radioactive material is located at least once each month ~~and will provide a written report of the survey to the Principal User.~~ C-1

b. Each Principal User is responsible for radiological safety within his work area. He will cause such readings and evaluations to be made as part of routine procedures as are necessary to insure that unwarranted radiological hazards are not present. Health Physics will, upon request, advise on appropriate procedures and, in some instances, provide necessary survey instrumentation.

c. Health Physics will provide additional coverage to users of radioactive materials, radiation producing devices, lasers, and microwave generators consistent with their requirements and will, upon request, perform additional studies and evaluations.

3. AREAS OF INTEREST. Radiological protection surveys will include evaluations of the following areas, as appropriate;

- a. Surface contamination, both removable and fixed.
- b. Dose-rate measurements.
- c. Airborne radiological hazard, both particulate and gaseous.
- d. Ventilation, including fume hoods.
- e. Storage areas for radioactive materials.
- f. Radioactive waste management, including radioactive waste disposal sinks.
- g. Fire and safety hazards.
- h. Radiation safety and contamination control aspects of the working environment and experimental procedures.
- i. The familiarity of personnel with radiological safety and emergency procedures.

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ANNEX Q (MACHINE-PRODUCED RADIATION)
to WR 40-10 (Health Physics Regulations)

1. All machines and devices which produce X-Ray, laser or microwave radiation will be registered with the Health Physics Officer, who will maintain the required registry of such devices in accordance with AR 700-52 and other pertinent directives.
2. All proposed procurements, installations, modifications to installations, and relocations of X-ray, laser, and microwave devices will be coordinated with Health Physics. An evaluation will be made of the planned use of the equipment, its location, and protective barriers, interlocks, etc., prior to final approval to insure the adequacy of the facility prior to commitment of funds.
3. Design or modification of installations shall be accomplished in accordance with:
 - a. For X-Ray: TB MED 62, and the recommendations given in NCRP Reports 33 through 36 and NBS Handbook 93 (Non-Medical X-Ray Protection).
 - b. For Laser: TB MED 279 (Control of Hazards to Health from Laser Radiation) and AR 40-46.
 - c. For Microwave: TB MED 270 (Control of Hazards to Health from Microwave Radiation), and AR 40-44.
 - d. For Accelerator: NBS Handbook 107 (Radiological Safety in Design and Operation of Particle Accelerators).
4. Persons having responsibility for these radiation sources will notify the Health Physics Officer of their receipt prior to putting them into use.
5. Health Physics will conduct a radiation protection survey of all new, modified, or repaired X-ray, laser, or microwave installations prior to their routine use. A radiation protection survey is defined as the evaluation of the radiation hazards in and around an installation. It customarily includes a physical survey of the arrangement and use of the equipment and measurements of the exposure rates under expected operating conditions. A full radiation protection survey is not required following repairs if there is no possibility that the output, alignment, shielding, or safety aspects of the equipment have been altered by the repairs.

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6. Health Physics will conduct a radiation protection survey of existing installations upon request, or at the discretion of the Health Physics Officer, to ascertain that equipment, structural shielding, safety devices, and operating procedures are in accordance with pertinent directives, standards, and guides.
7. A written report of the results of the survey will be furnished to the person responsible for the installation.
8. Whenever an X-Ray, laser, or microwave device or its installation is found to exceed the limits of the appropriate safety standard, or is otherwise potentially hazardous to personnel, the Health Physics Officer will recommend suitable corrective action, and will determine if the equipment can continue to be operated pending repairs, modifications, etc., without jeopardizing the health and well-being of patients and/or occupationally exposed personnel. The responsible individual will be advised, in writing, of these recommendations so that appropriate action may be taken.
9. It is the responsibility of the person in charge of the installation to assure that all equipment under his jurisdiction is operated by persons competent in its safe use. When necessary, he will develop an SOP governing the use of the equipment and post it prominently to insure compliance with his instructions.
10. The person in charge of the installation is responsible for the proper education of personnel in safe operating procedures and the nature of injuries resulting from overexposure. He should promulgate rules for working safety, including any restrictions in operating techniques required, to assure safe utilization of equipment.
11. All persons entering an X-ray, laser, or microwave area shall comply with all safety instructions which concern or affect their conduct and shall use such safety devices as are furnished for their protection.

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APPENDIX 1 (GENERAL SAFETY PRECAUTIONS FOR LASER OPERATIONS)
to ANNEX Q (MACHINE-PRODUCED RADIATION)

1. PURPOSE. To provide guidelines for the safe operation of laser devices at Walter Reed Army Medical Center.

2. GENERAL. The effects of laser radiation are essentially the same as light generated by more conventional ultraviolet, infrared, and visible light sources. The unique biological implications attributed to laser radiation are generally those resulting from the very high intensities and monochromaticity of laser light. The principal biological hazards are to the eyes and, to a lesser degree, to the skin. Susceptibility to injury and the severity of injury are dependent upon various properties and the power density of the laser light.

3. HAZARD EVALUATION.

a. General Procedure. Three aspects of a laser application influence the total hazard evaluation and thereby influence the application of control measures:

- (1) The laser device's capability of injuring personnel.
- (2) The environment in which the laser is used.
- (3) The personnel who may be exposed.

A practical means for both evaluation and control of laser radiation hazards is to first classify laser devices according to their relative hazards and then to specify appropriate controls for each classification. The use of the classification method will in most cases preclude any requirements for laser measurements and greatly reduce the need for calculations. This standardized laser classification scheme defines aspect 1 - the potential hazard of the laser device. Aspects 2 and 3 vary with each laser application scheme. The total hazard evaluation procedure must consider all three aspects, although in most cases only aspect 1 influences the control measures which are applicable.

b. Laser and Laser System Hazard Classification Scheme.

(1) The general classification scheme with general hazard control concepts is as follows:

(a) Class 1 - Exempt (EL) laser devices are those not capable of emitting hazardous laser radiation under any operating or viewing conditions.

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(b) Class II - Low power (LP) laser devices are those CW visible (400-700 nm) laser devices having a total power between 0.4 μ W and 1 mW. Precautions are required only to prevent continuous staring into the direct beam; momentary (<0.25 sec) exposure as would occur in an unintentional viewing situation is not considered hazardous.

(c) Class III - Medium power (MP) laser devices are potentially hazardous if the direct beam is viewed by the unprotected eye, but do not (unless focused) cause hazardous diffuse reflections. Care is required to prevent intrabeam viewing and control specular reflections. Most military laser rangefinders and designators fall into this category.

(d) Class IV - High power (HP) lasers are those pulsed visible lasers capable of producing hazardous diffuse reflections or fire and skin hazards, or those CW lasers with an output above 0.5 W. Safety precautions associated with high power lasers generally consist of using door interlocks to prevent exposure to unauthorized or transient personnel entering the laser facility, the use of baffles to terminate the primary and secondary beams, and the wearing of protective eyewear and clothing by personnel.

(e) Class V - Enclosed Laser (ES) - As the name implies, the laser is enclosed such that potentially hazardous optical radiation does not exit from the enclosure.

(2) This classification scheme is identical to that used in American National Standards Institute "ANSI-Z-136, Safe Use of Lasers, 1973." This classification may already appear on commercial laser products manufactured subsequent to the adoption of that standard and should be used unless the laser is modified to significantly change its output power or energy, or unless the laser is enclosed.

4. SAFEGUARDS AND LIMITATIONS.

a. Medical examinations will be performed on personnel who work with lasers in accordance with ANNEX F to these Regulations.

b. Visitors to a laser installation who are adequately protected from the laser beam by laser goggles or other suitable means need not be included in the surveillance program.

c. Significant or unexplained changes in the ocular examination will be reported to the Health Physics Officer, WRAMC, for investigation in coordination with the Ophthalmology Service, WRAMC.

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d. Any individual having or suspected that there has been an accident involving exposure to laser radiation will report the accident to the Health Physics Officer as soon as possible (Ext. 5107 or 5161).

e. Signs warning of hazardous laser radiation will be posted at all entrances to such areas. These signs are available from Health Physics, WRAMC.

f. Only trained personnel will operate laser devices.

g. Each section using laser devices will maintain SOP's for the operation of each type of laser device used within the section. These SOP's will be approved by Health Physics.

h. Laser installations will be inspected periodically by Health Physics.

ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)
to WR 40-10 (Health Physics Regulations)

1. RESPONSIBILITIES.

a. The Health Physics Officer, WRAMC, is responsible for providing full-range Health Physics support throughout WRAMC.

b. The Commander, WRAMC, provides such guidelines as are necessary to insure adequate protection for medical treatment personnel involved in patient care who are occupationally exposed to ionizing radiation.

2. SPECIFIC REQUIREMENTS.

a. Individuals who are occupationally exposed to radiation from radioisotopes or X-ray producing devices will wear film badges unless specifically exempted therefrom by the Health Physics Officer.

b. Personnel, equipment, linen and facilities will be monitored for radioactive contamination following any procedure in which the possibility of contamination exists.

c. Dressings, etc., destined for disposal will be monitored and disposed of as radioactive waste when warranted.

d. Health Physics personnel will not impede patient care, but are expected to make recommendations to minimize the accumulated dose to medical personnel and patients who are not being treated with radiation.

e. Patients will not normally be discharged from the hospital with more than ~~50~~ mCi of radioactive material remaining in the body. The specific requirements of USAEC License 08-01738-02 are given in para 7, APPENDIX 5 to this ANNEX. C-1

f. Guidance on various areas of patient care are described below:

(1) Health Physics Aspects of Nursing Care of Radiation Therapy Patients with SEALED Sources (See APPENDIX 1 to this ANNEX).

(2) Health Physics Aspects of Nursing Care of Radiation Therapy Patients with NON-SEALED Sources (See APPENDIX 2 to this ANNEX).

(3) Death - Health Physics Procedures (See APPENDIX 3 to this ANNEX).

(4) Health Physics Aspects of Surgery and Autopsy (See APPENDIX 4 to this ANNEX).

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(5) Health Physics in the Therapeutic Administration of Radioactive Material (See APPENDIX 5 to this ANNEX).

(6) Management of Radioactive Casualties (See ANNEX S to these Regulations).

APPENDIX 1 (HEALTH PHYSICS ASPECTS OF NURSING CARE OF RADIATION THERAPY PATIENTS WITH SEALED SOURCES)
to ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)

1. PURPOSE. The purpose of this APPENDIX is to familiarize the nursing staff with their responsibilities to the patient and themselves in the prevention of unnecessary exposure to radiation.

2. GENERAL.

a. This type of radioactive source is encapsulated in a metal tube which is then sealed and therefore is classified as a sealed source. Once this source has been removed from the patient, there is no longer a source of radiation in the patient. Normally, there is no contamination on the linen, utensils, etc.

b. If any of the following should occur, notify Health Physics (Ext. 3575/5107) AND the physician who administered the radioactive material:

- (1) Major surgery.
- (2) Transfer of the patient.
- (3) Death of the patient.

3. SPECIFIC GUIDANCE.

a. Whenever possible, place the patient in a private room with the bed near the outside wall of the room. When it is necessary, two radiation therapy patients may be placed in the same room. A non-radiation therapy patient should not be in the same room with a radiation therapy patient.

b. Consistent with adequate care for the patient, carry out only minimal nursing procedures close to the patient. If the patient's clinical status requires constant observation, rotate personnel required to perform adequate nursing care in order to minimize exposure to personnel. The patient's bed should be approached only when required by nursing duties.

c. Wear YOUR film badge when entering the area. DO NOT use the film badge issued to another employee. Film badges may be obtained by calling Health Physics (Ext. 3575/5107).

d. Personnel are not to remain in the room unless engaged in a specific activity. Custodial, utility, maintenance, and food service workers

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should not enter the room unless they receive permission and instructions from the ward nurse.

e. A television set, telephone, books, etc., may be provided for the patient.

f. Excreta, linens, and other equipment may be handled in the usual manner.

g. Special handling of the food tray is not required.

h. In the event of a suspected loss or dislodgment of the sealed source:

(1) Notify the physician who administered the source.

(2) Notify Health Physics (Ext. 3575/5107).

(3) Do not remove any containers or linen from the room, flush the toilet, or use the sink.

(4) The radioactive source must be handled only with forceps.

i. Health Physics will monitor the patient area and will indicate a "safe distance" line for visitors.

j. The patient may have visitors. Except for the greeting, the visitors should stay on the "safe" side of the line indicated on the floor.

k. If the patient should die, notify the physician who administered the source. The source will be removed before the body is taken to the morgue.

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APPENDIX 2 (HEALTH PHYSICS ASPECTS OF NURSING CARE OF RADIATION THERAPY PATIENTS WITH NON-SEALED SOURCES)
to ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)

1. PURPOSE. The purpose of this APPENDIX is to familiarize the nursing staff with their responsibility to the patient and themselves in the prevention of unnecessary exposure to radiation.

2. GENERAL.

a. This type of radioactive source is usually administered in liquid form and therefore is classified as a non-sealed source. The source material will remain in the patient until it decays by half-life and/or is excreted; therefore, contamination of linen, etc., is possible.

b. Notify Health Physics (Ext. 3575/5107) AND the physician who administered the radioactive material if any of the following occur:

(1) Major surgery.

(2) Transfer of the patient.

(3) Death of the patient.

3. SPECIFIC GUIDANCE.

a. Whenever possible, place the patient in a private room with the bed near the outside wall of the room. When necessary, two radiation therapy patients may be placed in the same room. A non-radiation therapy patient should not be in the same room with a radiation therapy patient.

b. Consistent with adequate care for the patient, carry out only minimal nursing procedures close to the patient. If the patient's clinical status requires constant observation, rotate personnel required to perform adequate nursing care in order to minimize exposure to personnel. The patient's bed should be approached only when required by nursing duties.

c. Wear YOUR film badge when entering the area. DO NOT use the film badge of another employee. Film badges may be obtained by calling Health Physics (Ext. 3575/5107).

d. Personnel are not to remain in the room unless engaged in a specific activity. Custodial, utility, maintenance, and food service personnel should not enter the room unless they receive permission and instructions from the ward nurse.

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e. A television set, telephone, books, etc., may be provided the patient.

f. The food tray will be prepared entirely with disposable components. The tray will be disposed of as waste within the patient's room. Uneaten food WILL NOT be given to other patients or staff members.

g. Health Physics will monitor the patient area and will indicate a "safe distance" line for visitors.

h. The patient may have visitors. Visitors should stay on the "safe" side of the line indicated on the floor.

i. Necessary contamination control measures are very similar to isolation techniques.

j. Cover the mattress and pillow on the bed with plastic or rubber material.

k. Wear gloves when changing bed linen, dressings, etc.

l. The patient must wear hospital pajamas.

m. Place a plastic-lined waste basket and linen hamper in the patient's room.

n. Place waste, soiled linen, etc., in the designated containers for monitoring and disposal by Health Physics personnel.

o. Personal items for patient care (thermometer, bedpan, etc.) will be kept in the patient's room. Bath water may be disposed of in the commode.

p. Ambulatory patients will use the commode in THEIR room.

q. Diagnostic samples of blood, urine, and feces should only be obtained when authorized by the radiotherapist.

r. The urine excreted by the patient is radioactive. Spills, bed-wetting, or any accident with urine are radiation hazards. Wear gloves. In the event of an accidental spill of urine, cover it with absorbent material, then place the material in the designated waste container. Notify Health Physics immediately.

s. Call the Post Engineer AND the Health Physics Officer for correction of plumbing problems. Blocked drains may be a radiation hazard.

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t. If the patient dies, notify the physician who administered the source AND Health Physics. The body will not be removed from the ward until a Health Physicist advises on the appropriate protective measures to be taken during transport of the remains.

u. The room will not be returned to general use (i.e., another patient placed in the room) until cleared by Health Physics.

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APPENDIX 3 (DEATH - HEALTH PHYSICS PROCEDURES)
to ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)

1. APPLICABILITY. This APPENDIX applies to the management of remains of patients who have been undergoing radiation therapy with radioactive implants or unsealed radioisotopes. If the residual quantity within the body is less than 5 mCi (i.e., if there is no Health Physics Instruction Card in the patient's Kardex File), the body will be handled without regard for the presence of the radioactive material.

2. RADIOACTIVE IMPLANTS. When the patient has been treated with a radioactive implant, the procedure outlined below will be followed:

a. Notify the radiotherapist who administered the implant. The implant will be removed before the remains are taken to the morgue.

b. Notify Health Physics (Ext. 3575/5107) for any special instructions in management and transportation of the remains and return of the room to general use.

c. After the radioactive implant has been removed from the body, the remains may be handled in the routine manner.

d. If the radioactive implant cannot be removed from the body (e.g., radon seeds, gold seeds, etc.), process the remains as outlined in para 4, below.

3. UNSEALED RADIOISOTOPES. When the patient has been receiving radiation therapy using unsealed radioactive material (radioisotopes), the procedure outlined below will be followed:

a. Notify the radiotherapist who administered the radioactive material.

b. Notify Health Physics (Ext. 3575/5107). A Health Physics Technician will report to the ward to assist in:

(1) Management of the remains.

(2) Transportation of the remains to the morgue.

(3) Survey of the room, personal effects, linen, etc., for radioactive contamination and clear them for return to general use.

(4) Removal of any radioactive waste or items for disposal or decontamination, as appropriate.

(5) Removal of protective markings and signs from the patient's room.

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4. ADMINISTRATIVE REQUIREMENTS. To insure the prompt identification of radioactive remains and to facilitate the minimizing of radiation exposure of the staff, the following administrative procedures will be followed.

a. The "CAUTION - RADIOACTIVE MATERIALS" label affixed to the outside of the chart will remain in place until all radioactive material is removed from the body.

b. The tag located in the Kardex File bearing the radiation warning symbol and the words, "CAUTION - RADIOACTIVE MATERIALS. This patient's body contains a significant quantity of radioactive material as specified in Chapter 3, NCRP Report Number 37", will be attached to the body in the same manner as the tag contained in the mortuary pack.

c. A similar tag or label will be attached to the outside of the shroud by the attending Health Physics Technician.

d. If the body contains residual quantities of radioactive material, the Health Physics Officer or his representative will complete and sign one of the following statements in accordance with Appendix V, NCRP Report Number 37. This statement will be attached to the Death Certificate for transmittal to the Funeral Director by the Registrar, WRAMC.

(1) REPORT ON RADIOACTIVITY

TO: Funeral Director

FROM: Health Physics Officer
Walter Reed Army Medical Center
Washington, D. C. 20012

This body contains no significant amount of radioactive material. No special precautions are required if only standard embalming procedures are employed.

HEALTH PHYSICS OFFICER
Walter Reed Army Medical Center
DATE: _____

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(2) REPORT ON RADIOACTIVITY

TO: Funeral Director

FROM: Health Physics Officer
Walter Reed Army Medical Center
Washington, D. C. 20012

This body contains a significant amount of radioactive material. The following special precautions are recommended:

HEALTH PHYSICS OFFICER
Walter Reed Army Medical Center
DATE: _____

6. REFERENCES.

- a. NCRP Report Number 37, Precautions in the Management of Patients Who Have Received Therapeutic Amounts of Radionuclides.
- b. Quimby, E. N., and Feitelberg, S., Radioactive Isotopes in Medicine and Biology, Lea and Debiger, Philadelphia, 1963.

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APPENDIX 4 (HEALTH PHYSICS ASPECTS OF SURGERY AND AUTOPSY)
to ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)

1. GENERAL.

a. Health Physics will provide direct support (consisting of at least one (1) technician) to surgery and autopsy on patients whose bodies contain radioisotopes.

b. The principal guidance for surgeons, pathologists, and funeral directors on this subject is contained in NCRP Report No. 37, a copy of which will be provided by Health Physics upon request.

c. Health Physics support and/or advice regarding radiation protection during surgery or autopsy may be obtained by calling:

Duty hours: Ext. 3575, 2276, 3481, and 5107.

After duty hours: Ext. 5107.

2. SPECIAL REQUIREMENTS.

a. Prior to the surgery (autopsy) the physician who administered the radioactive material should meet with the assigned surgeon (pathologist) and the Health Physics Officer. The probable residual quantity of radioactive material within the body will be estimated. The Health Physics aspects of the surgery (autopsy) procedure will be ~~estimated~~. **EVALUATED.**

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b. If the anticipated exposure to the surgeon (prosector) and his assistants is considered to be prohibitive, it may be necessary to delay the procedure to allow for a "cooling off" of the radioactive material in the body, or rotate the personnel performing the procedure to preclude overexposure.

c. Personnel engaged in and supporting surgery (autopsy) will wear film badges if the patient contains radioisotopes, unless exempted by the Health Physics Officer.

d. Personnel, equipment, linen, and facilities will be monitored for radioactive contamination following the procedure when the possibility of contamination exists.

e. Tissues, dressings, etc., destined for disposal will be monitored and disposed of as radioactive waste, when warranted.

f. Health Physics personnel will not impede procedures, but are

expected to make recommendations to minimize the accumulated dose to the surgeon (pathologist) and other members of the team.

g. Autopsy.

(1) At the completion of the autopsy, the physician who administered the radioactive material will inform the Health Physics Officer of the probable residual quantity of radioactive material within the body, based on the body fluids, tissues, and organs which were removed.

(2) The Health Physics Officer will review the statement which has been executed for delivery to the Funeral Director to determine if the warning is still applicable.

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APPENDIX 5 (HEALTH PHYSICS IN THE THERAPEUTIC ADMINISTRATION OF RADIOACTIVE MATERIAL)
to ANNEX R (HEALTH PHYSICS ASPECTS OF PATIENT CARE)

1. PURPOSE. The purpose of this ANNEX is to specify the duties of the Health Physics Technician in the prevention of unwarranted exposure to nursing personnel, visitors, and those who occupy areas adjacent to the patient being treated.

2. NOTIFICATION OF THERAPEUTIC ADMINISTRATION.

a. Sealed Sources.

(1) The radiotherapist will forward to the Health Physics Technician the type and quantity of sealed sources, the applicator to be used and its loading arrangement, the patient's name, date of use, and ward number.

(2) The radiotherapist will load the applicator and record the pertinent data in the log book in the storage room.

b. Non-Sealed Sources. The Nuclear Medicine Clinic will notify the Health Physics Technician by telephone of the proposed schedule for the administration of the radioactive material.

c. Notification of Ward Nurse.

(1) The Health Physics Technician will notify the appropriate ward nurse of the proposed administration of radioactive material. A copy of APPENDIX 1 or 2 to ANNEX R will be furnished to the ward as appropriate.

(2) The Health Physics Technician will obtain from the nurse the names and social security numbers of those persons who will be caring for the therapy patient and will issue film badges to them.

(3) WRAMC Form 426, "Radiation Therapy Monitoring Record", will be initiated in duplicate by the Health Physics Technician. The names of those persons involved in the patient's care will be entered on this form.

3. PREPARATION OF THE RADIOACTIVE MATERIAL.

a. Sealed Sources. The Health Physics Technician should insure that the log of the source use is correct and up to date.

b. Non-Sealed Sources. The Health Physics Technician has no specific duties that relate to the preparation of non-sealed sources.

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4. SEALED SOURCE ADMINISTRATION.

a. The radiotherapist is responsible for the safe handling of the radioactive material from the time it leaves Radiation Therapy until he returns it.

b. Health Physics (Ext. 3573/5107) will provide a technician for assistance, upon request.

5. NON-SEALED SOURCE ADMINISTRATION.

a. The Nuclear Medical Service personnel are responsible for safe delivery of the radioactive material to the ward, and for obtaining sufficient absorbent paper and other protective equipment as indicated by the type of radioactive material.

b. A Health Physics Technician will normally be in attendance during therapeutic administration of unsealed radioactive material.

c. The Health Physics Technician will:

(1) Ascertain that the protective materials are located to provide protection of medical personnel.

(2) Remain available during the administration for assistance.

d. Following administration, the Health Physics Technician will:

(1) Monitor the administering staff and their equipment.

(2) Insure that radioactive laundry and waste containers are in the patient's room and are properly labeled.

(3) Employing a manner which will obtain the desired results without alarming the patient, instruct him (her) in procedures for preventing the spread of contamination.

6. PATIENT CARE ON THE WARD.

a. When the therapeutic application is performed at a location other than the patient's room, the Health Physics Technician will go to the

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ward as soon as practicable after the patient arrives.

b. The Health Physics Technician will:

(1) Ascertain that the patient's bed is placed in a position that will reduce any unnecessary exposure of adjacent areas.

(2) Mark on the floor a "safe distance" line ~~of 5 mR/hr.~~ C-1

(3) Advise the patient of the potential hazard to visitors who spend too much time in the room. He will take care not to alarm the patient and will emphasize that the treatment has been prescribed for the patient and not the visitors.

(4) Prepare an information packet to be posted near the doorway to the patient's room. This packet will consist of:

(a) A completed WRAMC Form 426, "Radiation Therapy Monitoring Record".

(b) A copy of "Health Physics Aspects of Nursing Care of Radiation Therapy Patients with Sealed Sources" or a copy of the "Health Physics Aspects of Nursing Care of Radiation Therapy Patients with Non-Sealed Sources," as appropriate.

(c) A "CAUTION - RADIOACTIVE MATERIALS" sign.

(5) Place a Health Physics Identification card in the patient's Kardex File.

(6) Return to the ward at least once each day to insure that personnel are maintaining good Health Physics practices.

c. Removal of protective markings.

(1) If the patient was treated with a sealed source, the Health Physics restrictions (signs, etc.) will be removed after the source has been removed.

(2) If the patient was treated with a non-sealed source of radioactive material, all Health Physics restriction will remain in effect until the exposure rate at 1 meter is ~~2 mR/hr or less.~~ INDICATES A "NO RESTRICTION" LEVEL OF ACTIVITY. C-1

(a) The administering physician, as well as the ward officer, should be notified when Health Physics restrictions are removed.

(b) Radioactively-contaminated laundry and waste will be removed from

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the patient's room and the room will be monitored before it is released for normal occupancy.

d. If the patient is not being discharged from the hospital when the residual activity is acceptable, the Health Physics sticker in the Kardex File should be changed to read: "See instructions on reverse side of the "CAUTION - RADIOACTIVE MATERIALS" tag in the patient's chart." This tag should be changed to read: "This patient's body contains no significant quantity of radioactive material. This patient does not warrant any Health Physics precautions except in the following instances:

"(1) In the event of major surgery, notify Health Physics (Ext. 3575/5107) AND the physician who administered the radioactive material. The procedures in APPENDIX 4 (Health Physics Aspects of Surgery and Autopsy) to this ANNEX apply.

"(2) In the event of death, notify Health Physics (Ext. 3575/5107) AND the physician who administered the radioactive material. The procedures outlined in APPENDIX 3 (Death - Health Physics Procedures) to this ANNEX apply."

7. DISCHARGE OF THE THERAPY PATIENT.

a. The US Atomic Energy Commission License for Walter Reed Army Medical Center provides:

(1) Patients receiving radiotherapy with non-sealed Iodine-131 or Gold-198 shall remain hospitalized until the residual activity in the body is ~~30~~ millicuries or less. c-1

(2) Patients containing radioactive implants, except Gold-198 seeds, shall remain hospitalized until the implant is removed.

b. Normally, radiation therapy patients will remain hospitalized until the residual activity in the body is 30 millicuries or less, regardless of isotope.

c. Clearances for discharge of the patient may be obtained from Health Physics (Ext. 3575/5107) or the therapist who administered the material.

d. If the patient is returning to a home where there are young children, an evaluation of the dose to them may be appropriate in determining the discharge date.

e. In no event will a patient be discharged if there is sufficient

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radioactive material remaining in the body to warrant posting of the patient's room with the radiation warning symbol.

ANNEX S (MANAGEMENT OF RADIOACTIVE AND CONTAMINATED PATIENTS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE.

a. To delineate the responsibilities and describe the procedures for management of radioactive and radioactively-contaminated casualties.

b. To prescribe control measures to limit the radiation exposure to the staff treating the radioactive or radioactively-contaminated casualty.

c. To prescribe control measures to limit the spread of radioactive contamination through WRAMC resulting from handling a radioactive or radioactively-contaminated casualty.

d. To provide guidance in the management of radioactive or radioactively-contaminated casualties.

2. APPLICABILITY. This ANNEX is applicable to all individuals and activities at Walter Reed Army Medical Center in the handling of radioactive and/or radioactively-contaminated casualties.

3. DEFINITIONS.

a. A radioactive patient is a patient who is radioactive because of internal deposition of radioactive material or neutron activation of body tissues. If improperly managed, such a casualty could irradiate medical personnel and/or contaminate personnel, equipment and facilities.

b. A radioactively-contaminated patient is an individual who has external contamination on his clothing and/or body. After removal of radioactive contamination, the individual presents no radiation hazard.

4. GENERAL GUIDANCE.

a. Radioactive patients and contaminated patients will receive all necessary medical care and treatment at the earliest practicable time.

b. Radiation fields and radioactive contamination will not deter medical personnel in efforts to save life or limb, although slightly different techniques may be employed (e.g., rotating medical personnel to minimize exposure of any one individual, etc.).

c. Radioactively-contaminated patients will be decontaminated at the earliest opportunity consistent with their medical needs.

d. Every effort will be made to minimize radiation exposure and the spread of contamination during medical treatment.

e. Health Physics will provide a representative to advise on exposure and contamination control at the site of patient treatment. This representative will not impede patient care, but is expected to make recommendations to minimize personnel exposure and avoid the loss of resources due to radioactive contamination.

f. At the earliest possible time consistent with the medical needs of the patient, the attending physician will allow decontamination to begin. Decontamination will be undertaken by paramedical personnel under the direction and guidance of a Health Physics representative.

g. All contaminated clothing, equipment and waste materials will be retained by the Health Physics representative.

h. Contaminated valuables will be accounted for using the DA Form 8-178 (Patient's Deposit Record) in the conventional manner. These valuables will be retained by the Health Physics representative, who will account for them and will undertake to decontaminate them as soon as the situation permits, so that they may be returned to the Hospital Treasurer or the patient. Valuables and personal property of the patient will not be disposed of as contaminated waste without the written consent of the patient.

5. RESPONSIBILITIES.

a. The senior medical officer (or senior individual, in the absence of a medical officer) present at the scene of an accident is responsible to:

(1) Apply first aid to the patient (radiation casualty).

(2) Evaluate the injury of the patient to determine if immediate evacuation is required.

(3) Evaluate the contamination of the patient, if practicable.

(4) Decontaminate the patient before evacuation if the condition of the patient permits, and if such decontamination can be performed without aggravating the injuries.

(5) Employ contamination control measures.

(6) Arrange, undertake, or direct evacuation of the casualty to the

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Attending Surgeon's Office, WRAMC, by the most practical means.

(7) Notify ASO (Ext. 3335) AND Health Physics (Ext. 3575/5107) that a radiation casualty is being evacuated to ASO.

b. The Attending Surgeon will:

(1) Notify Health Physics (Ext. 3575/2276/3481/5104/5107) that a potentially radioactive or radioactively-contaminated casualty is en-route and request a support team.

(2) Undertake treatment of the casualty emphasizing life-saving measures only until the Health Physics team arrives.

(3) Contamination control measures which are appropriate for an Emergency Room are quite similar to isolation techniques employed with a highly contagious patient. The movement of the patient throughout the hospital should be limited as much as possible until decontamination can be undertaken or contamination control measures implemented (e.g., have X-Rays taken in the Emergency Room, etc.).

(4) Exposure control measures under Emergency Room conditions are essentially as follows:

(a) Employ the minimum number of medical personnel necessary to evaluate and treat the patient.

(b) Limit the time individuals spend in the proximity of the casualty to the minimum consistent with his needs.

(c) Keep all nonessential personnel as far away from the patient as practicable.

(d) If the patient is highly radioactive, or contaminated, rotate or replace staff personnel frequently to limit individual exposure. Keep a record of all personnel who attended the patient including the length of time they were near the patient.

c. The Health Physics Officer, WRAMC, is responsible to:

(1) Provide a team, supplies, and equipment to support the care of radioactive or contaminated casualties.

(2) Provide exposure control and monitoring of staff personnel attending the casualty.

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(3) Advise, direct or conduct decontamination of the casualty at the earliest time consistent with medical needs of the patient.

(4) Direct contamination control measures to limit the spread of contamination throughout the hospital.

(5) Survey the hospital areas for radioactive contamination.

(6) Advise on decontamination of hospital areas as early as possible following treatment of the casualty.

(7) Notify the members of the Subcommittee for Medical Evaluation of Radiation Workers of the WRAMC Radioisotope Committee of the radioactive or radioactively-contaminated casualty and assemble them so that they may make appropriate recommendations regarding the medical management of the casualty and parameters to be examined on a suspected or actual overexposure. Reference WR 40-19 (Radioisotope Committee).

(8) Notify the Public Affairs Officer (Ext. 2131) promptly of the incident and provide updated information periodically. Reference WR 360-4 (Nuclear Accidents and Incidents).

(9) Make appropriate reports to the Surgeon General, the Atomic Energy Commission, and other agencies in accordance with pertinent directives.

(10) Make a prompt investigation of the incident.

(11) Prepare and submit necessary reports of the incidents.

6. Specific guidance on the management of a radioactive or radioactively-contaminated patient to minimize exposure of the staff or the spread of contamination depends on the prevailing situation. Such guidance will be developed on the scene by the Health Physics representative. The recommendations of this representative should be heeded whenever possible, since radioactive contamination can necessitate very costly decontamination operations and result in the loss of facilities for many days.

7. Reference: NCRP Report Number 37 (Precautions in the Management of Patients Who Have Received Therapeutic Amounts of Radionuclides).

ANNEX T (HEALTH PHYSICS WORK PERMITS)
to WR 40-10 (Health Physics Regulations)

1. GENERAL. Health Physics Work Permits, WRAMC Form 697, provide researchers, experimenters, repairmen, maintenance men, and other personnel special instructions and/or clearance to accomplish specific tasks while minimizing the risk to themselves and others from radiological hazards.

2. SPECIFIC.

a. This permit is required before personnel may perform:

(1) Repair and maintenance operations on, with, or in equipment and/or areas specifically posted.

(2) Special work with radioactive material (e.g., welding, brazing, grinding, etc.) except where the personnel are working under the conditions and provisions already specified in WRAMC Radioisotope Authorizations to Use Radioactive Material.

b. In addition, Health Physics Work Permits shall be issued upon request of users for written control procedures, or whenever the Health Physics Officer considers it necessary to amplify or supplement current published Health Physics procedures and regulations.

c. The Health Physics Officer will post equipment and areas as follows:

(1) Equipment containing radioactive material (plumbing fixtures, ventilation stacks, fume hoods, radioactive waste disposal sinks, etc.) will be posted with a sign stating, "Approval of the Health Physics Officer is required before any maintenance or repair of this item is started."

(2) Areas including radiation control areas and other areas selected by the Health Physics Officer will be posted with a sign stating, "Occupancy of this area by maintenance personnel is prohibited without a Health Physics Work Permit, WRAMC Form 697."

d. Except in cases of emergency, Work Permits will be submitted to Health Physics in duplicate, giving the description, location, and time the work is to be accomplished. The duplicate copy, returned by Health Physics, will specify necessary control measures and/or restrictions.

e. Arrangements to handle emergency situations which require the

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Health Physics Work Permit can be handled by telephone or personal notification to the appropriate Health Physics Section:

<u>Location of Work</u>	<u>Health Physics Telephone Extension</u>
WRAMC	3575 or 5107
WRAIR	3481 or 5107
AFIP	2276 or 5107
DORF	5168 or 5107

ANNEX U (CONTAMINATION CONTROL AND DECONTAMINATION PROCEDURES)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To delineate responsibilities relating to contamination control and decontamination procedures at WRAMC.
2. RESPONSIBILITIES.
 - a. Health Physics is responsible for control of radioactive contamination and supervision of decontamination procedures.
 - b. Each Principal User is responsible for assisting Health Physics in the accomplishment of their mission by:
 - (1) Controlling contamination within his area of responsibility.
 - (2) Reporting all spills, releases, accidents, incidents, or unusual occurrences involving radioactive material promptly, so that contamination control may be initiated.
 - (3) Providing the resources for decontamination operations.
 - c. In general, the individual who causes contamination to occur performs the decontamination required. In cases where adequate resources are not available to perform the decontamination, the Health Physics Officer will, upon request, coordinate with other activities to secure the needed resources.
3. The contamination limits prescribed by Department of the Army are shown in the APPENDIX (Permissible Levels of Radioactive Contamination) to this ANNEX.
4. GENERAL. Air or water that contains radioactive material in excess of the concentrations specified in Appendix B, Table II, 10 CFR 20, shall be considered to be contaminated and shall be controlled and disposed of in accordance with the instructions of the Health Physics Officer.
5. Methods of controlling contamination which may be employed to minimize the spread of radioactive contamination include:
 - a. Use of personal protective clothing and devices, such as rubber or plastic gloves, laboratory coats, shoe covers, head covers, face masks, respirators, etc.
 - b. Providing and frequently using an exposure rate meter capable of detecting and monitoring contamination from the radioisotope(s) in use.

- c. Using separate, specially-marked radioactive waste containers.
 - d. Limiting traffic and occupancy of work areas where radioactive materials are in use.
 - e. Patterning work flow and procedures to minimize transfers and manipulations of radioactive material.
 - f. Conducting procedures which generate radioactive aerosols, dusts, or gaseous products in fume hoods, glove boxes, or other suitable closed systems.
 - g. Designating and posting of contaminated and potentially contaminated areas during procedures which are likely to produce contamination.
 - h. Covering working surfaces with polyethylene and absorbent disposable material.
 - i. Using trays capable of containing a total spill of liquid radioactive material under experiments of this type.
 - j. Using double containers for vessels of radioactive materials which are easily upset, e.g., volumetric flasks.
 - k. Using polyethylene bags to contain waste and to line waste containers. If Tritium is used, the polyethylene should be replaced by or contained in kraft paper bags, since Tritium easily penetrates polyethylene and is retarded by paper.
 - l. Avoiding the use of house vacuum lines with radioactive materials.
 - m. Rigorously posting cabinets, refrigerators, ovens, etc., where radioactive material is used, so that all personnel will be advised of its presence. When the item is not used exclusively for radioactive material, the radioactive material should be separated from the other contents and conspicuously posted.
 - n. Establishing control points outside contaminated areas where personnel will monitor themselves for contamination with a suitable instrument before leaving the area.
 - o. Promptly cleaning up and monitoring all spills of radioactive material.
6. Decontamination methods are many and varied. The Health Physics Officer will supervise and advise on decontamination procedures.

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a. Personnel Decontamination.

(1) Individuals with contaminated clothing should remove their clothing at the earliest opportunity.

(2) Decontamination of the skin should be attempted promptly after discovery of contamination. The skin should be washed thoroughly and repeatedly with a mild soap or detergent worked to a good lather with a soft brush. Care should be taken not to abrade the skin.

(3) Special decontamination of individuals beyond that described above will be under the supervision of Health Physics.

b. Surface decontamination will be undertaken only by personnel who are wearing protective gloves and, in some cases, protective clothing. Material used in decontamination will be disposed of as radioactive waste in accordance with instructions received from Health Physics.

7. HANDLING OF CONTAMINATED LAUNDRY.

Contaminated clothing and bedding will be collected by Health Physics personnel at the site of the contamination and taken for decontamination or disposal.

PERMANENTLY FIXED AND REMOVABLE CONTAMINATION LEVELS

Contamination items and indications for action	Contamination level				Method of measurement	
	Fixed or removable	Alpha		Beta-gamma		
		DPM per 100 cm ²	DPM per 100 cm ²	mc/hr @ 1 in.		DPM per 100 cm ²
1. Clothing, including shoes						
a. Personal. Should be replaced, decontaminated or stored for decay if above.	Both	200	.....	0.2	.....	Probe
b. Protective						
(1) General. Should be replaced and/or decontaminated if above.	Both	1,000	.....	2.0	.....	Probe
(2) Laundry. Should not be released to public laundry if above.	Both	200	.....	0.4	.....	Probe
(3) Respirators. Should be decontaminated after use if above.	F R	200 .....	..... None	*1.0 .....	..... None	Probe ** Smear.
2. Containers. Prior to nonradiation use, should be decontaminated if above.	F R	200 .....	..... None	0.2 .....	..... None	Probe Smear.
3. Laboratories and Work Areas						
a. Nonradiation areas. Require posting or decontamination if above.	F R	600 .....	..... 30	0.25 .....	..... 100	Probe Smear
b. Fixation. Required if decontamination not possible and periodic check of fixation, if above.	F R	1,000 .....	..... 200	2.0 .....	..... 200	Probe Smear.
4. Skin						
a. Body. Continue decontamination if above.	F R	200 .....	..... None	0.06 .....	..... None	Probe Smear
b. Hands. Continue decontamination if above.	F	400	.....	0.3	.....	Probe
5. Vehicles						
a. Use in radioactive area. Should not be above.	F R	1,000 .....	..... 300	2.0 .....	..... 1,000	Probe Smear
b. Used in nonradiation area. Should not be above.	F R	500 .....	..... 50	0.4 .....	..... 500	Probe Smear

F -- Fixed R -- Removable

* At contact with any surface of the mesh.

** Smears Analyzed with a calibrated reader.

ANNEX V (HEALTH PHYSICS ASPECTS OF FIRE FIGHTING)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE: To prescribe general measures to be followed to minimize radiological hazards associated with fire protection.

2. FIRE PREVENTION.

a. Whenever possible, flammable materials will not be stored with radioactive materials. When flammable materials must be stored in conjunction with radioactive materials, the manner of storage will be coordinated with the WRAMC Fire Prevention Branch (Ext. 3318 at Main Post, or 5317 at Forest Glen) to insure that the fire hazard is minimized.

b. Every effort will be made by the user to eliminate fire hazards within his area of responsibility.

c. During routine inspections by fire prevention personnel, the location of radioactive material will be made known to the inspector. The "CAUTION - RADIOACTIVE MATERIALS" warning which is to be posted on containers and rooms in accordance with instructions contained in ANNEX D to these Regulations will assist in meeting this requirement.

3. FIRE FIGHTING. Whenever firemen respond to a call in an area posted "CAUTION - RADIOACTIVE MATERIALS", the following protective measures will be employed to minimize radiological hazards:

a. Firemen will wear self-contained breathing apparatus, protective coat and boots.

b. Firemen will use survey instruments provided for this purpose (See the APPENDIX to this ANNEX).

c. Health Physics (Ext. 5107) will be notified that there is a fire in a posted area.

d. Personnel will stay in the area the shortest period of time necessary to accomplish the fire-fighting mission. Firemen will avoid unnecessary contact with equipment, opening of containers, or handling of debris.

e. Personnel who have entered the area will remain in the vicinity until surveyed and released by Health Physics personnel. This measure is prescribed to avoid unnecessary spread of radioactive contamination. In the event of personal injury, the provisions of ANNEX W to these Regulations will be followed in lieu of this provision.

4. SPECIAL CONSIDERATIONS.

a. During fire fighting in areas where large radioactive sources are located (e.g., animal irradiators, teletherapy unit, calibration unit, etc.), every effort will be made to cool the source with a stream of water if the heat of the fire might cause the lead shielding to melt. When the lead shielding melts, it may escape or change shape in such a way that a serious radiation hazard could result.

b. Reactor Radiation Alarms.

(1) There is a Radiation Alarm at the DORF Reactor. If the alarm is ringing, the firemen should be especially alert for radiation. Since the alarm is electrically operated, it may be ringing because of a fire-produced malfunction.

(2) The fact that the Radiation Alarm is not ringing does not necessarily mean that there is no radiation hazard. The fireman should always use a high range exposure ratemeter.

c. Health Physics will conduct classes for the Fire Department at least annually regarding the use of radiological survey instruments and radiological hazards associated with fire protection.

APPENDIX (INSTRUCTIONS TO FIREMEN) to ANNEX V (HEALTH PHYSICS ASPECTS OF FIRE FIGHTING)

1. RADIAC INSTRUMENTS:

a. The WRAMC firemen are provided the following radiac equipment:

(1) Two (2) high-range exposure ratemeters.

(2) One (1) Beta-Gamma film badge per man.

(3) Six (6) Radiacmeters (IM-147 or equivalent).

(4) One (1) PP-1578 Radiacmeter Charger or equivalent.

b. Each fireman shall wear his film badge while on duty and shall leave it in a designated place in the Fire Station while he is off duty.

c. The high-range exposure ratemeters, IM-147 or equivalent, and the PP-1578 shall be kept in a box in the Fire Station and taken to fires that are reported to be in or adjacent to Radiation or Reactor Areas.

d. Personnel from Health Physics will periodically check the operation of radiac equipment.

e. The high-range exposure ratemeter shall be turned in to Health Physics quarterly for recalibration. Replacement instruments will be issued by Health Physics for interim use by the Fire Department.

2. NOTIFICATION OF HEALTH PHYSICS. In the event of fire in a Radiation Area, Reactor Area, or where a Radioactive Material warning sign is posted, notify Health Physics (Ext. 5107).

3. USE OF HIGH-RANGE EXPOSURE RATEMETER.

a. Prior to use of the high-range exposure ratemeter, it should be checked to insure proper battery function and calibration in accordance with the instruction sheet in the storage box.

b. The instrument should be ON for at least 30 seconds before use under normal temperatures (50-100⁰ F) and for one (1) minute if the temperature is below 50⁰ F.

c. Before arrival at the area, the instrument should be turned on to the lowest scale.

d. The areas within Radiation or Reactor Areas known to be near

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sources of radiation should be monitored first. If the situation permits, the radiation source should be removed or protected from fire damage.

e. The instrument should be used as a guide so that radiation areas may be avoided in searching for survivors.

f. If the exposure rate is greater than 100 mR/hr, firemen shall not enter the area, except to save life, unless an officer from Health Physics, WRAMC, is present.

4. USE OF IM-147/PD AND PP-1578.

a. The IM-147/PD is charged to a zero reading by use of the PP-1578.

b. At the scene of the fire, the IM-147/PD should be read and a mental note made of the reading, if it is other than zero.

c. While engaged in lifesaving operations, or operations under the advice of the Health Physics Officer, read the IM-147/PD as often as the situation permits, so that your actions may be governed by the exposure limit that has been established.

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ANNEX W (RADIOLOGICAL EMERGENCIES)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE.

a. The primary purpose of this ANNEX is to insure that an individual who is known or suspected to have been involved in a radiation accident and/or incident that could have resulted in an internal and/or external exposure to ionizing radiation receives proper medical care, and that the possible radiation exposure is evaluated.

b. A secondary purpose of this ANNEX is to insure that the source of the accidental radiation exposure is contained, so that further exposure of personnel will be controlled.

2. GENERAL GUIDANCE.

a. It is assumed that radioactive material will be handled by qualified persons and in accordance with existing regulations and policies. It is expected that this ANNEX will be interpreted by those persons in the light of their knowledge of the relative radiotoxicity of the various radioactive materials (radionuclides) in their possession.

b. A radiation accident may be defined as an unforeseen occurrence, either actual or suspected, involving exposure or contamination of humans and the environment by ionizing radiation. The accident will be considered as occurring over a short period of time, from seconds up to several days. Chronic occupational or other long-term exposure will not be considered.

c. There are two ways in which humans can be exposed to ionizing radiation:

(1) External. The source of ionizing radiation may be outside of the body, so that the radiation strikes the individual and is absorbed, depending upon its physical characteristics. Radiation from X-ray generators, particle accelerators, sealed sources of radionuclides and reactors are examples of this type. The radiation may be beta, gamma, or neutrons. Alpha emitters present no significant external hazard. Particle accelerators may produce other particles such as deuterons, mesons, etc. All persons who are known or suspected to have been externally exposed to an acute dose (within a twenty-four (24) hour period) in excess of:

(a) Whole body, head and trunk, active blood-forming organs, gonads or lens of the eye -- 3 rem.

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(b) Skin of the whole body and thyroid -- 10 rem.

(c) Hands and forearms, feet and ankles -- 30 rem.

shall be reported immediately to the Health Physics Officer, WRAMC (Ext. 5107).

(2) Internal. The source of ionizing radiation may gain entrance into the human body by inhalation, ingestion, injection or absorption through the intact or injured body surface. Radionuclides may also be formed within the body following exposure to an external source of neutrons. All persons who are known or suspected to have been internally exposed to radioactive material shall be reported to the Health Physics Officer, WRAMC.

(3) Suspected exposures to levels shown shaded in the bar chart, (See the APPENDIX to this ANNEX) should follow the procedures in 3-c below. Suspected exposures to levels shown unshaded in the bar chart should follow applicable procedures in 3-d and 3-e below.

3. In the event of an emergency, the most senior knowledgeable individual present will assume control of the situation and direct activities until relieved by proper authority. The exact actions and sequence of actions to be taken will be determined by the nature of the emergency. The following actions are typical responses to emergency situations (The sequence of these actions is highly variable.):

a. Restrict personnel associated with the emergency to a controlled safe area in the vicinity of the emergency to insure their availability and to limit the spread of contamination.

b. Call the Fire Department, if necessary.

(1) Main Section -- Ext. 3317

(2) Forest Glen -- Ext. 5317.

c. Minor spills involving little radiation hazard to personnel.

(1) Notify all other persons in the room at once.

(2) Permit only the minimum number of persons necessary to deal with the spill into the area.

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- (3) Confine the spills immediately.

Liquid spills:

Don protective gloves. Drop absorbent paper on spill.

Dry spills:

Don protective gloves. Dampen the spill thoroughly taking care not to spread the contamination. (Note: Water should generally be used except where chemical reaction with water would generate air contaminant. Oil should then be used.)

- (4) Decontaminate.

- (5) Notify Health Physics as soon as possible.

- (6) Monitor all persons involved in the spill and cleaning.

d. Major spills involving radiation hazard to personnel.

- (1) Notify all personnel not involved in the spill to vacate the area at once.

- (2) If spill is liquid, and the hands are protected, right the container.

- (3) If the spill is on the skin, flush thoroughly.

- (4) If the spill is on clothing, discard outer or protective clothing at once.

- (5) Switch off all fans. Do not turn off fume hoods.

- (6) Vacate the room.

- (7) Notify Health Physics at once.

- (8) Take immediate steps to decontaminate personnel involved, as necessary.

- (9) Decontaminate the area (Personnel involved in decontamination must be adequately protected).

- (10) Monitor all persons involved in the spill and cleaning to determine adequacy of decontamination.

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(11) Permit no person to resume work in the area until a survey is made and approval of Health Physics is secured.

e. Accidents involving radioactive dusts, mists, fumes, organic vapors and gases.

(1) Notify all other persons to vacate the room immediately.

(2) Hold breath and close escape valves, switch off fans, except fume hoods, if time permits.

(3) Vacate the room.

(4) Notify Health Physics at once.

(5) Ascertain that all accesses to the room are closed and post conspicuous warnings or guards to prevent accidental opening of doors.

(6) Report at once all known or suspected inhalations of radioactive materials.

(7) Evaluate the hazard and the necessary safety devices for safe re-entry.

(8) Determine the cause of contamination and rectify the condition.

(9) Decontaminate the area.

(10) Permit no person to resume work in the area until a survey is made and approval of Health Physics is secured.

f. Injuries to personnel involving radiation hazard.

(1) Wash minor wounds immediately, under running water, while spreading the edges of the gash.

(2) Render first aid

(a) Stop bleeding

(b) Restore breathing

(c) Protect from shock

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g. Evacuate casualties requiring immediate emergency medical aid to ASO by the most practical and expedient means consistent with the medical needs of the patient.

(1) Remove outer clothing of patient, if contaminated with radioactive material.

(2) Secure the person's film badge and place it in a labeled envelope.

(3) Wrap every patient evacuated in a blanket, sheet, plastic, etc., (except for the face) to contain any contamination.

(4) Notify ASO (Ext 3305/3401) that a contaminated patient is en-route, giving an estimated time of arrival at ASO, and advise the Attending Surgeon of all facts relating to the individual's radiation exposure.

(5) Accompany the exposed persons to the ASO, WRAMC.

h. Notify Health Physics of the emergency and advise whether any patients have been evacuated to ASO.

<u>LOCATION</u>	<u>DUTY HOURS</u>	<u>IF BUSY OR NO ANSWER</u>	<u>AFTER HOURS</u>
WRAMC	3575	2276/3481	5107
WRAIR	2276	3481	5107
AFIP	2276	3481	5107
MDW (IDS 198)	2276	3481/5107	5107
Forest Glen	5107	5104/5268	5107

4. Health Physics will respond to all radiological emergencies and will:

a. Provide technical advice as necessary.

b. Furnish additional resources (personnel, supplies, and equipment).

c. Supervise the reduction of radiological hazards.

d. Monitor the persons who were in the vicinity of the accident if there is a reasonable probability that they may have been exposed and/or contaminated.

e. Take action to prevent further contamination of personnel and equipment.

f. Make and/or coordinate all appropriate follow-up measures, reports, investigations, etc.

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5. To insure the proper treatment of patients who may have been exposed to ionizing radiation, the provisions of WRAMC Letter, MEDEC-YHP, 18 Sept 73, Subject: Management of Radioactive and Contaminated Emergency Patients, will be followed. This letter will be posted in the WRAMC Emergency Room, all dispensaries, and clinics which would receive emergency patients.

6. NUCLEAR REACTOR EMERGENCIES. Reactor operations shall be performed with close attention to controlling and minimizing exposures from radioactive materials, including induced radioactivity and otherwise.

a. The Health Physics Officer, in conjunction with the reactor staff, will develop plans and procedures in accordance with applicable regulations to insure the health and safety (as pertains to ionizing radiation) of operating personnel, other on-site personnel, or off-site personnel.

b. All persons who are assigned to the reactor for duty or training, and those persons who routinely respond to reactor emergencies, shall be given periodic training in established emergency procedures.

c. Persons who are authorized to conduct experiments in the reactor unaccompanied by members of the reactor staff shall be given instructions on the proper procedures to take in the event of a reactor emergency.

d. Records and reports of reactor emergencies shall be made in accordance with applicable regulations.

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APPENDIX TO ANNEX W

Hazards from absorption into the body.

Group 1. Very High Hazard.

10µc 100µc 1mc 10mc 100mc 1c 10c

Low Level	Medium Level	High Level
*Pb ²¹⁰ , Po ²¹⁰ , *Ra ²²⁶ , *Ra ²²⁸ , Ac ²²⁷ , Th ²²⁸ , Th ²³⁰ , Np ²³⁷ , Pu ²³⁸ , Pu ²³⁹ , Pu ²⁴⁰ , Pu ²⁴¹ , Pu ²⁴² , *Am ²⁴¹ , Cm ²⁴²		

Group 2. High Hazard.

10µc 100µc 1mc 10mc 100mc 1c 10c

Low Level	Medium Level	High Level
*Na ²² , Ca ⁴⁵ , *Sc ⁴⁶ , *Co ⁶⁰ , Sr ⁹⁰ , *Ru ¹⁰⁶ , I ¹²⁹ , *I ¹³¹ , *Cs ¹³⁷ , *Ce ¹⁴⁴ , *Eu ¹⁵⁴ , *Ta ¹⁸² , Bi ²¹⁰ , At ²¹¹ , Ra ²²⁴ , U ²³³		

Group 3. Medium Hazard.

10µc 100µc 1mc 10mc 100mc 1c 10c

Low Level	Medium Level	High Level
C ¹⁴ , *Na ²⁴ , Si ³¹ , P ³² , S ³⁵ , C ¹³⁶ , *K ⁴² , Sc ⁴⁷ , *V ⁴⁸ , *Cr ⁵¹ , *Mn ⁵⁶ , *Mn ⁵⁶ , Fe ⁵⁵ , *Cu ⁶⁴ , *Zn ⁶⁵ , *Ga ⁷² , *As ⁷⁶ , *Rb ⁸⁶ , Sr ⁸⁹ , Y ⁹⁰ , Y ⁹¹ , *Zr ⁹⁵ , *Nb ⁹⁵ , *Mo ⁹⁹ , *Ru ¹⁰³ , *Rh ¹⁰⁵ , Pd ¹⁰³ , Ag ¹⁰⁵ , Ag ¹¹¹ , *Cd ¹⁰⁹ , *Sn ¹¹³ , *Te ¹²⁷ , *Te ^{129m} , *Ba ¹⁴⁰ , *La ¹⁴⁰ , Pr ¹⁴³ , Pm ¹⁴⁷ , Sm ¹⁵¹ , *Ho ¹⁶⁶ , *Tm ¹⁷⁰ , *Lu ¹⁷⁷ , *Re ¹⁸³ , *Ir ¹⁹⁰ , Ir ¹⁹² , *Pt ¹⁹¹ , *Au ¹⁹⁶ , *Au ¹⁹⁹ , *Tl ²⁰⁰ , *Tl ²⁰¹ , Tl ²⁰² , Tl ²⁰⁴ , *Pb ²⁰³ , Rn ²²⁰ , *Rh ²²² , U ²³⁵		

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Group 4. Low Hazard.

10 μ c 100 μ c 1mc 10mc 100mc 1c 10c

Low Level	Medium Level	High Level
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H³, *Be⁷, C¹⁴, Ni⁵⁹, Zn⁶⁹, Ge⁷¹, U²³⁸, Natural Thorium, Natural Uranium, Noble Gases.

*Emits gamma radiation in significant amounts

For information on any isotope not listed contact Health Physics Office.

Note: All personnel are cautioned that in addition to the radiological hazard associated with the above listed isotopes many of these isotopes, especially the heavy metals, are also extremely toxic and proper laboratory handling procedures should be used at all times.

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ANNEX X (HEALTH PHYSICS SUPPORT AFTER DUTY HOURS)
to WR 40-10 (Health Physics Regulations)

1. PURPOSE. To describe the Health Physics support capabilities available after duty hours and the procedures to be followed to obtain this support.

2. RESPONSIBILITIES.

a. The Health Physics Officer will:

(1) Develop procedures for notification of Health Physics personnel when Health Physics support is required after duty hours.

(2) Advise all users of radiation-producing devices and radioisotopes, Duty Officers, Fire Department, and Military Police of the method of contacting Health Physics personnel after duty hours.

(3) Provide, in easily accessible locations, stocks of emergency supplies and survey instruments which may be needed in the event of radiological emergency.

b. Military Police will:

(1) Monitor Extension 5107 after duty hours.

(2) Contact Health Physics personnel in the event of any requirement for after duty hours support in accordance with the procedures developed by Health Physics.

(3) Contact Health Physics in the event of burglary, vandalism, etc., in any area marked as containing radioactive materials.

(4) Receive shipments of radioactive materials arriving after duty hours at the Forest Glen Military Police Station and store them in the designated areas in the Health Physics Bunker (Bldg. 149A). **CONTACT HEALTH PHYSICS IF ANY SHIPMENT APPEARS TO HAVE BEEN DAMAGED.**

c. The Fire Department will:

(1) Notify Health Physics of any fires in areas marked as containing radioactive materials.

(2) Follow precautionary procedures for fire fighting in areas marked as containing radioactive materials (See ANNEX V to these Regulations).

d. Administrative Officers of the Day for WRAMC will seek the advice

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and assistance of Health Physics on matters relating to radioactive material when necessary.

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APPENDIX 1 (HEALTH PHYSICS INSTRUCTION TO MILITARY POLICE)
to ANNEX X (HEALTH PHYSICS SUPPORT AFTER DUTY HOURS)

1. GENERAL.

a. Since the WRAMC Military Police are not supplied with radiac instruments, they should not enter areas that are posted as Radiation Areas unless Health Physics personnel are present.

b. Military Police should recognize the Radiation Area and High Radiation Area signs and know the significance of the signs.

c. They should know how to contact Health Physics.

d. The principle role of the Military Police in radiological emergencies is to control crowds and traffic.

2. MILITARY POLICE RESPONSE TO DORF ALARMS.

a. Remote readouts and alarms from the Diamond Ordnance Radiation Facility (DORF) are installed in the Forest Glen Military Police Station. When any of these alarms are actuated, the following procedures should be followed:

(1) Press reset button.

(2) If alarm resets, note the occurrence and make no phone calls.

(3) If the alarm cannot be reset, determine which alarm is sounding and proceed as follows:

(a) Radiation Alarm.

1 Notify Health Physics in the usual manner.

2 Notify one of the DORF officials listed on the DORF Emergency Card.

(b) Fire Alarm.

1 Notify the Fire Department.

2 Notify Health Physics.

3 Notify one DORF Official from the DORF Emergency Card.

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4 Follow normal procedures for Military Police in event of fire. Do not enter or approach the building without the approval of the Fire Department or Health Physics, both of whom will have radiac instruments.

c. Burglar Alarm.

1 If the Radiation Alarm does not sound, follow normal Military Police procedures for burglary.

2 Notify one DORF Official from the DORF Emergency Card.

3 DO NOT notify Health Physics unless the Radiation Alarm sounds.

(d) Overflow Alarm.

1 Notify one DORF Official from the DORF Emergency Card.

2 Make no other notifications unless requested to do so.

(e) Power Failure Alarm.

1 Notify one DORF Official from the DORF Emergency Card.

2 Make no other notifications unless requested to do so.

3 Stand by the DORF gate until power is restored. This is to provide physical security and fire watch since the alarm system will be inoperable.

4 If personnel restoring power detect a radiation hazard proceed as if a Radiation Alarm had sounded (para 2a(3)(a) above).

3. MILITARY POLICE NOTIFICATION OF HEALTH PHYSICS.

a. During Duty Hours, call Ext. 5107/5104/5268 for Health Physics Support.

b. If Health Physics Support is required after Duty Hours, or emergency calls are received on Ext. 5107, contact one individual listed on the Health Physics Notification Roster and allow each telephone number reached to ring ten (10) times before going on to the next individual. Senior Personnel are listed in order of the closeness of their residence to WRAMC. It is desirable to contact individuals at the top of the list, if possible.

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APPENDIX 2 (INSTRUCTIONS TO DUTY OFFICERS)
to ANNEX X (HEALTH PHYSICS SUPPORT AFTER DUTY HOURS)

1. Health Physics support may be obtained at any time by calling Ext. 5107 and requesting a Health Physicist.
2. Any matter relating to radiation safety or a radiological emergency (e.g., radiation exposure, release of radioactive material, fire with radioactive materials present, spills, or radioactive contamination, etc.) should be referred to Health Physics for appropriate action.
3. Incoming shipments of radioactive material which arrive after duty hours will be delivered to the Forest Glen Military Police, who are provided proper storage accommodations for this material.

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APPENDIX 3 (INSTRUCTIONS TO HEALTH PHYSICS PERSONNEL) TO ANNEX X (HEALTH PHYSICS SUPPORT AFTER DUTY HOURS)

1. MAINTENANCE AND CALIBRATION OF EMERGENCY EQUIPMENT.

a. The following Sections of WRAMC Health Physics will each maintain a cache of supplies and equipment to meet the potential emergency needs in that area.

- (1) DORF Health Physics Section.
- (2) WRAIR, AFIP, and MDW Health Physics Section.
- (3) WRAMC (Hospital) Health Physics Section.

b. An inspection of each Emergency Cache will be conducted periodically by the responsible Section. Remedial action will be taken by the inspector to correct any deficiencies noted.

c. The Health Physics Nuclear Instrument Repairmen have the following responsibilities:

- (1) Quarterly calibration of all portable radiation survey instruments, to include testing and/or replacement of batteries, as needed.
- (2) Semiannual calibration of all dosimeters currently in use and/or stored as emergency equipment (TB 750-242-3).
- (3) Performance of maintenance, as required, on all Health Physics instrumentation.
- (4) Maintenance of orderly records to indicate that the above requirements have been met.

2. EMERGENCY NOTIFICATION AFTER DUTY HOURS. The Military Police at Forest Glen monitor Ext. 5107 after duty hours. They are provided with a Health Physics Notification Roster for the purpose of securing Health Physics support upon request from any individual. They are instructed to notify one individual from the Roster. The individual receiving the call shall:

- a. Evaluate the request.
- b. Direct any action which must be taken prior to his arrival.
- c. Report promptly to WRAMC, secure needed emergency equipment, and

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report to the scene.

- d. Take such actions as are necessary.
- e. Call in, or have the Military Police call in, additional personnel, if necessary.
- f. Notify an officer of the Health Physics Office of serious problems, extensive contamination, overexposures, releases of radioactive material, etc.
- g. Maintain an informal log of events.
- h. Prepare a written report of the incident.

3. EMERGENCY SITUATIONS. In emergency situations, the Health Physics Officer may summon all military members of Health Physics to report to duty. Each member shall report promptly to Building 188, Forest Glen Section, unless instructed otherwise. He will put on a yellow Health Physics work coat or coveralls so that he may be readily identified at the accident area. He will wear his film badges and one each 0-200 mR, 0-50 R and 0-600 R dosimeter. He will equip himself with an appropriate survey instrument and a protective mask or self-contained breathing apparatus for his personal use.

4. The Health Physics Officer at the scene of the emergency will designate personnel to insure that film badges and other appropriate personnel dosimetry are distributed to those individuals requiring them. He will also insure that logs are maintained indicating to whom the dosimeter was issued (e.g., film packet number and/or dosimeter serial number), and the amount of exposure received by individuals wearing dosimeters.

5. Health Physics personnel will monitor emergency personnel and advise them concerning radiation hazards, but they shall not authorize exposures. Such authorization is a Command responsibility.

APPENDIX 4 (INSTRUCTIONS TO PRINCIPAL USERS)
to ANNEX X (HEALTH PHYSICS SUPPORT AFTER DUTY HOURS)

1. To minimize the possibility and severity of radiological emergencies, the following measures are strongly recommended.

a. At the end of the day, the equipment or material should be secured in order to protect janitorial, security and other personnel from inadvertent exposure.

b. All potentially hazardous sources of radiation should be labeled with caution signs.

c. Auxiliary equipment that may be contaminated, such as sinks, fume hoods, or working surfaces, should be posted with the appropriate sign.

d. Areas in which there is a radiation field should be posted appropriately.

e. Caution signs should be required when conditions are such that a person should not habitually occupy the area.

f. If the radiation level is so high that a worker should not remain in the area for more than one (1) hour, very strict controls should be established.

g. A security, fire and safety check should be performed in each area in which radioactive material is used or stored as a routine matter at the close of each day.

h. Radiation sources should be stored in such a manner that emergency or repair personnel would not receive a significant exposure under conditions short of disaster.

2. Health Physics support after duty hours may be obtained at any time by calling Ext. 5107 and requesting a Health Physicist.

3. Radiological emergencies are to be managed in accordance with ANNEX W to these Regulations.