NRC FORM 313M (8-86) 10 CFR 35	U.S. NUCLEAR REGULATORY COMMISSION APPLICATION FOR MATERIALS LICENSE – MEDICAL	Approved by OMB 3150-0041 Expires 6-30-89

INSTRUCTIONS – *Complete Items 1 through 26 if this is an initial application or an application for renewal of a license. Use supplemental sheets where necessary. Item 26 must be completed on all applications and signed. Retain one copy. Submit original and one copy of entire application to : Director, Office of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Upon approval of this application, the applicant will receive a Materials License. An NRC Materials License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Parts 19, 20 and 35 and the license fee provision of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 26 and the appropriate fee enclosed.*

1.a. NAME AND MAILING ADDRESS OF APPLICANT *(institution, firm, clinic, physician, etc.)* INCLUDE ZIP CODE	1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED *(If different from 1.a.)* INCLUDE ZIP CODE
Department of the Army Walter Reed Army Medical Center Washington, D.C. 20307-5001 TELEPHONE NO.: AREA CODE (301) 427 5104	NO CHANGE
2. PERSON TO CONTACT REGARDING THIS APPLICATION Gerald M. Connock, MAJ, MS Health Physics Officer, WRAMC TELEPHONE NO.: AREA CODE (301) 427 5104	3. THIS IS AN APPLICATION FOR: *(Check appropriate item)* a. ☐ NEW LICENSE b. ☐ AMENDMENT TO LICENSE NO. c. ☒ RENEWAL OF LICENSE NO. 08-01738-02
4. INDIVIDUAL USERS *(Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)* Individuals approved by the Radiation Control Committee, Walter Reed Army Medical Center	5. RADIATION SAFETY OFFICER (RSO) *(Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.)* Gerald M. Connock, MAJ, MS, Ref: AR 40-14 and 40-37, The Health Physics Officer will be appointed by the Commanding General, WRAMC. (See Item 7).

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE NO CHANGE

RADIOACTIVE MATERIAL LISTED IN:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
10 CFR 31.11 FOR IN VITRO STUDIES		
10 CFR 35.100, SCHEDULE A, GROUP I		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP II		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP III		
10 CFR 35.100,SCHEDULE A, GROUP IV		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI		

ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM		
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES		
PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
GOLD-198 AS COLLOID FOR INTRA-CAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA		
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.		

6.b. RADIOACTIVE MATERIAL FOR USES NOT LISTED IN ITEM 6.a. *(Sealed sources up to 3 mCi used for calibration and reference standards are authorized under Section 35.14(d), 10 CFR Part 35, and NEED NOT BE LISTED.)*

ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	MAXIMUM NUMBER OF MILLICURIES OF EACH FORM	DESCRIBE PURPOSE OF USE
Sulfur-35	Any	1000	Medical research and development as defined in Section 30.4, Title 10, Code of Federal Regulations, Part 3 and Human Use as defined in Section 35.3, Title 10, Code of Federal Regulations, Part

KKL 4

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

For Items 7 through 23, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the medical licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10.8 , Rev. _____ Date: _____

7. MEDICAL ISOTOPES COMMITTEE See Encl-Tab B		15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL *(Check One)* See Encl Tab C, Chpt 4	
X	Names and Specialties Attached; and		Appendix G Rules Followed; or Tab D, Cond #3
	Duties as in Appendix B; or *(Check One)*	X	Equivalent Rules Attached
X	Equivalent Duties Attached	16. EMERGENCY PROCEDURES *(Check One)* See Encl Tab D Cond #6	
8. TRAINING AND EXPERIENCE See Encl-Tab C			Appendix H Procedures Followed; or
	Supplements A & B Attached for Each Individual User; and Chpt 3	Y	Equivalent Procedures Attached
	Supplement A Attached for RSO.	17. AREA SURVEY PROCEDURES *(Check One)* See Encl Tab C Chpt 7	
9. INSTRUMENTATION *(Check One)*			Appendix I Procedures Followed; or Tab D, Cond#2
	Appendix C Form Attached; or See Encl-Tab E	X	Equivalent Procedures Attached
X	List by Name and Model Number	18. WASTE DISPOSAL *(Check One)* See Encl Tab C Chpt 8,	
10. CALIBRATION OF INSTRUMENTS See Encl Tab F			Appendix J Form Attached; or Tab D, Cond #4
X	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*	X	Equivalent Information Attached
	Equivalent Procedures Attached; and	19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)* NO CHANGE	
	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*		Appendix K Procedures Followed; or
X	Equivalent Procedures Attached		Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT See Encl Tab G		20. THERAPEUTIC USE OF SEALED SOURCES No Change	
X	Description and Diagram Attached		Detailed Information Attached; and
12. PERSONNEL TRAINING PROGRAM NO CHANGE			Appendix L Procedures Followed; or *(Check One)*
	Description of Training Attached		Equivalent Procedures Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL Cond # 5		21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133) See Encl Tab H	
Y	Detailed Information Attached See Encl Tab D	X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)* See Encl Tab D / Cond. # 5		22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS See Encl Tab I	
		X	Detailed Information Attached
	Appendix F Procedures Followed; or	23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
Y	Equivalent Procedures Attached	X	Detailed Information Attached See Encl Tab J

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY		FILM		
		TLD	NO CHANGE	
		OTHER (Specify)		
b. FINGER		FILM		
		TLD	NO CHANGE	
		OTHER (Specify)		
c. WRIST		FILM		
		TLD	NO CHANGE	
		OTHER (Specify)		

d. OTHER (Specify)

See Enclosure Tab C Chpt 5/Tab D Cond. #1

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

b. ATTACH A COPY OF THE AGREEMENT LETTER SIGNED BY THE HOSPITAL ADMINISTRATOR.

c. WHEN REQUESTING THERAPY PROCEDURES, ATTACH A COPY OF RADIATION SAFETY PRECAUTIONS TO BE TAKEN AND LIST AVAILABLE RADIATION DETECTION INSTRUMENTS.

26. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 1a certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Parts 30 and 35, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)*

(1) LICENSE FEE CATEGORY: 7B

(2) LICENSE FEE ENCLOSED: $ Exception, 10CFR170.11 (a)(5)

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

Joel T. Hiatt

(1) NAME *(Type or Print)*

JOEL T. HIATT, MAJ, MS

(2) TITLE

Executive Officer

c. DATE

08 MAY 1987

NRC FORM 313M (8-86)

ITEM 5

TRAINING AND EXPERIENCE OF RADIATION SAFETY OFFICER

TRAINING AND EXPERIENCE OF AUTHORIZED RADIOISOTOPE USERS

1. NAME OF AUTHORIZED USER (Last, First, MI)	2. STATE OR TERRITORY IN WHICH LICENSED: (MD, DDS, DVM, etc.)
CONNOCK, Gerald M.	N/A

RANK/GRADE	ORGANIZATION	ORGANIZATIONAL DIVISION	BLDG./ROOM NO.	WRAMC AUTHORIZATION NO.
MAJ/04	WRAMC	Health Physics Office	Bldg 188,FGS,WRAMC	

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
N/A	N/A	N/A

4. FORMAL EDUCATION — HIGHEST ACADEMIC DEGREE ATTAINED

	Higher Educational Institutions Attended	Type of Program Pursued and Dates of Attendance	Degree, Diploma or Certificate Received and Date
a.	Univ of CA, Los Angeles	Medical Physics Jan 78 - Dec 79	M.S., Dec 79
b.			
c.			
d.			

5. TRAINING RECEIVED IN BASIS RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING (Include course title if known) B	TYPE AND LENGTH OF TRAINING: LECTURE/ LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Univ of CA, Los Angeles, CA Jan 78 - Dec 79 Interservice Nuc Wpns Sch Sandia Base, NM Jan 81	30 qtr hrs 24 hrs	2 years
b. RADIATION PROTECTION	UCLA - Jan 78 - Dec 79 INWS, Sandia Base, NM Jan 81 AFRRI, Bethesda,MD May 80	30 qtr hrs 24 hrs 40 hrs	2 years
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	UCLA - Jan 78 - Dec 79 INWS, Sandia Base, NM Jan 81 AFRRI, Bethesda, MD May 80	30 qtr hrs 24 hrs 40 hrs	2 years
d. RADIATION BIOLOGY	UCLA - Jan 78 - Dec 79 AFRRI, Bethesda, MD May 80	30 qtr hrs 40 hrs	2 years
e. RADIOPHARMACEUTICAL CHEMISTRY	UCLA - Jan 78 - Dec 79	30 qtr hrs	2 years

6. EXPERIENCE WITH RADIATION *(Actual use of Radioisotopes) (Sealed or unsealed source)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Mo-99 Tc-99m	1 Ci	UCLA	2 years	Nuc Medicine Quality Assurance
Cd-109 NA-22 Ba-133 In-113m	))Microcurie)Amounts)	UCLA	2 years	Experimentation Experimentation
Ga-67	.1 Ci	UCLA	2 years	Nuc Medicine
Co-57	1 mCi	UCLA	2 years	Experimentation
Co-60	400 Ci	UCLA	2 years	Rad Therapy
Cs-137	.1 Ci	UCLA	2 years	Experimentation
I-131	.5 Ci	UCLA	2 years	Nuc Med Therapy & Expiramentation
I-125	.2 Ci	UCLA	2 years	Nuc Medicine
Ir-192	.1 Ci	UCLA	2 years	Rad Therapy

7. EXPERIENCE WITH RADIATION PRODUCING DEVICES *(X-ray, Irradiators, etc.)*

DEVICE	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
X-ray Systems	UCLA	2 years	Survey, Research
X-ray Systems	AHSUSA, Fort Sam Houston, TX	2 weeks	Survey
X-ray Systems	USAMEDDAC Panama	8 months	Survey
Laser	USAEHA, Aberdeen Proving Ground, MD	1 week	Survey
Microwave Ovens	USAEHA, Aberdeen Proving Ground, MD	1 week	Survey

8. CERTIFICATION

I certify that the information provided hereon is true and complete to the best of my knowledge.

1 APR 1984
(Date Signed)

Gerald M. Connock
(Signature of Applicant)

ITEM 7

MEDICAL ISOTOPE COMMITTEE

EXTRACT
DEPARTMENT OF THE ARMY
WALTER REED ARMY MEDICAL CENTER
WASHINGTON, DC 20307-5001

WRAMC Regulation
No. 40-92

4 OCT 1985

Medical Services
PATIENT CARE COMMITTEES, BOARDS AND COUNCILS

*This regulation supersedes WR 15-4 dated 17 Nov 1981.

CHAPTER I
GENERAL

1-1 Purpose.

a. This regulation establishes a reference containing all standing committees, boards and councils concerned with patient care at Walter Reed Army Medical Center (WRAMC).

b. This regulation also provides limited basic guidance for each of the standing committees, boards and councils and a listing of applicable references.

1-2 Scope. This regulation applies to all components of the hospital element of WRAMC.

1-3 Intradepartmental Committees. Intradepartmental committees will not be addressed in this regulation unless they are specifically required by regulation. Intradepartmental committees should be addressed at the department level.

1-4 Submission and Approval of Minutes. The format at the Appendix will be utilized for the submission of the minutes of all committees, boards and councils, unless prescribed otherwise by regulation. A summary of the highlights and recommendations of committee minutes (excluding departmental minutes) will be provided by the recorder for inclusion in the agenda of the Quality Assurance Committee or Executive Committee. Summaries should be brief but adequate. In most cases, unless otherwise specified, committee minutes will be submitted through the Quality Assurance Committee to the Executive Committee for approval.

RADIATION CONTROL COMMITTEE

a. Composition

Deputy Commander (Chairman)
Chief, Department of Medicine
Chief, Department of Nursing
Chief, Department of Pathology and Area Lab Services
Chief, Department of Radiology
Chief, Radiation Therapy Service
Chief, Nuclear Medicine Service
Health Physics Officer (RPO)
Senior Nuclear Pharmacist
Assistant Health Physics Officer (alternate RPO) (Recorder)
Director, WRAIR
Radiation Safety Officer, WRAIR
Radiation Protection Officer, AFIP
Radiation Protection Officer, USAMRIID

b. Purpose - To formulate rules and procedures for the safe use of sources of ionizing and non-ionizing radiation; to assure compliance with the regulation and standards of the Nuclear Regulatory Commission, the Office of the Surgeon General, Department of the Army and other regulatory agencies; and to conduct a continuing review of the administrative control procedures.

c. Responsibilities

See items C (1) thru (16), para 3-5, HSC Pam 40-1.

d. Minutes - One copy of the committee minutes will be forwarded (thru D, MAA) to the Executive Committee for approval NLT five (5) working days after the meeting. This copy will remain as part of the Executive Committee minutes. One copy of the minutes will also be included in the "Radioisotopes in Human Use Activities" report, RCS MED-197.

e. Office of Record - Health Physics

f. Frequency - Quarterly or at the call of the chairman.

g. References

(1) AR 40-14, Control and Recording Procedures for Occupational Exposure to Ionizing Radiation

(2) HSC Pam 40-1

(3) JCAH Accreditation Manual for Hospitals, 1985

(4) AR 40-37

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
WASHINGTON, D.C. 20307-5001

CHANGE No. 1
HSHL-HP
MEMO Number 4

30 April 1987

Organization and Function
Of The
Radiation Control Committee Subcommittees

1. Make the following pen and ink corrections and enter change (Change 1) in the margin opposite the correction; Page 1, Paragraph 1.c., change WRAMC Regulation 15-4, "Health Care Committees" to read WRAMC Regulation 40-92, "Patient Care Committees, Boards, and Councils".

2. Remove Pages B-1 and B-2 and replace with Pages B-1 and B-2.

3. File this change sheet in front of the publication for reference purposes.

Gerald M. Connock

GERALD M. CONNOCK
MAJ, MS
Health Physics Officer

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307

HSHL-HP
MEMO Number 4

19 July 1983

ORGANIZATION AND FUNCTION OF THE RADIATION CONTROL COMMITTEE SUBCOMMITTEES

1. REFERENCES

a. Title 10, Chapter 1, Code of Federal Regulations, "Energy - U.S. Nuclear Regulatory Commission Rules and Regulations."

b. WRAMC US NRC License 08-0738-02.

c. WRAMC Regulation ~~15-4~~ 40-92, ~~"Health Care Committees."~~ "Patient Care Comm. Hees, Boards, and Councils." change1

d. WRAMC Regulation 40-10, "Health Physics."

2. DISCUSSION

Reference a. above stipulates that no individual may receive, acquire, own, possess, use, or transfer radioactive material unless authorized by the Nuclear Regulatory Commission (NRC) via a Specific NRC License. At present, WRAMC possesses a "Specific NRC License of Broad Scope for By-Product Material" that allows WRAMC to utilize certain types and quantities of radioactive material for the purpose specified therein. One of the NRC requirements for possession of the current license stipulates that WRAMC must establish a radiation safety committee that exercises administrative control over the safe use of radioactive materials. In order to fulfill this requirement, WRAMC has established the Radiation Control Committee (RCC) with responsibility and authority for assuring the safe use of ionizing radiation at WRAMC and certain tenant activities. The primary method used by the WRAMC RCC to fulfill its responsibilities for administrative supervision of licensed radioactive materials is via the review process associated with WRAMC Radioactive Material Authorizations applications. RCC safety evaluations of the proposed uses of radioactive material, which take into consideration such matters as the adequacy of facilities and equipment, training and experience of the user, and the operating or handling procedures, are necessary in order for the RCC to accomplish its function and mandatory if WRAMC desires to possess a NRC License for radioactive material.

CONTENTS OF THIS MEMO WERE APPROVED BY THE WRAMC RADIAITON CONTROL COMMITTEE ON 2 JUNE 1983

3. SUBCOMMITTEE PURPOSES, FUNCTIONS AND ORGANIZATION

a. Standing Subcommittee are as follows:

(1) Subcommittee for Human Use of Ionizing Radiation (Annex A)

b. Special Subcommittees

Special subcommittees are appointed by the Radiation Control Committee as required.

c. Membership on Subcommittee

(1) Determined by areas of special competence or training as required by purpose for subcommittee.

(2) Individual are nominated and approved by the Radiation Control Committee at its quarterly meeting. Individuals nominated and approved need not be members of the Radiation Control Committee.

d. Chairperson of Subcommittee

(1) Should be a member of the Radiation Control Committee.

(2) Appointed by the Chairperson, Radiation Control Committee.

e. Meetings of Subcommittees

(1) Time/Frequency: As required.

(2) Quorum: Consists of more than 50% of the designated members of of the subcommittee.

(3) Voting: All designated members of the subcommittee will vote on issues brought before the subcommittee requiring actions. Members with a vested interest in a particular issue will disqualify themselves from voting on that issue.

(4) Reports: At quarterly Radiation Control Committee Meeting.

4. RADIATION MATERIAL AUTHORIZATIONS

The Radioactive Material Authorization Application review process is outlined in Annex B.

WILLIAM E. WOODWARD
LTC, MSC
Health Physics Officer

ANNEXES
A - Subcommittee for Human Use of Ionizing Radiation
B - WRAMC Regulation 40-10, "Health Physics," Chapter 3, "Authorization to Use Radioactive Material."

ANNEX A

SUBCOMMITTEE FOR THE HUMAN USE OF IONIZING RADIATION

1. PURPOSE

a. To review proposals/requests for the human use of ionizing radiation and to recommend approval/disapproval.

b. To give interim approval/disapproval on requests for the human use of ionizing radiation and make recommendations to the RCC.

c. To Consider, make recommendations on, act on all other matters referred to it by the Radiation Control Committee.

2. MEMBERSHIP. The subcommittee for Human Use of Ionizing Radiation shall consist of at least the following six (6) individuals:

a. A person with special competence in health physics and radiation safety.

b. A physician recognized as a specialist in radiation therapy.

c. A physician recognized as a specicalist in nuclear medicine.

d. A person qualified by training and experience to formulate radioactive drugs.

e. A physician with special competence in internal medicine or hematology.

f. A representative of the Judge Advocate's Office.

Additional members may be appointed to the subcommittee in order to achieve sufficient diversity in the membership. These members shall be qualified in various disciplines pertinent to the field of human use of ionizing radiation (e. g. radiation biology, radiation physics, clinical pathology, radiology and endocrinology).

ANNEX B

CHAPTER 3
Authorization to Use Radioactive Material

3-1. GENERAL.

a. The NRC has issued a specific "License of Broad Scope for Byproduct Material" to WRAMC allowing use of specific types and quantities of radioactive material. NRC requirements stipulate that a Radiation Control Committee be established to exercise administrative control over the safe use of radioactive materials. The WRAMC RCC was chartered to meet these requirements.

b. The RCC issues Radioactive Material Authorizations to Principal Users as a means of controlling the use of radioactive material. All users of radioactive material must receive their authorization prior to using the material.

c. Non-human Use Radioactive Material Authorizations are issued for 3 years. Human Use Authorizations are issued for 1 year. Both types of authorizations may be renewed upon request.

d. Individuals possessing more than 1/2 pound of pure natural uranium compounds are required to obtain an authorization.

3-2. APPLICATION PROCEDURE.

a. To obtain, amend, renew or terminate an authorization for use of radioactive material, individuals must submit WRAMC Form 1661-R, "Application for Authorization to Use Radioactive Material - Human Use", or WRAMC Form 1662-R, "Application for Authorization to Use Radioactive Material - Non-human Use". Each Principal User and Co-worker must submit WRAMC Form 1643, "Training and Experience of Authorized Radioisotope Users", with the application. Each physician listed on a Human Use Authorization is required to submit NRC Form 313-M Supplement B, "Preceptor Statement", or a certificate of Board Certification with the application. Protocols describing the use and accountability of radioactive material from the time of receipt until the time of disposal will be submitted with the application. Applications will be submitted to the HPO for review and approval. All applications for human use of radioisotopes will be submitted to the Human Use Subcommittee of the RCC by the HPO for review of physician training and experience.

b. All requested information on the application will be provided. Incomplete applications will be returned, causing a delay in approval.

c. Application for use of gamma cell irradiators must include a copy of the proposed Standing Operating Procedures addressing personnel safety, routine operation and emergency provisions.

3-3. REVIEW PROCEDURES. All applications will be reviewed by the RCC and HPO to insure that individuals meet training and experience requirements, proposed procedures do not violate existing regulations and facilities and equipment are adequate for proposed usage. Applications will be signed by the HPO and returned to applicant. This is considered interim approval until the RCC next meets and officially approves the application.

3-4. TERMINATION OF AUTHORIZATION. An authorization may be terminated by the Principal User, the RCC or the HPO at any time. When an authorization is terminated, the Principal User will ensure that all work areas are cleared by the HPO prior to releasing them for alternate use and coordinate final disposition of unused radionuclides with the Radioactive Materials Control Branch, HPO.

WRAMC RADIATION CONTROL COMMITTEE MEMBERSHIP

TITLE	MEMBER/SIGNATURE
DEPUTY COMMANDER (Chairperson) (576-1394/5)	HASTINGS, James E., COL, MC
CHIEF, DEPARTMENT OF MEDICINE (Member) (576-1205)	HUNT, Keith K., Jr., COL, MC
CHIEF, DEPARTMENT OF NURSING (Member) (576-1870)	ADAMS-ENDER, Clara L., COL, ANC
CHIEF, DEPARTMENT OF PATHOLOGY (Member) (576-1280)	CLARK, Gary B., COL, MC
CHIEF, DEPARTMENT OF RADIOLOGY (Member) (576-1930)	HAGAN, Raoul, COL, MC
CHIEF, RADIATION ONCOLOGY SERVICE (Member) (576-1180)	YUEN, Albert, MAJ, MC
CHIEF, NUCLEAR MEDICINE SERVICE (Member) (576-0168)	VAN NOSTRAND, Douglas, LTC(P), MC
HEALTH PHYSICS OFFICER (Member) (427-5161)	CONNOCK, Gerald M., MAJ, MS
SENIOR NUCLEAR PHARMACIST (Member) (576-0177)	STOOPS, Howard, CPT, MS
ASSISTANT HEALTH PHYSICS OFFICER (Recorder) (427-5104)	HINTENLANG, David E., CPT, MS
DIRECTOR, WRAIR (Member) (576-3551/2/87/3607)	TOP, Franklin H., Jr., COL, MC
RADIATION SAFETY OFFICER, WRAIR (Member) (576-3428)	BASS, Billy G., DAC
RADIATION PROTECTION OFFICER, AFIP (Member) (576-2973/0414)	BUCK, James L., LCDR, USN
RADIATION PROTECTION OFFICER, USAMRIID (Member) (393-1839 X7335)	BECKWITH, William, DAC
ASSISTANT HEALTH PHYSICS OFFICER (ALTERNATE RPO) (427-5107)	BURTON, David W., DAC

OF

COLONEL JAMES EASTMAN HASTINGS, MC

DATE OF BIRTH: [redacted] SSN: [redacted] DATE: 23 Jun 86

MARRIED: [redacted]

CHILDREN: [redacted]

EDUCATIONAL TRAINING:

Amherst College, B.A. [redacted]
New York University School of Medicine, M.D. [redacted]

GRADUATE MEDICAL EDUCATION:

University of Virginia Hospital; Straight Medical Intern, 1961-1962
Vanderbilt University Hospital; Medical Resident, 1962-1964, 1965-1966
Vanderbilt University Hospital; Cardiology Fellowship, 1964-1965
Walter Reed General Hospital; Cardiology Fellowship, 1969-1970

LICENSES AND CERTIFICATIONS:

Licensed to practice medicine, State of Tennessee, 1968
Canal Zone, July 1972
American Board of Internal Medicine, June 1969
American Board of Internal Medicine, Cardiovascular Disease, October 1973
American Board of Internal Medicine, Recertified in Internal Medicine, 1980

TEACHING AND HOSPITAL APPOINTMENTS:

Vanderbilt University; Instructor in Medicine, 1964-1966
University of Panama, Republic of Panama; Special Professor of Medicine, 1974
University of Hawaii; Clinical Professor of Medicine, 1975-1982
University of the Pacific; Adjunct Clinical Professor of Medicine, 1976-1982

PROFESSIONAL SOCIETIES & COMMITTEES:

American Medical Association (Delegate to Convention from Canal Zone) 1974-1976; 1982-present (Alternate Delegate from US Army 1982-1985)
American Heart Association
Canal Zone Heart Association (President, 1973-1974; various committees 1972-1973, 1974-1975)
Canal Zone Cancer Society (Scientific Committee)
Fellow, American College of Physicians (Governor's Committee 1975-1982 for Regional Meeting)
Sixth Pan Asian Congress of Cardiology (Exhibits Committee)
Hawaii Heart Association (Board of Governors, 1976-1978; Research Committee, 1977-1979)
National Board of Medical Examiners, Member of Board 1982-1985
National Library of Medicine, Board of Regents 1982-1985; Chairman of Search Committee for Replacement of Chairman, 1984

Ex 6

CURRICULUM VITAE

NAME: Keith Kellogg Hunt, Jr. DATE OF RANK: 3 June 1977

RANK: Colonel, Medical Corps MOS: 60F

SSN: [redacted] MILITARY SERVICE: 1 July 1962 to present

CURRENT ASSIGNMENT: Chairman, Department of Medicine, Walter Reed Army Medical Center, Washington, DC 20307-5001 (Telephone: 202-576-1205)

BUSINESS ADDRESS: Walter Reed Army Medical Center, Washington, DC 20307-5001

DATE OF BIRTH: [redacted]

PLACE OF BIRTH:

RELIGION:

NAME OF SPOUSE:

DATE MARRIED:

CHILDREN:

HOME ADDRESS:

PROFESSIONAL EDUCATION AND TRAINING

University of Virginia		BA, Psychology
University of Virginia Medical School		MD
Rotating Internship Tripler Army Medical Center Honolulu, Hawaii	Jul 1962 - Jun 1963	
General Practice Residency Walson Army Hospital Fort Dix, New Jersey	Sep 1965 - Aug 1966	
Internal Medicine Residency Walter Reed Army Medical Center Washington, DC	Sep 1966 - Aug 1969	
Pulmonary Fellowship Walter Reed Army Medical Center Washington, DC	Sep 1969 - Aug 1970	

SPECIALTY CERTIFICATION:

American Board of Internal Medicine	23 October 1970
Diplomate in Subspecialty of Pulmonary Disease	17 October 1972
Recertification, American Board of Internal Medicine	29 October 1977

Ex 6

MILITARY SERVICE:

5th General Hospital, Stuttgardt; Staff internist, 1966-1969
Walter Reed Army Medical Center; Cardiology Fellowship to Assistant Chief, Cardiology Service, 1969-1972
USA Elm Canal Zone; Chief of Medicine, Gorgas Hospsital, 1972-1975
Tripler Army Medical Center; Chief of Medicine, 1975-1982
[illegible]
National Defense University; Student (class president), Industrial College of Armed Forces, 1985-1986
Walter Reed Army Medical Center; Deputy Commander for Clinical Services, 1986 to present

PUBLICATIONS:

Hastings, J.E., Friedman, et al, Culture of Human White Blood Cells using Differential Leukocyte Separation. Nature, London 192:1214, 1961

Cheitlin, M. and Hastings, J.E., Indications for Coronary Angiography, Annals of District of Columbia, Summer, 1972

Davia, J.E., Golden, M.S., Price, H.L., Hastings, J.E., and Cheitlin, M.D., Pulmonary Varix, A Diagnostic Pitfall. Circulation XLIX, May 1974

Hastings, J.E., Challenges in Medical Education, US Medicine, 1 August 1983

Bishop, Cannon, Eversmann, Graeter, Hastings, Jernigan, Mathis, Mitchum, Nicola, Roadman, Steely, Thie, Welsh, Wortham, Vela, Zajtchuk, Moscato; Integrating The Civilian Health Care System into Medical Mobilization; NDU press, 1986

PRESENTATIONS:

Canal Zone Heart Association Annual Lecture, November 1972
Annual Hawaii Heart Course in Cardiovascular Nursing Lecture, 1975
University of California Review Course in Internal Medicine Lecture, August 1976, 1977, 1978, 1979, 1980 (presentations)
ACP Regional Meeting, Hawaii--Panel Moderator, 1977, 1978, 1979, 1980, 1981

HONORARIUMS:

House Staff Association, Annual Award to Best Teacher, Gorgas Hospital, 1975
"A" Designator for Professional Competence, Internal Medicine, US Army, 1979
Joint Chiefs of Staff Award for Excellence in Research, N.D.U., June 1986

MILITARY AWARDS:

Army Achievement Medal
Joint Services Commendation Medal
Army Commendation Medal
Meritorious Service Medal with OLC
Legion of Merit

PROFESSIONAL ASSIGNMENTS:

Chairman, Department of Medicine Walter Reed Army Medical Center Washington, DC 20307	1 July 1982 - Present
Associate Chairman, Department of Medicine Uniformed Services University of the Health Sciences Bethesda, Maryland	1 July 1982 - Present
Medical Consultant to the Surgeon General	5 January 1982 - 1 July 1982
Chief, Pulmonary Disease Service Walter Reed Army Medical Center Washington, DC 20307	1 July 1974 - 1 July 1982
Consultant to the Surgeon General in Pulmonary Disease	27 August 1980 - Present
Associate Professor of Medicine Uniformed Services University of the Health Sciences Bethesda, Maryland	14 January 1980
Pulmonary Division Program Coordinator Department of Medicine Uniformed Services University of the Health Sciences Bethesda, Maryland	August 1978 - Present
Clinical Assistant Professor of Medicine Georgetown University Washington, DC	1 July 1977
Chief, Pulmonary and Infectious Disease Service Madigan Army Medical Center Tacoma, Washington	24 August 1970 - 30 June 1974
Director, Clinical Clerkship Program Madigan Army Medical Center Tacoma, Washington	March 1972 - March 1974
Attending Physician Harborview Medical Center Seattle, Washington	October 1971 - June 1974
Battalion Surgeon 27th Infantry Battalion, 25th Infantry Division Schofield Barracks, Hawaii	July 1963 - August 1965

PROFESSIONAL SOCIETIES

Society of Medical Consultants to the Armed Forces (Associate Membership), 20 April 1982
Fellow American College of Physicians, March 1974
Fellow American College of Chest Physicians, October 1973
Maryland Thoracic Society
District of Columbia Thoracic Society
Association of Military Surgeons of the United States

SPECIAL HONORS

Distinguished Military Graduate, ROTC, University of Virginia	
Meritorious Service Medal	11 November 1974
Outstanding Teacher Award - Presented by the Intern Class of 1971, Madigan Army Medical Center	1971
Selected for ACP-MKSAP Faculty, Washington, DC	September 1977
"A" Professional Designator Award, US Army	December 1979
Selected for ACP-MKSAP Faculty, Washington, DC	February 1980
Meritorious Service Medal	4 March 1980
American College of Chest Physicians, Governor for the Army	October 1981-October 19
Army Achievement Medal	28 September 1981
Selected to Order of Military Medical Merit	13 November 1982
Army Commendation Medal	10 January 1984

COMMITTEE ASSIGNMENTS

Chairman, Search Committee for Chairman, Department of Pediatrics, WRAMC	April 1987
Chairman, Steering Committee for WRAMC Ethics Committee	March 1987
Governor's Advisory Council, American College of Physicians	January 1985
Chairman, Patient Care Assessment Committee, WRAMC	October 1984 - present
Chairman, Library Committee, WRAMC	October 1984
Pre-Reviewer for Pulmonary Subspecialty Programs, Residency Review Committee	1983 - present
Member, WRAMC Quality Assurance Committee	February 1983 - presen
Credentials Committee, WRAMC	July 1982 - present
Human Subjects Research Review Board for the Surgeon General US Army	Jan - Jul 1982
Member, Steering Committee of the Section on Clinical Pulmonary Medicine of the American College of Chest Physicians	November 1981
Walter Reed Army Medical Center Steering Committee on Holistic Medicine	1981
Department of Medicine Education Committee, Walter Reed Army Medical Center	December 1978 - presen
Executive Committee, District of Columbia Thoracic Society	July 1976 - June 1977
Education Committee, Walter Reed Army Medical Center	July 1974 - present
Education Committee, Madigan Army Medical Center	Sep 1970 - Jun 1974
Rabies Committee, Madigan Army Medical Center	Sep 1970 - Jun 1974
Infection Committee, Madigan Army Medical Center	Sep 1970 - Jun 1974

PUBLICATIONS

Epstein R, Cole R, Hunt KK. Pleural effusion secondary to pulmonary cryptococcosis. Chest 61:296-298, 1972.

Matthews JI, Molitor JT, Hunt KK. Pyrimethamine-induced leukopenia and thrombocytopenia in a patient with malaria and tropical sprue: Case report. Military Medicine 138:280-283, 1973.

Schwartz MI, Goldman AL, Roycroft DW, Hunt KK. Vascular invasion by chrondrosarcoma simulating pulmonary emboli. Am Rev Resp Dis 106:109-113, 1972.

Epstein RL, Hall RV, Gillespie JT, Hunt KK. Asymptomatic right lower thoracic nodule. Chest 62:741-742, 1972.

Hunt KK, Cole R. Cardiomegaly and pectus excavatum. Chest 64:511-512, 1973.

Hunt KK, Epstein RL. Pulmonary sarcoidosis simulating metastatic malignancy: Case report. Military Medicine 139:552-553, 1974.

Patterson JR, Blaschke TF, Hunt KK, Meffin PJ. Lidocaine blood concentrations during fiberoptic bronchoscopy. Am Rev Resp Dis 112:53-57, 1975.

Hunt KK, Enquist RW, Bowen TE. Multiple pulmonary nodules with central cavitation. Chest 69:529-530, 1976.

Tellis CJ, Hunt KK. Eosinophilic granuloma of the lung. Military Medicine 143:256-262, 1978.

Matthews JI, Torrington KG, Hunt KK. Superior vena cava syndrome. Am Rev Resp Dis 119:683-684, 1979.

Matthews JI, Hooper RG, Hunt KK. Hernia of foramen of Morgagni presenting as pleural mass. Southern Med J 72:1348-1349, 1979.

Beechler CR, Enquist RW, Hunt KK, Ward GW, Knieser MR. Immunofluorescence of transbronchial biopsies in Goodpasture's syndrome. Am Rev Resp Dis 121:869-872, 1980.

Spratling L, Hunt KK, Tellis CJ. Diagnosis of blastomycosis by transbronchial lung biopsy. Military Medicine 146:279-280, 1981.

Derderian SS, Rajagopal KR, Abbrecht P, Bennett LL, Doblar D, Hunt KK. High frequency positive pressure jet ventilation in bilateral bronchopleural fistulae. Critical Care Medicine 10:119-121, 1982.

Matthews JI, Hunt KK. Sarcoidosis - reversal of respiratory failure 21 years after onset of disease. Arch Int Med 144:168-170, 1984.

ABSTRACTS

Ward GW, Hunt KK, Evans R, Hase TS. Immunofluorescent techniques in examination of lung pathology. J Allergy and Clin Immunology 57:218, 1976.

Rajagopal KR, Abbrecht PH, Tellis CJ, Hunt KK. Hypercapnic and flow resistive loading responses in obstructive sleep apnea patients. Am Rev Resp Dis 123(4):188, 1981.

Rajagopal KR, Abbrecht PH, Derderian SS, Bennett LL, Doblar DD, Kahn RC, Ray C, Hunt KK. High frequency ventilation in bilateral broncho-pleural fistula. Am Rev Resp Dis 112(4):67, 1981.

LETTERS AND BOOK REVIEWS

Hunt, KK. The second-strength PPD test. NEJM 28:1326, 1971 (Letter).

Hunt KK. Post-cyclophosphamide pneumonitis. NEJM 287:668-669, 1972 (letter).

Hunt KK. Book review of Respiratory Physiology. Military Medicine 140:116, 1975.

Hunt KK. Book review of Broncho-Pulmonary Immunopathology. Military Medicine 143:178, 1978.

Hooper RG, Tellis CT, Hunt KK. Methodology in transbronchial lung biopsy. Chest 73:130, 1977 (letter).

Hunt KK. Book review of Recent Advances in Respiratory Medicine. Military Medicine 142:886, 1977.

Hunt KK. Book review of Pulmonary Emergencies. Military Medicine 143:551, 1978.

Hunt KK. Book review of Practical Points in Pulmonary Disease. Military Medicine 143:702, 1978.

Hunt KK. Book review of Respiratory Physiology II.Military Medicine 144:66, 1979.

Hunt KK. Book review of Lung Sounds. Military Medicine 144:202, 1979.

Hunt KK. Book review of Status Asthmaticus. Military Medicine 144:332, 1979.

Hunt KK. Book review of Pulmonary Tuberculosis, A Journey Down The Centuries. Military Medicine 144(6):424, 1979.

Hunt KK. Book review of Tuberculosis - Discussions in Patient Management. Military Medicine 144:807, 1979.

Hunt KK. Book review of Selected Papers in Respiratory Therapy. Military Medicine 144:822, 1979.

Hunt KK. Book review of Pulmonary Physiology in Clinical Medicine. Military Medicine 145:846, 1980.

Hunt KK. Book review of Manual of Clinical Problems in Pulmonary Medicine. Military Medicine 146:406, 1981.

Hunt KK. Book review of The Lung: Radiologic-Pathologic Correlations. Military Medicine 146:538, 1981.

Hunt KK. Book review of Obstructive Pulmonary Disease. Military Medicine 147:233, 1982.

Hunt KK. Book review of Clinical Pulmonary Medicine. Military Medicine 147:413, 1982.

Hunt KK. Book review of Manual of Acute Respiratory Care. Military Medicine 147:599, 1982.

Hunt KK. Book review of Pulmonary Diseases. Military Medicine 147:1017, 1982.

Hunt KK. Book review of Pulmonary Emergencies. Military Medicine 148:121, 1983.

Hunt KK. Book review of Problems in Pulmonary Medicine for the Primary Physician. Military Medicine 148:374, 1983.

Hunt KK. Book review of Chest Medicine. Military Medicine A27, 1983.

Hunt KK. Book review of Synopsis of Diseases of the Chest. Military Medicine 149:106, 1984.

CURRICULUM VITAE

NAME: CLARA L. ADAMS-ENDER RANK: Colonel

POSITION: Chief, Department of Nursing
Walter Reed Army Medical Center
Washington, D.C. 20307-5001

PERSONAL HISTORY:

EDUCATION:

INSTITUTION/PLACE	FROM/TO	MAJOR	DEGREE
• Command & General Staff College, Fort Leavenworth, Kansas	1975-1976	Military Art & Science	MMAS
• University of Minnesota Minneapolis, Minnesota		Med-Surg Nursing	MS
• NC Agricultural & Technical State University, Greensboro, North Carolina		Nursing	BS

MILITARY SERVICE SCHOOL	LOCATION	GRADUATION
• US Army War College	Carlisle Barracks, PA	1982
• USAREC Recruiting Commanders' Course	Ft Ben Harrison, IN	1981
• USAREC Recruiting Managers' Course	Ft Ben Harrison, IN	1981
• Personnel Management for Executives	DA Regional Training Center, Europe	1979
• Command & General Staff College	Ft Leavenworth, KS	1976
• Inspector General's Course	HQDA, Washington, DC	1976
• ANC Officer Advanced Course	Academy of Health Sciences, FSHTX	1964

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MILITARY SERVICE SCHOOL	LOCATION	GRADUATION
• Chief Nurses' Orientation Course	Academy of Health Sciences, FSHTX	1974
• Recovery Room & Intensive Care Surgical Nursing Course	Fitzsimons AMC, Denver, CO	1963
• ANC Officer Basic Orientation	Medical Field Service School, FSHTX	1961

PAST ASSIGNMENTS:

ORGANIZATION	LOCATION	POSITION	DATE
• Walter Reed Army Medical Center	Washington, DC	Ch, Dep Nurs	1984-Pres
• US Army Recruiting Command	Ft Sheridan, IL	Ch, ANC Div	1981-1984
• Frankfurt Army Regional Medical Center	Frankfurt, West Germany	Asst Ch and Ch, Dept Nurs	1978-1981
• HQ, Health Services Command	Fort Sam Houston, TX	Inspector General (IG)	1976-1978
• USAMEDDAC, Kimbrough Army Hospital	Fort Meade, MD	Asst Ch, Dept of Nursing	1974-1975
• WRAIN Center, University of Maryland	Washington, DC	Instructor/ Asst Prof	1969-1974
• US Army Medical Trng Cen	Fort Sam Houston, TX	Instructor	1965-1967
• 121st Evac Hospital	ASCOM, Korea	Staff Nurse	1963-1964
• Walson Army Hospital	Fort Dix, NJ	Gen Duty Nurse	1961-1963

ACADEMIC APPOINTMENTS:

Adjunct Assistant Professor	Georgetown Univ School of Nursing, Washington, DC	1985-Pres
Assistant Professor	WRAIN Center, Univ of MD School of Nursing	1971-1974
Instructor	WRAIN Center, Univ of MD School of Nursing	1969-1971

PROFESSIONAL ORGANIZATIONS:

The Retired Officers Association	1986-
Department of Army Speakers Bureau, Public Affairs Office	1986-
National Association for Female Executives, Inc.	1986-Pres
Member, Drug and Alcohol Nurses Assn. (DANA)	1985-Pres
ANA Council of Nursing Administration	1985-Pres
Chairperson, Impaired Nurse Committee, DC Nurses Assn.	1985-Pres
Member, Legislative Committee, DC Nurses Assoc.	1984-Pres
American Nurses' Foundation Century Club	1982-Pres
Retired Army Nurse Corps Association	1981-Pres
American Red Cross Nurse (#33046)	1981-Pres
American Organization of Nurse Executives	1980-Pres
Federal Women's Program	1977-Pres
Association of US Army	1976-Pres
National League for Nursing	1973-Pres
Chi Eta Phi Sorority, Inc.	1972-Pres
Foundation of Thanatology	1970-Pres
Sigma Theta Tau Honor Society	1968-Pres
American Nurses Association	1962-Pres

COMMUNITY ORGANIZATIONS & ACTIVITIES:

PUBLICATIONS:

"Answers to Questions About Army Nurse Recruiting," All Volunteer, February 1984.

"Nurse Salaries", Recruiter Journal, May 1984.

"Identity Crisis and Dilemmas in Ambulatory Health Care Delivery", Medical Bulletin, January/February, 1982.

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PUBLICATIONS:

"Development of Clinical Head Nurses as Managers of Nursing Care", Medical Bulletin, June 1981.

"Department of Nursing Support to Ambulatory Care - Issues, Dilemmas and Proposed Solution", Medical Bulletin, September 1980.

"The Role of the Nurse in the Maintenance and Restoration of Hope", Bereavement: Its Psychosocial Aspects, ed. Schoenberg, et al., New York: Columbia University Press, 1975, (Co-author).

Attitudes Toward Fear of Death and Dying Among Army Officers, Defense Documentation Center, Department of Army Washington, DC 1976.

HONORS:

- Awarded the "A" professional designator by TSG for continued demonstration of exceptional ability in the field of Nursing Administration in June 1985.
- First black ANC Officer to graduate from the US Army War College (USAWC) in 1982.
- First nurse and female to qualify and serve as Senior Marcher for 700 USAREUR soldiers in the four-day, 100-mile Nujmegen March, Nijmegen, Holland in July 1980.
- First nurse, black and female to be awarded the Master of Military Art and Science Degree, CGSC, Fort Leavenworth, Kansas 1976.
- ANC selectee to attend Command & General Staff College (CGSC) in 1975.
- First female in Army to qualify and be awarded the Expert Field Medical Badge in July 1967.
- Secondary zone promotions to Major, Lieutenant Colonel and Colonel.

AWARDS AND DECORATIONS:	YEAR
The World Who's Who of Women	1986
Black Nurse of the Year	1985
Who's Who in American Nursing	1984
Certificate of Achievement - University of MN Distinguished Grad	1984
Roy Wilkins Meritorious Service Award of the NAACP	1983
Meritorious Service Medal w/3OLC	1982
Omega Psi Phi Fraternity's Citizen of the Year	1981
Presidential Sports Award - Backpacking	1980
Meritorious Service Medal w/2OLC	1978
Female Athlete of the Year, CGSC	1976
Meritorious Service Medal	1974
Cum Laude Graduate University of Minnesota	
Personality of the South	1969
Outstanding Young Woman of America	1968
Army Commendation Medal	1967

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CONSULTANT POSITIONS:

- Member, Visiting Committee, Frances Payne Bolton SON, Case Western Reserve University, Cleveland, OH — 1985-Pres
- Nurse Consultant, WRAMC Health Services Region — 1984-Pres
- Specialty Consultant, Medical-Surgical Nursing, 7th MEDCOM — 1978-1981
- Chief Nurse, 32nd Combat Support Hospital, 7th MEDCOM — 1978-1979
- Member of Editorial Board, Foundation of Thanatology — 1970-1978
- Nurse Consultant to Children's TV Workshop, NY
- Consultant to Chief, ANC on Recruitment & Retention of Minority Students in Nursing — 1972-1975

PROFESSIONAL PRESENTATIONS:

SUBJECT/TITLE	AUDIENCE/LOCATION	DATES
"Responsibilities of Nurse Administrators in Staff Education about the Impaired Nurse"	DCNA Conference on Impaired Nurses in the Workplace Washington, D.C.	Nov 1986
"Mentoring Relationships -- Toward Excellence in Nursing Practice	NSNA Mid Year Conference Louisville, KY	Nov 1986
"Pathways to Power"	DC Nurses Association Continuing Education Workshop Washington, D.C.	Nov 1986
"Cultural Diversity in Nursing Practice"	Keynote Speaker Michigan Nurses Association Convention	Oct 1986
"Ethical Issues in Nursing - Allocation of Scarce Resources"	Ethical Issues Workshop George Washington University SON Washington, D.C.	Oct 1986
"Contributions of Federal Women to Defense"	Women's Equality Day Ft. Leavenworth, KS	Aug 1986
"Professional Excellence: A Challenge for Federal Women"	Federal Womens Program Ft. Gordon, GA	Mar 1986
Achieving Excellence - A Challenge for Federally Employed Women	Federal Women's Program CECOM, Ft. Monmouth, NJ	

PROFESSIONAL PRESENTATIONS:

SUBJECT/TITLE	AUDIENCE/LOCATION	DATES
• "Utilizing the Nursing Process in Nursing Management"	Graduate Students, Georgetown University SON, Wash, DC	Feb 1985
• Managing Complex Health Care Systems/Organizations	Graduate Students, Georgetown University SON, Wash, DC	Feb 1985
• Research Paper- "Attitudes Toward Fear of Death and Dying Among Army Officers"	Nurse Educators/Graduate Students, Cal State Univ, Long Beach CA	Mar 1985
• "Challenges of the Army Officer in the year 2000"	Keynote Speaker, ROTC Ball, Morgan State Univ, Balt., MD	May 1985
• Achieving Excellence in Nursing Practice Through the Mentoring Process	Prof Nurses/NAACOG Convention, New Orleans LA	Jun 1985
• "The Role of the Supervisor in Management"	Level I Supervisors Course WRAMC, Wash, DC	Jun 1985
• Getting Ready for Success in Life	Eastern Star Chapter, Waukegan, IL	Mar 1984
• Nursing Career Opportunities in the Army Nurse Corps	Nurse Educators Boston, MA	Mar 1984
• Preparing for Nursing Excellence Towards the Year 2000	Central Carolina Chapter of BNA, Durham, NC	Apr 1984
• Management of Nursing Practice in a Major Medical Center	Nurse Educators, Washington, DC	Jun 1984
• The Army Nurse Corps-- An Opportunity for Excellence in Nursing Practice	Nurse Educators/ Washington, DC	Feb 1983
• What are Qualities for Success in the Workplace?	Chicago Federal Womens Program, Chicago, IL	May 1983
• Marketing the US Army Reserve for ANC Officers	USAR Chief Nurses/ St. Louis, MO	Jun 1983
• ANC Opportunities in the US Army Reserve	Professional Nurses/ Cleveland, OH	Sep 1983
• A Career of Excellence in the Army Nurse Corps	Nurse Educators and Students, Omaha, NE	Nov 1983

PROFESSIONAL PRESENTATIONS:

SUBJECT/TITLE	AUDIENCE/LOCATION	DATES
• Preparation for Excellence in Nursing Practice	Connecticut Student Nurses Association Convention, Danbury, CT	Nov 1983
• Nursing Opportunities in the Army Nurse Corps	Nurse Educators/ San Francisco, CA	Mar 1982
• Ingredients of a Successful Person	Federal Womens Program	May 1982
• Who am I? Where Am I Going?	Nurse Educators/ Washington, DC	Jun 1982
• Implementation of ANC Standards of Nursing Practice	Army Nurse Corps Executives/ HQ 7th MEDCOM, Heidelberg, FRG	Jun 1980
• Identity Crisis and Dilemmas In Ambulatory Health Care Delivery	Ambulatory Patient Care Conf Garmisch, West Germany	Dec 1980

SHORT COURSES, WORKSHOPS AND CONFERENCES:

TITLE	LOCATION	DATE
First National Conference on Alcohol and Drug Abuse Prevention	Washington, DC	1986
Ethical Dilemmas in Nursing Practice for Nurse Executives	Fairfax, VA	1986
Application of Ethical Principles to Nursing Practice	Washington, DC	1986
Army Nurse Corps Professional Development Conference	Washington, DC	1986
Investment in Excellence	Washington, DC	1986
Army Nurse Corps Strategic Planning Conference	Washington, DC	1985
Health Care Professionals Course on Alcoholism (Tri-Service Alcohol Rehabilitation Department)	Bethesda, MD	1985
Negotiating Skills (Amer Mtg Assn)	Washington, DC	1984
Health Services Command Chief Nurse Conference	San Antonio, TX	1984

SHORT CONFERENCES WORKSHOPS AND CONFERENCES:

TITLE	LOCATION	DATE
AMSUS Convention	San Diego, CA	1984
The National Commission on Nursing Recommendations: Challenges and Opportunities Under Prospective Pricing	Chicago, IL	1983
The New Payment Environment and Financial Management for the Nursing Service Administrator	Dallas, TX	1983
Army Nurse Corps Strategic Planning	Leesburg, VA	1983
Army Nurse Corps Strategic Planning	Nashville, TN	1982

SPECIALTY SKILLS

a. Proficiency in German - Moderate
b. Proficiency in Spanish - Beginner
c. [redacted]

HOBBIES: [redacted]

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Updated 15 Apr 86

CURRICULUM VITAE

NAME: Gary Bruce Clark, M.D.

DATE/PLACE OF BIRTH:

MARRIED:

SOCIAL SECURITY NUMBER:

HOME ADDRESS:

CURRENT PROFESSIONAL APPOINTMENT:

Chief, Department of Pathology and
Area Laboratory Services
Walter Reed Army Medical Center
Washington, D.C. 20307-5001
(202) 576-1280
21 Oct 1985 - Present

Pathology Consultant
Office of the Surgeon General of the Army
1 Aug 1983 - Present

Clinical Associate Professor
Department of Pathology (Primary)
Department of Military Medicine (Secondary)
Uniformed Services University of the
Health Sciences
Bethesda, Maryland
19 May 1984 - Present

ACADEMIC EDUCATION:

Monroe High School
Monroe, Michigan

Undergraduate:

Bachelor of Science
University of Colorado
Boulder, Colorado

Postgraduate:

Doctor of Medicine
University of Colorado
Denver, Colorado

Master of Public Administration with Special
Elective in National Resources Management
George Washington University
Washington, D.C.

Internship:	Pediatrics Yale-New Haven Hospital New Haven, Connecticut July 1967 - July 1968
Residency:	Pathology (Anatomic/Clinical) Walter Reed Army Medical Center Washington, D.C. July 1971 - July 1975
Fellowship:	Neuropathology Department of Neuropathology Armed Forces Institute of Pathology Washington, D.C. February 1978 - February 1980
Subspecialty Symposia:	Mammalian and Human Medical Genetics Jackson Laboratory Bar Harbor, Maine 23 July - 3 August 1979

MEDICAL LICENSURE: District of Columbia (No.7307), 1974-Present
Colorado (No.20926), 1977-1983

BOARD CERTIFICATION: American Board of Pathology
Anatomic Pathology - May 1978
Clinical Pathology - May 1978
Neuropathology - May 1980

MILITARY HISTORY

Commission:	U.S. Army - Reserve - 14 August 1967 U.S. Army - Regular - 31 January 1980
Rank:	Colonel - 4 August 1980
Occupational Specialty Designation:	A61U, 27 June 1985
Training:	U.S. Army Medical Field Service School Fort Sam Houston, Texas August 1967
	U.S. Army Infantry School (Airborne) Fort Benning, Georgia September 1968
	U.S. Army Special Warfare School Fort Bragg, North Carolina October - December 1968
	Armed Forces Staff College (Class #62) Norfolk, Virginia August 1977 - January 1978

U.S. Army AMEDD Advanced Officers Course
By Correspondence
July 1980 - February 1983

Industrial College of the Armed Forces (Class '85)
Washington, D.C.
August 1984 - June 1985

U.S. Army Flight Surgeons School
Fort Rucker, Alabama
August - September 1985

Awards and Honors:

Purple Heart, November 1969
Bronze Star Medal, February 1970
Bronze Star Medal, First Oak Leaf Cluster February 1970
Bronze Star Medal, Second Oak Leaf Cluster with V Device, May 1970
Air Medal, July 1970
Bronze Star Medal, Third Oak Leaf Cluster September 1970
Silver Star, November 1970
Army Commendation Medal, January 1972
Meritorious Service Medal, November 1977
Humanitarian Service Medal, January 1979
Joint Services Commendation Medal, January 1981
Military Order of Medical Merit, November 1982
Meritorious Service Medal, First Oak Leaf Cluster, July 1983
Meritorious Service Medal, Second Oak Leaf Cluster, September 1984
Joint Chiefs of Staff Award, Industrial College of the Armed Forces, June 1985

Foreign Awards and Honors:

Vietnamese Parachutist Wings, May 1969
Vietnamese Cross of Gallantry with Silver Star, March 1970
Greek Parachutist Wings, April 1971
Danish Parachutist Wings, May 1971

PRIOR PROFESSIONAL APPOINTMENTS:

Orthopedic Orderly
Denver City Hospital
Denver, Colorado
June - September 1960

Research Assistant in Neuroembryology
University of Colorado
Boulder, Colorado
June - September 1961

Research Virologist in Pediatrics
University of Colorado Medical School
Denver, Colorado
(Including three months at National Institute of Infections Disease and Allergy, Bethesda MD)
September 1964 - September 1965

Battalion Surgeon (General Medical Officer)
U.S. Army First Special Forces
5th Special Forces Group
Ban Me Thuot, Republic of Viet Nam
February 1969 - July 1970

Battalion Surgeon (General Medical Officer)
U.S. Army First Special Forces
Special Forces Detachment (Abn), Europe
Bad Toelz, Federal Republic of Germany
July 1970 - July 1971

Chief of Pathology/Chief of Professional Services
Operation New Arrivals, 47th Field Hospital
Fort Chaffee, Arkansas
April - June 1975

Chief of Pathology/Chief of Professional Services
Bassett Army Hospital
Fort Wainwright, Alaska
August 1975 - July 1977

Command Surgeon
Joint Readiness Exercise JACK FROST
172nd Infantry Brigade
Fort Wainwright, Alaska
January 1977

Acting Chairman, Department of Pediatric Pathology
Armed Forces Institute of Pathology
Washington, D.C.
1 July 1979 - 18 February 1980

Registrar, Registry of Pediatric Pathology/Medical Genetics
American Registry of Pathology
Armed Forces Institute of Pathology
Washington, D.C.
1 July 1979 - 18 February 1980

Staff Pathologist, Department of Neuropathology
Armed Forces Institute of Pathology
Washington, D.C. 20306
2 February 1980 - 15 July 1980

Commander
209th General Dispensary
Hanau, Federal Republic of Germany
16 July 1980 - 30 June 1981

Command Surgeon
VII Corps
Stuttgart, Federal Republic of Germany
15 June 1981 - 15 July 1983

Command Surgeon
LOGEX 1981
Fort Pickett, Virginia
7 - 15 August 1981

Blood Bank Consultant
7th Medical Command
Heidelberg, Federal Republic of Germany
23 October 1981 - 15 July 1983

Chairman
Department of Pathology & Area Lab Svcs
Walter Reed Army Medical Center
Washington, D.C. 20307
1 August 1983 - 5 August 1984

PRIOR ACADEMIC APPOINTMENTS:

Instructor in Neuropathology
University of Alaska School of Medicine
Fairbanks, Alaska
August 1976 - August 1977

Assistant Professor of Pathology
Uniformed Services University of
the Health Sciences
Bethesda, Maryland
August 1978 - August 1980

ORGANIZATIONAL MEMBERSHIP:

College of American Pathologists (Fellow)
American Society of Clinical Pathology (Fellow)
American Association of Blood Banks
International Academy of Pathology
Society of Pediatric Pathology
Society of Armed Forces Medical
Laboratory Scientists
Washington Society of Pathologists
Canadian Association of Neuropathologists
American Association of Military Surgeons
Paleopathology Association

ORGANIZATIONAL OFFICES:

American Association of Blood Banks
Inspection and Accreditation Program
Inspector: 1977 - Present
National Membership Committee
Member: 1979 - 1984
Chairman: 1985 - Present

ORGANIZATIONAL OFFICES (cont):

College of American Pathologists
Inspection and Accreditation Program
Inspector: 1980 - Present
First Deputy Commissioner for Overseas Laboratories: January 1982 - July 1983
House of Delegates
Delegate: 1983 - Present

Society of Armed Forces Medical Laboratory Scientists
Board of Directors: August 1983 - Present
Editor of Proceedings of SAFMLS:
March 1987 - Present

ELECTED SOCIETIES:

Alpha Epsilon Delta (Pre Med), 1960
Phi Sigma Society (Biological Sciences), 1962
American Alpine Club (Mountaineering), 1981
Pi Alpha Alpha (Public Administration), 1986

PROFESSIONAL PRESENTATIONS:

Course Co-Director (with Dr. Herbert Polesky)
Frozen Blood: Theory and Applications
American Society of Clinical Pathologists
October 1974, Washington, D.C.
May 1975, Las Vegas, Nevada
October 1975, Chicago, Illinois
May 1976, Dallas, Texas

Course Director
Pediatric Pathology for General Pathologists
Armed Forces Institute of Pathology
5 - 9 November 1979

Course Director
Pathology of Genetic Disease
Armed Forces Institute of Pathology
11 - 15 February 1980

Conference Director
VII Corps AMEDD Conference
Stuttgart, Federal Republic of Germany
11 February 1982 (Ist Annual)
11-12 February 1983 (IInd Annual)

PUBLICATIONS:

Abstracts: The Effect of Cortisone on Inflammation in Rabbits; Clark, G.B. and Fulginite, V.; Fed Proc Abstracts, 1965.

Texts: Polesky, H.F.; Clark, G.B.; and Radcliffe, J.H.: Frozen Blood - Theory and Applications, ASCP Workshop Handbook, 1974.

Clark, G.B., LTC; General Pediatric Pathology, Part III (Syllabus); Armed Forces Institute of Pathology, Washington, D.C., 1981.

Journals:

1. Shatsky, S.A.; Alter, W.A.; Evans, D.E.; Armbrustmacher, V. and Clark, G.: Traumatic Distortions of the Primate Head and Chest: Correlation of Biomedical, Radiological and Pathological Data; 18th Stapp Car Crash Cong., 1974.

2. Clark, G.B.: Frozen Blood: Laboratory Techniques and Clinical Utilization; Current Concepts in Pathology; William Beaumont Army Medical Center, 1974.

3. Spees, E.K.; Pool, P; Sullinger, W.O.; Clark, G.B.; Passerti, F.A.; Sperry, D.; Woodbury, M.A.; Amos, D.B.: HLA Genetic Structure of an Eritrean Semitic Group. In Kissmeyer-Nielson, F., Ed.; Histocompatibility Testing, Copenhagen, Munksgaard, p. 213, 1975.

4. Clark, G.B.: Petroleum, Petrochemicals and Health Care: Energy Issues in Health, DHEW Publication No. (HRA)79-14510 (1979).

5. Clark, G.B. and Cline, B.: Impact of Oil Shortage on Medical Plastics; Public Health Reports, May-June 1981.

6. Clark, G.B.: Sick Call by Appointment - One Way to Help a General Dispensary Feel Better; Medical Bulletin, 7th Medical Command, 39:13, 1982.

7. Clark, G.B.: La Medecine dans Les Forces Speciales Americaines; Medecine et Armees 10:229-230, 1982.

8. Spees, E.K.; Clark, G.B.; Smith, M.T.: Are Anencephalic Neonates Suitable as Kidney and Pancreas Donors?; Transplantation Proceedings VOL XVI, No. 1, p. 57-60, Feb 84.

9. Clark, G.B.; Henry, J.M.; McKeever, P.: Correlation of the Histology and Clinical Prognosis of Pilocytic Astrocytomas of the Cerebrum; Cancer 56:1128-1133, 1985.

10. Beaty, J.R.; Brady, R.E.; Clark, G.B.; Coronado, D.A.; Harris, G.S.; Hix, W.M.; Moscato, J.J.; Noll, J.B.; Sandidge, W.M.; Scofield, T.C.; Sholdt, L.L.: Planning for the Mobilization of the Nation's Medical Resources, National Defense University Press, Ft Lesley J. McNair, Washington, D.C., 1985.

11. Rueda Pedraza, M.E.; Heifetz, S.A.; Sesterhenn, I.A.; Clark, G.B.: Correlation of the Histology of Intracranial Teratomas and Antigen Markers for Germ Cell Elements; Perspectives in Pediatric Pathology (accepted for publication for 1986).

12. Clark, G.B.; Spees, E.K., Smith, M.T.: Systemic Pathology of Anencephaly and Allograft Implications (to be submitted).

13. Gaydos, J.C.; Cowan, D.N.; Polk, A.J.; Clark, G.B.; Steward, K.R.; Jones, R.V.; Henry, J.M.: Errors in the Recorded Blood Groups and Types of US Army Soldiers in Europe (to be submitted).

Posters: Henry, J.; Clark, G.B.; McKeever, P.: Cerebral Pilocytic Astrocytoma - A New Entity: IXthInternational Congress on Neuropathology, Vienna, Austria, 5-10 September 82.

CURRICULUM VITAE

NAME: Raoul O. Hagen

DATE AND PLACE OF BIRTH: [ ]

PREMEDICAL EDUCATION: B.A., University of Iowa, [ ]

MEDICAL EDUCATION:

School: M.D., Univ. of Iowa Medical School, [ ]

Internship: Rotating, St. Benedict's Hospital, Odgen, Utah
1 July 1958 - 30 June 1959

Residency: Radiology, Tripler Army Hospital, 1963-1965
Radiology, Walter Reed General Hospital, 1965-1966

MILITARY ASSIGNMENTS:

Clinical Clerk, Letterman General Hospital, July-September 1957.

Army Senior Medical Student Program, Iowa City, Iowa, September 1957-June 1958

General Medical Officer, Prison doctor, Dermatologist, and Flight Surgeon,
Fort Leavenworth, Kansas, 1959-1963

Radiologist and Chief, Radiation Therapy Service, Department of Radiology
Brooke General Hospital, 1967-1968

Chief of Radiology, 93rd Evacuation Hospital, Vietnam
September 1968 - September 1969

Chief, Professional Services, 93rd Evaluation Hospital, Vietnam
1 March - 1 September 1969

Consultant in Radiology, USARV
June-August 1969.

Radiologist, Brooke General Hospital
September 1969 - July 1970

Chief, Department of Radiology, Brooke Army Medical Center
July 1970 - June 1979

Radiology Consultant to Health Services Command
1975 - June 1979

Radiology Consultant to The Surgeon General
January 1978 - July 1982

Chief, Department of Radiology, Tripler Army Medical Center
July 1979 - August 1984

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Chief, Department of Radiology, Walter Reed Army Medical Center
September 1984 - present

Radiology Consultant to The Surgeon General
September 1984 - present

ACADEMIC APPOINTMENTS:

Clinical Instructor, University of Texas Health Science Center, San Antonio
1967

Clinical Assistant Professor, University of Texas Health Science Center,
San Antonio, 1968-1970

Clinical Associate Professor, University of Texas Health Science Center,
San Antonio, 1970-1974

Clinical Professor, University of Texas Health Science Center, San Antonio
1 September 1974 - June 1979

Associate Clinical Professor, University of Hawaii, John A. Burns School of
Medicine, Honolulu, HI, 1982 - 1984

PROFESSIONAL ORGANIZATIONS:

American College of Radiology
Radiological Society of North America
Long Binh Radiological Society

BOARD CERTIFICATION:

American Board of Radiology, December 1967

HONORS:

Prefix "A" in Radiology
Who's Who in Texas
Who's Who in the South and Southwest
Recipient, Magna Cum Laude Award, Radiological Society of North America,
1971, for scientific exhibit
Elected a Fellow, American College of Radiology, 1981

LICENSURE:

Texas
California
Iowa

PUBLICATIONS:

Gastric bezoars: A frequent complication in the postoperative ulcer patient. Radiology, 197:341-344, May 1973.

Carcinoma of the testis: An analysis of 104 patients with germinal tumors of the testis other than seminoma. Cancer, 31:633-640, March 1973.

Scientific exhibit on "Multisystem radiographic analysis of complications in thermally burned patients", Radiological Society of North America, 1971.

CURRICULUM VITAE

NAME: Albert Yuen, M.D.

HOME ADDRESS: [redacted]

OFFICE ADDRESS: Department of Radiation Oncology
Walter Reed Army Medical Center
Washington, D.C. 20307
202-576-1180

BIRTHDAY AND BIRTHPLACE: [redacted]

MARITAL STATUS: [redacted]

SOCIAL SECURITY NUMBER: [redacted]

EDUCATION:

B.S. Materials Engineering
Rensselaer Polytechnic Institute
Troy, New York

M.S. Materials Science
Rensselaer Polytechnic Institute
Troy, New York

Doctor of Medicine
Albany Medical College
Albany, New York

1980-1981 Internship
Brooke Army Medical Center
Fort Sam Houston, Texas

RESIDENCY: 1981-1984 Radiotherapy
M.D. Anderson Hospital and Tumor Institute
Houston, Texas

BOARD CERTIFICATION:
1981 National Board of Medical Examiners
1984 American Board of Radiology in Therapeutic Radiology

CURRENT LICENSE: New York State, No. 153015
Maryland, No. D31759

PROFESSIONAL SOCIETIES:
American College of Radiology
American Society of Therapeutic Radiology and Oncology
American Society of Clinical Oncology
Gilbert H. Fletcher Society
M.D. Anderson Associates

HONORARY SOCIETIES: Tau Beta Pi 1970 (Engineering)
Alpha Sigma Mu 1971 (Materials Science)

PUBLICATIONS: Yuen A, Medina J E, Goepfert H, and Fletcher G H. Management of Stage T3 and T4 Glottic Carcinomas, American Journal of Surgery, 148:467-472, 1984

DOUGLAS VAN NOSTRAND
CURRICULUM VITAE

Date of Birth
Place of Birth [redacted]

EDUCATION

High School	The Lawrenceville School Lawrenceville, New Jersey 1962-1965
Undergraduate	Duke University, Durham, North Carolina Degree: BS [redacted]
Postgraduate	Emory University School of Medicine Atlanta, Georgia Degree: M.D. [redacted]
Internship	Wilford Hall Medical Center San Antonio, Texas Internal Medicine Director: Gerald Parker, M.D. 1973-1974
Residency	Wilford Hall Medical Center San Antonio, Texas Internal Medicine Director: Charles Coltman, M.D. 1974-1976
Fellowship	National Naval Medical Center Bethesda, Maryland Nuclear Medicine Director: Peter T. Kirchner, M.D. 1976-1978
Diagnostic Ultrasound Training Program	Thomas Jefferson University Philadelphia, Pa Trainee - 3 month course Director: Barry Goldberg, M.D. 1977

Ex 6

Douglas Van Nostrand
Curriculum Vitae

BOARD CERTIFICATION

Diplomate of National Board of Medical Examiners:	Number 148723, July 1, 1974
Diplomate of American Board of Internal Medicine:	Number 55825, June 16, 1976
Diplomate of American Board of Nuclear Medicine:	Number 04406, Sept. 30, 1978

PRESENT POSITION

Chief, Division of Nuclear Medicine	Walter Reed Army Medical Center Washington, D.C. July 1980 to present Lt Colonel

APPOINTMENTS

Associate Professor of Clinical Radiology	Department of Radiology and Nuclear Medicine Uniformed Services Univ of Health Sciences Bethesda, Maryland 14 January 1980 to present
Assistant Clinical Professor	Department of Radiology George Washington University Washington, D.C. July 1981 to present

PREVIOUS POSITIONS

Chief, Division of Nuclear Medicine	Malcolm Grow Medical Center Andrews Air Force Base Washington, D.C. June 1978 - June 1980
Chief, Division of Ultrasound	Malcolm Grow Medical Center Andrews Air Force Base Washington, D.C. June 1978 - June 1980
United States Air Force	Commissioned June 1969 (Active Duty from June 1973 to July 1980)
United States Army	Interservice Transfer, July 1980 (Active Duty from July 1980 to present)

Douglas Van Nostrand
Curriculum Vitae

HONORS

United States Air Force Commendation Medal	January 5, 1981
Fellow, American College of Physicians	September 5, 1985
"A" Professional Designator Award, United States Army	September 23, 1986

LICENSES

State of Maryland	Number 321922, March 15, 1978
District of Columbia	Number 12489, October 1980

SOCIETIES

Society of Nuclear Medicine
American College of Physicians
American College of Nuclear Physicians
Radiological Society of North America

SERVICES

Member, Clinical Investigation Committee	1980-1985
Member, Radiation Control Committee	1980-
Chairman, Radiation Human Use Subcommittee	1980-
Member, Radioactive Drug Research Committee	1980-1984
Chairman, Radioactive Drug Research Committee	1984-
Alternate Delegate to the American College of Nuclear Physicians	1983-1985
U. S. Army Delegate to the American College of Nuclear Physicians (ACNP)	1985-
Member, Practice Management and Economics Committee (credentials) of ACNP	1986-

PRESENTATIONS

D. Van Nostrand, M.D., W.R. Janowitz, M.D., D.R. Holmes, M.D., H.A. Cohen, M.D., "Accuracy of Radionuclide Multiple Gated Acquisition (MUGA) in the Assessment of Myocardial Wall Motion."

- World Federation of Nuclear Medicine and Biology, Second International Congress, September 1978.
- Society of Nuclear Medicine, Mid-Eastern Chapter, Eighth Annual Meeting, April 1978.
- American College of Physicians, Society of the Air Force Physicians, February 1978.

- American Heart Association, 51st Scientific Session, October 1978.

D. Van Nostrand, M.D., W.R. Janowitz, M.D., H.R. Adams, M.S., P.T. Kirchner, M.D., "Comparison of Tc-99m Methylene Diphosphonate (MDP) and Tc-99m Pyrophosphate."

- Society of Nuclear Medicine, Mid-Eastern Chapter, Seventh Annual Meeting, March 1977

D. Van Nostrand, M.D., P.J. Murphy, M.D., N. Holland, M.D., C.C. Atkins, M.D., F.H. Gerber, M.D., "Efficacy of Postoperative Bone Scanning in the Management of Breast Carcinoma."

- American College of Physicians, Society of the Air Force Physicians, March 1979.

- Society of Nuclear Medicine, Mid-Eastern Chapter, Ninth Annual Meeting, April 1979.

- American Roentgen Ray Society Annual Meeting
April 1980.

D. Van Nostrand, M.D., "Gallium Scanning in the Detection of Abdominal Abscesses."

- American College of Surgeons, Spring Surgical Symposim, Walter Reed Army Medical Center and Uniformed Services of Health Sciences
April 1981.

D. Van Nostrand, M.D., "I-131 Chest Survey and Metastatic Thyroid Carcinoma."

- Walter Reed Radiological Symposium, May 1981.

M.H. Goldman, M.D., N. Ward, M.D., F. Shawl, M.D., D. Van Nostrand, M.D., "Multiple Cardiac Sequellae of Nonpenetrating Chest Trauma: Noninvasive Assessment and Management."

- Army Association of Cardiology, Brooke Army Medical Center, May 1981.

J. Garcia, M.D., D. Van Nostrand, M.D., W.H. Howard, M.D., R.W. Kyle, B.S., "Spectrum of 67-Gallium Renal Activity in Patients with No Evidence of Renal Disease."

- Society of Nuclear Medicine, Mid-Eastern Chapter, Thirteenth Annual Meeting, April 1983.

R.C. Smallridge, M.D., M.H. Goldman, M.D., K. Raines, M.D., D. Van Nostrand, M.D., "Left Ventricular Function in Hyperthyroidism: Studies Using Radionuclide Angiography."

- Army Association of Cardiology, Dwight Eisenhower Army Medical Center, May 1983.

S.J. Raible, M.D., M.S. Schaaf, M.D., W.J. Oetgen, M.D., D. Van Nostrand, M.D., "Acromegaly and the Heart: Evaluation of Cardiac Function by Radionuclide Angiocardiography."

- Thirteenth Annual Session of the Association of Army Cardiology 18-20 April 1984

J.A. Kark, D. Van Nostrand, J.A. Key, et. Al., "Effects of Attitude Hypoxia on Blood Flow in the Spleen and Lungs of Men with Sickle Cell Trait,"

- American Society of Hematology, 26th Annual Meeting 1-4 December 1984

S. Shay, D. Eggli, D. Van Nostrand, L. Johnson, "Gastric Emptying of solid Food in Patients with Gastroesophageal Reflux,"

- Society of Nuclear Medicine 32nd Annual Meeting, 2-5 June 1985

D. Eggli, D. Van Nostrand, "The Role of Radionuclide Imaging in Training Injuries,"

- Training Associated Injuries Workshop, Walter Reed Army Institute of Research, 16-17 July 1985.

M. Schaff, S. Raible, D. Van Nostrand, I. Cohen, W. Oetgen, R. Smallridge, "Radionuclide Evaluation of Cardiac Function in Acromegaly Evidence for an Acromegalic Cardiomyopathy".

-Acromegaly Centennial Symposium, 29 June-1 July 1986.

BOOK REVIEWS

"Nuclear Medicine, Focus on Clinical Diagnosis", Military Medicine, 146:716, 1981.
"Clinical Nuclear Medicine", Military Medicine, 146:876, 1981.
"1982 Yearbook of Nuclear Medicine", Military Medicine, 147:872, 1982.
"Introductory Physics of Nuclear Medicine," Military Medicine, 148: 23, 1984.
"1983 Yearbook of Nuclear Medicine," Military Medicine, 149: 11, 1984.
"Current Topics in Tumor Cell Physiology and Positron-Emission Tomography, "Clin Nuc Med, 10:316, 1985
"1986 Yearbook of Nuclear Medicine, "Military Medicine" in press.

ABSTRACTS/PAPERS/BOOK CHAPTERS

D. Van Nostrand, M.D., W.R. Janowitz, M.D., H.R. Adams, M.S., P.T. Kirchner, M.D., "Comparison of Tc-99m Methylene Diphosphonate (MDP) and Tc-99m Pyrophosphate." Medical Imaging, Abstract, September 1977.

W.R. Janowitz, M.D., D. Van Nostrand, M.D., D.R. Holmes, M.D., Lt Cmdr H. Cohen, "Evaluation of Segmental Left Ventricular Wall Motion by Multiple Gated Radionuclide Angiography", Circulation, Abstract, Vols. 57 and 58, Supplement II, pp II-9, October 1978.

D. Van Nostrand, M.D., W.R. Janowitz, M.D., D.R. Holmes, M.D., H.A. Cohen, M.D., "Evaluation of Segmental Left Ventricular Wall Motion by Multiple Gated Radionuclide Angiography", Catheterization and Cardiovascular Disease, Vol 5, No 3, pp 547-555, 1979.

D. Van Nostrand, M.D., R.C. Smallridge, M.D., "Thyroid Trapping of Technetium-99m During In Vivo Labeling of RBC's", J Nucl Med, 23:1146-1147, 1982.

D. Van Nostrand, M.D., J.H. Corley, R.W. Kyle, R.E. Stotler, "Utility of Selective Spleen Scintigraphy in Clarification of Equivocal Defects on Liver/Spleen Scan", J Nucl Med, 24:559-562, 1983.

S.M. Manier, M.D., D. Van Nostrand, M.D., "From 'Hot Spots' to Superscan;" Clin Nucl Med, 8:624-625, 1983.

S.M. Manier, M.D., D. Van Nostrand, M.D., "Gamut: Super Bone Scan", Semin Nucl Med, 14:46-47, 1984.

J.E. Garcia, M.D., D. Van Nostrand, M.D., W.H. Howard, M.D., R.W. Kyle, B.S., "The Spectrum of Gallium - 67 Renal Activity in Patients with No Evidence of Renal Disease," J Nucl Med, 25:575-580, 1984.

D. Van Nostrand, M.D., "Ascending Aortic Aneurysm", Clin Nucl Med, 9:357, 1984.

S.M. Manier, D. Van Nostrand, R.W. Kyle, "Primer and Atlas for Renal Transplant Scintigraphy, Part I," Clin Nucl Med, 10:52-62, 1985.

S.M. Manier, D. Van Nostrand, R.W. Kyle, "Primer and Atlas for Renal Transplant Scintigraphy, Part II," Clin Nucl Med, 10:118-133, 1985.

D. Van Nostrand, and E.B. Silberstein, "Therapeutic Uses of P-32," In: Nuclear Medicine Annual 1985, edited by L.M. Freeman, H.S. Weissman, Grune and Stratton, New York. pp 285-344, 1985.

J.A. Kark, D. Van Nostrand, J.A. Key, P.G. Tarassoff, J.J. Canik, H.C. Williams, R.C. Reba, D.M. Posey, C.J. Ruehle, and J.R. Burge, "Effects of Altitude Hypoxia on Blood Flow in The Spleen and Lungs of Men with Sickle Cell trait, Blood, 64: Supple 1, pp 49a, 1984. (abstract)

J. Neutze, D. Van Nostrand, W. Major, "Peritoneo-scintigraphy in Detection of Improper Placement of Peritoneal Catheter into Bowel Lumen Prior to Chromic Phosphate P-32 therapy: A Case Report," Clin Nuc Med 10: 777-779, 1985.

S.M. Manier, D. Eggli, P.W. Blue, D. Van Nostrand, "Diffuse Radioiodine Lung Uptake in Miliary Thyroid Carcinoma Metastasis," Clin Nuc Med 10: 872-873, 1985

S. Shay, D. Eggli, D. Van Nostrand, L. Johnson "Gastric Emptying of Solid Food in Patient with Gastroesophageal Reflux," J Nuc Med, 26: pp 71, 1985 (Abstract).

G. Graham, M.D., D. Van Nostrand, M.D., D. Eggli, M.D., J. Neutze, M.D., "Utility of Lateral Imaging in Rectosigmoid Bleeding," Clin Nuc Med, 10:298-299, 1985.

B. W. Booth, M.D., D. Van Nostrand, M.D., and G. M. Graeber, M.D., "Hypertrophic Osteoarthropathy (HPO) and Breast cancer. A Case Report and Review of HPO Associated with Non-Primary Intrathoracic Tumors," in press 1986.

D. Van Nostrand, M.D., J.E. Madewell, M.D., L.M. McNiesh, M.D., R.W. Kyle, B.S. CNMT, D. Sweet, M.D., "Radionuclide Bone Scanning in Giant Cell Tumor," J Nucl Med, Accepted for publication, 1986.

H.R. Terebelo, D.O., D. Van Nostrand, M.D., "Systemic Toxicity from Arteriovenous Shunting of Hepatic Artery Infusion Chemotherapy," Military Medicine 150: 552-554, 1985.

M. Schaaf, M.D., S. Raible, M.D., D. Van Nostrand, M.D., I. Cohen, M.D., W. Oetgen, M.D., R. Smallridge, M.D., "Radionuclide Evaluation of Cardiac Function in Acromegaly: Evidence for an Acromegalic Cardiomyopathy," in press in proceedings of Acromegaly Centennial (Abstract).

D. Van Nostrand, M.D., J. Neutze, M.D., F. Atkins, Ph.D, "Side Effects of 'Rational Dose' Iodine-131 Therapy for Metastatic Well-Differentiated Thyroid Carcinoma," J Nucl Med 27:1519-1527, 1986

D. Van Nostrand, M. D., S. Baum M. D., Eds., "Primers and Atlas of Clinical Nuclear Medicine", J. B. Lippincott Company, Philadelphia, in press, 1987

S. Manier, D. Van Nostrand, M.D., R. Kyle, S. Abreu, M. D. "Renal Transplant Scintigraphy," In: Primers and Atlases of Clinical Nuclear Medicine, Eds., D. Van Nostrand, M. D., S. Baum, M. D., J.B. Lippincott, Co, Philadelphia, in press, 1987.

S. Manier, M.D., D. Van Nostrand, M. D., F. Atkins, Ph.D, S. Y. Wu, M.D., "I-131 Neck and Chest Scintigraphy," Eds., D. Van Nostrand, M.D., S. Baum, M.D., Primers and Atlases of Clincial Nuclear Medicine, J. B. Lippincott, Co., Philadelphia, in press 1987.

CURRICULUM VITAE

for

GERALD M. CONNOCK, M.S.

Date & Place of Birth: [redacted]

Home Address: [redacted]

Home Telephone Number: [redacted]

Office Address: Health Physics Office
Walter Reed Army Medical Center
Washington, DC 20307-5001

Office Telephone Number: (301) 427-5104

Degrees:

M.S. - Medical Physics [redacted]
University of California, Los Angeles
Los Angeles, CA

B.A. - Anthropology [redacted]
University of Florida
Gainesville, FL

Professional Societies: Health Physics Society

Other Education and Training:

1987 — Health Physics in Radiation Accidents Course
REAC/TS, Oak Ridge Associated Universities
Oak Ridge, TN

1986 — International Conference on Non-Military Radiation Emergencies
American Medical Association
Washington, DC

1980 - 1983 — USA Command and General Staff Officer Course
Non-resident

1982 — Laser and Microwave Hazards Workshop
US Army Environmental Hygiene Agency
Aberdeen Proving Ground, MD

1981 — AMEDD Radiation Protection Officers Workshop
US Army Environmental Hygiene Agency
Aberdeen Proving Ground, MD

Ex 6

1981	US Army Medical X-Ray Survey Techniques Course Academy of Health Sciences, US Army Fort Sam Houston, TX
1981	Nuclear Hazards Training Course Interservice Nuclear Weapons School Sandia Base, NM
1980	Medical Effects of Nuclear Weapons Course Armed Forces Radiobiology Research Institute Bethesda, MD
1977	AMEDD Officer Advanced Course Academy of Health Sciences, US Army Fort Sam Houston, TX
1972	Essential Medical Training for AMEDD Aviators Fort Sam Houston, TX
1972	Rotary Winged Officers Course Fort Rucker, AL
1971	Battalion Surgeons Assistance Course US Army Medical Field Service School Fort Sam Houston, TX
1971	AMEDD Officer Basic Course US Army Medical Field Service School Fort Sam Houston, TX

Chronological Experience:

Oct 1985 - Present

Walter Reed Army Medical Center
Washington, DC 20307-5001
Health Physics Officer
Health Physics Office

Develop, direct and provide health physics services for WRAMC and its supported activities including USAMRIID, Ft. Detrick. Develop, review, and direct Health Physics Training programs. Organize, equip, train and direct the operations of the Radiological Advisory Medical Team. Serve as Executive Agent for the WRAMC Radiation Control Committee and for Nuclear Regulatory Licenses and DA Authorizations for the possession, storage, use and disposal of radioactive material at WRAMC and tenant activities. Provide interpretation and assure compliance with license conditions,

CONNOCK, Gerald M. (Continuation of Curriculum Vitae)

practices. Evaluated Department of the Army operational doctrine pertaining to medical operations in radiation environments, which affected the health of individuals and the environment within which AMEDD facilities and units operated. Further recommended concepts of operations for the employment of AMEDD units in ionizing and nonionizing radiation environments. Represented the command at numerous interservice and civilian meetings addressing ionizing and non-ionizing radiation protection.

Jan 1978 - Dec 1979

University of California, Los Angeles
Medical Physics Division
Student

Studied radiation protection, regulations, radiation biology, medical physics, radiopharmacology, nuclear medicine physics, and radiation therapy. Wrote a thesis dealing with Minimum Object Visibility on X-rays, a comparison between standard and high kilovoltage techniques. In addition, gave in-service physics training on imaging systems to nuclear medicine technologists.

Publications:

"Medical Operations in a Contaminated Environment," Symposium on Mission Accomplishment in an NBC Environment, American Defense Preparedness Association, 1980.

"Minimum Size Object Visibility on X-Rays Taken at 80 kVp and 240 kVp," UCLA, 1979 - (thesis).

federal laws, Army Regulations, and National Standards pertaining to ionizing and non-ionizing radiation. Advise the Commander, WRAMC, as Radiation Protection Officer, on all other matters pertaining to ionizing and nonionizing radiation hazards.

Sep 1984 - Oct 1985

Walter Reed Army Medical Center
Washington, DC 20307-5001
Chief, Operations Branch
Health Physics Office

Apr 1984 - Sep 1984

Walter Reed Army Medical Center
Washington, DC 20307-5001
Assistant Chief, Operations Branch
Health Physics Office

Supervise personnel in conduct of radiation protection surveys for radioisotope laboratories, X-ray units, radiotherapy procedures, emergency response, and shielding evaluations. Provide classes for medical personnel in ionizing radiation protection.

Jul 1983 - Mar 1984

US Army Medical Department Activity Panama
Ancon, Republic of Panama
Alternate Radiation Protection Officer
Health Physics Consultant

Assisted in the performance of radiation protection surveys for radioisotope laboratory, X-ray units, and emergency response. Assisted in the management and monitoring of a radiation film badge program. Provided advice on numerous radiation protection and procedural questions for medical staff and patients. Assisted in the preparation and submission of the renewal of the Department of the Army Radioactive Material Authorization.

Dec 1979 - Jul 1982

Academy of Health Sciences, US Army
Combat Developments and Health Care Studies Directorate
Fort Sam Houston, TX
Nuclear Medical Science Officer

Provided professional consultation and prepared operational concepts for the Commandant and his staff, both medical and non-medical personnel, concerning ionizing and nonionizing

30 August 1985

CURRICULUM VITAE

STOOPS, HOWARD CECIL, RPh

[redacted]

I. PERSONAL:

A. [redacted]
B.
C.
D.

II. ACADEMIC AND PROFESSIONAL EDUCATION:

[redacted] Duquesne University, Pittsburgh PA; B.S. Pharmacy

MAR 85 Triservices Nuclear Pharmacy Orientation Course

MAY 85 Safe Use And Handling Of Radioisotopes Course

JUL 85 Nuclear Pharmacy Extended Training Course

AUG 85 Advanced Nuclear Medicine Technologist Training Course

Military Education

JAN 80 - MAR 80 Medical Service Corps Officer Basic Course, Ft. Sam Houston TX

MAR 80 - APR 80 Medical Service Corps Pharmacy Officer Orientation Course Ft. Sam Houston TX

III. PROFESSIONAL LICENSE:

A. Registered Pharmacist, Certificate # RP-030846-L , Pennsylvania State Board of Pharmacy , September 1979

Ex 6

IV. PROFESSIONAL EXPERIENCE;

SEP 1985 to Present	Chief, Nuclear Pharmacy Department, Nuclear Medicine Service, Walter Reed Army Medical Center, Washinton, D.C.
SEP 1984 to SEP 1985	Nuclear Pharmacy Residency Course, Nuclear Medicine Service, Letterman Army Medical Center, Presidio of San Francisco, CA
APR 1982 to AUG 1984:	Chief Sterile Products, Inpatient Pharmacy Service Dwight David Eisenhower Army Medical Center, Ft. Gordon GA.
APR 1980 to MAR 1982:	Staff Pharmacist, Outpatient Pharmacy Service Dwight David Eisenhower Army Medical, Ft. Gordon GA.
SEP 1979 to DEC 1979:	Staff Pharmacist, Eckerds Drug Store Erie, PA

DEPARTMENT OF THE ARMY

CERTIFICATE OF TRAINING

This is to certify that

CPT HOWARD C. STOOPS

has successfully completed

SAFE USE AND HANDLING OF RADIOISOTOPES

29 April – 10 May 1985

AMA Category I Credits Assigned: 66 Hours

Given by Letterman Army Medical Center & Letterman Army Institute of Research
Presidio of San Francisco, California 94129
Cosponsor: The Surgeon General, Department of the Army, Washington, D.C.

Sheldon R. Kiser

SHELDON R. KISER, Ph.D.
Professor of Medical Physics
Program Director, LAMC

DEPARTMENT OF THE ARMY

This is to certify that

HOWARD C. STOOPS

has successfully completed

6F-H19, 18th Annual Triservices Nuclear Pharmacy Orientation Course

Universal Program Number: 185-602-85-02

Continuing Education Credit: 51.25 Contact Hours

11 March to 22 March 1985

Given at Letterman Army Medical Center
Presidio, SF, California 94129-6700

ALFRED W. GILL
LTC, MSC
Continuing Education Coordinator

"Academy of Health Sciences, Pharmacy Branch/, Medicine and Surgery Division, is approved by the American Council on Pharmaceutical Education as a provider of continuing pharmaceutical education."

DA FORM 87, OCT 78 EDITION OF 1 JUL 74 WILL BE USED

DEPARTMENT OF THE ARMY

FRTIFICATE OF TRAINING

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CPT HOWARD C. STOOPS

has successfully completed

NUCLEAR MEDICINE TECHNOLOGY REVIEW COURSE

26 - 30 August 1985

Robert J. Lull MD

ROBERT J. LULL, MD, COL, MC
Chief, Nuclear Medicine Service

en at LETTERMAN ARMY MEDICAL CENTER

CURRICULUM VITAE

for

DAVID E. HINTENLANG, PH.D.

Date & Place of Birth:

Home Address:

Home Telephone Number:

Office Address: Health Physics Office
Walter Reed Army Medical Center
Washington, DC 20307-5001

Office Telephone Number: (301) 427-5107

Degrees:

Ph.D. - Physics
Brown University
Providence, RI

M.Sc. - Physics
Brown University
Providence, RI

B.S. - Physics
Bucknell University
Lewisburg, PA

Other Education and Training:

1987 — Nuclear Weapons Orientation Advanced Course
Interservice Nuclear Weapons School
Kirtland Air Force Base, NM 87117

1986 — Health Physics in Radiation Accidents Course
Oak Ridge Associated Universities
Oak Ridge, TN 37831-0117

1986 — Laser and Microwave Hazards Workshop
US Army Environmental Hygiene Agency
Aberdeen Proving Ground, MD

1985 — Health Care Administrator's Logistics Development Course
Walter Reed Army Medical Center
Washington, DC 20307-5001

1985	Medical Effects of Nuclear Weapons Armed Forces Radiobiology Research Institute Bethesda, MD
1985	Nuclear Hazards Training Course Interservice Nuclear Weapons School Kirtland Air Force Base, NM
1985	US Army Medical X-Ray Survey Techniques Course Academy of Health Sciences, US Army Fort Sam Houston, TX
1984	AMEDD Officer Basic Course Academy of Health Sciences, US Army Fort Sam Houston, TX

Experience:

Jan 1985 - Present

Walter Reed Army Medical Center
Washington, DC 20307-5001
Assistant Health Physics Officer
Chief, Technical Services Branch
Health Physics Office

Develop, direct and provide health physics services for WRAMC and all tenant activities. Develop, review, and direct Health Physics Training programs. Organize, equip, train and direct the operations of the Radiological Advisory Medical Team. Serve as first line Executive Agent for the WRAMC Radiation Control Committee to administrate requirements of Nuclear Regulatory Commission Licenses and DA Authorizations for the possession, storage, use and disposal of radioactive material at WRAMC and tenant activities. Provide interpretation and assure compliance with license conditions, Federal Laws, Army Regulations, and National Standards pertaining to ionizing and nonionizing radiation. Advise the Commander, WRAMC, and Radiation Protection Officer, on all other matters pertaining to ionizing and nonionizing radiation hazards.

HINTENLANG, David E. (Continuation of Curriculum Vitae)

Publications:

Hintenlang, David E., and Bray, P. J., "NMR Studies of Boron Sulfide-Based Glasses," Journal of Non-Crystalline Solids, 69, 1985.

Bray, P. J., Hintenlang, D.E., and Mulkern, R. V., "NMR Studies of Fluoride and Fast Ion Conducting Glasses," Journal of Non-Crystalline Solids, 56, 1983.

Bray, P. J., Hintenlang, D. E., Lui, M. L., and Mulkern, "Recent NMR Studies of Oxide, Fluoride and Superionic Conducting Glasses," Glastechnische Berichte, 1983.

Bray, P. J., Lui, M. L., and Hintenlang, D. E., "NMR Studies of Structure and Ion Motion in Glasses," Proceedings for the Third Otto Schott Symposium of Glasses, 1982.

Bray, P.J., Gravina, S. J., Hintenlang, D. E., and Mulkern, R. V., "Nuclear Magnetic Resonance of Glasses," MAGNETIC Resonance Review, to be published.

Professional Membership:

American Physical Society
Sigma Xi
Health Physics Society
(Baltimore-Washington Chapter)
American Association for the Advancement of Science.

CURRICULUM VITAE

NAME IN FULL: Franklin Henry Top, Jr.

RANK, CORPS, COMPONENT: Colonel, Medical Corps, United States Army

SSAN: [redacted]

DOB: [redacted]

DATE ENTERED ACTIVE DUTY: 1 Aug 1966 DATE PRESENT RANK: 10 Dec 1974

TOTAL YEARS MILITARY SERVICE: 20 DATE PERMANENT RANK: 28 Jan 1979

WIFE'S NAME: [redacted]

CHILDREN'S NAME(S): [redacted]

EDUCATION - MILITARY, CIVILIAN, DATE, DEGREE, SCHOOLS:

Yale University, New Haven, CT [redacted] - BS	
Yale University, New Haven, CT [redacted] - MD (Cum Laude)	
Pediatric Internship, University of Minnesota Hospital	1961-1962
Pediatric Residency, University of Minnesota Hospital	1962-1964
Basic Course, Medical Field Service School, Ft Sam Houston, TX	1966
Army Medical Department (AMEDD) Executive Course	1983

MILITARY ASSIGNMENTS:

Internist, Department of Virus Diseases, Division of Communicable Disease and Immunology, (CD&I), Walter Reed Army Institute of Research (WRAIR), Washington, DC	1966-1968
Assistant Chief, Department of Virus Diseases, Div CD&I, WRAIR	1968-1970
Chief, Department of Virology (SEATO), Bangkok, Thailand	1970-1973
Chief, Pediatric Training Program (SEATO), " "	1972-1973
Deputy Director, US Army Medical Component, (SEATO)	1972-1973
Chief, Department of Virus Diseases, Div CD&I, WRAIR	1973-1976
Director, Division of Communicable Disease and Immunology, WRAIR	1976-1978
Professor of Pediatrics, Uniformed Services University of Health Sciences, Bethesda, Maryland	1978-present
Deputy Director, Walter Reed Army Institute of Research	1979-1981
Commander, US Army Medical Institute of Chemical Defense Aberdeen Proving Ground, Maryland	1981-1983
Director and Commandant, Walter Reed Army Institute of Research	1983-present

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MILITARY AWARDS, HONORS, BADGE:

Legion of Merit with Oak Leaf Cluster
Meritorious Service Medal
The Surgeon General's A Prefix

MEMBERSHIP, SCIENTIFIC COMMITTEES:

Member, Microbial and Infectious Disease Advisory Committee, 1976-1980
National Institute of Allergy and Infectious Diseases,
National Institutes of Health, Bethesda, Maryland

PROFESSIONAL SOCIETIES:

Alpha Omega Alpha Honor Medical Society 1960
Certified, American Board of Pediatrics 1966
Society for Pediatric Research
The American Society of Tropical Medicine and Hygiene
Infectious Disease Society of America
American Association of Immunologists
American Association for the Advancement of Science
American Medical Association

MISCELLANEOUS (HOBBIES, SPECIAL INTERESTS): [ ]

PROFESSIONAL INTERESTS:

Over 40 publications in Pediatric infectious diseases, respiratory viruses, arboviruses, and streptococcal infections.

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CURRICULUM VITAE

NAME: Billy G. Bass

SSAN: [redacted]

DOB: [redacted]

Present Position:

Director, Instrumentation Division
Walter Reed Army Institute of Research
Washington, D.C. 20307

Telephone: (202) 576-3428

Home Address:

[redacted]

Wife's Name:

[redacted]

Children: [redacted]

Military Service:

U.S. Air Force (1950 - 1954)
Electronic Technician (Radar/microwave)
Maintained microwave and communication equipment

Education Background

University of Maryland overseas (Europe) 1951-1953 (Night courses)

27 Semester hours liberal arts curriculum

North Carolina State College, Raleigh, North Carolina

Bachelor of Nuclear Engineering [redacted] 164 s.h.
Graduate Study, Nuclear Engineer Feb. - June 1958 12 s.h.

University of California at Los Angeles Sept. 1959 - June 1962

Electrical Engineering 15 semester hours (evening)

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University of Maryland, College Park, Maryland Sept. 1963 - June 1966

Electrical Engineering and Computer Science 24 semester hours (part time)

George Washington University, Washington, D.C.

Master of Engineering Administration
30 semester hours in the following areas:

Personnel Administration

Contract Administration

Operations Research

Res./Dev. Administration

Law for Engineers

Acounting

Business Administration

Industrial Psychology

George Washington University, Washington, D.C.

Doctor of Science, Electrical Engineering and Computer Science

Major Area of Study: Medical Engineering

Minor Areas of Study: Computer Science
Communication

Electronic Fundamentals, Radar & Microwave Systems

U.S. Air Force Technical Schools 1950 - 1951

Digital Systems Engineering

RCA Institute, Washington, D.C. 1968

Personnel Management for Executives, Williamsburg, VA. (2 weeks) 1978
Decision Making for Executives Seminar, Frederick, MD. (1 week) 1979
Labor Relations in Government Seminar, Washington, D.C. (1 week) 1980
Management and Industrial Relations Seminar, Ga. Tech. (1 week) 1980
Advanced Management, U.S. Army Mgmt. Tng. Act., Washington, D.C. (1 week) 1979
Emerging Trends in Mgmt. Technology, USAMETA, Washington, D.C. (1 week) 1980

Work Experience:

1976 - Present: Director, Instrumentation Division, WRAIR. Manage the design, development, test and evaluation of unique biomedical and clinical research instrumentation systems. Work involves manual as well as microprocessor based instrumentation, electronic, mechanical, acoustical, microwave, millimeter--wave, optical and nuclear components. Use of state-of-the-art electronics and data processing concepts. Manage ionizing radiation facilities for the Institute. Conduct research in radiation dosimetry

1972 - 1976: Chief, Analytical Chemistry Department, Biochemistry Division, WRAIR. Managed operations of analytical laboratories in support of drug abuse research. Operations included atomic absorption spectrometry, mass spectrometry, high performance liquid chromotography and automated clinical instrumentation development laboratory. Managed reference laboratory and quality control program for drug abuse laboratories (commercial contractors). Directed design of automated analytical instrumentation using commercial minicomputers as well as surplus DOD computers from tactical weapon systems (Minuteman ICBM, army artillary fire control computers). Performed contract administration. Managed ionizing radiation facilities. Served as technical/scientific consultant to several private organizations as well as government committees. Planned and directed new research projects in analytical instrumentation and methodology. Lectured to various organizations in nuclear medicine instrumentation, analytical systems and nuclear physics.

1970 - 1972: Chief, Department of Automated Instrumental Analysis, Biochemistry Division, WRAIR. Planned and directed the total dismantlement of the Walter Reed Research Reactor (Nuclear). Managed operation of automated analytical laboratories. Directed research in analytical methodology and instruments for assessment of toxic substances in biological fluids and the study of the metabolism of drugs of abuse in humans. Established mass spectrometry laboratory. Established automated gas chromatography laboratory. Directed design, development, test and evaluation of analytical instrumentation systems. Established laboratory automation system using surplus Department of Defense weapon system computers. Served as contract administrator, lecturer and consultant in nuclear medicine instrumentation and medical electronics.

1967 - 1970: Chief, Department of Nucleonics, Nuclear Medicine Division, WRAIR. Directed operation of research nuclear reactor. Planned and directed multifaceted program of research using a nuclear reactor applied to biomedical problems. Established automated neutron activation analysis laboratory. Developed and implemented quality control procedures and production control procedures for reactor-produced radiopharmaceuticals. Directed design and application of automated analytical instrumentation and state-of-the-art electronics and nuclear physics to biomedical research. Served as contract administrator, lecturer and consultant in nuclear physics and biomedical electronics.

1962 - 1967: Chief, Electronics Section, Nuclear Medicine Division, WRAIR. Supervised and performed design, development, evaluation and testing of state-of-the-art electronic analog and digital devices for use in biomedical research. Design and development of advanced nuclear medicine instrumentation systems (whole body counters, body scanners, radionuclide imaging systems, radiation dosimetry devices, etc.). Planned and implemented program of research in the development and application of advanced nuclear/electronic devices to military medical problems.

1961 - 1962: Adv. Avionics System Designer, Douglas Aircraft Company, Space Division. Avionics system design, test, and evaluation. Instrumentation components evaluation for nuclear rocket program. Wrote test procedures for radiation hardening of electronic circuits and components. Design and evaluation of state-of-the-art electronics for advanced missile and space vehicle production. Performance evaluation of microwave systems, communications and attitude control systems. Wrote specifications for space vehicle hardware. Studied automated test equipment and procedures for space vehicle systems.

1960 - 1961: System Design Engineer. Douglas Aircraft Company. Design, development, test and evaluation of electronic systems for sonic data dnalysis as part of anti-submarine warfare research program. Performed sound propagation studies. Designed closed reel magnetic tape recording system for sonic data reduction and analysis. Performed sensor design evaluations as well as shipboard and aircraft instrument design and evaluation. Wrote specifications for anti-submarine warfare research equipment.

1959 - 1960: Design Engineer. Douglas Aircraft Company. Microwave and avionics system test and evaluation. Airborne radar system design. All attitude indicating system and auto-pilot test and evaluation. Control system analysis. Wrote specifications for avionic system components.

1957 - 1958: Nuclear System Design Engineer, Newport News Shipbuilding and Dry Dock Co. Nuclear power system design and evaluation. Nuclear power plant performance analysis. Wrote technical specifications for nuclear power plant components for shipboard use. Pressurized water reactor power plant component design and evaluation.

Special Qualifications:

Typing - 60 wpm

Digital Computer Programming Languages

BASIC
FORTRAN
PL/1
IBM 360 Assembly
Microprocessor Assembly (8080 - Z80)

Professional Society Membership

IEEE
AAMI

Awards

Department of Army Training Fellowship (1 year, 1972)
Outstanding Performance Award (1964, 1967, 1971, and 1977)
Technical Achievement Award (WRAIR) 1976

PUBLICATIONS

1. Bass, B.G., Effects of Particle Radiation on Selected Electronic Components, Douglas Aircraft Company Report A2-260-S/VE-M295, March 2, 1962.

2. Bass, B.G., New Walter Reed Multiple Crystal Whole Body Counter, San Diego Biomedical Engineering Symposium, 16-18 March 1966.

3. Levri, Elvio A., Runyan, Thomas E., Bass, B.G., Mahin, D.T., Diagnostic Applications of Neutron Activation Analysis in Medicine, Second International Conference on Medical Physics, August 11-15, 1969.

4. Bass, B.G., Ryan, E.L., Gardner, H.B., Mahin, D.T., The Walter Reed Multiple Crystal Whole Body Counter, Second International Conference on Medical Physics, 11-15 August, 1969.

5. Bass, B.G., Plan for the Dismantling of a Research Nuclear Reactor, March, 1970. (Master's Thesis, George Washington University School of Engineering and Applied Science).

6. Bass, B.G., Wisla, S., Miller, V., Health Physics Aspects of Dismantling a Research Nuclear Reactor, Health Physics Annual Meeting, 15 June 1972.

7. Bass, B.G., Holman, E.C., The Walter Reed Research Reactor Dismantling Project, Transactions of American Nuclear Society, Vol. 15, No. 2, Nov. 1972.

8. Bass, B.G., Use of Excess Weapons System Computers in Biomedical Instrumentation, U.S. Army ADP Symposium, 15 Nov. 1972. (Abstract)

9. Khouri, Edward M., Olsson, Ray A., Bedynek, Julius L., and Bass, Billy G., "An Implantable Semiconductor Betaradiation Detector," Am. J. Physiol. 323(1), 1977.

10. Bass, Billy G., "Effects of Supranormal Concentrations of Potassium Ion and Other Vasoactive Drugs on the Visual Evoked Response and Regional Cerebral Blood Flow in the Monkey Brain." Doctoral Dissertation. George Washington University, Washington, D.C., May, 1978.

11. Bass, B.G., Youm, Y., Tremayne, M.D., Groer, J., Lee, J., A Device for Measuring Knee Laxity, 18th Annual Meeting of Association for Advancement of Medical Instrumentation, May, 1983.

12. Martin, Al, Perone, Pat, Bass, B.G., "Management of Peripheral Nerve Injury.", J. of the Irish Colleges of Physicians and Surgeons, Vol. 8, #4, April, 1979, pp 150-151.

CURRICULUM VITAE

Name: James Luther Buck, M.D.

Address: Home: [redacted]

Work:
Department of Radiologic Pathology
Armed Forces Institute of Pathology
Washington, D.C. 20306-6000 (202-576-2973)

Date of Birth: [redacted]

Place of Birth: [redacted]

Education:

[redacted] B.A. University of Utah, Salt Lake City, Utah

M.D. University of Virginia, Charlottesville, Virginia

Awards and Honors:

1975 Phi Beta Kappa, University of Utah
Salt Lake City, Utah

1979 Alpha Omega Alpha, University of Virginia
Charlottesville, Virginia

Postdoctoral Training:

Internship and Residency:

1980-1984 Resident, Diagnostic Radiology,
Parkland Memorial Hospital,
Dallas, Texas

Fellowship:

1983-1984 Resident/Fellow, Nuclear Medicine
Parkland Memorial Hospital,

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Certification:

1984	American Board of Radiology (Diagnostic Radiology with Special Competence in Nuclear Radiology)

Academic Appointments:

1981-1984	Instructor in Radiology Southwestern Medical School Dallas, Texas
1984-	Assistant Professor of Radiology Uniformed Services University of Health Sciences Bethesda, Maryland 20814

Hospital Appointments:

1984- 1986	Head, Gastrointestinal Radiology Naval Hospital (NMC NCR) Bethesda, Maryland 20814

Membership and Offices in Professional Societies:

1983	Radiological Society of North America

Publications:

1. Drane WE, Karvelis K, Buck JL, and Silverman EG: The "3-D Effect" of Diffuse Skin Involvement by Mycosis Fungoides on Gallium Imaging. Clin Nucl Med 11:264-265, 1986.

21 April 1987

CURRICULUM VITAE

NAME: William L. Beckwith, Jr.

DATE OF BIRTH: [redacted]

WIFE:

HOME ADDRESS:

BUSINESS ADDRESS: Health Physics
U.S. Army Medical Research Institute of Infectious Diseases
Fort Detrick, Frederick, Maryland 21701-5011
Telephone: (301) 663-7335

EDUCATION:

1984-CURRENT	Hagerstown Junior College, Hagerstown, Maryland Business Administration/Radiation Science
1971-1972	Frederick Community College, Frederick, Maryland General Studies
1968-1969	Academy Health Sciences, Fort Sam Houston Texas Advanced Laboratory Procedures (52 weeks)
[redacted]	Fryeburg Academy, Fryeburg, Maine H. S. Diploma

OTHER SCHOOLS OR TRAINING:

MAR-1987	Harvard University, School of Public Health, Boston, MA Occupational & Environmental Radiation Protection
OCT-1986	U.S. Army Environmental Hygeine Agency, Aberdeen, Maryland AMEDD Physics in Military Medicine
JAN-1986	U. of Texas, Health Science Ctr., San Antonio, Texas Radiation Safety Officers Course
SEP-1984	Occupational Safety and Health Administration, Washington, D.C. 600-2 Collateral Duty Course for Other Federal Agencies
MAR-1984	U.S. Army Environmental Hygeine Agency, at Ft Detrick, MD Microwave Ovens Survey Techniques Workshop
FEB-1980	U. of Texas, Health Science Ctr., San Antonio, Texas Basic Radiological Health

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21 April 1987

CURRICULUM VITAE: William L. Beckwith, Jr.

OTHER SCHOOLS OR TRAINING: (continued)

OCT-1979	WRAMC at Fort Detrick, Maryland Introduction to Radiation Principles
NOV-1974	WRAIR at Walter Read Army Medical Center, Washington, D.C. Health Aspects of Radioisotopes
1973	USAMRIID, Fort Detrick, Maryland Ultracentrifugation Symposium
1959	Academy of Health Sciences, Fort Sam Houston, Texas Basic Laboratory Procedures (16 weeks)
1981-1986	American Medical Technologists, Park Ridge, Illinois Continuing Education 20.8 CEUs (208 contact hours)

PROFESSIONAL ORGANIZATIONS:

American Medical Technologists
Tri-State Society of American Medical Technologists
National Committee for Clinical Laboratory Standards

AWARDS AND HONORS:

Phi Theta Kappa National Honor Fraternity
AMT Distinguished Achievement Award 1977
AMT Exceptional Merit Award 1981
AMT Editor's Award for Most Improved Publication 1981
AMT President's Letters of Commendation 1982/1983
Achievement in Editing 1982/1983
Achievement in Writing 1983

CERTIFICATIONS:

AMT Medical Technologist, Jan '70 Revalidated Dec '86
HEW Medical Technologist, Jun '85 Cert. #3120019
HEW MT General Supervisor, Jul '81 Cert. #3120019

PUBLICATIONS:

The United States Army Medical Research Institute of Infectious Diseases, J of AMT, Vol 37, No 1, Jan-Feb '75, pp. 35-36

Reading is Believing, J of AMT, Vol 43, No 5, Sep-Oct '81, p. 270

Communication: What Wondrous Advances We've Made - Or Have We J of AMT, Vol 44, No 1, Jan-Feb 82, pp. 16-17

21 April 1987

CURRICULUM VITAE: William L. Beckwith, Jr.

PUBLICATIONS: (continued)

The Detractors of Our Children, AMT Events, Jan-Feb '85, p. 8

Convention Confession, AMT Events, Mar-Apr '85, p. 44

PROFESSIONAL EXPERIENCE:

1979-CURRENT

Health Physics Technician/Radiation Protection Officer
Health Physics, USAMRIID
Fort Detrick, Frederick, Maryland 21701-5011

Oversee all aspects of the radiation safety program and insure that the Institute is in compliance with NRC license requirements and all rules and regulations from DA to local authority.

1971-1979

Research Laboratory Supervisor
Virology & Rickettsiology Division
USAMRIID
Fort Detrick, Frederick, Maryland 21701-5011

Oversaw the day to day operations of laboratories. Began by setting up P-3 and P-4 labs in new facilities and assisted researchers in instituting research protocols and the like. Responsible for assigning personnel to work units and other administrative tasks to insure a ongoing smooth operation of the divisions missions.

1970-1971

Research Assistant
Bacteriology Division, USAMRIID
Fort Detrick, Frederick, Maryland 21701-5011

Enzyme and subcellular particle alteration examinations to animal host systems when toxins such as Staph enterotoxin B were introduced

1959-1969

Medical Technologist
Verona, Italy; Boston Army Base; Saugus Memorial Hospital; Bamberg, Germany; Frederick Memorial Hospital

Worked in all areas of the clinical laboratory: Blood Bank, Hematology, Serology, Chemistry, Cytology, Bacteriology, Perisitology, Coagulation

CURRICULUM VITAE
FOR
DAVID W. BURTON

Date & Place of Birth: [redacted]

Home Address: [redacted]

Home Telephone Number: [redacted]

Office Address: Health Physics Office
Walter Reed Army Medical Center
Washington, D.C. 20307-5001

Office Telephone Number: (301) 427-5104

Education:

Degree: A.A. - Radiation Science [redacted]
Montgomery Junior College
Rockville, Maryland 20850

Curriculum included Fundamental Atomic and Nuclear Physics, Radiation Instrumentation, Biological Effects of Radiation, Radiation Hazards Evaluation and Control.

Experiences:

Jan 87 - Present. C, Radioactive Material Control Branch
Health Physics Office
Walter Reed Army Medical Center
Washington, D.C. 20307-5001

Serves as Chief, Radioactive Material Control Branch and Alternate Radiation Protection Officer with direct responsibility to recommend, formulate, and execute the policy for life-cycle control of all radioactive material utilized by WRAMC and tenant activities. Responsible for advising the Health Physics Officer and approximately 650 physicians, clinicians, and researchers of all Federal, State and US Army regulations governing the receipt, possession, use, transfer, transport and disposal of all radioactive material permitted to WRAMC by US Nuclear Regulatory Commission (NRC) Licenses and Department of Army Authorizations.

Aug 74 - Jan 87 Radiation Safety Officer
Litton Bionetics, Inc.
5516 Nicholson Lane
Kensington, Maryland 20895

Responsible for entire Radiation Safety Program at Litton Bionetics. This includes all radioactive licensing activities with the State of Maryland. Reviewing, evaluating and approving the safety aspects of all research studies involving radioactive materials. Coordinating the procurement, safe use, and proper disposal, of all radioactive material. Responsible for training of laboratory personnel in the proper handling of radioisotopes. Perform and/or supervise in taking of routine health physics surveys. Administer personnel monitoring program and maintain all attendant records.

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BURTON, David W. (Continuation of Curriculum Vitae)

Jun 73 - May 75

Senior Radiation Technician
Institute for Resource Management
428 Fourth Street
Annapolis, Maryland 21403

Worked as a contract Health Physicist at nuclear power plants in Connecticut, New Jersey, and Tsuruga, Japan. Performed radiation and contamination surveys. Monitored personnel entries into high radiation areas. Worked in counting lab, counting all kinds of contamination surveys and air samples. Read TLD's and kept personnel exposure records.

Apr 70 - Aug 74

Radiation Technician
Armed Forces Radiobiology
Research Institute
NNMC Bethesda, Maryland 20014

Performed all routine monitoring for a 1 MW Triga Reactor, a 50 Mev Linac, a 300,000 Curie Co-60 Irradiation Facility, a Nuclear Medicine Department, and a large hot cell with a pneumatic tube system to the reactor core and remote handling equipment. Duties included initial entries into all exposure rooms, personnel monitoring, environmental sampling and monitoring with remote film stations, radiation and contamination surveys, air samples, instrument calibration, waste disposal, and the attendant record keeping.

Sept 68 - May 69

Laboratory Aide
Montgomery Junior College
Takoma Park, Maryland

Performed basic surveys, isotope inventory, instrument calibration, and quality control for isotope lab.

Organizations:

1975

National Health Physics Society

1980

Baltimore/Washington
Chapter of Health Physics Society

WRAMC REGULATION 40-10

HEALTH PHYSICS

ITEM 8 - TRAINING AND EXPERIENCE

ITEM 15 - GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL

ITEM 17 - AREA SURVEY PROCEDURES

ITEM 18 - WASTE DISPOSAL

ITEM 24 - PERSONNEL MONITORING DEVICES

DEPARTMENT OF THE ARMY
HEADQUARTERS, WALTER REED ARMY MEDICAL CENTER
WASHINGTON, D.C. 20307-5001

WRAMC Regulation
No. 40-10

30 April 1987

Medical Services
HEALTH PHYSICS

*This regulation supersedes WRAMC Regulation 40-10, 25 May 1983
Approved by the Radiation Control Committee, WRAMC

CHAPTER 1
General

1-1. PURPOSE. The purpose of this regulation is to supplement applicable Federal, State and Army regulations governing the methods for control of potential health hazards resulting from the procurement, possession, storage, transportation and use of radioactive materials and equipment capable of producing potentially hazardous radiation.

1-2. APPLICABILITY. This regulation is applicable to all activities assigned or attached to WRAMC for Health Physics support. In addition, applicability extends to the following:

a. Military District of Washington units possessing X-Ray producing devices and microwave ovens.

b. The US Army Medical Research Institute of Infectious Diseases, Ft. Detrick, MD for the procurement, storage, use and disposal of radioactive materials.

c. The US Army Institute of Dental Research and the sections of the Department of Pathology, WRAMC located at Ft. Meade, MD.

1-3. REFERENCES. Required publications are listed in the Appendix.

1-4. DEFINITIONS. The following definitions apply to terms used throughout this regulation.

a. Authorization. A formal, Radiation Control Committee (RCC) approved document permitting named individuals to possess and use radioactive materials.

b. Bioassay. The determination of kinds, amounts, concentrations and locations of radioactive materials in the human body. This may be by in-vivo counting (e.g. whole body counting, selected organ counting) or by analysis of materials excreted or removed from the human body.

c. Controlled (restricted) area. Any area to which access is limited for the purpose of protecting persons from exposure to ionizing radiation or radioactive materials.

d. Co-worker. An individual listed on an authorization who possesses qualifications similar to the Principal User.

e. Half-life. Time required for a radioactive substance to lose 50% of its activity by decay. Each radionuclide has a unique half-life.

f. Short Half-life. A half-life of 65 days or less.

g. Long Half-life. A half-life of greater than 65 days.

h. HPO. Health Physics Office.

i. NRC. Nuclear Regulatory Commission.

j. Radiation Worker. An individual whose work is performed in a controlled area and who might be exposed to more than 10% of the radiation exposure standards as a result of employment or duties in a controlled area.

k. Principal User. An individual who possesses adequate training and experience with radioactive materials and bears ultimate responsibility for possession, inventory and implementation of the radiation protection procedures necessary to ensure the safe use of materials specified in the authorization.

l. RCC. Radiation Control Committee.

m. Radiation Protection Survey (Radioactive Materials). The evaluation of various locations to determine existing or potential radiation hazards associated with the use of radioactive materials.

n. Radiation Protection Survey (X-Ray producing devices). An evaluation, under specified conditions, of existing or potential radiation hazards associated with the use of X-Ray producing devices.

o. Radioactive Material. Any material or combination of materials that spontaneously emit ionizing radiations.

p. Radioactive Waste. Surplus items of or containing radioactive material and rendered non-usable because of excess radioactive contamination.

q. Sealed Source. Radioactive materials sealed in an impervious container designed to prevent dispersion under normal use.

r. Shielding Evaluation. An evaluation of the design or modification plans for a fixed radiologic facility to preclude the occurrence of radiation hazards.

s. TLD. Thermoluminescent Dosimeter.

t. Technician. An individual who works under the direct supervision of a Principal User or Co-worker for the purpose of performing certain routine duties associated with the use of materials specified in the authorization.

u. Trainee. An individual who works under the direct supervision of a Principal User or Co-worker for the purpose of obtaining the necessary training and experience to qualify for either status.

CHAPTER 2
Training

2-1. GENERAL. The NRC requires that training be given to any employee who works in or frequents the vicinity of any area controlled by the licensee for protection of individuals from exposure to ionizing radiation. The Commander, WRAMC, has implemented training programs pertaining to the hazards of radiation and the methods for minimizing those hazards for radiation workers and other personnel.

2-2. PROGRAMS.

a. Initial Briefing.

(1) The Principal User is responsible for individuals who work under or are associated with work areas designated on his Authorization for the Use of Radioisotopes. He is required to give and document an initial and annual briefing to those individuals which covers, at a minimum, the following:

(a) WRAMC Notice to Employees

(b) Form NRC-3, Notice to Employees

(c) Title 10, Code of Federal Regulations, Parts 19, 20 and 21

(d) Information concerning the storage, transfer and use of radioisotopes allowed under his authorization

(e) Authorization to Use Radioisotopes (WRAMC Form 1661-R, Application for Authorization to Use Radioactive Material - Human Use and/or WRAMC Form 1662-R, Application for Authorization to Use Radioactive Material - Non-human Use)

(f) Hazards and protective measures associated with isotope usage

(g) Procedures for requesting a report of exposure to radiation

(2) This briefing will be given and acknowledged by signing WRAMC Form 538, Radiation Worker Briefing.

b. Introductory Principles of Radiation Protection Course: This two-day course, given by the staff of the HPO, is designed to complete and reinforce training given by the Principal User. It provides supplementary training, in an academic setting, required for the safe handling of

radioisotopes and protection of individuals from external and internal radiation hazards. It is required that all radiation workers attend this course, as soon as possible, after beginning work at WRAMC. An examination is given at the end of this course. If the student fails the exam it may be retaken, after additional preparation, or the student may elect to retake the course. Subsequent failure requires that the Principal User evaluate the advisability of retaining the individual in a position which requires the handling and use of radioisotopes.

c. Principal User Classes. The senior staff of the HPO conducts periodic classes on selected topics. These topics are based on the need to disseminate current information on license and regulation changes, to correct deficiencies which have been noted and to enhance the professional competency of individuals working in radiation environments. This is mandatory for Principal Users. Co-workers are encouraged to attend.

d. Nursing In-service: Briefings, designed for nursing and para-professional staff who come in contact with patients undergoing therapy with radioisotopes, are presented upon request to the HPO. Specific details on the types of therapy or other procedures are covered.

e. Briefing for Support Personnel: This class is designed for individuals whose duties take them into areas where radioisotopes are used. It familiarizes personnel with signs, placards and color schemes associated with radioactive material, gives a general outline of what radiation and contamination are and sets ground rules for what should and should not be done in these areas.

f. Briefing for Firefighters: This briefing covers methods of designating areas where radioactive materials are used, use of radiation detection instrumentation, notification procedures and procedures for ensuring protection from contamination and internal deposition.

g. Briefing for Military Police/Security Personnel: This class teaches the proper method for receiving, inspecting and storing incoming packages containing radioisotopes and addresses the procedures for dealing with problems such as a damaged container or leaking package.

CHAPTER 3
Authorization to Use Radioactive Material

3-1. GENERAL.

a. The NRC has issued a specific "License of Broad Scope for Byproduct Material" to WRAMC allowing use of specific types and quantities of radioactive material. NRC requirements stipulate that a Radiation Control Committee be established to exercise administrative control over the safe use of radioactive materials. The WRAMC RCC was chartered to meet these requirements.

b. The RCC issues Radioactive Material Authorizations to Principal Users as a means of controlling the use of radioactive material. All users of radioactive material must receive their authorization prior to using the material.

c. Non-human Use Radioactive Material Authorizations are issued for 3 years. Human Use Authorizations are issued for 1 year. Both types of authorizations may be renewed upon request.

d. Individuals possessing more than 1/2 pound of pure natural uranium compounds are required to obtain an authorization.

3-2. APPLICATION PROCEDURE.

a. To obtain, amend, renew or terminate an authorization for use of radioactive material, individuals must submit WRAMC Form 1661-R, "Application for Authorization to Use Radioactive Material - Human Use", or WRAMC Form 1662-R, "Application for Authorization to Use Radioactive Material - Non-human Use". Each Principal User and Co-worker must submit WRAMC Form 1643, "Training and Experience of Authorized Radioisotope Users", with the application. Each physician listed on a Human Use Authorization is required to submit NRC Form 313-M Supplement B, "Preceptor Statement", or a certificate of Board Certification with the application. Protocols describing the use and accountability of radioactive material from the time of receipt until the time of disposal will be submitted with the application. Applications will be submitted to the HPO for review and approval. All applications for human use of radioisotopes will be submitted to the Human Use Subcommittee of the RCC by the HPO for review of physician training and experience.

b. All requested information on the application will be provided. Incomplete applications will be returned, causing a delay in approval.

c. Application for use of gamma cell irradiators must include a copy of the proposed Standing Operating Procedures addressing personnel safety, routine operation and emergency provisions.

3-3. REVIEW PROCEDURES. All applications will be reviewed by the RCC and HPO to insure that individuals meet training and experience requirements, proposed procedures do not violate existing regulations and facilities and equipment are adequate for proposed usage. Applications will be signed by the HPO and returned to applicant. This is considered interim approval until the RCC next meets and officially approves the application.

3-4. TERMINATION OF AUTHORIZATION. An authorization may be terminated by the Principal User, the RCC or the HPO at any time. When an authorization is terminated, the Principal User will ensure that all work areas are cleared by the HPO prior to releasing them for alternate use and coordinate final disposition of unused radionuclides with the Radioactive Materials Control Branch, HPO.

CHAPTER 4
General Rules for the Safe Use of Radioactive Material

4-1. RESPONSIBILITIES. Principal Users of radioactive material are responsible for applying precautions listed in this chapter and insuring their implementation by personnel listed on their Radioactive Material Authorization.

4-2. LABORATORY PRECAUTIONS. General rules for the safe use of radioactive materials include:

a. Wearing of laboratory coats or other removable protective clothing at all times when actively involved in the use of unsealed sources of radioactive material.

b. Wearing disposable gloves at all times while handling radioactive materials except:

(1) those quantities less than those specified by WRAMC general license for use of byproduct material for certain in-vitro clinical or laboratory testing,

(2) when handling totally encapsulated sealed sources of beta or gamma types which are exempt from leak testing requirements,

(3) during the injection of a radiopharmaceutical when the loss of tactile sensation would hinder venipuncture technique resulting in infiltrations requiring repeat studies and increasing patient exposure.

c. Monitoring hands, clothing and work area for contamination after handling unsealed radioactive material:

(1) before leaving the area,

(2) when work is completed.

d. Never eating, drinking, smoking or applying cosmetics in areas where radioactive materials are used or stored.

e. Wearing assigned personnel monitoring device(s) at all times while in areas where radioactive materials are used or stored.

f. Disposing of radioactive waste only in specially designated receptacles.

g. Never pipetting by mouth.

h. Confining radioactive solutions to covered containers plainly identified and labeled with name of compound, radionuclide, date, activity and radiation level.

i. Transporting radioactive materials in appropriately shielded containers.

4-3. NUCLEAR MEDICINE PRECAUTIONS. Additional general rules specifically applicable to preparations and use of radioactive materials for human use include:

a. Using syringe shields for preparation and administration of patient doses except during the actual injection in those patients in which a loss of manual dexterity would result in an increase incident of dose infiltration resulting in increased exposure to the patient from the procedure.

b. Assaying each patient dose in the dose calibrator prior to administration. Doses that differ from the prescribed dose by more than 10% will not be used.

c. Wearing TLD finger badges during elution of generator and preparation, assay and injection of radiopharmaceuticals.

d. Surveying generator, kit preparation and injection areas for contamination at the end of the day; decontaminating when necessary.

4-4. VENTILATION IN RADIATION CONTROLLED AREAS. Procedures resulting in the generation of radioactive aerosols, dusts or gaseous products will be conducted in a hood, iodine box, dry box or other suitable closed system. Radioactive gases or material with radioactive gaseous daughters will be stored in gas tight containers and kept in areas having approved ventilation. For handling low to moderate levels of radioactive materials, the average velocity through openings in the hood will be 100 feet per minute(fpm). For highly toxic or high level radioactive material, the velocity through the opening must be at least 125 fpm but may not exceed 200 fpm.

CHAPTER 5
Personnel Monitoring

5-1. GENERAL.

a. This chapter prescribes procedures and responsibilities for monitoring and recording occupational exposures to ionizing radiation from radiation producing devices and radioactive materials.

b. Each activity receiving personnel dosimetry service from HPO will designate a personnel dosimetry coordinator and alternate to assist HPO in the issue, exchange and collection of dosimetry devices.

c. Application for personnel dosimetry service must be initiated by the individual and submitted on a properly completed DD Form 1952, "Dosimeter Application and Record of Occupational Radiation Exposure", to the HPO. The HPO will evaluate the information on the application and issue appropriate dosimetry or provide written notification that dosimetry is not needed.

d. Assignment of a personnel dosimetry device to an individual does not automatically make him a radiation worker. Occasionally exposed individuals may be monitored to determine need for permanent issue of dosimetry devices.

5-2. FILM BADGES.

a. The whole body badge is the primary dosimetry device used at WRAMC and is the only device legally recognized for whole body dosimetry. Other devices such as TLD may be used to monitor portions of the body or as supplemental dosimeters.

b. A whole body badge will be worn only by the individual to whom it is issued.

c. WRAMC issued dosimetry will not be worn by personnel when occupationally exposed at other facilities.

d. Whole body badges will be worn on the front of the torso. In the event a protective garment, such as a lead apron, is worn the badge will be worn under the protective garment.

5-3. SUPPLEMENTAL MONITORING DEVICES. Additional personnel monitoring devices will be provided when necessary to monitor a portion of the body or to obtain more immediate data. These devices will be worn only by individuals to whom they are issued.

5-4. CARE OF MONITORING DEVICES. When not being worn, personnel monitoring devices will be stored in the designated place and turned in to the personnel dosimetry coordinator during designated exchange periods. Film badges are not

to be worn during non-duty hours or when the individual is examined in medical or dental clinics.

5-5. BIOASSAY.

a. The HPO will designate individuals to participate in the bioassay program. Once so designated, individuals will participate until released, in writing, by the HPO.

b. Individual Responsibilities.

(1) Appearing for measurement at the time, place and frequency required.

(2) Providing required specimen for in-vitro counting.

(3) Informing HPO of changes in working conditions or other factors influencing the type or frequency of bioassay measurement.

5-6. RECORDS.

a. Records of individual radiation exposure are maintained on DD Form 1141, "Record of Occupational Exposure to Ionizing Radiation", or an Automated Dosimetry Report (ADR). The records are kept at the HPO until individuals depart WRAMC or are removed from dosimetry service. Records are then placed in the individual health record. Records may be reviewed at the HPO during normal duty hours.

b. Locator Cards.

(1) DD Forms 1141 or ADR are medical records. Locator cards identifying radiation workers will be furnished by HPO to the medical records section for placement in individual medical records.

(2) Individuals not maintaining medical records at the out-patient medical records section, WRAMC, must bring their records to the HPO to have the locator card inserted.

c. Personnel occupationally exposed at a facility outside the jurisdiction of WRAMC will furnish all exposure information to the HPO.

d. The DD Form 1141 or ADR is covered under the Privacy Act. Therefore a written authorization, signed by the individual must be forwarded to the HPO before occupational exposure information can be released.

5-7. TERMINATION OF PERSONNEL DOSIMETRY. Individuals who wish to terminate personnel dosimetry service for any reason will report to the HPO, Building 188, Forest Glen Section with their medical records during normal duty hours. The individual must provide HPO with the reason for termination and a forwarding address.

CHAPTER 6
Radiation Detection Instruments

6-1. GENERAL. The Health Physics Office will acquire, maintain and provide, to all activities, radiation detection instruments to meet the requirements of NRC licenses issued to WRAMC.

6-2. CALIBRATION. The HPO will ensure that the instruments are calibrated and will maintain calibration records.

6-3. USER RESPONSIBILITIES. The User is responsible for:

a. Security, proper use, and availability of instruments assigned to him/her.

b. Notifying the HPO if an instrument is not functioning properly or is due calibration.

CHAPTER 7
Radiation Protection Surveys

7-1. GENERAL. Periodic radiation protection surveys are required in all areas where radioactive materials are stored or used. Requirements and responsibilities for these surveys at WRAMC are contained in this chapter.

7-2. RESPONSIBILITIES.

a. The HPO is responsible for:

(1) Performing all pre-use surveys, weekly, monthly, quarterly, special and final surveys.

(2) Notifying the Principal Users of any deficiencies or radiological hazards noted during survey.

(3) Performing a resurvey within five (5) workdays of any areas where:

(a) Levels of removable contamination exceed 500 dpm/100 cm^2.

(b) Dose-rates exceed 0.2 mR/hr.

(c) Potentially hazardous situations are noted.

b. The Principal User is responsible for:

(1) Performing daily surveys.

(2) Notifying HPO immediately if contamination levels in excess of 100 cpm or dose-rates in excess of 2mR/hr are discovered during the daily survey.

(3) Notifying HPO immediately of any accidents or unusual incidents involving radioactive materials.

(4) Ensuring that deficiencies noted during radiation protection surveys are corrected.

(5) Ensuring that a pre-use survey has been performed on all areas under their control prior to using or storing radioactive materials.

(6) Ensuring that a final survey has been performed and approved in areas under their control prior to releasing the area for non-radioactive use, maintenance or modification.

CHAPTER 8
Radioactive Waste Management and Control

8-1. RESPONSIBILITIES.

a. The HPO is responsible for ensuring that all radioactive waste is managed, controlled, and disposed of in accordance with accepted directives and guidelines of applicable Army, Federal, and State regulations.

b. Principal Users are responsible for:

(1) Segregating radioactive waste into:

(a) Solid: short half-life.

(b) Solid: long half-life.

(c) Scintillation vials of less than 0.05 microcuries H-3 or C-14 per gram of fluid.

(d) Scintillation vials: short half-life.

(e) Scintillation vials: long half-life.

(f) Aqueous fluid vials: less than 30 ml fluid, short half-life.

(g) Aqueous fluid vials: less than 30 ml fluid, long half-life.

(h) Aqueous fluids: more than 30 ml fluid, by individual radionuclide.

(i) Flammable liquids: by individual radionuclide.

(j) "BACTEC" Vials.

(k) Commercial Radio-Immuno-Assay Kits.

(l) Animal carcasses/animal waste: short half-life.

(m) Animal carcasses/animal waste: long half-life.

(n) Animal carcasses: less than 0.05 microcuries H-3 or C-14 per gram of animal tissue averaged over the entire weight of the animal.

(o) Gas, combustible.

(p) Gas, non-combustible.

(4) Scintillation vials will be packaged separately from other materials. They will be tightly closed and placed in a shipping tray that is labeled with the words "Caution-Radioactive Material". Care must be taken to prevent breakage of the vials while in storage/transport. The trays will be tagged as previously indicated.

(5) All broken glassware, vials, bottles, tubes, pipettes, syringes, needles, and similar items must be packaged in double magenta plastic bags, placed in cardboard boxes and sealed to prevent personal injury. The bags and boxes will be tagged as previously indicated.

(6) Short half-life materials and items contaminated with short half-life materials will be separated from other materials. Radioactive warning labels must be defaced on all vials and materials prior to placing the items in the double magenta plastic bags. The bags will be tagged as previously indicated.

(7) Biological wastes (animal carcasses/animal waste) will be prepared by the user in a manner that allows the waste to be readily packaged in alternating 10-inch layers of waste and packing materials. Prepared biological waste will be placed in double magenta plastic bags and tagged as previously indicated.

8-2. RELEASE OF RADIOACTIVE MATERIAL INTO THE SANITARY SEWAGE SYSTEM.

a. Liquid radioactive waste will not be released into the sanitary sewage system unless prior approval has been included in the WRAMC Radioactive Material Authorization.

b. Other conditions for the disposal of liquid radioactive waste material into the sewage system are:

(1) The total quantity of material released by the user in any one month will not exceed 100 microcuries.

(2) The sink must be conspicuously posted with a sign bearing the Radioactive Caution Symbol and words, "Caution - Radioactive Material Wash Sink", and with a notice to the user that radioactive material discharged through the sink must be readily soluble or dispersible in water.

(3) A record of the identity and activity of radionuclides released will be maintained by the Principal User. This record will be reviewed by HPO for compliance with regulatory limits.

8-3. COLLECTION, LOCAL TRANSPORTATION AND STORAGE OF RADIOACTIVE WASTE.

a. Properly packaged radioactive waste will be brought to centralized collection points in Building 40, Building 2, or other designated locations. Under the supervision of the HPO, waste will be placed in barrels or other

CHAPTER 9
Sealed Source Leak Testing and Accountability

9-1. RESPONSIBILITIES.

a. The HPO is responsible for ensuring and documenting that all sealed sources are acquired, inventoried, leak tested, transferred and disposed of in accordance with applicable requirements.

b. Principal Users are responsible for ensuring and documenting that all sealed sources used to support their operation are specifically permitted by their WRAMC Radioactive Material Authorization and that each source is acquired, inventoried, transferred and disposed of in accordance with the requirements of this chapter.

9-2. ACQUISITION OF SEALED SOURCES. Regardless of curie amount or intended use, the acquisition of each sealed source will be cleared with the HPO prior to any commitment for purchase or receipt. The HPO will determine which Federal regulatory requirements apply to acquisition of the sealed source and provide prospective suppliers with any required certification/NRC license documents.

9-3. INVENTORY OF SEALED SOURCES. A current inventory of all sealed sources will be maintained by the responsible Principal User and the HPO.

a. Each Principal User will maintain an inventory of all sealed sources permitted by their WRAMC Radioactive Material Authorization on DA Form 3862 "Controlled Substances Stock Record". Entries must include the specific item of equipment and/or radioisotope, location of the item, level of activity, applicable NRC or DA authorization number and expiration date. The name of the Principal User or his designated Inventory Officer will be entered. The columnar portion of the form will reflect receipts, transfers, local disposal, and date of the physical inventory. The HPO will conduct periodic inspections to verify and document implementation of this policy.

b. Each accountable sealed source at WRAMC will be assigned a Health Physics control number by the HPO.

c. A record of inventory for each sealed source will be maintained by the HPO.

9-4. TRANSFER/DISPOSAL OF SEALED SOURCES. The transfer/disposal of all sealed sources will be coordinated with the HPO.

a. Individual sealed sources will be transferred only to authorized recipients or licensed disposal sites.

CHAPTER 10
Health Physics Aspects of Patient Care

10-1. GENERAL REQUIREMENTS.

a. It is the responsibility of all personnel who are occupationally exposed to radiation from patients receiving radiotherapy to:

(1) Properly utilize the dosimetry issued to them.

(2) Know and conform to the radiation protection and emergency measures pertaining to their procedures.

b. Radiation safety procedures will not impede emergency medical care, however, a maximum effort will be made to minimize the exposure of individuals performing the treatment.

10-2. RESPONSIBILITIES.

a. The physician performing the procedure will:

(1) Notify the HPO one week prior to the scheduled procedure date and provide the following information:

(a) Patient's name.

(b) The date and time the procedure will be initiated.

(c) Type and approximate length of the procedure.

(d) Isotope activity in milligram equivalent or millicurie amount.

(e) The location (treatment room, O.R. or room on the ward) where the radioactive material will be introduced into the patient.

(f) The room and ward to which the patient will be assigned for the duration of the procedure.

(2) Ensure that there are enough radiation shields available for the procedure.

(3) Ensure that an adequate number of trained support personnel are available during the procedure.

b. The service performing the procedure, Radiation Therapy/Oncology or Nuclear Medicine, will ensure that the physician performing the procedure is listed on the appropriate Human-Use Authorization which covers the procedure and has been authorized by the RCC.

CHAPTER 11
Animals Containing Radioactive Material

11-1. RESPONSIBILITIES.

a. The Principal User is responsible for:

(1) Ensuring that animals containing radioactive material are housed only in cages labeled as containing radioactive material. The labels on the cages will indicate the radioisotope and millicurie amount introduced into each animal.

(2) Ensuring that the cages containing animals which have had radioactive material introduced into them are housed only in rooms which have been approved and posted by the HPO.

(3) Ensuring the HPO and Director of Department of Lab Animals, WRAIR, are notified prior to the commencement or change in procedure of all projects where radioactive material is introduced into laboratory animals.

(4) Notifying the HPO and the Director of Department of Lab Animals, WRAIR, at the termination of studies.

(5) Removing all radioactive material from rooms used exclusively to house animals.

(6) Ensuring that all applicable radiation protection procedures are met.

(7) Notifying the HPO of any unusual occurrences or incidents in which radioactive material is involved.

b. The HPO is responsible for:

(1) Ensuring that rooms and cages used to perform procedures and house animals are properly posted and labeled.

(2) Informing the Principal User and the animal handlers of any special radiation protection procedures to be observed.

CHAPTER 12
X-Ray Producing Devices

12-1. X-RAY PROTECTION SURVEY REQUIREMENTS.

a. A radiation protection evaluation will be made for the planned use of equipment, the location where the equipment will be used and the protective barriers, interlocks and other associated protective devices prior to the procurement of the equipment.

b. An initial radiation protection survey will be performed prior to the routine use of any newly installed, modified or relocated equipment or facility.

c. All x-ray producing devices intended for human-use will have a radiation survey biennially.

d. All x-ray producing devices not intended for human-use will have a radiation survey triennially.

e. A resurvey will be performed after every change in equipment, subsystem, component, workload or operating conditions that might significantly increase the exposure of patients or operating personnel to ionizing radiation.

12-2. RESPONSIBILITIES.

a. The using organization is responsible for:

(1) Ensuring that a shielding evaluation is performed prior to the procurement, installation, modification or relocation of any x-ray producing equipment or facility.

(2) Ensuring that a radiation protection survey is performed prior to the use of any newly installed, modified, or relocated x-ray producing equipment or facility.

(3) Notifying the HPO of any change in equipment, subsystem, component, workload or operating conditions.

(4) Reporting the location of all x-ray producing devices to the HPO.

(5) Ensuring that written procedures are established to provide radiation protection and emergency procedures for each facility.

(6) Preventing the unwarranted exposure of patients or operating personnel to ionizing radiation.

CHAPTER 13
Non-ionizing Radiation Sources

13-1. RESPONSIBILITIES.

a. The HPO is responsible for:

(1) Maintaining an inventory of all microwave sources (to include microwave ovens), high intensity optical sources, LASERS, RF sources, and ultrasound devices at WRAMC.

(2) Performing or coordinating for comprehensive microwave oven surveys.

(3) Requesting support from the U.S. Army Environmental Hygiene Agency to Perform radiation protection surveys of non-ionizing radiation producing devices other than microwave ovens.

b. Department heads and activity chiefs responsible for the operation of non-ionizing radiation producing equipment, to include microwave ovens, are responsible for:

(1) Notifying the HPO of the type of device, manufacturer, model, serial number, Maintenance Management Control Number (MMCN) and location (building and room) of each item of these types of equipment.

(2) Notifying the HPO when a system is received, moved to a new location, or turned in for maintenance or disposal.

(3) Ensuring that SOPs are published, posted, and enforced.

(4) Providing a copy of the SOP for each item to the HPO.

(5) Ensuring that personnel working in the vicinity of this equipment are informed of the potential hazards associated with the radiation produced by the equipment.

(6) Ensuring that a monthly visual inspection of the equipment is performed and documented.

APPENDIX
References

AR 40-5	Preventive Medicine.
AR 40-14	Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials.
AR 40-37	Licensing and Control of Radioactive Materials for Medical Purposes.
AR 40-46	Control of Health Hazards from Lasers and other High Intensity Optical Sources.
AR 40-61	Medical Logistics Policies and Procedures.
AR 40-66	Medical Record and Quality Assurance Administration.
AR 40-583	Control of Potential Hazards to Health from Microwave and Radio Frequency Radiation.
AR 385-11	Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety).
WR 40-92	Patient Care Committees, Boards and Councils.
TB MED 521	Management and Control of Diagnostic X-Ray, Therapeutic X-Ray, and Gamma Beam Equipment.
TB MED 523	Control of Hazards to Health from Microwave and Radio Frequency Radiation and Ultrasound.
SB 11-206	Personnel Dosimetry Supply and Service for Technical Radiation Exposure Control.
3 CFR 3195-01	Presidential Directive, Radiation Protection Guidance to Federal Agencies for Diagnostic X-Rays.
10 CFR Chap 1	Nuclear Regulatory Commission.
21 CFR Chap 1	Radiological Health.
29 CFR 1910	Occupational Safety and Health Standards.

The proponent of this regulation is The Health Physics Office, WRAMC. Users are invited to send comments and suggested improvements on DA FORM 2028 (Recommended Changes to Publications and Blank Forms) to Commander, WRAMC, ATTN: HSHL-HP, Washington, DC 20307-5001.

FOR THE COMMANDER:

OFFICIAL:

JOEL T. HIATT
MAJ, MS
Executive Officer

DONALD A. JOHNSON
Colonel, MS
Chief of Staff

DISTRIBUTION:
A plus 500 cys to HPO

WRAMC TERMS AND CONDITIONS FOR RADIOACTIVE MATERIAL AUTHORIZATIONS

ITEM 13 - PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

ITEM 14 - PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS

ITEM 15 - GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL

ITEM 16 - EMERGENCY PROCEDURES

ITEM 17 - AREA SURVEY PROCEDURES

ITEM 18 - WASTE DISPOSAL

GENERAL PROVISIONS
FOR AUTHORIZED USE OF RADIOACTIVE MATERIAL AT
WALTER REED ARMY MEDICAL CENTER

PRINCIPAL USERS FOR **WRAMC RADIOACTIVE MATERIAL AUTHORIZATIONS** ARE RESPONSIBLE FOR COMPLIANCE WITH THE FOLLOWING PROVISIONS:

a. Maintaining occupational, occasional and environmental ionizing radiation exposures as low as is reasonably achievable (ALARA). Current dose limitations are:

FOR OCCUPATIONAL EXPOSURE

Whole Body	5 rems in any one year
Skin	30 rems in any one year
Hands	75 rems in any one year
Forearms	30 rems in any one year
Other organs, tissues and organ systems	15 rems in any one year
Fertile women (with respect to fetus)	0.5 rems in gestation period

FOR OCCASIONALLY EXPOSED INDIVIDUALS OF THE GENERAL PUBLIC

Individual	0.5 rems in any one year
Students (under 18 years)	0.5 rems in any one year

FOR THE GENERAL POPULATION

Suitable sample of the exposed population or the whole exposed population	0.17 rems average per year

b. Obtaining and using proper personnel dosimetry devices in accordance with Condition No. 1 for Radioactive Material Authorizations, "Personnel Dosimetry."

c. Having available and using the following radiation detection and/or collection devices:

TYPE OF INSTRUMENT	NUMBER REQUIRED

d. Performing radiation surveys of authorized work areas in accordance with Condition No. 2 for Radioactive Material Authorizations, "Area Survey Procedures." Surveys for contamination should include not only the work area but also any protective clothing used, the bottoms of shoes, and all potentially exposed areas of the body. The Health Physics Officer will be notified if contamination levels in excess of 1000 dpm/100 cm^2 exist.

REVISED - 5 May 1987

GENERAL PROVISIONS FOR AUTHORIZED USE OF RADIOACTIVE MATERIAL AT WALTER REED ARMY MEDICAL CENTER (Continued)

e. Notifying the Health Physics Officer when radiation levels in unrestricted areas exceed 2 millirems in any one hour or 100 millirems in any seven days.

f. Complying with the provisions of Condition No. 3 for Radioactive Material Authorizations, "General Rules for Safe Use of Radioactive Material."

g. Maintaining an inventory of radioactive materials in accordance with AR 40-61.

h. Posting of appropriate radiation warning signs and labels and the removal of warning signs and labels when no longer required.

i. Instructing co-workers, technicians and trainees concerning the safe handling and usage of the radioactive materials listed in this authorization and concerning their responsibilities and rights as occupational radiation workers.

j. Insuring the proper disposal of radioactive materials in accordance with Condition No. 4 for Radioactive Material Authorizations, "Radioactive Waste."

k. Notifying the Health Physics Office promptly of any changes in the use, location or possession of radionuclides from the terms of this authorization.

l. Storage of radioactive materials such that they are secured from unauthorized removal from the place of storage. Materials kept in an unrestricted area must be under the constant surveillance and the immediate control of the principal user or other authorized user.

m. Compliance with applicable provisions of Condition No. 5 for Radioactive Material Authorizations, "Procedures for Ordering, Receiving and Safely Opening Packages Containing Radioactive Material," and in particular insuring that all NRC licensed or DA authorized radioactive materials entering Walter Reed Army Medical Center or its supported activities have either been processed through the Health Physics Office or have been documented by the Health Physics Office as having been received.

n. Insuring that NRC licensed or DA authorized radioactive materials are not transferred to unauthorized users or outside of WRAMC or its supported activities.

o. In the event of an emergency situation, accomplishing the emergency procedures outlined in Condition No. 6 for Radioactive Material Authorizations, "Emergency Procedures."

p. Complying with the applicable provision of Condition No. 7 for Radioactive Material Authorizations, "Requirements for the Use of Radioactive Iodine, Tritium, and Phosphorus-32."

q. Complying with the applicable provisions of Condition No. 8 for Radioactive Material Authorizations, "Ventillation Requirements."

r. Complying with the applicable provisions of Condition No. 9 for Radioactive Material Authorizations, "Gas Chromatograph Requirements."

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307-5001

CONDITION NO. 1

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

PERSONNEL DOSIMETRY

1. PERSONNEL DOSIMETRY ASSIGNMENT LEVELS

An appropriate personnel monitoring device or devices will be assigned to each individual as required by the Health Physics Officer. In addition, other personnel monitoring techniques (e.g., bioassay) will be utilized to evaluate personnel dosimetry as deemed necessary by the Health Physics Officer. Personnel monitoring devices will usually be assigned when individuals could potentially receive in excess of the following levels in a three (3) month period:

Whole Body, head and trunk, active blood forming organs, gonads or lens of the eye	63 millirems
Skin of the whole body (other than hands, wrists, feet or ankles), forearms, and cornea of the eye	375 millirems
Hands and wrists, or feet and ankles	938 millirems
Bone, thyroid, other organs, tissues and organ systems	250 millirems

2. APPLICATION FOR PERSONNEL DOSIMETRY SERVICE

a. Supervisors of individuals who are potentially exposed to occupational radiation doses in excess of the above values must require such individuals to submit an application for Personnel Dosimetry Service (DD Form 1952) to the Health Physics Office, WRAMC, prior to assignment to that work.

b. The procedure and responsibilities for processing the application are as follows:

(1) Individual Application for Personnel Dosimetry Service: The applicant has the responsibility to furnish:

(a) Individual data

(b) Previous occupational exposure history

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(2) Statement of Work Conditions/Environment by Supervisor: The supervisor has the responsibility to furnish:

(a) A statement of types of exposures in worker's environment (e.g., X-ray, neutron, isotope).

(b) A statement that the applicant has been oriented in radiation safety procedures relevant to his/her position by completion and return of WRAMC Form 538

3. USE OF PERSONNEL MONITORING DEVICES

a. When not being worn, the personnel monitoring devices will be stored in the designated place and are turned in to the activity film badge coordinator during the designated exchange periods.

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

c. WRAMC issued film badges shall not be worn by WRAMC personnel when occupationally exposed at other facilities without the consent of the Health Physics Officer.

d. Whole body film badges will be worn on the front of the torso. In the event a protective garment such as a lead apron is worn, the badge shall be worn under the protective garment.

4. TERMINATION OF PERSONNEL DOSIMETRY SERVICE

The Principal User notifies the Health Physics Office of all department personnel who utilize the personnel dosimetry service.

5. BIOASSAY

a. Individuals who are required to participate in the Bioassay Program due to use of radioactive iodine, tritium, and/or phosphorus-32 will continue participation until released in writing by the Health Physics Officer.

b. The Principal User will assure that personnel required to participate in the Bioassay Program:

(1) Appear for measurement at the time, place and frequency required.

(2) Provide appropriate samples for in-vitro counting.

(3) Inform the Health Physics Officer of changes in working conditions or other factors that would influence the type, or frequency of bioassay measurement.

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20012

CONDITION NO. 2

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

AREA SURVEY PROCEDURES

1. All elution, preparation, and injection areas where radionuclides other than Tritium or Carbon-14 are used will be surveyed daily with a low-range thin-window G-M survey meter and decontaminated if necessary.

2. For those areas using Tritium or Carbon-14 only, a series of wipe tests to measure contamination levels will be performed. The method for performing wipe tests will be sufficiently sensitive to detect 100 dpm per 100 cm^2 for the contaminant involved.

3. A permanent record will be kept of all survey results, including negative results. The record will include:

a. Location, date, and type of equipment used.

b. Name of person conducting the survey.

c. Detected contamination levels, keyed to locations on drawing.

d. Corrective action taken in the case of contamination, reduced contamination levels after corrective action, and any appropriate comments.

4. Area will be cleaned if the contamination level exceeds 100 dpm/100 cm^2.

5. The Health Physics Office will be contacted immediately if contamination levels exceed 1000 dpm/100 cm^2.

REVIEWED - No Changes Needed - 13 MAR 1987

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20012

CONDITION NO. 3

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL

1. Principal Users of radioactive material at WRAMC are responsible for incorporating all applicable precautions listed in this Condition into their procedures and assuring their implementation by personnel listed on their Radioactive Material Authorization.

SECTION I - LABORATORY PRECAUTIONS

2. Following are general rules for the safe use of radioactive materials:

a. Wear laboratory coats or other protective clothing at all times in areas where radioactive materials are used.

b. Wear disposable gloves at all times while handling radioactive materials.

c. Monitor hands and clothing for contamination after each procedure or before leaving the area.

d. Do not eat, drink, smoke, or apply cosmetics in any area where radioactive material is stored or used.

e. Wear assigned personnel monitoring device(s) at all times while in areas where radioactive materials are used or stored. Whole body monitoring device(s) should be worn at chest or waist level.

f. Dispose of radioactive waste only in specifically designated recepticles.

g. Never pipette by mouth.

h. Confine radioactive solutions in covered containers plainly identified and labeled with name of compound, radionuclide, date activity, and radiation level, if applicable.

i. Always transport radioactive materials in appropriate shielding containers.

REVIEWED - No Changes Needed - 13 MAR 1987

CONDITION NO. 3 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL)

SECTION II - NUCLEAR MEDICINE PRECAUTIONS

3. Following are additional general rules specifically applicable to preparation and use of radioactive materials for human use.

a. Use syringe shields for preparation of patient doses and administration to patients except in circumstances such as pediatric cases when their use would compromise the patient's well-being.

b. Assay each patient dose in the dose calibrator prior to administration. Do not use any doses that differ from the prescribed dose by more than 10%.

c. Wear TLD finger badges during elution of generator and preparation, assay, and injection of radiopharmaceuticals.

d. Survey Generator, kit preparation, and injection areas for contamination after each procedure or at the end of the day. Decontaminate if necessary.

SECTION III - VENTILATION IN RADIATION CONTROLLED AREAS

4. Procedures resulting in the generation of radioactive aerosols, dusts or gaseous products shall be conducted in a hood, dry box or other suitable closed system. Radioactive gases or material with radioactive gaseous daughters shall be stored in gas tight containers and kept in areas having approved ventilation. For handling low to moderate levels of radioactive materials, the average velocity through openings in the hood shall be 100 fpm. For highly toxic or high-level radioactive material, the velocity through the opening must be raised to an average of 125 - 200 fpm.

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WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307-5001

CONDITION NO. 4

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

RADIOACTIVE WASTE

1. General. Radioactive waste from Walter Reed Army Medical Center and tenant activities will be controlled, packaged, transported, and disposed of in accordance with AR 385-11, "Ionizing Radiation Protection;" Title 10, Code of Federal Regulations; Title 49, Code of Federal Regulations; Nuclear Regulatory Commission Licenses issued to WRAMC; applicable provisions of State Government requirements for waste disposal sites located within their jurisdiction; and the guidelines delineated herein.

2. Definitions:

a. Radioactive Material: Any material or combination of materials that spontaneously emits gamma rays, X-rays, alpha particles, beta particles, neutrons, or other atomic particles that are capable of producing ions, directly or indirectly by their passage through matter.

b. Radioactive Waste: Surplus items containing radioactive material, property contaminated with radioactive material to the extent that decontamination is economically unsound, and materials that have become contaminated during possession/use of radioactive material.

c. Activity: The number of nuclear transitions (disintegrations) occurring in a given quantity of material per unit time (disintegrations per second); expressed in units of Curies or Becquerels.

d. Specific Activity: Total activity of a given radionuclide per gram of a compound, element, or radioactive nuclide.

e. Curie: The special unit of activity. One curie equals 3.700×10^{10} nuclear transitions per second. (Abbreviated Ci.). Several fractions of the curie are in common usage:

(1) Microcurie: One-millionth of a curie (3.7×10^4 disintegrations per sec.). Abbreviated μCi.

(2) Millicurie: One-thousandth of a curie (3.7×10^7 disintegrations per sec.). Abbreviated mCi.

REVISION 2, effective 13 Apr 87

(3) Picocurie: One-millionth of a microcurie (3.7×10^{-2} disintegrations per second or 2.22 disintegrations per minute). Abbreviated pCi; replaces the term $\mu\mu$ Ci.

f. Becquerel: The special name for the unit of activity. One becquerel equals one nuclear transition per second.

g. Half-life, Radioactive: Time required for a radioactive substance to lose 50 percent of its activity by decay. Each radionuclide has a unique half-life.

h. Short Half-life Radioactive Waste: Radioactive waste containing one or more radionuclides having a radiological half-life of less than 65 days.

i. Long Half-life Radioactive Waste: Radioactive waste containing one or more radionuclides having a radioactive half-life equal to or greater than 65 days.

SECTION I - RADIOACTIVE WASTE CONTROL IN THE LABORATORY/CLINIC

1. Principal Users are responsible for assuring that radioactive waste resulting from the conduct of authorized procedures is controlled in a manner that meets the safety/security measures prescribed by US Army, Federal, and applicable State Regulations. All Users of radioactive materials are responsible for:

a. Segregating their radioactive waste into the categories listed below:

(1) Solid: Short half-life.

(2) Solid: Long half-life.

(3) Scintillation Vials: $\leq$ 0.05 microcuries H-3 or C-14 per gram of fluid.

(4) Scintillation Vials: Short half-life.

(5) Scintillation Vials: Long half-life.

(6) Aqueous Fluid Vials: $\leq$ 30 ml fluid, short half-life.

(7) Aqueous Fluid Vials: $\leq$ 30 ml fluid, long half-life.

(8) Aqueous Fluids: > 30 ml fluid, by individual radionuclide.

(9) Flammable Liquids: > 30 ml fluid, by individual radionuclide.

(10) "BACTEC" Vials.

(11) Commercial Radio-Immuno-Assay Kits.

(12) Animal Carcasses/Animal Waste: Short half-life.

(13) Animal Carcasses/Animal Waste: Long half-life.

(14) Animal Carcasses: $\leq$ 0.05 Microcuries H-3 or C-14 per gram of animal tissue averaged over the entire weight of the animal.

(15) Gas, Combustible.

(16) Gas, Non-combustible.

b. Limiting the non-radioactive waste which is intermixed with radioactive waste to an absolute minimum.

c. Removing or obliterating all "Radioactive Material" labels on non-radioactive vendor shipping packages and on short half-life radioactive waste. Uncontaminated vendor shipping containers may be disposed of in the normal trash by the users. Short half-life waste will be delivered to Health Physics Office (HPO) collection points for subsequent storage, decay, and ultimate disposal in the normal trash when HPO personnel have determined that the waste has reached natural background radiation levels.

d. Storing used Mo-99/Tc-99m generators and other items of equipment containing radioactive material in designated areas only. The radiation labels will be removed on such items only when they reach background radiation levels.

e. Maintaining their inventory of radioactive waste to a practical minimum.

f. Controlling radioactive waste in their work areas to prevent unauthorized disposal by the custodial service. Magenta plastic bags will be used to contain radioactive waste. Magenta bags will not be used for other purposes.

g. Insuring that all radioactive waste is delivered to HPO collection point personnel for ultimate disposal.

h. Marking all radioactive waste containers with the radiation caution symbol and the words "Caution - Radioactive Waste" and/or "Caution -Radioactive Material." Plus "DO NOT EMPTY!"

i. Insuring that radioactive material is not released into the sanitary sewage system without the specific approval of the Health Physics Officer.

j. Insuring that decontamination of reusable equipment is only performed in laboratory sinks that have been authorized via their Radioactive Material Authorization. See Section II for specific requirements concerning this procedure.

CONDITION NO. 4 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (RADIOACTIVE WASTE)

2. All Users of radioactive materials will package their materials for disposal as follows:

a. Segregate radioactive waste into the categories listed in Paragraph 1a, this section.

b. Solid radioactive wastes shall be placed in double magenta plastic bags or a receptacle lined with double magenta plastic bags. When full, the bags will be taped closed. The bags will be tagged with the User's Authorization number and information concerning the contents, chemical and physical forms of base material, radioisotope(s), activity and waste category.

c. Bulk liquid waste that is retained for disposal shall be collected in plastic bottles or sealed in 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 prior to placing them in an appropriate radioactive material container. The bottle or can will be marked with the User's Authorization number and information concerning the contents, chemical and physical forms of base material, radioisotope(s), activity, and waste category.

d. Scintillation vials shall be packaged spearately from other materials. They will be tightly closed and placed in a shipping tray that is labeled with the words "Caution - Radioactive Material." Care must be taken to prevent breakage of the vials while in storage/transport. The trays will be tagged as previously indicated.

e. BACTEC Vials shall be packaged separately from other materials. They will be autoclaved, all radiation labels obliterated, placed in a DOT Specification 7A, Type A, 55-gallon steel drum lined with a 4 mil thick magenta plastic bag. These vials will not be opened and care must be taken to prevent breakage. The drum will be tagged with the words "BACTEC VIALS."

f. All broken glassware, vials, bottles, tubes, pipettes, syringes, needles, and similar items must be packaged in double magenta plastic bags and then placed in small cardboard or plastic containers and sealed to prevent personal injury. The bags and the box will be tagged as previously indicated.

g. Radioactive gasses for disposal will not be transferred to the Health Physics Office without the prior coordination with the Radioactive Materials Control Branch.

h. Short half-life materials and items contaminated with short half-life materials shall be separated from other materials, providing there is no chemical or biological hazard involved. Radioactive warning labels must be defaced on all vials and materials prior to placing the items in the double magenta plastic bags. The bags will be tagged as previously indicated.

CONDITION NO. 4 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (RADIOACTIVE WASTE)

i. Biological wastes (e.g., animal carcasses/animal waste) shall be prepared by the User in a manner that allows the waste to be readily packed in in a 30-gallon drum alternating 10-inch layers of waste and packing materials. Prepared biological waste shall be placed in double magenta plastic bags and tagged as previously indicated.

SECTION II - RELEASE OF RADIOACTIVITY INTO THE SANITARY SEWAGE SYSTEM

1. Liquid waste will be released to the sanitary sewage system in accordance with Title 10, Code of Federal Regulations, Chapter 1, Part 20.303 (i.e., 10 CFR 20).

2. Unless specifically authorized by the Health Physics Office, all releases of radioactive liquid to the sanitary sewerage system will be conducted by the Health Physics Office to assure that the quantity of radioactive material released into the system by combined WRAMC disposal procedures does not exceed the following limits:

a. The quantity of any licensed or other radioactive material released into the system by WRAMC in any one day does not exceed the larger of paragraphs a(1) or (2) below.

(1) The quantity which, if diluted by the average daily quantity of sewage released into the sewer by WRAMC will result in an average concentration equal to the limits specified in Appendix B, Table I, Column 2 of 10 CFR 20 or

(2) Ten times the quantity of such material specified in Appendix C of 10 CFR 20 and

b. The quantity of any licensed or other radioactive material released in any one month, if diluted by the average monthly quantity of water released by WRAMC, will not result in an average concentration exceeding the limits specified in Appendix B, Table I, Column 2 of 10 CFR 20 and

c. The gross quantity of licensed and other radioactive material, excluding hydrogen-3 and carbon-14, released into the sewerage system by WRAMC does not exceed one curie per year. The quantities of hydrogen-3 and carbon-14 released into the sanitary sewerage system may not exceed 5 curies per year for hydrogen-3 and 1 curie per year for carbon-14. Excreta from individuals undergoing medical diagnosis or therapy with radioactive material shall be exempt from any limitations contained in this document.

3. The following policy and procedures apply to all individuals permitted to release radioactive washings into the sanitary sewage system via laboratory sinks:

a. Such release approval must be specifically included in the Principal User's WRAMC Radioactive Material Authorization.

CONDITION NO. 4 FOR RADIOACTIVE MATERIAL AUTHORIZATION (RADIOACTIVE WASTE)

b. The sink through which the material is discharged must be conspicuously posted with a sign bearing the Radiation Caution Symbol and the words, "Caution - Radioactive Material Wash Sink."

c. The sink must be 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 substance which is hazardous to health or will result in a substantial harm to domestic animals, fish, shellfish or wildlife.

d. A record of the identity and activity of radionuclides released via sink decontamination procedures will be maintained by the Principal User. All releases will be documented in a permanent log maintained for each wash sink. Each release will be documented in the log by date, radionuclide, total activity released and the cumulative activity released within the current calendar quarter. This data will be reviewed by HPO personnel for compliance with regulatory limits and collection of the quarterly activity release value.

e. The material must be essentially neutral (i.e., pH of 6.0 - 8.0).

f. The quantity of any material released by the user in any one month will not exceed 100 microcuries.

SECTION III - COLLECTION, LOCAL TRANSPORTATION AND STORAGE OF RADIOACTIVE WASTE

1. Properly packaged radioactive waste will be brought to centralized collection points in Building 40, Walter Reed Army Institute of Research; Building 2, Walter Reed Army Medical Center; or other designated locations as appropriate. Operational hours for collection points may be ascertained by calling the Health Physics Office. Under the supervision of the Health Physics Office, waste will be placed in barrels or other required containers. Wastes for disposal must be categorized as listed in Section I. Waste that has not been properly separated and tagged will not be accepted. Such waste must be repackaged by the user.

2. Principal Users will assure that packaged radioactive waste delivered to the above noted collection points is kept under constant surveillance until removed by Health Physics personnel to preclude the possibility of loss or theft.

3. All radioactive waste will be transported from the above noted collection points to the Radioactive Material Storage Areas located in Buildings 149-A and 516, Forest Glen Section, WRAMC, for ultimate disposal.

CONDITION NO. 4 FOR RADIOACTIVE MATERIAL AUTHORIZATION (RADIOACTIVE WASTE)

SECTION IV - RADIOACTIVE WASTE DISPOSAL SUPPLIES

1. Items of supply for the containment and packaging of radioactive waste are stocked by the Supply and Administration Branch, Materiel Division, Directorate of Industrial Operations, WRAMC. The stockage items meet U.S. Army and Federal radioactive material packaging requirements for most of the radioactive waste resulting from laboratory and/or clinic procedures at WRAMC, WRAIR and AFIP. However, it should be noted that packaging requirements vary with the particular type, form and curie amount of the radioactive waste. Consequently, all personnel involved with the packaging of radioactive waste should consult the Health Physics Office in order to assure that the available stockage items meet packaging specification requirements for each particular radioactive waste disposal operation.

2. Following are the currently stocked items:

a. DRUM, Steel, DOT Specification 17-H, 30-gallon with gasket and sealing bolt. (Used as shipping container for the transport of radioactive biologicals).

b. DRUM, Steel, DOT Specification 17-H, 55-gallon with gasket and sealing bolt. (Used as a shipping container for the transport of low-level radioactive materials).

c. VERMICULITE, 4 cu ft bags. (Used as an absorbent material for the packaging of biological and liquid radioactive waste) - agricultural, Grade 4.

d. SLAKED LIME (Used to retard spoilage of biological radioactive waste).

e. BAG, Plastic, Magenta, 20" x 15" x 60", 4 mil thickness. (Used as a liner for large waste receptacle).

f. BAG, Plastic, Magenta, 13" x 12" x 24", 2 mil thickness. (Used as a liner for small laboratory radioactive waste receptacle).

g. DIATOMACEOUS EARTH, medium grade (floor dry #85), 2.5 cu ft bag. (Used as an absorbent material for packaging of liquid radioactive waste).

3. Additional items will be stocked or procured as required to meet the provisions of Federal/State regulatory agencies.

4. Principal Users are responsible for funding the costs of materials and supplies used to dispose of radioactive wastes. Although Principal Users will pay for the supplies they stock for use in their particular areas, the Health Physics Office, RMC Branch, will order and pick up the supplies needed to collect and package the radioactive waste received from the Principal Users. All orders placed by the Health Physics Office for radioactive waste disposal supplies for the hospital, WRAIR and AFIP will be funded by Clinical Investigation, Department of Pathology/Laboratory Services, Department of Radiology, WRAIR, or AFIP as appropriate.

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307-5001

CONDITION NO. 5

FOR

RADIOACTIVE MATERIAL AUTHORIZATIONS

PROCEDURES FOR
ORDERING, RECEIVING AND SAFELY OPENING PACKAGES
CONTAINING RADIOACTIVE MATERIAL

1. GENERAL. Radioactive material for Walter Reed Army Medical Center (WRAMC) and tenant activities will be ordered, received and secured in accordance with US Army Regulations, Title 10, Code of Federal Regulations, and the provisions of WRAMC's Nuclear Regulatory Commission License.

2. PRINCIPAL USER'S RESPONSIBILITIES.

a. WRAMC Principal Users are responsible for ordering and receiving radioactive material in accordance with the instructions outlined below.

b. A Principal User may procure only those radioisotopes currently authorized for his use by the WRAMC Radiation Control Committee, subject to the limitations of his authorization.

c. Unless specified prior arrangements have been made with the Health Physics Officer, 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 less the amount of activity the User will have on hand at the time the new order is received.

d. Specific prior approval of the Health Physics Officer shall be required before receiving and/or transferring gifts containing radioactive material. This procedure applies to those instances where normal supply channels are not utilized. All gifts will be delivered to one of the locations listed below.

3. ORDERING PROCEDURES.

a. The Principal User shall submit a completed Purchase Request through normal supply channels for the procurement of all radioactive materials.

b. In addition to the information required by WRAMC Procurement Regulations, each purchase request shall contain the following:

CONDITION NO. 5 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (PROCEDURES FOR ORDERING, RECEIVING AND SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL)

(1) Radionuclide, chemical form, and total activity (Activity is given as microcurie (uCi), millicurie (mCi), or curie (Ci); for natural radioactive materials microgram (ug), milligram (mg), gram (g), or kilogram (kg) may be used; for radium equivalent sources such as Cesium-137 milligram radium equivalent (mg Ra eq) may be used where appropriate).

(2) This notice will be typed after the item description:

RADIOACTIVE MATERIAL
NOTIFY HEALTH PHYSICS OFFICE
PRIOR TO PLACING ORDER
(TELEPHONE NO. 427-5104)

(3) The WRAMC Radioactive Material Authorization Number will be indicated in the "Attention Line" of the "Ship To" address.

(4) Date required or delivery date.

(5) One of the proper shipping addresses designated below:

(a) For items to be delivered by mail:

Health Physics Officer
Bldg 188, Forest Glen Section
Walter Reed Army Medical Center
ATTN: Authorization No. _____
Washington, D.C. 20307-5001

(b) For items to be delivered by all other means:

Health Physics Officer
Bldg 188, 2681 Linden Lane
Forest Glen Section
Walter Reed Army Medical Center
ATTN: Authorization No. _____
Silver Spring, MD 20910

(c) For items destined for USAMRIID, Ft. Detrick, Maryland:
Radiation Protection Officer
US Army Medical Research Institute
of Infectious Diseases
South Loading Dock, Bldg 1425
Fort Detrick
Frederick, Maryland 21701

(d) For any item destined for Andrew Rader Clinic, Ft. Myer, Virginia:

Andrew Rader Army Clinic
Bldg 1425
Fort Myer, Virginia 22211

(e) For any item destined for Army Medical Laboratory, Fort Meade, Maryland:

Radiation Protection Officer
Army Medical Laboratory
Bldg 2490
Fort Meade, Maryland 20755

4. RECEIVING PROCEDURES.

a. All incoming shipments of radioactive material to Walter Reed Army Medical Center will be received by the Health Physics Office during duty hours, or by the Military Police, WRAMC Forest Glen Section during non-duty hours. Shipments to Fort Detrick, Fort Meade or Fort Myer will be delivered to the address shown in paragraph 3. The Health Physics Office must be notified immediately of any shipment delivered to an unapproved address.

b. All incoming packages of radioactive material will be examined for damage immediately upon receipt. Any packages that appear to be wet, punctured, crushed, or otherwise damaged will be considered to be contaminated. Until the Health Physics Office has determined otherwise, do not handle such packages.

c. Incoming radioactive material shipments must be continuously secured against unauthorized removal and the radiation levels adjacent to the secured storage area may not exceed 0.5 mR/hr.

5. SHIPMENT MONITORING & DELIVERY TO AUTHORIZED RECIPIENTS.

a. All shipments of radioactive material must be inspected by the Health Physics Office to insure that the shipment does not exceed the possession limits of the Authorization under which it is ordered. Unauthorized shipments will be returned to vendor when possible, disposed of as radioactive waste, or held until the Principal User obtains an amended Radioactive Material Authorization allowing receipt of the material. Unauthorized shipments will not be held by Health Physics for more than ninety (90) days.

b. Shipments will be delivered to Principal Users by the Health Physics Office after monitoring procedures have been accomplished.

CONDITION NO. 5 FOR RADIOACTIVE MATERIAL AUTHORIZATION (PROCEDURES FOR ORDERING, RECEIVING AND SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL)

6. FINAL SOURCE CONTAINER CHECK. The Principal User is responsible for making a final check of the radioactive materials source container after it is delivered by the Health Physics Office. This check will follow the steps outlined below:

a. Put on gloves.

b. Open outer package (following manufacturer's directions, if supplied) and remove packing slip. Open inner package and verify that the contents are as listed on the packing slip.

c. Check integrity of source container, inspecting for breakage of seals or vials, loss of liquid, discoloration of packaging material, etc.

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CONDITION NO. 6

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

EMERGENCY PROCEDURES

1. MINOR SPILLS

a. Notify: Notify persons in the area that a spill has occurred.

b. Prevent the Spread: Cover the spill with absorbent paper.

c. Clean Up: Use disposable gloves and remote handling tongs. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves.

d. Survey: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination.

e. Report: Report incident to the Health Physics Officer.

2. MAJOR SPILLS

a. Clear the Area: Notify all persons not involved in the spill to vacate the room.

b. Prevent the Spread: Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

c. Shield the Source. If possible, the spill should be shielded, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

d. Close the Room: Leave the room and lock the door(s) to prevent entry.

e. Call for Help: Notify the Health Physics Officer immediately.

f. Personnel Decontamination: Contaminated clothing should be removed and stored for further evaluation by the Health Physics Officer. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

g. IN CASE OF EMERGENCY: Contact the Health Physics Officer at 427-5107/5104.

REVIEWED - No Changes Needed - 13 MAR 1987

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WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307-5001

CONDITION NO. 7

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

SECTION I - GENERAL

1. This condition delineates responsibilities and requirements for utilizing radioactive iodine, tritium and/or phosphorus-32 in amounts of 1.0 millicurie or greater. Principal Users of radioactive material at WRAMC and tenant activities are responsible for incorporating all applicable precautions listed in this condition into their procedures and assuring that all applicable precautions are followed by the personnel listed on their Radioactive Material Authorizations.

SECTION II - RADIOACTIVE IODINE

2. RADIATION SAFETY PRECAUTIONS

a. The general rules for the safe use of radioactive material specified in Condition 3 for Radioactive Material Authorizations will be followed.

b. All laboratory facilities authorized to use radioactive iodine will be equipped with a suitable survey meter. Calibrated survey meters will be provided by the Health Physics Office. The individual user is responsible for conducting a thorough survey of the work area and immediate vicinity upon completion of all procedures involving radioactive iodine.

c. All procedures involving use of 1.0 millicurie or more of radioactive iodine will be performed in an iodination box approved by the Health Physics Office. Procurement of the Iodination Box is the responsibility of the individual department and users. Charcoal filters for the iodination boxes will be exchanged by the Health Physics Office on a periodic basis.

d. Procedures involving less than 1.0 millicurie of radioactive iodine will be performed in ventillation hoods approved by the Health Physics Office. Iodination boxes are not required for these procedures.

e. In the case of therapeutic usage, the radioactive iodine vial will be vented inside an approved iodination box prior to being transported to the patient care area.

REVISED 28 April 1987

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

f. Nuclear Medicine procedures involving administration of more than 30 millicuries of radioactive iodine will be coordinated with the Health Physics Office at least 2 days in advance of a scheduled treatment.

3. AIR MONITORING REQUIREMENTS

a. The below listed air samples will be collected and evaluated in order to assure personnel safety:

(1) User Breathing Zone: A sample of the air from the vicinity of the user's mouth and nose will be collected throughout each procedure involving volatile radioactive iodine. The user will collect this sample utilizing the equipment and instructions provided by the Health Physics Office. Breathing zone samples will be secured in a container to prevent contamination and turned in to the Health Physics Office for analysis.

(2) Room Air: An air sample that is representative of the air within the room where iodination procedures are conducted will be collected continuously for a period of one week. Installation, removal and analysis of the filter is the responsibility of the Health Physics Office. Users will assure the sample collection system is operational and report duration of all accidental sampling interruption to the Health Physics Office.

(3) Effluent Air: A sample of air that is representative of the air being discharged to the environment by the fume hood used for iodination procedures will be collected continuously for a period of one month. Installation, removal and analysis of these filters is the responsibility of the Health Physics Office.. Users will assure the sample collection system is operational and report the duration of all accidental sampling interruptions to the Health Physics Office.

b. The below listed equipment (or its equivalent) will be utilized in the collections of air samples:

(1) Vacuum System: A vacuum pump or an in-house vacuum line capable of maintaining a flow rate of 10 LPM is acceptable. In all cases where an in-house vacuum line is utilized, an additional charcoal impregnated filter will be installed between the vacuum source and the filter used for the same collection.

(2) Collection Filters: A four-inch charcoal filter supplied by the Health Physics Office will be utilized for the collection of air samples.

4. BIOASSAY REQUIREMENTS

a. The Health Physics Office will conduct the bioassay program. Objectives of the program are to:

(1) Indicate whether entry of radionuclides into the body has occurred.

(2) Determine the activity resulting from ingestion or inhalation of radionuclides.

(3) Take appropriate action to find out how, when and why the ingestion or inhalation of radionuclides has taken place so as to curtail the problem and prevent a recurrence.

b. An investigation of the individual's work procedures will be performed when bioassay results indicate the following limits have been exceeded:

Thyroid burden of I-125	0.12 uCi
Thyroid burden of I-131	0.04 uCi

c. Radionuclide work procedures will be curtailed/modified when bioassay results indicate the following limits have been exceeded:

	STOP WORK
Thyroid burden of I-125	0.50 uCi
Thyroid burden of I-131	0.14 uCi

d. Principal user will monitor the amounts of radioisotopes used by personnel working under their authorization and assure their participation in the bioassay program as required.

e. Monitoring for internal deposition of radionuclides will normally be performed under the following circumstances:

(1) When laboratory surveys indicate frequent or gross contamination.

(2) When air sampling indicates levels of airborne contamination exceeding 10% of maximum permissible concentration.

(3) When internal deposition of radioactive material is known or suspected.

(4) When the total amount of I-125 and/or I-131 handled in any three-month period exceeds the value listed below, the using individual will participate in the thyroid uptake bioassay program.

TYPE OF OPERATION	VOLATILE OR DISPERSIBLE	BOUND TO NON-VOLATILE AGENT
Processes in open room or bench with possible escape of iodine from process vessels	.1 mCi	1 mCi
Processes with possible escape of iodine carried out within a fume hood of adequate design face velocity, and performance reliability	1 mCi	10 mCi

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATION (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

TYPE OF OPERATION	VOLATILE OR DISPERSIBLE	BOUND TO NON-VOLATILE AGENT
Processes carried out within glove boxes, ordinarily closed, but with possible release exposure to contaminated box and box leakage	10 mCi	100 mCi

5. THYROID BLOCKING AGENT REQUIREMENTS:

a. Agents that block the accumulation of radioiodine by the thyroid gland may be permitted for those at risk to the volatization of high specific activity radioiodine used in radioiodination procedures subsequent to a thyroid evaluation and recommendation by the consulting physician in the thyroid clinic that such an agent should be administered.

b. The supervisor of any radiation workers performing radioiodination experiments will advise the radiation workers of the standard safety procedures and monitoring requirements. In addition, the radiation worker will be advised of the possibility of using a thyroid blocking agent prior to the experiment. In the event that the radiation worker agrees to use this additional precaution, the supervisor will send military radiation workers to ASO and civilian radiation workers to the Occupational Health nurse with a request that a medical consultation be arranged at the Nuclear Medicine Thyroid Clinic for medical evaluation of the worker's thyroid relative to the use of a blocking agent.

c. The responsibilities with regard to recommended usage of a thyroid blocking agent are as follows:

(1) Supervisor:

(a) Advise radiation workers of safe procedures, monitoring requirements and bioassay requirements in using radioactive iodine.

(b) Advise radiation workers of potential use of a thyroid blocking agent at the time of a radioiodination experiment.

(c) Complete a sick call slip requesting a consultation at the thyroid clinic for thyroid evaluation with respect to the use of a thyroid blocking agent prior to radioiodination experiments. Active Duty Military must present sick call slip to ASO. Civilians must present sick call slip to Occupational Health nurse.

(2) ASO or Occupational Health Nurse: Arrange for a consultation at the thyroid clinic.

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

(3) Nuclear Medicine Thyroid Clinic:

(a) Determine the medical advisability of the radiation worker using a thyroid blocking agent and advise the radiation worker as to the advisability/nonadvisability of its use prior to a radioiodination experiment.

(b) Annotate consultation form with:

1. Medical evaluation of thyroid condition.

2. Recommendations regarding use of a thyroid blocking agent to include dose and time to be taken with respect to a radioiodination experiment.

3. Statement indicating that radiation worker has been advised of the hazards of radioactive iodine, the necessity for bioassay and the advisability/nonadvisability of using a thyroid blocking agent.

(c) Supply radiation worker with a prescription (if applicable) to obtain a thyroid blocking agent at WRAMC pharmacy. (Civilian must obtain concurrence from the Occupational Health Clinic in order to have the prescription filled at the WRAMC pharmacy).

(d) Notify Health Physics Office in writing of those personnel who have been reviewed regarding the use of a thyroid blocking agent to be used in conjunction with radioiodination experiments and the recommendations regarding the use of a thyroid blocking agent.

(4) Health Physics:

(a) Maintain a listing of all radiation workers who have been evaluated in the thyroid clinic and recommendations for each worker regarding the use of a thyroid blocking agent.

(b) Notify the radiation worker's supervisor regarding the evaluation and recommendations of the thyroid clinic's physician.

SECTION III - TRITIUM

6. SAFETY PRECAUTIONS

a. The general rules for the safe use of radioactive material specified in Condition No. 3 for Radioactive Material Authorizations will be followed.

b. All procedures involving the use of 10.0 millicuries or more of tritium in one month (1.0 millicurie for processes utilizing nucleoclide precursors) should be performed in ventillation hoods approved by the Health Physics Office.

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

7. BIOASSAY REQUIREMENTS

a. The Health Physics Office will conduct the bioassay program. Objectives of the program are to:

(1) Indicate when entry of radionuclides into the body has occurred.

(2) Determine the activity resulting from the ingestion or inhalation of radionuclides.

(3) Take appropriate action to find out how, why, and when the ingestion of inhalation of radionuclides has taken place so as to prevent the problem and prevent recurrence.

b. An investigation of the individual's work procedures will be performed when bioassay results indicate the following limit has been exceeded:

Total urine activity 5.00 uCi/1 for H-3

c. Radionuclide work procedures will be curtailed/modified when bioassay results indicate the following limit has been exceeded:

Total urine activity 50.00 uCi/1 for H-3

d. Principal Users will monitor the amounts of radionuclide used by personnel working under their authorizations and assure their participation in the bioassay program as required.

e. Monitoring for internal deposition of radionuclides will normally be performed under the following circumstances:

(1) When laboratory survey indicates frequent or gross contamination.

(2) When internal deposition of radioactive material is known or suspected.

(3) When the total amount of tritium processed by an individual at any one time, or the total amount processed in any one month exceeds the values listed below, the using individual will participate in the bioassay program.

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

TYPES OF OPERATION	HTO & OTHER TRITIATED COMPOUNDS (Including Nucleotide Precursors	HT OR T_2GAS IN SEALED PROCESS CESS VESSELS	HTO MIXED WITH MORE THAN 10Kg OF INERT H_2O OR OTHER SUBSTANCES
Process in open room or bench, with possible escape of tritium from process vessel.	10 mCi	10 Ci	1 mCi/Kg
Processes with possible escape of tritium carried out within a fume hood of adequate design, face velocity, and performance reliability.	100 mCi	100 Ci	10 mCi/Kg
Processes carried out within glove boxes, ordinarily closed, but with possible release of tritium from process & occasional exposure to contaminated box & box leakage.	1 Ci	1,000 Ci	100 mCi/Kg

SECTION IV - PHOSPHORUS-32

8. RADIATION SAFETY PRECAUTIONS

a. Phosphorus-32 is the highest energy radionuclide commonly encountered in research laboratories and as such requires special care. If millicurie quantities are used, finger dosimeters should be worn. The use of lead-impregnated rubber gloves, is also recommended. The absorption of the B-particles by low-density materials (for example) plexiglas gives rise to relatively high energy bremsstrahlung which may require some lead shielding when quantities of 10 mCi or greater are being handled.

b. Always use remote handling tools. Avoid direct contact with containers of Phosphorus-32.

c. Shield sources of Phosphorus-32 with both low and high density shielding. Low density shielding such as plastic should be utilized as the first layer of shielding.

d. Always use impermeable gloves and safety glasses.

e. The applicable general rules for the safe use of radioactive material specified in Condition No. 3 for Radioactive Material Authorizations will also be followed.

CONDITION NO. 7 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS (REQUIREMENTS FOR THE USE OF RADIOACTIVE IODINE, TRITIUM AND PHOSPHORUS-32

9. BIOASSAY REQUIREMENT

a. The Health Physics Office will conduct the bioassay program. Objectives of the program are to:

(1) Indicate when entry of radionuclides into the body has occurred.

(2) Determine the activity resulting from the ingestion or inhalation of radionuclides.

(3) Take appropriate action to find out how, why, and when the ingestion or inhalation of radionuclides has taken place so as to prevent the problem and prevent reoccurrence.

b. An investigation of the individual's work procedures will be performed when bioassay results indicate the following limit has been exceeded:

Total Urine Activity:	0.06 uCi/day for P-32 (sample taken on day 2)

c. Radionuclide work procedures will be curtailed/modified when bioassay results indicate the following limit has been exceeded:

Total Urine Activity:	0.20 uCi/day for P-32 (sample taken on day 2)

d. Principal Users will monitor the amounts of radionuclides used by personnel working under their authorizations and assure their participation in the bioassay program as required.

e. Monitoring for internal deposition of radionuclides will normally be performed under the following circumstances:

(1) When laboratory survey indicate frequent or gross contamination.

(2) When internal deposition of radioactive material is known or suspected.

(3) When the total amount of Phosphorus-32 processed by an individual at any one time exceeds 25 millicuries the individual will participate in the bioassay program.

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, DC 20307

CONDITION No. 8

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

VENTILATION REQUIREMENTS

1. General: Procedures resulting in the generation of radioactive aerosols, dusts or gaseous products shall be conducted in a hood, dry box, iodine box or other suitable closed system. Radioactive gases or material with radioactive gaseous daughters shall be stored in gas tight containers and kept in areas having approved ventilation. For handling low to moderate levels of radioactive material, the average velocity through openings in the hood shall be 100 fpm. For highly toxic or high-level radioactive material, the velocity through the opening will be rasied to an average of 125 - 200 fpm. The ventilation system will be designed to permit air flow in such a direction that any radioactive material picked up by air will flow away from the worker. The air flow should always be from a noncontaminated area toward the contaminated area. Laboratory ventilation will confine the toxic contaminant, exhaust it with suitable duct work and fans, and pass the material through a collector, scrubber or filter as needed before releasing it to the environment. The ventilation system will also provide sufficient air to make up for the amount exhausted.

2. Equipment Design:

a. Hood design

(1) A laboratory hood is a simple enclosure in which work can be carried out without toxic materials escaping. In order to keep the material from escaping the enclosure, sufficient air must be exhasuted to create an indraft through the face of the hood. This indraft must be strong enough to overcome the actions which allow materials to escape.

(2) Instrument checks on the velocity of air entering the hood will be performed under various conditions encountered during actual operations. Checking air flow patterns with a small source of smoke will be performed indicate the presence of crossdrafts that could pull material from the hood.

(3) In general, a hood should be located well away from any doorway where supply air must enter in order to avoid crossdrafts.

(4) During periods when the hood is unattended, it may be practical to use somewhat lower velocities, 75 to 80 fpm. Dual speed fans will permit operation at the higher velocity while the hood is in use and at the lower velocity when it is closed.

REVIEWED - No Changes Needed - 13 March 1987

b. Exhaust System:

(1) The exhaust system is designed to remove the airborne materials which are picked up in the hood. To safely vent the contaminated air, it may need to be filtered, or otherwise treated, before discharge to the environment. Cleaning equipment will be selected with view to the corrosive and toxic materials handled and the varying requirements for removal of radioactive materials.

(2) The duct work inside the building will be under negative pressure. Under these conditions any leakage in the duct system will be into the ducts and the radionuclides will be confined. To accomplish this, the fan must be located at the point where the exhaust leaves the building. Duct work connecting several hoods will have streamlined connections. Branch duct should enter at angles of 30 to 45 degrees in order to permit better passage of air at high velocities. In such mulitiple installations, care should be taken to see that the exhaust system is balanced so that one hood does not provide the bulk of the air for the system.

(3) Velocities of air in ducts should be great enough to maintain minimum transport velocities for the material being conveyed. Usual range of transport velocities for particulate material is 3500 to 4500 fpm.

(4) In hoods where large quantities of water are handled, it is necessary to provide some means of removing the condensation that collects in the duct. When the system is intended to handle corrosive materials, the duct work should be of material resistant to corrosion.

(5) The discharge should be at least five to ten feet above the laboratory roof, located so the fumes will not be carried back into the laboratory or into the air, intake of adjacent buildings.

(6) Clean air must be supplied to replace the air removed by the exhaust system. If adequate air is not supplied to the room, the capacity of the exhaust system and the air velocity at the face of the hood is reduced. If there are multiple exhaust hoods and no makeup air, the airflow may be reversed through a hood that has a smaller fan or is turned off.

3. Proper Use of Hoods:

a. Inspect the hood and insure all components are in proper working conditions. Defective components must be repaired or replaced.

b. Insure the direction of air flow is into the hood.

c. When the hood door must be partially closed to achieve the proper flow rate, assure the hood door is positioned at the proper heights.

d. Keep sources of contamination, vapor, and flames at least six inches inside the hood.

e. Avoid leaning into the hood

3 August 1983

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, DC 20307

CONDITION NO. 9

For

RADIOACTIVE MATERIAL AUTHORIZATIONS

GAS CHROMATOGRAPH REQUIREMENTS

1. GENERAL: Some gas chromatograph detectors currently used at WRAMC have a radioactive source as a supply of electrons to effect the detection of gasses according to their molecular weights and holdup times.

a. Tritium Foil Type Detectors: Tritium is usually bound to a copper or stainless steel foil as titanium tritide. The binding agent may begin to break down and allow liberation of tritium at temperatures as low as 150° C. The gas chromatograph units should have a built-in thermocouple to shut the unit off at 220° C since the tritium would probably be entirely evolved at this temperature.

b. ^{226}Ra, ^{210}Pb, ^{90}Sr and ^{63}Ni Type Detectors: Temperatures below 500° C are not sufficient to break down the binding of these metallic isotopes to the detector foils. Therefore, moderately high temperatures are not a consideration in their operation. These sources may, however, be partially exposed when dismantling the detector unit; accordingly, detector units shall not be dismantled without Health Physics approval.

c. Vented Detectors: Some of the detectors are equipped with exit ports for venting potentially contaminated gases. These detectors while in use should be vented to a sink under running water or into an operating Health Physics approved fume hood.

d. Non-Vented Detectors: These detectors have no provisions for control of potentially contaminated exhaust gases and should be used in an operating Health Physics approved fume hood. The gases in these detectors are forced through a rubber leak seal at the end of the cylinder. These detector cylinder caps become highly contaminated on the inside surface and shall not be displaced from their cylinders without Health Physics inspection and approval.

2. RESPONSIBILITIES:

a. The gas chromatograph detector shall be used only by, or under the supervision of, the Principal User. The Principal User is responsible for:

(1) Control, safe operation and security of the gas chromatograph unit.

(2) Training selected individuals in its safe use and operation in accordance with the procedures outlined herein.

REVIEWED - No Changes Needed - 13 March 1987

CONDITION NO. 9 FOR RADIOACTIVE MATERIAL AUTHORIZATIONS - GAS CHROMATOGRAPH REQUIREMENTS (Continued)

(3) Insuring that these instructions, WRAMC Regulation 40-10 and other pertinent documents are available at all times and are complied with.

(4) Promptly reporting any accident that could result in an unsafe condition to the WRAMC Health Physics Officer (427-5107).

b. Individual operators are responsible for:

(1) Operating the unit in a safe manner at all times.

(2) Being familiar with the contents of these instructions, WRAMC Regulation 40-10, and other data as prescribed by the Principal User.

(3) Reporting all accidents or abnormal operating conditions that could result in an unsafe condition or exposure of personnel promptly to the Principal User.

3. EMERGENCY PROCEDURES:

a. In the event of an emergency, the following individuals will be notified after turning the power to the instrument off:

(1) The Principal User.

(2) Health Physics Officer, WRAMC (427-5107).

(3) Charge of Quarters of appropriate building(s).

b. In the event of **FIRE** in the room, the following will be done **immediately:**

(1) Notify the WRAMC Fire Department (Main Section - 576-3317; Forest Glen Section - 427-5317).

(2) Notify the Principal User.

(3) Notify the Health Physics Officer, WRAMC (427-5107).

(4) Notify the Charge of Quarters of appropriate building(s).

(5) The senior individual at the site should clear the area of personnel and attempt to turn off the power to the instrument.

c. Power Failure: In the event of a power failure, no danger exists.

ITEM 9

INSTRUMENTATION

LIST OF RADIATION DETECTION INSTRUMENTS

TYPE	NUMBERS AVAILABLE	RADIATION DETECTION	RANGE	WINDOW THICKNESS (mgm/cm^2)	USE
Eberline 6112	6	beta, gamma	0-1R/hr	30	Surveys
Eberline E 120	10	beta, gamma	0-50mR/hr	30	Lab Surveys
Eberline PAC-ISA	1	gamma	0-2000kcpm	1.5	Monitor
Eberline PAC-ISAGA	2	gama	0-2000kcpm	0.5	Monitor
Eberline PRM-5	1	beta/gamma	N/A	N/A	Monitor
Eberline 140	4	beta,gamma	0-60kcpm	N/A	Monitor
Eberline PRM-5-3	1	beta,gamma	N/A	N/A	Monitor
Eberline PRM-6	3	beta, gamma	0-500cpm	N/A	Survey
Eberline PRS-1 (Rascal)	14	beta, gamma	0-999,999cpm	N/A	Monitor
Eberline RM-16	10	gamma	10^2-10^6cpm	N/A	Monitor
Eberline MS-3	4	beta, gamma	N/A	N/A	Monitor
Eberline PRN-4	1	neutron	0-5kR/hr	N/A	Monitor
Gamma Industries 250B	20	beta, gamma	0-1000mR/hr	30	Survey
Gamma Industries 252B	10	beta, gamma	0-1000mR/hr	30	Survey

TYPE	NUMBERS AVAILABLE	RADIATION DETECTION	RANGE	WINDOW THICKNESS (mgm/cm^2)	USE
Ludlum 2	8	beta, gamma	0-50mR/hr	1.5	Survey
Ludlum 3	172	beta, gamma	0-500mR/hr	30	Survey
Ludlum 3	7	alpha	0-500mR/hr	1.0	Survey
Ludlum 12S	1	gamma	N/A	N/A	Monitor
Ludlum 16S	1	gamma	0-500,000cpm	N/A	Monitor
Ludlum 28	31	gamma	N/A	30	Monitor
Ludlum 2000	1	gamma	N/A	N/A	Monitor
Ludlum 2200	1	gamma	N/A	N/A	Monitor
Victoreen 440	3	gamma	N/A	1.0	Measure
Victoreen 440RF	1	gamma	0-300mR/hr	N/A	Measure
Victoreen 471	10	alpha, beta, gamma	0-1R/hr	$500mg/Cm^2$	Measure
Victoreen 808B	3	gamma	.1mR/hr-100mR/hr	N/A	Measure
Nuclear Data ND660MCA	1	gamma	N/A	N/A	Measure
Nuclear Data ND66	1	gamma	N/A	N/A	Measure
Canberra 2201	1	alpha, beta	N/A	N/A	Measure
Beckman LS-9800	1	beta	N/A	N/A	Measure
Packard AG-5780	1	gamma	N/A	N/A	Measure
Keithly 36150	2	beta, gamma	0-20R/hr	$50mg/Cm^2$	Measure

ITEM 10

CALIBRATION OF INSTRUMENTS

CALIBRATION OF SURVEY INSTRUMENTS

1. Survey instruments will be calibrated at least annually and following repair.

2. Calibration will be performed at two points on each scale. The two points will be approximately 1/3 and 2/3 of full scale. A survey instrument may be considered properly calibrated when the instrument readings are within $\pm$ 10% of the calculated or known values for each point checked. Readings with $\pm$ 20 are considered acceptable if a calibration chart or graph is prepared and attached to the instrument.

3. Survey instruments will be calibrated by an annually contracted company, whose procedures and sources are approved by the agreement state/NRC.

ITEM 11

FACILITIES AND EQUIPMENT

ITEM 11 - FACILITIES AND EQUIPMENT

1. Facilities

See attached drawings of the Nuclear Medicine Pharmacy, the Radiation Therapy isotope storage room, and a typical laboratory room.

2. Equipment

The following equipment/facilities are available as required:

a. Remote Handling:

(1) Niptongs and griptongs

(2) Atomic Accessories Handling Tool RHT-60

(3) Jaws and vices

(4) Remote forceps

(5) Magnetic handlers

b. Storage Containers:

(1) Steel safes

(2) Lead lined boxes

(3) Steel drums

(4) Lead storage containers

(5) Lead pigs

c. Shielding:

(1) Portable shields

(2) Shielding materials (e.g. sheet lead, plastic sheet, etc.)

d. Instrumentation:

See Item 9 of this application

e. Ventilation Control:

(1) Fume hoods

(2) Fume hoods with ionization boxes

(3) Fume hoods with absolute filter assemblies

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
HSHL-HO	Ventilation Survey, Nuclear Medicine Clinic

TO	FROM	DATE	CMT 1
Health Physics WRAMC	C, OHS	1 May 87	

1. References:

a. Engineer Technical Letter 1110-3-344, Engineering and Design-Interior Mechanical Design Conditions for Army and Airforce Medical Facilities, 4 October 1983.

b. DF, Subject: Ventilation Study, Nuclear Medicine Clinic, 6 April 1987.

2. General:

a. In response to ref. para 1, Mr. Petch, Industrial Hygienist, Occupational Health Section (OHS), Preventive Medicine Services (PMS), Walter Reed Army Medical Center (WRAMC), surveyed the ventilation systems in room [ ] on 9 and 10 April 1987.

b. Equipment used during survey was as follows:

1.	Shortridge Flow Hood	SN 2743	Cal date: 13 Jun 86
2.	Alnor 2600 Anemotherm	SN 1903	Cal date: 17 Jun 87
3.	TSI Anemotherm	SN 4562A	Cal date: 7 Dec 86
4.	MSA Smoke Tubes		

3. Findings and Discussion: Answered in sequence as in ref para 1.

a. Room [ ] (Renal Room) is under negative pressure, as verified by total exhaust measurement and smoke test.

b. Exhaust air from room [ ] exits the NMTF via the exhaust plenum located in area "P" penthouse (southwest corner of roof).

c. Exhaust from room [ ] is not recirculated. Room [ ] has an air exchange rate of 23 air changes per hour on exhaust side. The exhaust fan servicing room [ ] is EA8SW2 which is designed at 14,000CFM. The seventh floor exhaust duct velocity was 2648 CFM.

d. Xenon system when in use exhausts through an internal Xenon trap charcoal filter system and then to room air. Room [ ] air is 100% exhaust.

Ex 2

e. Xenon if released is diluted in a room of approximately 4560 cubic ft, exhausted at a rate of 1750 ft/min for an air exchange rate of 23 air changes per hour.

f. The series of rooms [ ] (Office, Radiopharmacy and Dose Room respectively) are under negative pressure; as verified by total exhaust measurement and smoke tests. See enclosure 1 for calculations.

g. Exhaust air from rooms [ ] exits the NMTF via a dedicated 14 inch diameter duct through a HEPA filter and a dedicated exhaust fan to the exhaust plenum located in area Q penthouse (southeast corner of roof).

h. Exhaust from room [ ] is not recirculated. Rooms [ ] have an air exchange rate of 12 air changes per hour on the exhaust side.

5. Technical Assistance: Contact the undersigned at 427-5338/9 for further information or assistance.

Albert W. Steele

Encl

ALBERT W. STEELE, R.S.
Chief, Occupational Health Section
Preventive Medicine Services

cf:
C, Nuclear Medicine

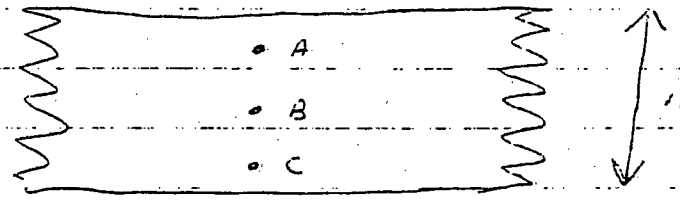
Q2

1A

EX 2

Room [ ] and other areas covered by fan EA 8 SW 2

Pitot traverse of main duct just before fan EA 8 SW 2 (on 7.5 inch floor)



18" x 18" duct

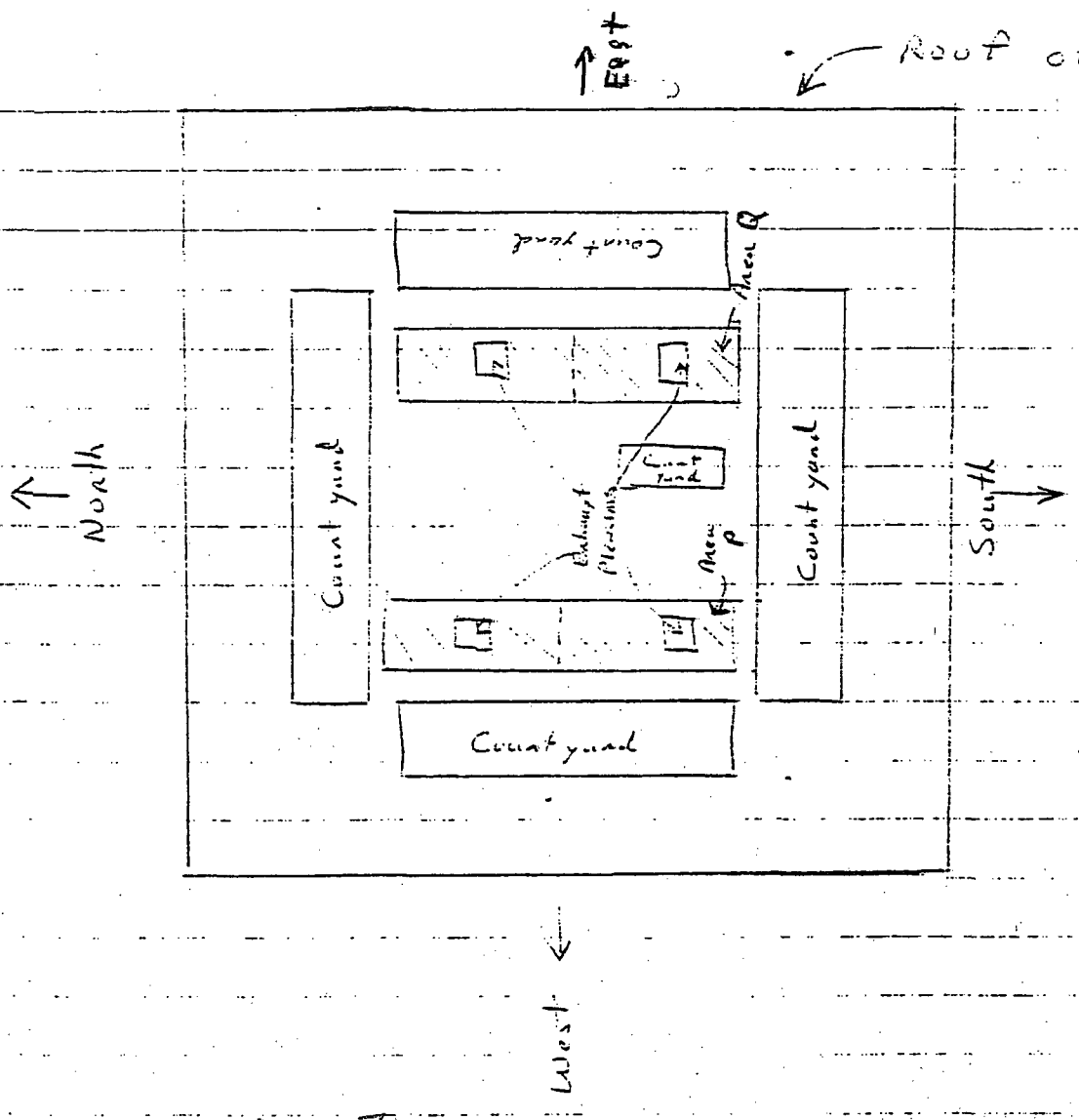
	1	2	3	4	5	6	7	8
Hole A =	1150 FPM	1200 FPM	1225 FPM	1250 FPM	1225 FPM	1200 FPM	1150 FPM	110
Hole B =	1250 FPM	1250 FPM	1225 FPM	1200 FPM	1225 FPM	1200 FPM	1150 FPM	100
Hole C =	1050 FPM	1100 FPM	1150 FPM	1175 FPM	1200 FPM	1225 FPM	1200 FPM	1150
Total:	3450 FPM	3550 FPM	3600 FPM	3625 FPM	3650 FPM	3625 FPM	3500 FPM	3250

Grand Total: 28250 FPM 18" x 18"

Average: 1177.1 FPM 1.5' x 1.5' = 2.25 ft² Ar

$$Q = VA$$
$$= (1177.1\ FPM)(2.25\ ft^2)$$
$$= 2648.5\ CFM$$

EX 2



Room [redacted] is exhausted through plenum in area P of penthouse on southwest corner of roof.

Rooms [redacted] are exhausted by a designated system to plenum in area Q of penthouse on southeast corner of roof.

Ex 2

II Rooms

Pitot traverse of 14" diameter stainless steel duct designated for Fume hood in room [ ]

	1	2	3	4	5	6	7	8
Hole A :	600FPM	650 FPM	700 FPM	700 FPM	675 FPM	700 FPM	600 FPM	700 FPM
Hole B :	700 FPM	775 FPM	800 FPM	800 FPM	800 FPM	750 FPM	750 FPM	725 FPM
Total	1300 FPM	1425 FPM	1500 FPM	1500 FPM	1475 FPM	1450 FPM	1350 FPM	1425 FPM

Total = 11425 FPM ⟶ Average = 714.1 FPM

Area = πr^2
= (3.14)(0.583 ft)^2
= 1.83 ft^2

Q = VA
= (714.1 FPM)(1.83 ft^2)
= 1306.7 CFM

Fume hood in Room [ ]

Dimensions = 41" x 28" (FC) (3.42 ft) x (2.33 ft)

Face Velocity = 164 FPM @ last reading (March 8

Area = 7.97 ft^2

Q = VA
= (164 FPM)(7.97 ft^2)
= 1307.1 CFM

Air exchange rate measured in air changes per hour =

@ $\frac{(1300.7)(60\text{min})}{6498\text{ft}^3} = 12.1$

@ $\frac{(1307.1\text{ CFM})(60\text{min})}{6498\text{ft}^3} = 12.1$

ITEM 21

PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES

ITEM 21 - INFORMATION FOR THE USE OF XENON-133

a. Quantities to be Used:

(1) Patient information:

(a) Number of studies expected per week: 8

(b) Average activity per patient: 20 millicuries

b. Use and Storage Areas:

(1) Xenon-133 studies are only performed in room [ ] Walter Reed Army Medical Center (see attached drawing of the Xenon-133 dispensing room). Xenon-133 is stored in the [ ], which is kept locked after duty hours. The individual leaded storage drawers used to house unused Xenon-133 vials are also kept locked. Each drawer is individually lead lined on the top, bottom and all four sides. (See attached drawing of the Nuclear Medicine Radiopharmacy).

(2) The attached drawings show the ventilation air flow rates and location of the exhaust vents and the supply vents of the Xenon-133 dispensing room and Radiopharmacy.

(3) The air flow rates for the Radiopharmacy and Xenon-133 dispensing room are such that the rooms are by design under negative pressure at all times.

c. Procedures for Routine Use:

(1) The Procedures to be followed for routine use of Xenon-133 are as follows: When Xenon-133 is to be used for a patient's study, the necessary vial is removed from the storage unit a dose is drawn in a syringe, and assayed in a dose calibrator. Once the assay has been completed, the Xenon-133 syringe is placed in a lead shield and transported to the imaging room. The patient is positioned and the Xenon-13 injected into the Ventil-

ITEM 21 (Continued)

Con II gas dispensing system which provides more than adequate shielding prior to administration of the Xenon-133 gas. The gas is injected directly into a breathing value with a bacterial filter attached to a 8 inch tube which is fitted to a face mask that forms a tight seal around the patient's mouth and nose. The opposite end of the tubing is attached to the Ventil-Con II. The Ventil-Con II regulates air flow for the various phases of the ventilation procedure along with trapping the CO_2 gas released by the patient. Hooked in tandem with the unit is the Xenon gas trap which draws the exhaled air by a vacuum pump through the silica gel desiccant jar, then the activated charcoal filter. The injection port arm is shielded with lead which makes external radiation levels negligible.

(2) Special apparatus for administration and collection of Xenon-133 is the Ventil-Con II system by RADX, Model # 143.

(3) Special procedures employed to reduce leakage: A patient face mask is used to reduce leakage.

d. Emergency Procedures:

When a Xenon-133 study is compromised, personnel are instructed to leave the room and to close the door. The negative pressure facilitates the removal of the Xenon-133 gas.

e. Air Concentrations of Xenon-133 in Restricted Areas:

(1) The maximum activity used per week (A): 1.6×10^5 uCi (see para (5) (a) below).

(2) Estimated fraction of Xenon-133 lost during use and storage (f): 20%

(3) Actual measured air flow: 1750 ft^3/min

ITEM 21 (Continued)

Calculated volume of air available per week for dilution of the Xenon-133:

$$V = 1750\ ft^3/min \times \frac{year}{52\ week} \times 1.49 \times 10^{10}\ \frac{ml/year}{ft^3/min} = 5.0 \times 10^{11}\ ml/wk$$

(4) For restricted areas Section 20.103 of 10 CFR, Part 20 requires that:

$$A/V \times f \leq 1 \times 10^{-5}\ uCi/ml$$

(5) Calculation of required ventilation rate: A maximum of 20 mCi of Xenon-133 will be used per patient and a maximum of 8 studies per week will be performed. The ventilation rate required to ensure compliance with Section 20.103 of 10 CFR, Part 20:

(a) Maximum activity used per week:

$$A = \frac{20\ mCi}{Patient} \times \frac{8\ Patients}{Week} \times \frac{1 \times 10^3\ uCi}{mCi} = 1.6 \times 10^5\ uCi/week$$

(b) Assume a loss rate of 20% (f)

(c) $$V = \frac{A \times f}{1X10^{-5} uCi/ml} = \frac{1.6 \times 10^5\ uCi/week \times 0.2}{1X10^{-5}\ uCi/ml} = 3.2 \times 10^9\ ml/week$$

The required ventilation rate is:

$$\frac{3.2 \times 10^9\ ml/week}{40\ hrs/week} \div \frac{1.7 \times 10^6\ ml/hr}{CFM} = 47\ CFM$$

Since the ventilation rate in the Xenon dispensing room is 1750 CFM, the ventilation system is satisfactory for a restricted area. The maximum permissible level of release of Xenon-133 per 40-hour week for a restricted area (NRC Regulatory Guide 10.8, Appendix M, Page 6) would be approximately 600 mCi. The air in room [7C06] is not recirculated and is exhausted from a roof plenum with flow rates of more than 2600 CFM.

ITEM 21 (Continued)

f. Methods of Xenon-133 Disposal:

(1) Diluation through exhausted systems. Not used.

(2) Absorption onto charcoal traps:

(a) An effluent concentration of greater than 1 X 10^{-2} uCi/ml acticates an audio visual alarm and the system is refilled with a new Xenon trap.

(b) The saturated filters are placed in a plastic bag and placed in a lead lined storage box in Nuclear Medicine Pharmacy and held until they decay ten (10) half-lives and disposed of in ordinary trash.

OPERATION, INSTALLATION, & MAINTENANCE MANUAL

Ventil-Con II

RADX

1390 WEST BELT DR., HOUSTON, TX 77043

Printed in U.S.A. 100(11/80)

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VENTIL-CON II

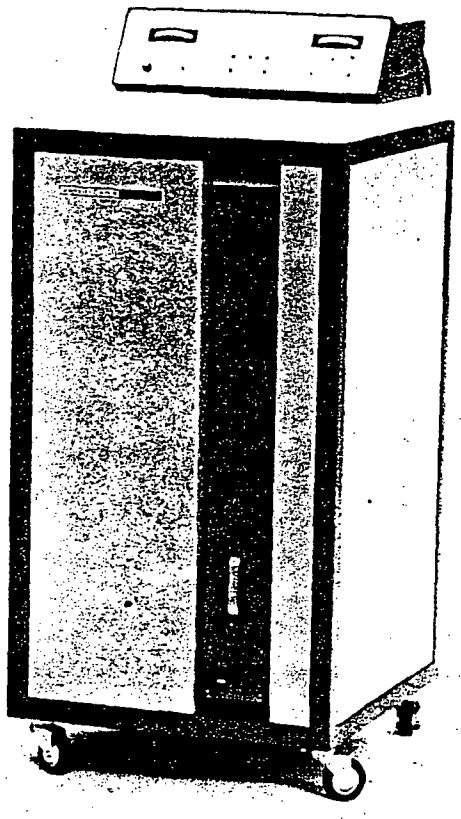


Fig. 1
Ventil-Con II Model 143

INTRODUCTION

Purpose - The Radx Ventil-Con II (Figure 1) was designed to provide a means of safely administering radioactive gases, principally ^{133}Xe to patients for the purpose of determining the patency of the pulmonary ventilation system.

Description - The Ventil-Con II is available in three different models: They are:

Model	Description
141	Ventil-Con II Rebreathing System Only
142	Ventil-Con II Rebreathing System with built-in Xenon Trap and Expandable Interface
143	Ventil-Con II Rebreathing System with built-in Xenon Trap, Expandable Interface and ^{133}Xe Xenon Trap Exhaust Port Detector/Alarm Warning System.

Note: This manual is dedicated to the 143 system. Deviations found in 142 and 141 are described where necessary.

Inspection and Unpacking - The Ventil-Con II is supplied with the following standard accessories:

1 - Breathing Port Adapter (Figure 26o)
1 - Face Mask Tubing $5\frac{1}{2}$" (Figure 26p)
1 - Adult Mouthpiece (Figure 26t)
1 - Nose Clip (Figure 26u)

In addition to the above, Models 142 and 143 are supplied with an Expandable Interface and its necessary mounting apparatus. The Expandable Interface and its accessories are shipped in a separate carton. Items shipped with the Expandable Interface are:

1 - Expandable Interface
1 - Flex Tube

Before discarding shipping cartons and packing material, inspect all parts for damage and make sure that all items are present. Report any discrepancies to Radx immediately.

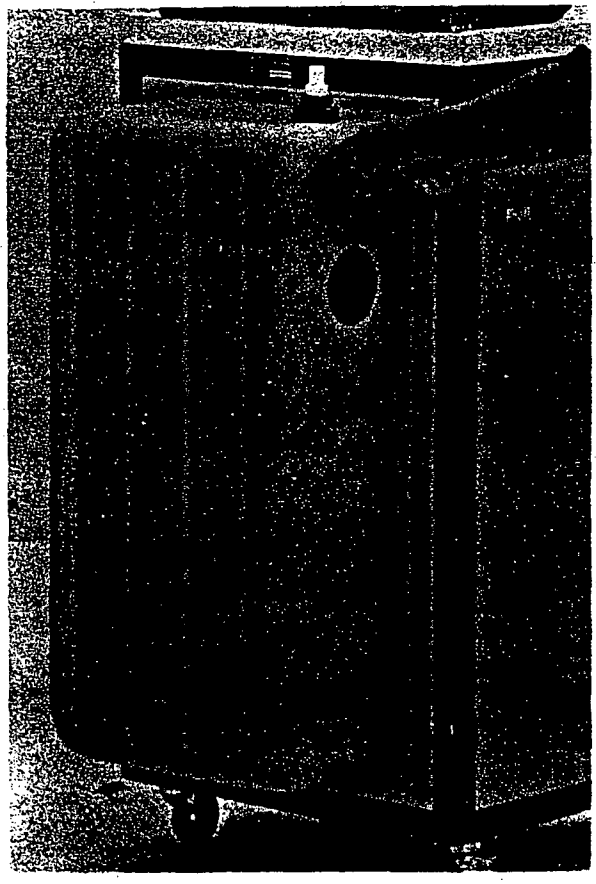


Fig. 2
Mounting Expandable Interface to rear door of Ventil-Con II

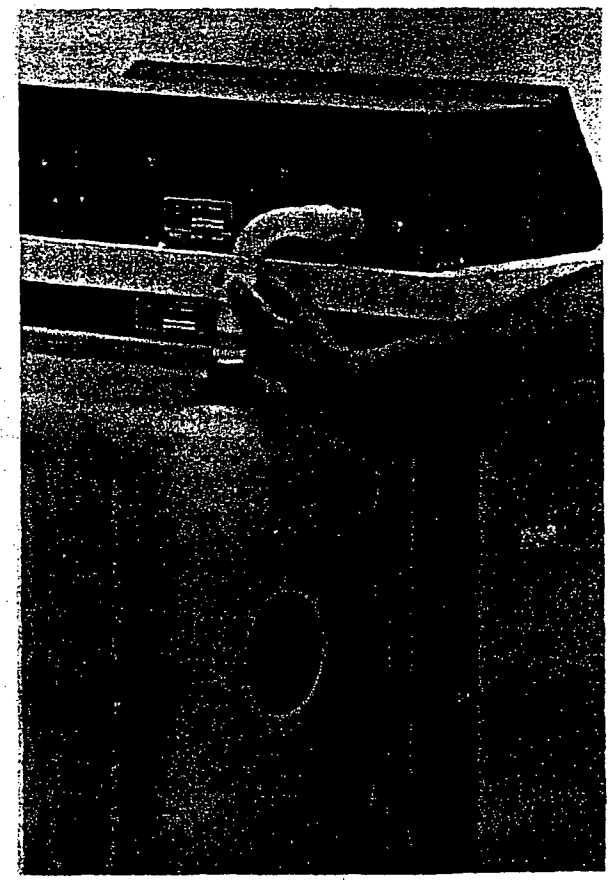


Fig. 3
Connecting flex tube between Ventil-Con II and Expandable Interface.

Assembly - The only assembly required with the Ventil-Con II is the mounting of the Expandable Interface on Models 142 and 143.

Expandable Interface - (Models 142 and 143) - The back side of the Expandable Interface housing is covered with heavy paper. Leave this intact to protect the internal bag. Locate the bulk-head fitting as this represents the top of the interface housing. The Expandable Interface should be mounted on the rear door of the Ventil-Con II with the six screws and washers provided (Figure 2). Attach the flex tube provided to the two male fittings, one on the Expandable Interface, and the other on the rear of the control panel labeled "To Interface" (Figure 3).

O_2 Hook Up - The Ventil-Con II requires an external O_2 supply, either a wall mount or tank. The O_2 supply should be regulated to a maximum pressure of 50 PSI and should be equipped with a flow meter capable of regulation to a rate of 2 liters per minute.

Attach a standard O_2 hose to the output of the O_2 flow meter. Standard O_2 line normally comes with a collar on both ends. Cut the collar off the end to be attached to the Ventil-Con II. Slip the O_2 hose through gold colored hose clamp which is shipped attached to the oxygen fitting. Slip the hose on to the oxygen fitting and slide the clamp firmly over the fitting as far as it will go.

The O_2 fitting screws on to the rear of the Ventil-Con II and may be easily disconnected if the unit is to be moved (Figure 4). It is also important to note that O_2 flow meters do not properly register unless O_2 is flowing. Therefore, to properly set the flow rate, it should be adjusted with the O_2 fitting free of the Ventil-Con II.

Check-Out - Before using your Ventil-Con II, you should perform the following checks. REPORT ANY DISCREPANCIES TO RADX IMMEDIATELY.

1. Access to all user serviceable parts is provided through the left hand door (as you face the unit). Due to electrical code requirements, the latch requires a tool (screwdriver) for opening. Open the access door and visually inspect the insides for signs of damage or loose connections which could occur during shipping.

2. All models have a CO_2 absorber jar (Figure 5) located inside the unit. The CO_2 absorber should contain pink barylyme granules.

3. Models 142 and 143 have a moisture absorber located to the left of the CO_2 absorber jar (Figure 5). This jar should contain blue silica gel desiccant crystals.

4. Raise the arm so that it is parallel to the floor. It should hold steady. If not, refer to Unit Repair Section.

5. Remove the protective cap from the breathing port.

6. Plug the unit into a grounded receptacle.

7. Turn the main power on. The green pilot light should come on.

8. Turn the Breathing Valve to "Rebreathe" (Figure 6) and push the center rod of the spirometer all the way in (Figure 7). The volume meter should read 0 liters ($\pm$ 0.5). Pull the center rod all the way out. The volume meter should read 10 liters ($\pm$ 0.5).

   Note: The spirometer can only be moved in the "Rebreathe" position.

9. Turn Breathing Valve (Figure 8) to "Washout" and turn the Operate/Evacuate Valve (Figures 5 and 9) to "Evacuate" position. By observing the volume meter you should observe the unit evacuating. Turn the Operate/Evacuate Valve back to "Operate".

10. Press the O_2 Assist button (Figures 6 and 8) on the arm. You should hear the electrical O_2 solenoid inside the unit "click".

11. Push the three positions switch in the Oxygen Replenishment section (Figures 10 and 11) to the "Manual" position. You should hear the O_2 solenoid "click".

12. Insert the Breathing Port adapter into the breathing port (Figure 12) and attach the face mask tubing and mouthpiece or face mask (Figure 13). Turn on the O_2 supply and adjust the flow rate to 2 liters per minute.

13. With the Breathe Valve in "Washout", breathe through the unit. You should notice little or no resistance.

14. Switch to "Rebreathe" and place the spirometer at 5 liters by using the center rod (Figure 7). Set the oxygen replenishment switch to "Auto" and set the control knob to 5 (Figure 11). Now breathe on the unit and observe the following:

    a. You should experience little or no resistance to normal breathing.

    b. The spirometer "volume" meter should move back and forth in rhythm with your breathing.

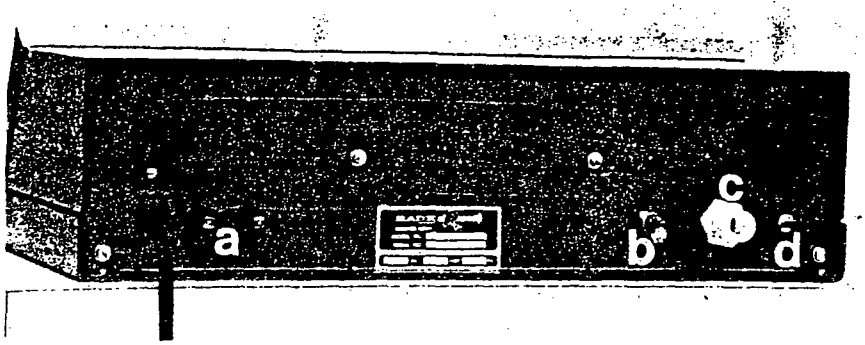


Fig. 4 Rear of Control Panel

a. Fuse holders

b. O_2 inlet

c. To interface port

d. Trap exhaust port

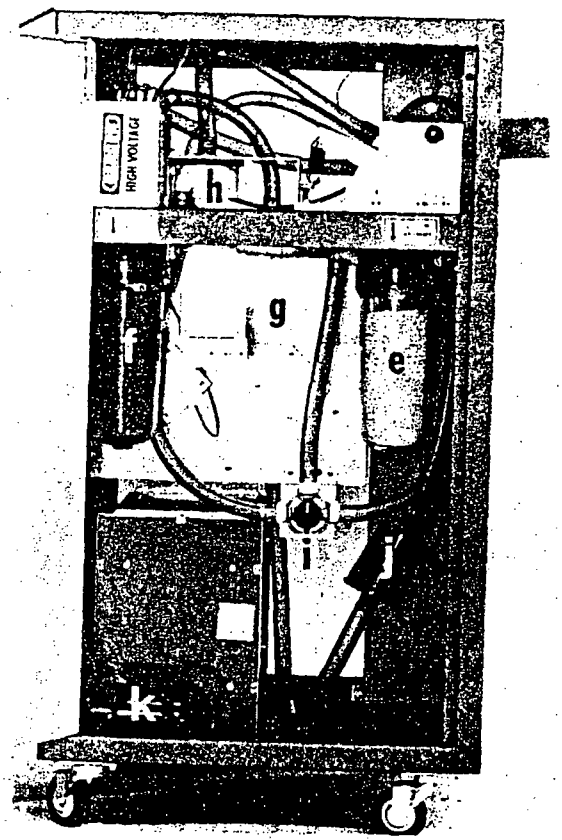


Fig. 5 Side of Ventil-Con II

e. CO_2 absorber

f. Moisture absorber

g. Spirometer

h. Mixing pump

i. Operate/Evacuate Valve

j. Bacteriological filter

k. Trap pump

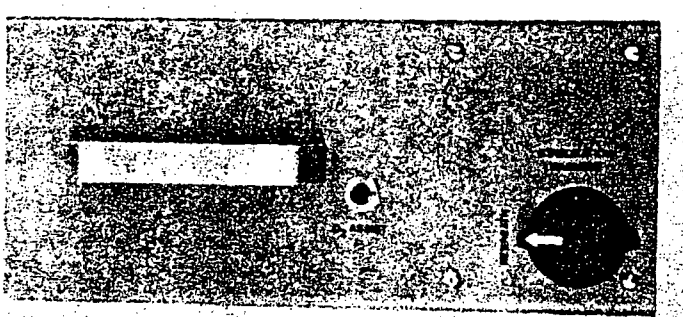


Fig. 6 Breathing Valve in Rebreathe

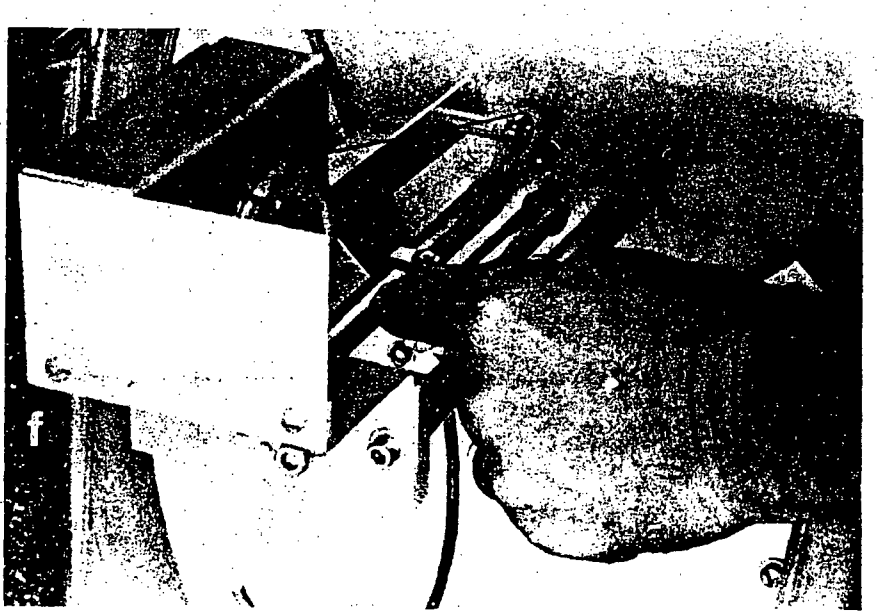


Fig. 7 Pushing in center rod of spirometer

f. Moisture absorber

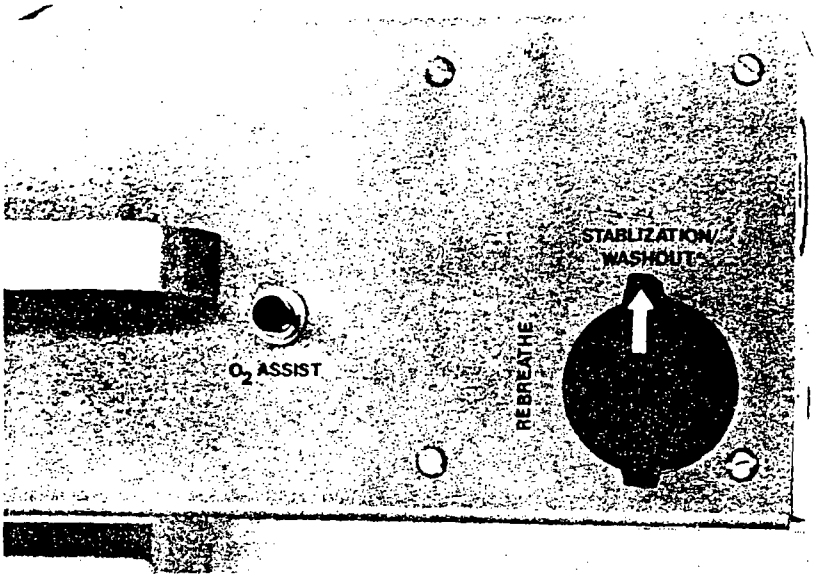


Fig. 8 Breathing Valve in Stabilization-Washout

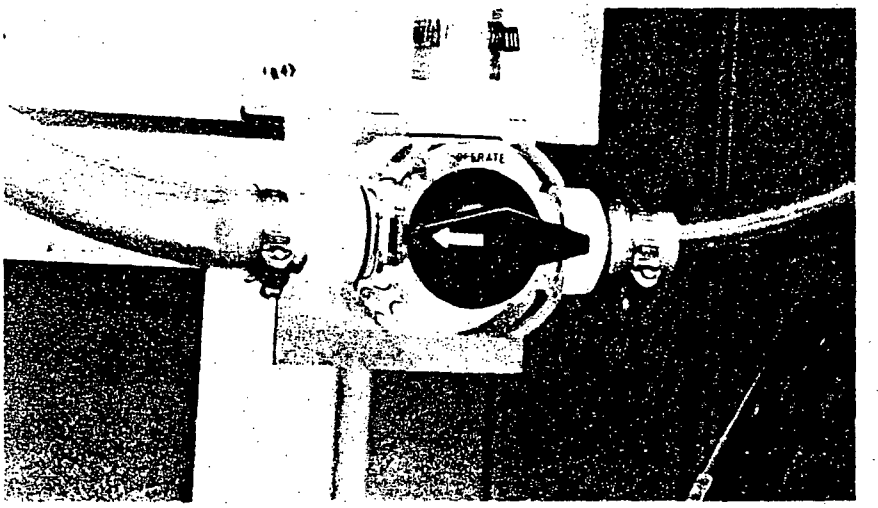


Fig. 9 Operate/Evacuate Valve

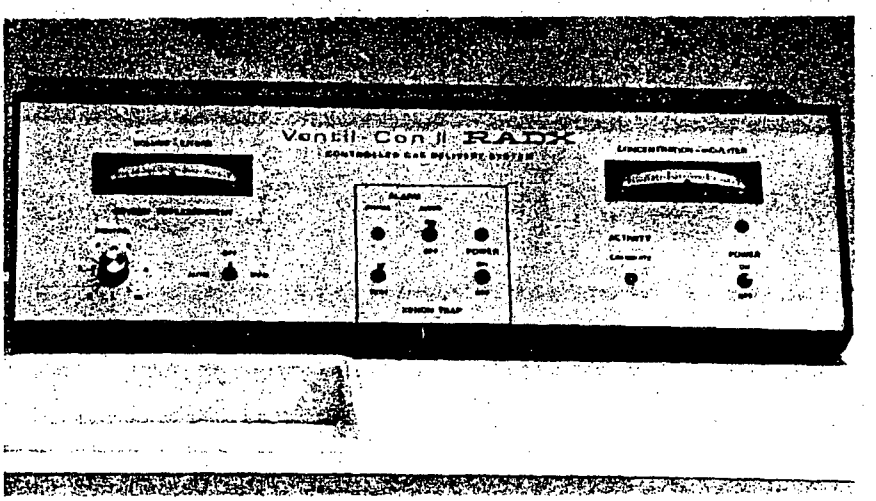


Fig. 10 Control Console

c. Each time the spirometer volume goes below 5 liters (the volume set on the oxygen replenishment control knob) you should hear the O_2 solenoid "click".

15. Turn the power switch located in the Xenon Trap section to "ON" (Figure 14) (Models 142 and 143). Locate the "Exhaust" fitting at the rear of the control panel and feel for air coming out (Figure 4).

16. With the audio switch in the "ON" position, push down on the Test switch (Model 143) (Figure 14). The red pilot light labeled visual should come on and you should hear the audio alarm. Turn the audio "OFF". The sound should stop.

Alarm Calibration - Model 143 is equippped with an end window GM tube detector/alarm system which continuously monitors the xenon trap exhaust port and activates an audio visual alarm when the concentration in the exhaust port exceeds 1×10^{-2} uCi/ml. The sensitivity is set at the factory but should be checked periodically to assure proper function.

1. Locate the alarm check point label (Figure 15) located on the left hand door.

2. Using a ^{137}Cs standard between 40 and 150 uCi the alarm is calibrated as follows:

   Calculate the activation distance of your ^{137}Cs standard by using the following formula:

   $$\text{Activation distance (AD)} = \sqrt{3.3 \times {}^{137}\text{Cs std.}} - 7$$

   Example: ^{137}Cs std. is 50 uCi

   $$\text{AD} = \sqrt{3.3 \times 50} - 7$$

   $$= \sqrt{165} - 7$$

   $$= 12.8 - 7$$

   $$= 5.8 \text{ cm}$$

3. Place the center of the ^{137}Cs standard at the AD calculated above by placing a ruler perpendicular to the alarm check point (Figure 16).

Fig. 16 Checking the calibration of the Xenon Trap Alarm with Cs137

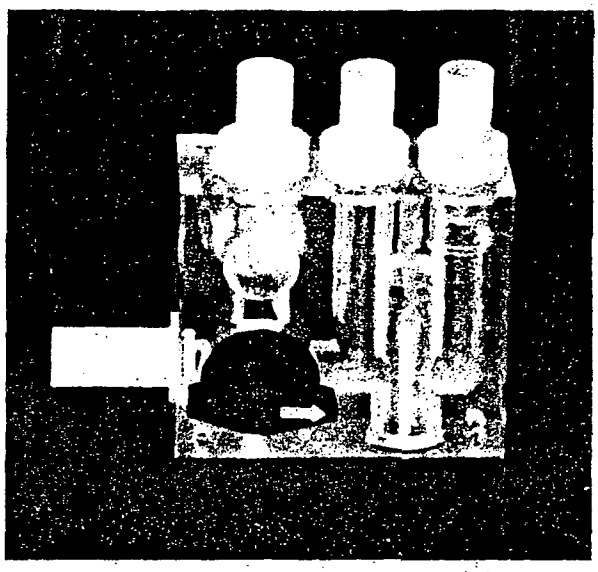


Fig. 18 Breathing Valve

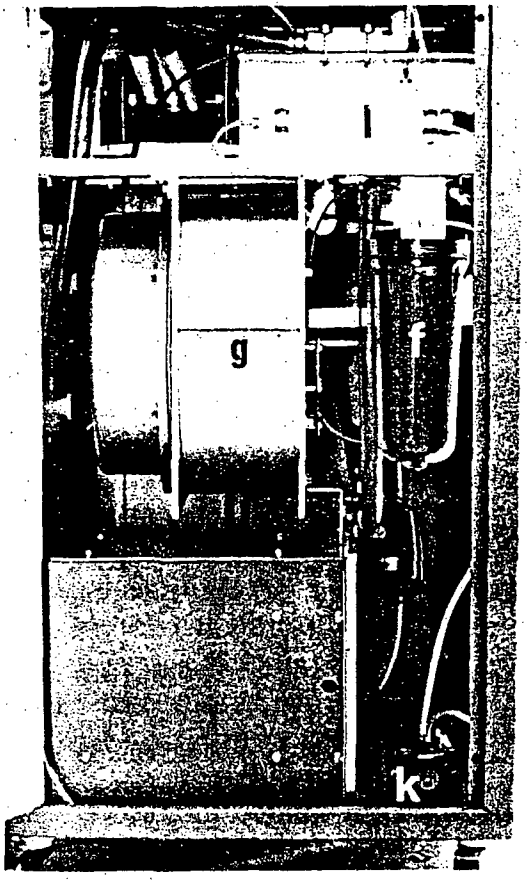


Fig. 17 Rear of the Ventil-Con II

f. Moisture absorber

g. Spirometer

k. Trap Pump

l. GM Tube for Xenon Trap Alarm

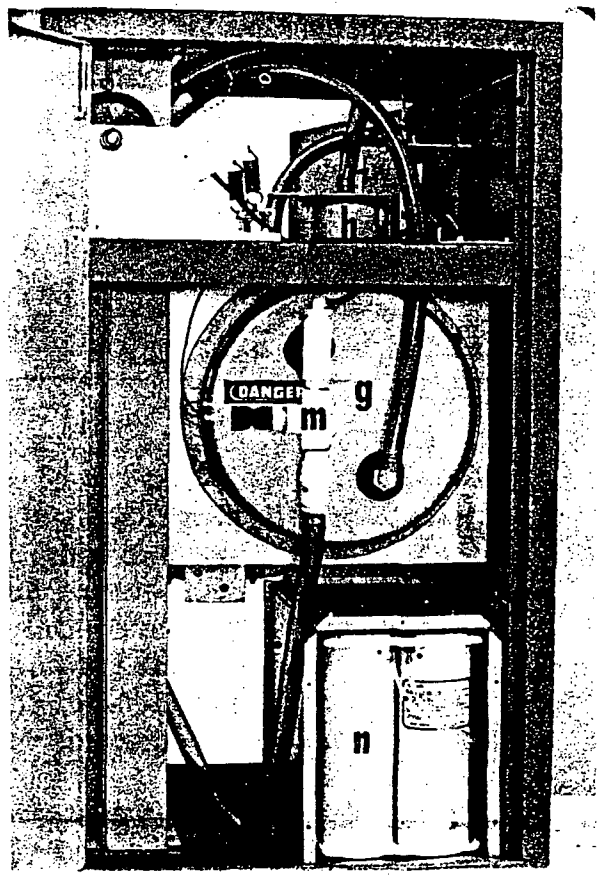


Fig. 19 Right side of Ventil-Con II

g. Spirometer

h. Mixing Pump

m. GM Tube for Concentration Meter

n. Activate Charcoal cartridge pack

The alarm should activate:

Acceptable limits

$\pm$ 0.5 cm for distances to 10 cm

$\pm$ 1.0 cm for distances greater than 10 cm

4. Move the Cs 137 Standard back 1.0 cm from the AD point, and the alarm should stop.

THEORY OF OPERATION

There are three generally recognized phases of a lung ventilation study. Each phase has variations supported by some and denied by others. In some circles even the phases are debated. This manual describes the use of the Ventil-Con II to perform the three phases and gives information on some of the more popular variations.

The three phases with more common variations are:

1. Washin
   a. Homogeneous administration
   b. Bolus administration
2. Equilibrium
3. Washout

The Ventil-Con II is designed to allow the user to perform the three phases. The unit consists of two separate plumbing systems (Diagram 1). In stabilization/washout, the patient inhales room air through a one way valve in the bottom of the breathing valve. When the patient exhales, this valve closes and another one opens directing the exhaled breath through the Ventil-Con II console into the exhaust port. In Models 142 and 143 the exhaled breath then goes into the expandable interface where it is subsequently drawn through the activated charcoal cartridge pack by the xenon trap pump.

The Expandable Interface is required because the trap pump moves air at the rate of 5 liters per minute while people normally breathe at a higher rate. Sick patients can breathe at rates up to 20-25 liters per minute. The Expandable Interface is a reservoir which accepts the excess flow rate until the trap can catch up. It has a capacity of approximately 100 liters and normally gives around 10 minutes of breathing time in washout.

In Model 143 the exhaled breath upon leaving the charcoal pack and trap pump, enters a chamber of 150 ml/m volume viewed by an end window Geiger-Mueller tube (Figure 17). When excessive ^{133}Xe (greater than 1×10^{-2} mCi/ml) appears in the exhaust port, an audio visual alarm activates.

The second plumbing system consists of the breathing valve (Figure 18), autoclavable bacteriological filter (Figure 5), CO_2 absorber (Figure 5), blower (Figure 5), GM detector (Figure 19), and spirometer (Figures 5, 17, 19). This is a closed system which may be opened to the outside only through the breathing valve and Operate/Evacuate valve. The breathing valve is equipped with a standard female Leur fitting followed by a one way valve for the injection of ^{133}Xe gas (Figure 20).

With the Operate/Evacuate valve in the operate position and the breathing valve in rebreathe as the patient exhales a one way valve in the head valve closes and the patients breath is directed first into the CO_2 absorber, thru the bacteriological filter and into the spirometer which expands to accommodate the increased volume. As the patient inhales, the one way valve opens and the patient breathes out of the spirometer thus contracting its volume. This system is actually a circuit with the patient on the opposite end of the spirometer with the spirometer providing opposite, but equal, reaction to the patients breathing.

The system is provided with an inline blower (Figure 5), which serves three functions:

1. Assists in providing one-way air flow
2. Overcomes inherent pathway resistance
3. Provides mixing to assure a homogenous mixture.

The rebreathing system is provided with two one-way input ports for the addition of O_2. Both are controlled by an electrical solenoid valve (Figure 21). One input port injects O_2 just before the spirometer allowing considerable mixing before reaching the patient. The second system (O_2 Assets) injects O_2 directly to any patient having breathing difficulties.

PROPER O_2 ADMINISTRATION DURING REBREATHING IS AN ABSOLUTE NECESSITY. Panic generally associated with O_2 deprivation is actually caused by a CO_2 build-up, since the unit is equipped with an effective CO_2 absorber. CO_2 build-up cannot occur thus insufficient O_2 will result in unconsciousness without alarm.

Too much O_2 can result in pulmonary arrest which can be fatal.

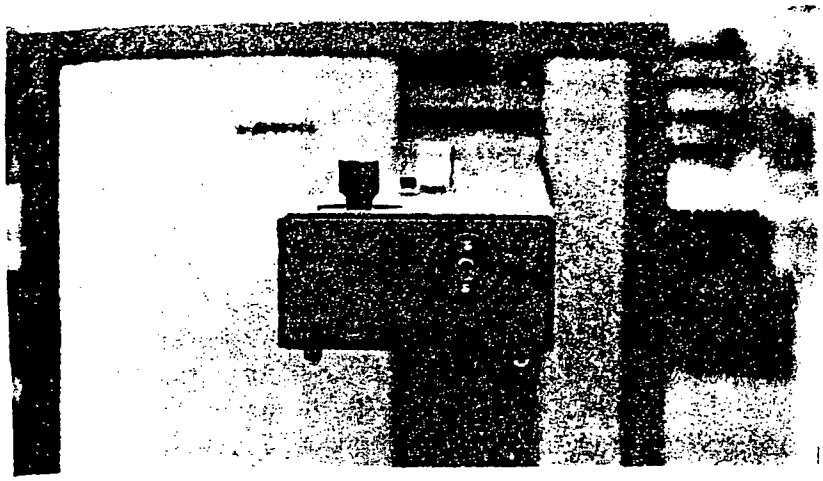


Fig. 20 Xenon Injection Port

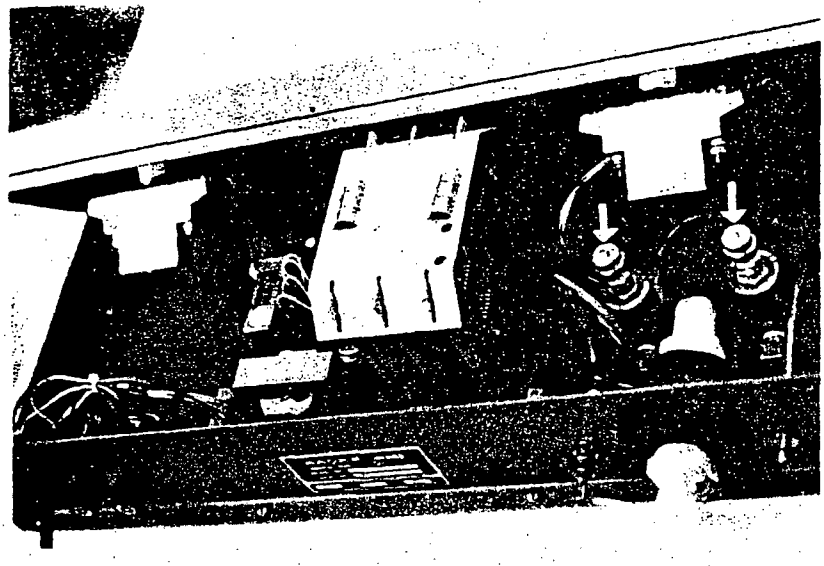


Fig. 21 Oxygen Solenoids (arrows)

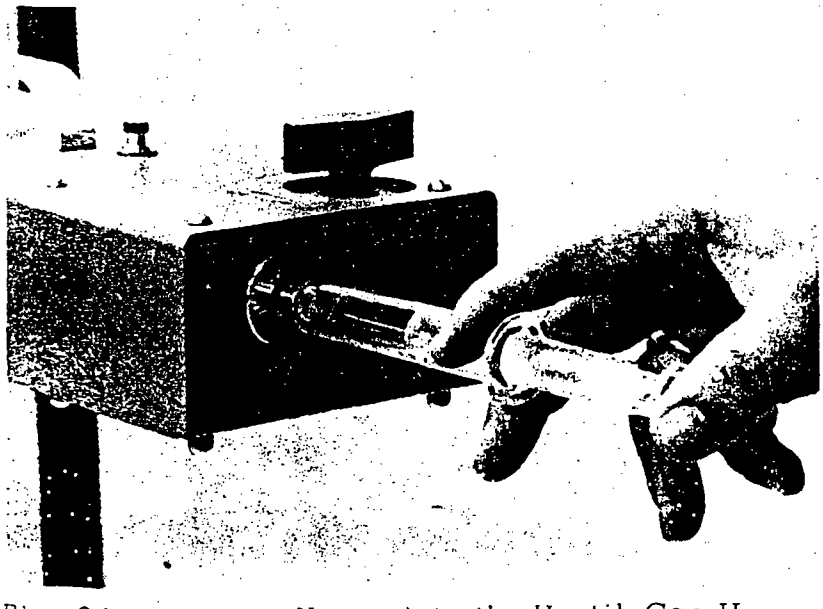


Fig. 24 Injecting Xenon into the Ventil-Con II through the Xenon Injection Port

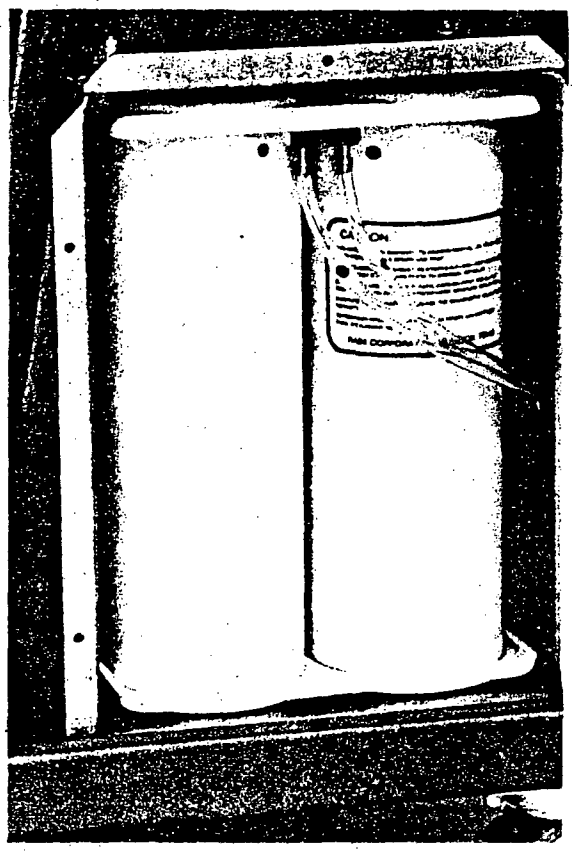


Fig. 22 8 cylinder, vertical, activated charcoal cartridge pack

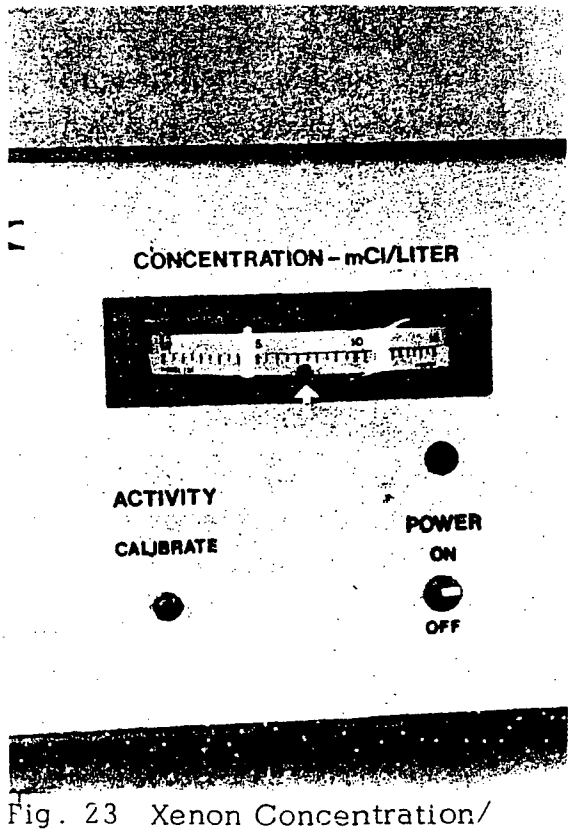


Fig. 23 Xenon Concentration/ Activity Section indicates "zeroing" screw

With the breathing valve in the washout position and the Operate/Evacuate valve in the evacuate position, the blower forces the air from the internal rebreathing system through the Operate/Evacuate valve into the general exhaust of the unit and follows the same path as previously described.

XENON TRAP - The term xenon trap is used to describe activated charcoal devices is a serious misnomer. Activated charcoal does not trap xenon but only acts as a delaying mechanism. If the xenon is delayed long enough to allow it to decay, then the word trap, although not scientifically correct, is from an end result standpoint, correct.

The process is best described by chromatagraphic principles where charcoal is the suspending media, air the solvent, and xenon the solute.

The process is dependent on the amount of charcoal, pathway configuration, temperature, and most significantly to air flow per unit time. The process is relatively independent on the amount of xenon, air flow rate (within reason) and humidity (but not water). Desiccants are used in xenon traps to remove the excess humidity which could condense in the charcoal cartridge interfering with the ability delay xenon. On a longer term basis, air pollutants, etc., will saturate the charcoal and negate its xenon delaying capacity

The single most important factor affecting the life of the trap is the total amount of air passing through it.

The patients exhaled breath first enters the Expandable Interface (Figure 3) where it is pulled through the silica gel desiccant jar (Figure 5), then the activated charcoal filter (Figure 19 and 22) by the trap pump (Figure 5 and 17). From the pump it is blown past the exhaust port monitoring GM tube (Figure 17) and out the back of the Ventil-Con II through a brass bulk head fitting (Figure 4).

OPERATION

Unit Preparation

1. Calibration of Xenon Concentration System - On the initial use it is necessary to check the Xenon Concentration meter calibration. This is done as follows:

   a. Turn the main power "ON".

b. With no ^{133}Xenon in the Ventil-Con II, adjust the concentration meter to zero by using the small screw in the center of the meter (Figure 23).

c. With the breathing valve in the rebreathe position, adjust the spirometer to 5.0 liters.

NOTE: If ^{133}Xe is in the unit, adjustment should be made by the Operate/Evacuate valve to lower the volume or the breathing valve to increase the volume. When the breathing valve is open, room air will be drawn into the unit.

CAUTION: During the addition of Xenon and at all times after Xenon has been added, the breathing valve should be in the Stabilization/Washout position except when you want the patient to breathe Xenon.

d. Inject a known amount of ^{133}Xe into the breathing valve (Figure 24) and allow several minutes for it to mix. Note: Figure 24 is for illustration only. To assure adequate radiation protection, a lead syringe holder should be used. Calculate the concentration by the following formula:

$$\text{Concentration} = \frac{\text{Xenon added}}{\text{Spirometer Volume} + 5 \text{ liters}}$$

In the above formula the constant 5 represents the dilution volume outside the spirometer, i.e., in the tubing, bacteriological filter, etc.

Recommendation: We recommend an initial concentration of 5 mCi/liter.

Example: Spirometer Volume = 5 liters

^{133}Xe Injected = 50 mCi

Then:

$$\text{Concentration} = \frac{50 \text{ mCi}}{5 + 5} = \frac{50}{10} = 5 \text{ mCi/liter}$$

Using a small screwdriver, adjust the concentration gain potentiometer so that the meter corresponds to the calculated concentration (Figure 25).

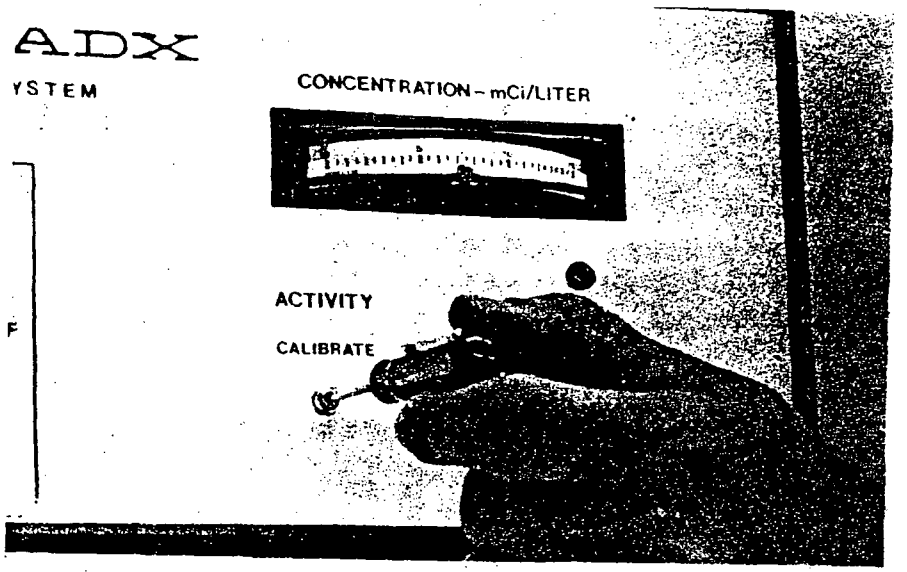


Fig. 25
Calibrating the
Concentration Meter with
the Activity Potentiometer

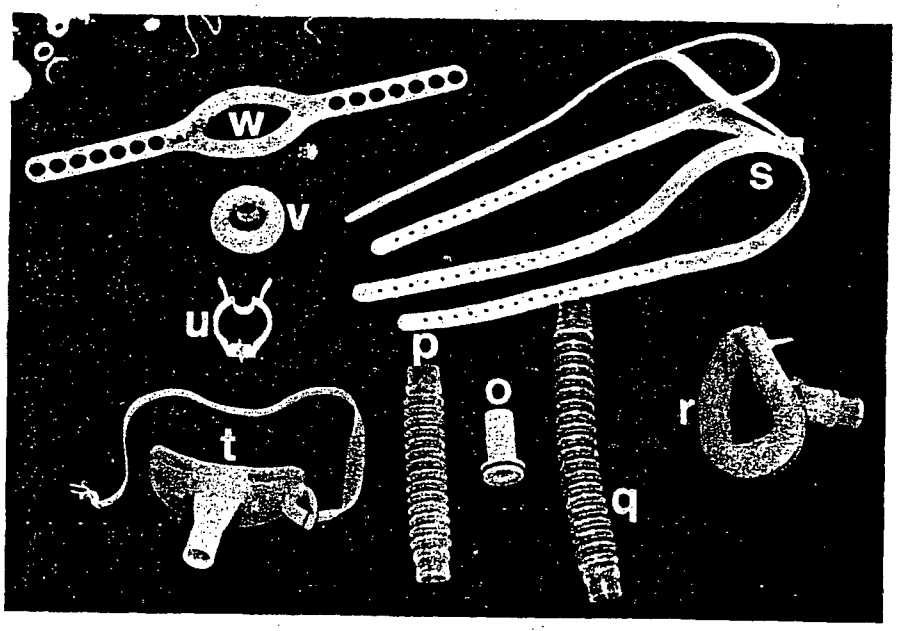


Fig. 26 Breathing accessories available for Ventil-Con II

o. Breathing Port Adapter
p. $5\frac{1}{2}$" Face Mask Tubing
q. 8" Face Mask Tubing
r. Adult Face Mask
s. Adult Face Mask Harness
t. Adult Mouthpiece (Headstrap included)
u. Nose clip
v. Infant Mask
w. Infant Mask Harness

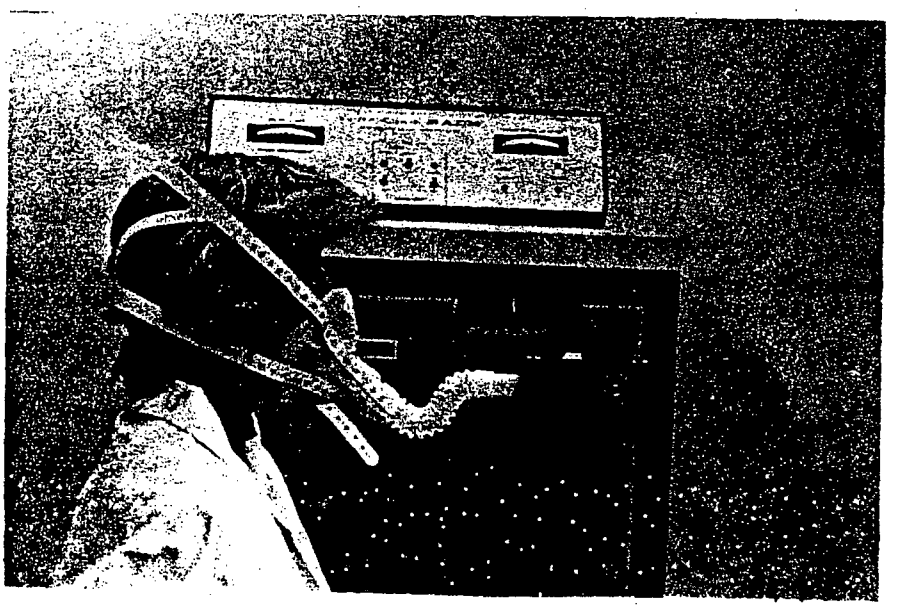


Fig. 27
Patient attached to
Ventil-Con II

CAUTION: When handling large quantities of ^{133}Xe, it should be properly shielded. The ^{133}Xe to be injected into the Ventil-Con II should be calibrated in a dosecalibrator. However, the user should be aware that the type of container that the ^{133}Xe is assayed in can significantly affect the reading due to the low energy of the ^{133}Xe gamma ray.

The Ventil-Con II is designed in such a fashion that the only Xenon lost during a study is that Xenon in the patient at the start of washout. The remaining stays in the unit and may be used on subsequent patients. All parts having patient contact, such as face masks or mouthpieces and face mask tubing, should be autoclaved after each use.

Recommendation: In our experience, a concentration of 5 mCi/liter is the maximum required for a satisfactory study. As the stored Xenon is used, subsequent patient studies will require longer times to complete or counting statistics will suffer.

The minimum concentration is in the order of 2.5-3.0 mCi/liter.

Start with a concentration of 5.0 mCi/liter and when it drops below 2.5-3.0 mCi/liter, bring it back to 5.0 by adding Xenon. The amount of ^{133}Xe required may be calculated from the following formula:

$$A = (C_2 - C_1)(V + 5)$$

A = Activity to ad

C_2 = Desired concentration

C_1 = Current concentration

V = Spirometer Volume

Example: Current concentration = 2.0 mCi/l

Spirometer Volume = 4.0 l

Desired concentration = 5.0 mCi/l

then

$$A = (5.0 \text{ mCi/l} - 2.0 \text{ mCi/l})(4.0 \text{ l} + 5.0 \text{ l})$$

$$= (3.0 \text{ mCi/l})(9 \text{ l})$$

$$= 27.0 \text{ mCi}$$

2. Disconnect the O_2 line at the rear of the Ventil-Con II (Figure 4) and turn the O_2 supply on adjusting the flow rate to 2 liters per minute. Reconnect the O_2 line.

3. Set the Oxygen Replenishment selector to Auto and adjust the Oxygen Control to 0.5 liter below the starting spirometer volume (Figure 11).

   Example: Spirometer Volume = 5.5 liters

   Set control to 5.0 liters

   Explanation: Normal tidal volume is approximately 0.5 liter. In the above example, every time the spirometer volume drops below 5.0 liters, the O_2 replenishment solenoid will open allowing O_2 to enter the system. By using the control in this fashion, the O_2 concentration at the start of the study will be maintained throughout.

4. Check that the Expandable Interface bag is not inflated.

Patient Preparation

1. If the patient is to be studied in a sitting position, use the $5\frac{1}{2}$" Face Mask Tubing. For the patient that cannot sit up, use the 8" tubing.

2. Face Masks are generally more comfortable than the Mouthpiece with Nose Clamp. When using a Face Mask, make sure you get a good seal particularly around the nose. A variety of patient hook-up accessories are available from Radx for use with the Ventil-Con II (Figure 26).

3. With the breathing valve in the Stabilization/Washout position, hook the patient to the Ventil-Con II (Figure 27). The patient is now breathing room air through the Ventil-Con II. When they exhale, a valve opens in the bottom of the breathing valve and admits room air. When they exhale, the intake valve closes and the exhaust valve opens and the patient's breath travels through the unit exhaust system.

   The patient should be allowed to breathe in this mode for several minutes to become acclimated to the system. If breathing difficulties are to be encountered, either psychological or otherwise, they will show up during the stabilization period where no Xenon is involved. It is during this time that the gamma camera should be set up and checked out.

Procedure

There are a multitude of procedures for performing Xenon Lung Ventilation studies. The procedures can vary significantly. The techniques and discussions which follow are based on our experience with our equipment and should not be construed as the only methodology. The user should feel free to change the recommended procedure to fit their particular requirements. The pros and cons of the "controversial" aspects of the study are presented below.

Bolus VS Homogeneous Administration

Bolus - Pro - Higher count rates provide a statistically superior image during the single breath phase of the procedure.

Con - Non-physiological.

Homogeneous - Pro - Physiological.

Con - Relatively low count rates provide a statistically poor image; however, they are comparable to the washout images which are statistically poor.

Equilibrium/Washout VS Single Breath/Washout

Single Breath/Washout - Pro - Fast

Con - See "Pro" on Equilibrium/Washout below.

Equilibrium/Washout - Pro - One of the most diagnostic portions of the lung ventilation study is the washout phase where poorly ventilated areas appear as "hot" spots. In order for these areas to fill with sufficient ^{133}Xe to become "hot" on washout, an equilibrium must be established between normal ventilated areas and poorly ventilated areas. This requires a minimum of 3-5 minutes of rebreathing of the Xenon/air mixture in the unit.

Con - Adds approximately 3-5 minutes to the test.

4. Shut-Down - After completion of washout, disconnect the patient, but allow the trap to run for an additional 5 minutes (10 maximum) to deflate the Expandable Interface.

ROUTINE MAINTENANCE

CO_2 Absorber - The soda lime granules shipped with the Ventil-Con II have a color indicator to show when they are saturated with CO_2. The normal color is pink and as they absorb CO_2 they turn violet to purple. The granules should be changed when about 2/3 of them have changed color. Under low use conditions, the color may fade thus we recommend changing them once per month or as the color changes, whichever comes first.

To change the absorber, do the following:

1. Evacuate the system by putting the Operate/Evacuate valve (Figure 9) in the Evacuate position. When the spirometer volume reaches O, put the valve in the Operate position and fill the spirometer to 10 liters by opening the breathing valve (Rebreathe position). When the spirometer fills, close the breathing valve and evacuate the unit again.

2. Unscrew the "bell" jar and dispose of the soda lime granules.

3. Refill the jar with fresh soda lime granules. When refilling, be sure the white tube is centered in the jar.

4. Screw the jar back onto the cap. If the jar tightens but still has a space between the blue cap and clear jar (check it with your finger nail) the tube was probably not adequately centered. The jar should be removed and the central tube recentered.

Bacteriological Filter - The Bacteriological Filter (Figure 5) should be removed and autoclaved each time you change the CO_2 absorber or no less often than once per month. It should be replaced entirely once per year. Before removing the Bacteriological Filter, evacuate the unit as described above for the CO_2 absorber.

Moisture Absorber - Units equipped with a Xenon Trap have a silica gel desiccant jar (Figure 5) to remove moisture from the air prior to entering the charcoal cartridge pack. Silica gel is normally a dark blue and turns clear to pinkish as it becomes saturated with water. When the granules are approximately 2/3 saturated, remove the "bell" jar. The silica gel

desiccant may be reconstituted by heating. This may be done on a stove top or in an oven. If done on a stove top, constantly stir the granules to prevent burning. If done in an oven, set the temperature to about 300°F. When the crystals turn blue they are ready for reuse.

Replace the jar as described in the CO_2 Absorber section.

Note: It is not necessary to evacuate the Ventil-Con II in order to service the Moisture Absorber.

Charcoal Cartridge Pack - Units equipped with a Xenon Trap will require periodic replacement of the charcoal cartridge pack. On units equipped with the trap alarm, the alarm should be the guide for replacement. If your unit is not equipped with an alarm, samples from the exhaust port should be taken at least weekly if not daily, and checked for radioactivity. To replace the charcoal pack do the following:

1. Open the right side panel (as you face the unit). This exposes the end of the cartridge pack (Figure 19).

   Caution: The charcoal cartridge pack can have up to one curie of activity, therefore it should be handled rapidly to reduce the exposure time.

2. Disconnect the two hoses attached to the cartridge pack and remove the pack by sliding it towards you (Figure 28).

3. Seal the ends with the caps that come attached to the new pack and store the used pack behind lead shielding for a period of no less than 15 half lives.

   Note: After suitable decay, the cartridge pack may be reused. Its reuse life is unpredictable.

4. Insert the fresh cartridge pack and be sure to follow the color coding for the hose hook up.

CBF Modification

Obrist et al [1] pioneered a procedure for determining cerebral blood flow by a non-invasive ^{133}Xe inhalation process. Radx offers as an option a Ventil-Con II modified for CBF.

[1] Obrist, W.D. et al, "Determination of Regional Cerebral Blood Flow by Inhalation of Xenon-133". Circulation Research, XX, 124-134, Jan. 1967.

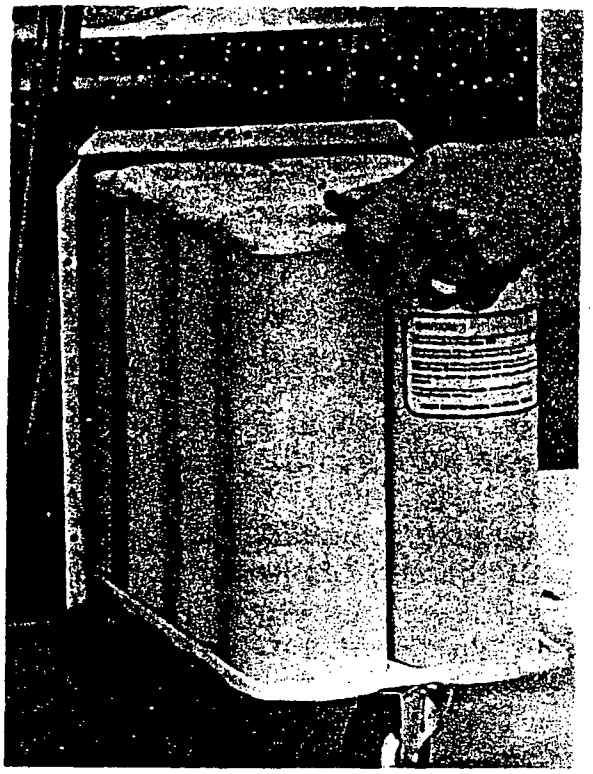


Fig. 28
Removing charcoal cartridge pack

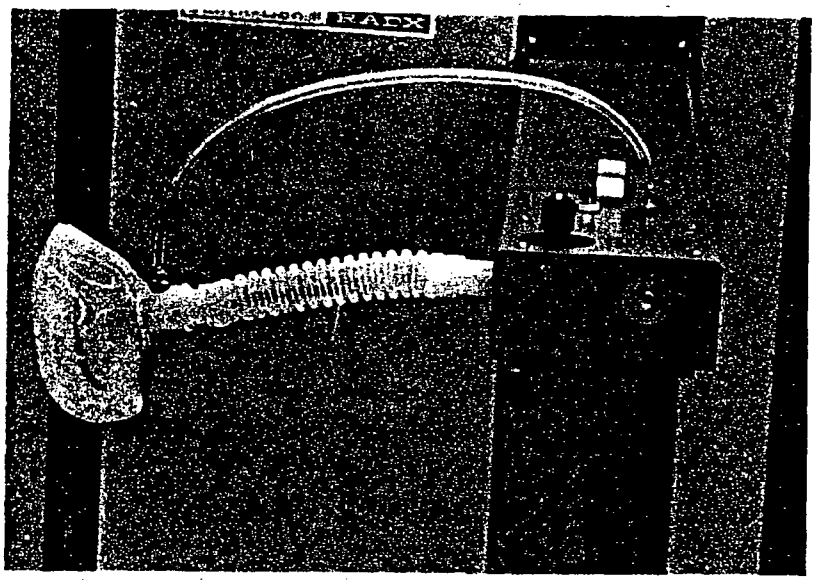


Fig. 29
CBF Face Mask attached to Ventil-Con II

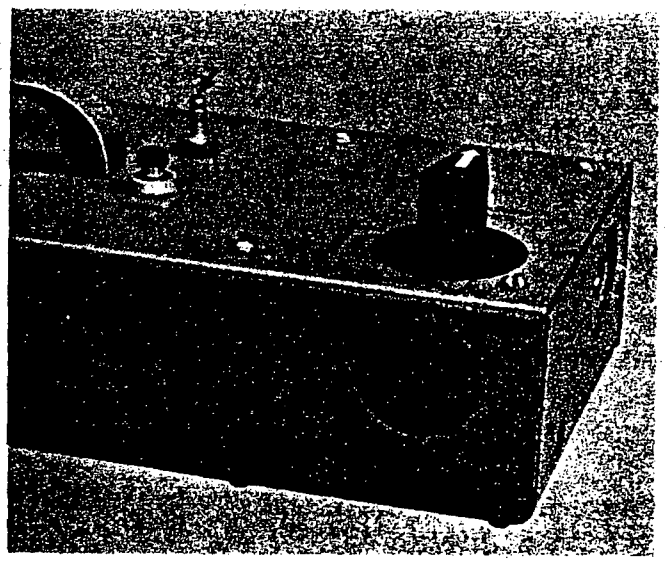


Fig. 30
CBF brass bulkhead fitting (arrow)

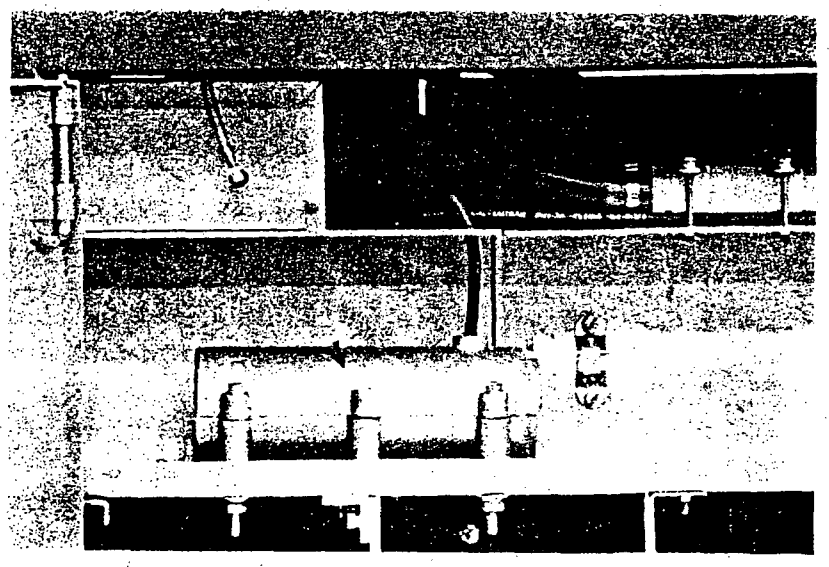


Fig. 31
Scintillation detector ("air probe") shield (arrow)

The Obrist technique requires (among other things) that a sample of the patient's exhaled breath be continuously monitored by a scintillation detector. The modification made to the Ventil-Con II provides simple and safe methods of taking the "Air Probe" sample.

These modifications are as follows:

1. The face mask is provided with a fitting to allow sampling (Figure 29).

2. A tube is run externally from the face mask to a brass bulk-head fitting on the arm (Figure 29).

3. Tubing is then run internally through the scintillation detector shield (the scintillation detector is not provided) (Figure 30).

4. From the shield it goes to the sampling pump and from the pump to a bulk-head fitting which exists at the rear of the unit and is labeled "To CO_2 Analyzer" (Figure 31).

5. Adjacent to the above fitting is another one labeled "From CO_2 Analyzer". This is then connected by tubing to the general exhaust of the Ventil-Con II.

Installation of CBF Unit

The CBF unit is set up and checked out in the same manner as the standard unit. Please refer to INSTALLATION starting on page 1.

The hook up of the special face mask is shown in Figure 29.

To install the "Air Probe" scintillation detector, do the following:

1. Disconnect the tubing that runs through the shield at the "L" located directly below the shield.

2. Pull the tube through the shield from the top.

3. With an Allen wrench, remove the four bolts that hold the top of the shield.

4. Remove the top.

5. Place the "well type" scintillation detector into the lower half in such a manner that the pass through hole in the detector lines up with the hole in the bottom of the shield.

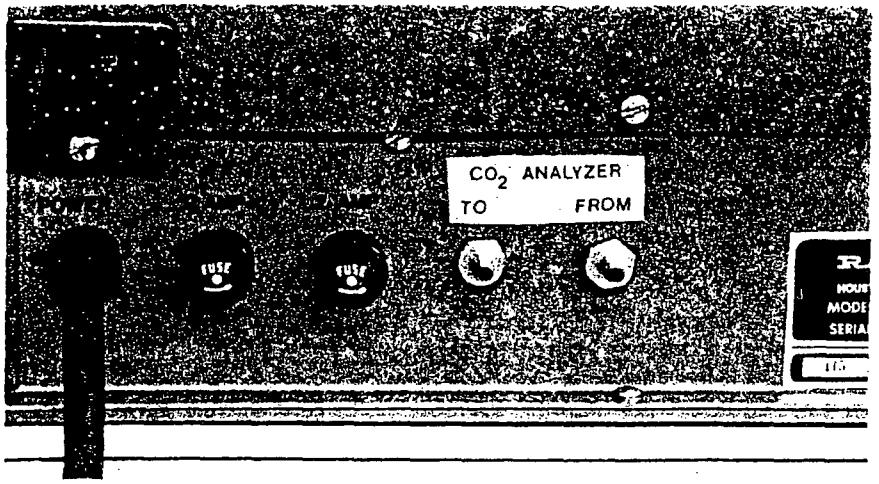


Fig. 32
Rear of CBF Modified Ventil-Con II showing the CO_2 Analyzer fittings.

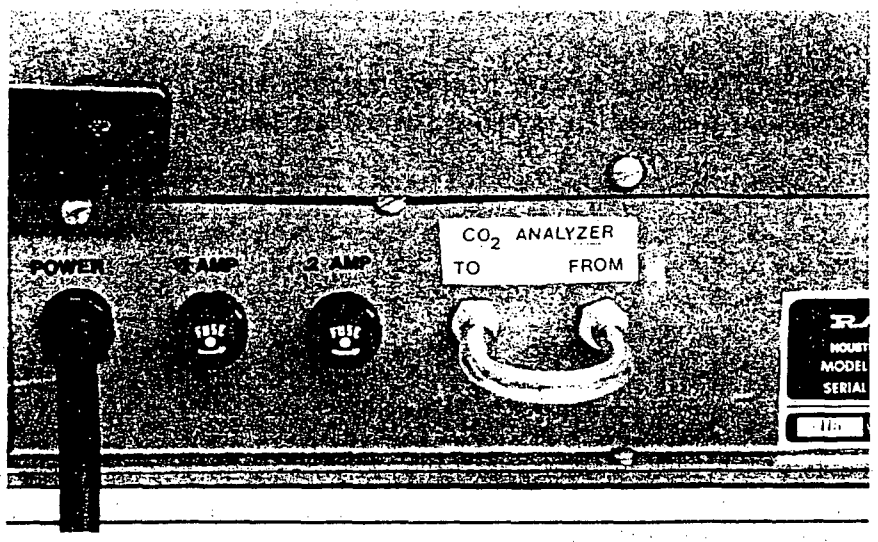


Fig. 33
Connecting the CO_2 Analyzer plumbing connections when an analyzer is not used.

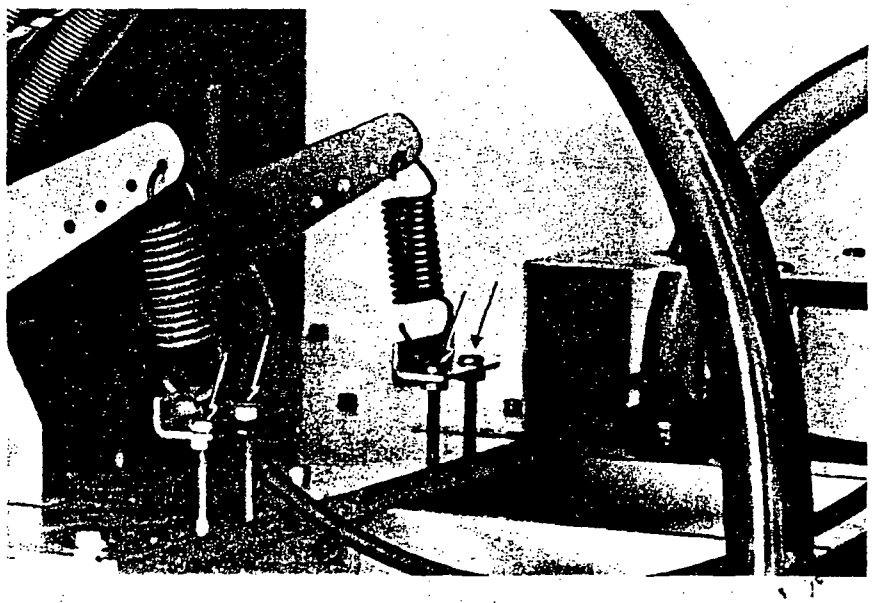


Fig. 34
Tensioning Bolts (arrows) for Ventil-Con II arm/brake mechanism

6. Replace the top, the bolts, and rethread the tube through both holes and reconnect it to the "L". Note: It may be easier to thread the tube prior to replacing the bolts.

7. If a CO_2 Analyzer is to be used, hook it to the output and input fitting at the rear of the Ventil-Con II. IF A CO_2 ANALYZER IS NOT USED, RUN A TUBE CONNECTING THE TO AND FROM CO_2 ANALYZER CONNECTIONS (Figure 33).

   NOTE: The Ventil-Con II modified for CBF may be used for standard lung ventilation studies by using a regular face mask or mouthpiece and disconnecting the tube between the TO/FROM CO_2 ANALYZER connections or disconnecting the CO_2 Analyzer.

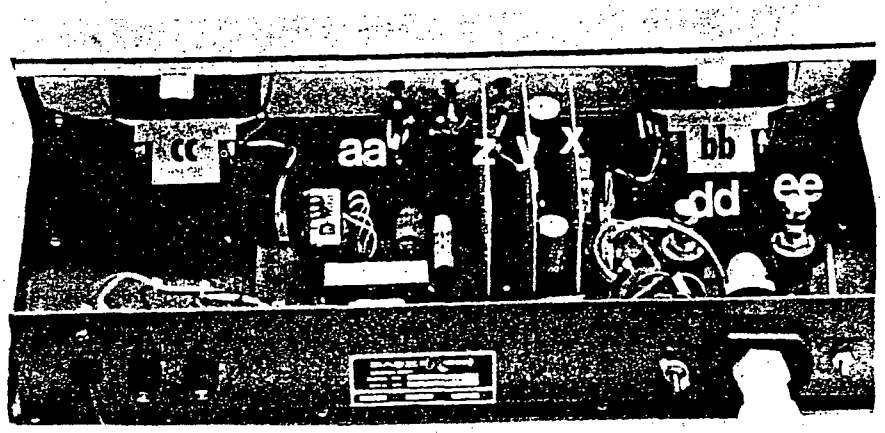
8. Turn the unit main power ON and the trap power ON. The CBF pump is activated when the trap power is turned on.

9. Check the TO CO_2 Analyzer fitting. You should feel a slow stream of air coming out.

CBF Procedure

The CBF procedure is best described in the paper of Obrist et al and in the manuals supplied with the multi-probe/computer systems necessary to collect and analyze the data.

Fig. 35 Electronics in Control Panel



x. Spirometer Volume Board

y. Xenon Trap Alarm Board

z. Activity/Concentration Board

aa. Mother Board

bb. Volume Meter

cc. Activity/Concentration Meter

dd. Manual/Automatic O_2 Solenoids

ee. Emergency Assist O_2 Solenoids

Unit Repair Section and Parts List

The following unit repair section presents the symptoms and provides a flow diagram to diagnose the problem and determine the action necessary to facilitate repair. The parts list provides information indicating which figure in the manual best shows the part in question. If the symptoms do not appear in this section, or if the repair instructions do not solve the problem, please call the Radx service department.

Arm sag which occasionally develops immediately as a result of vibration during shipment is treated separately below.

Arm Sag - If the arm of the Ventil-Con II drops by itself after being elevated, the arm requires adjustment of the brake band tensioning springs. Access to these springs is gained through either side door (Figure 34). Adjust the spring tension as follows:

1. Loosen the lock nut on the underside of the L bracket on all four screws.

2. Turn each screw clockwise so that it stretches the springs about 1/4 inch at a time.

3. Elevate the arm and place a 1 to 2 lb. weight on the end. If the arm sags, repeat step 2.

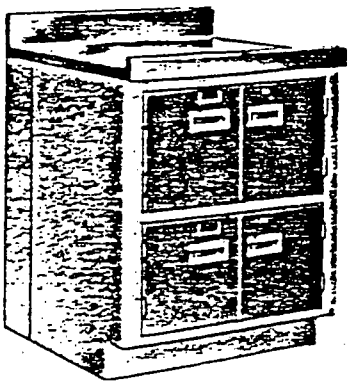
   Note: Over tension of the brake springs will result in an arm which is difficult to elevate.

4. After achieving proper tension, retighten the lock nuts below the L brackets.

PARTS LIST
VENTIL-CON II

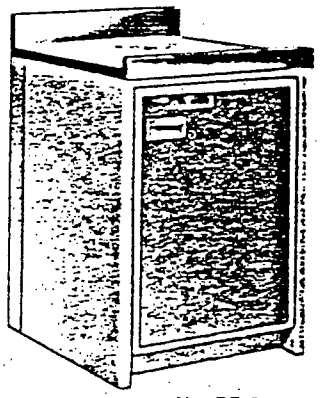
Description	Figure Number	Catalog Number	Part Number
Autoclavable Bacteriological Filter	5j	105	45-05-012
Infant Face Mask	26v	108	20-01-144
Infant Face Mask Harness	26w	114	20-01-144-1
Adult Mouthpiece with Headstrap	26t	109	20-01-058
Adult Face Mask	26r	110	20-01-151
Adult Face Mask Harness	26s	116	20-01-151-1
Nose Clip	26u		20-01-057
$5\frac{1}{2}$" Face Mask Tubing	26p	132	55-01-019
8" Face Mask Tubing	26q	133	55-01-020
Breathing Port Adapter	26o		55-03-069
Soda Lime Granules-CO_2 Absorber	5e	104	45-05-011
Silica Gel Desiccant	5f, 7f, 17f	126	45-05-006
Head Valve	18		30-05-024
Vertical Charcoal Cartridge Pack	19n, 22	125	20-01-154
Xenon Injection Port-Luer Fitting	20		30-05-025
Mixing Pump	5h, 19h		VC0485
Operate/Evacuate Valve	5j, 9		30-05-015
Expandable Interface Bag			20-02-028
Expandable Interface Housing	2		20-01-184
Xenon Trap Pump	5k, 17k		30-04-005
Control Panel			
Sonalert			10-28-002
LED (Red)-Xenon Trap Power and Alarm			10-19-033
LED (Green)-Main Power			10-19-034
Calibrate Potentiometer			10-06-040
Oxygen Control Potentiometer			10-06-016
Main Power Switch			10-13-082
Trap Power Switch			10-13-080
Audio ON-OFF			10-13-077
Trap Test Switch			10-13-079
Oxygen Control Switch			10-13-078
Volume Meter	35bb		10-10-015
Concentration Meter	35cc		10-10-016
Mother Board	35aa		10-09-026
Oxygen Solenoids	21, 35dd, ee		30-05-005
Volume Printed Circuit Board	35x		10-09-023
Concentration Printed Circuit Board	35z		10-09-024

STANDARD SYSTEM MODULES



No. RH-3

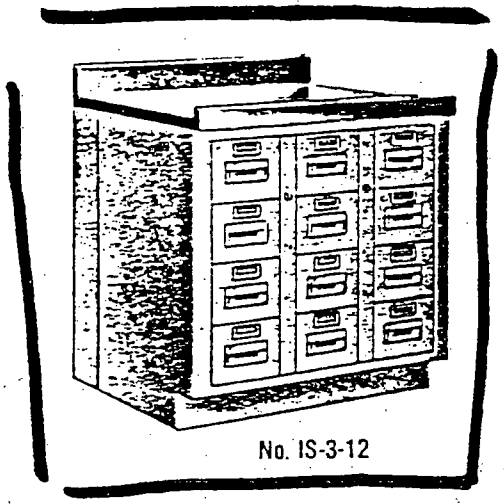
No. RH-3 Receiving, Holding and Storage Module provides a lead shielded upper compartment for receiving and holding materials received into the Nuclear Medicine Department until time permits re-location and storage in the proper module. The lower lead shielded compartment may be used for short or long term decay.



No. RF-3

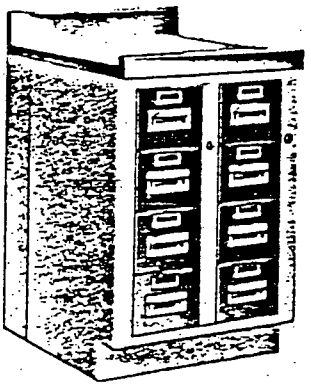
No. RF-3 Refrigerator Module provides a 4 cu. ft. lead shielded refrigerator complete with a freezer compartment and two lead shielded drawers. The U.L. listed refrigerator operates on single phase, 60 cycle, 115 volt AC, and is equipped with wide range temperature control and push button defrost.

STORAGE FOR XENON-133



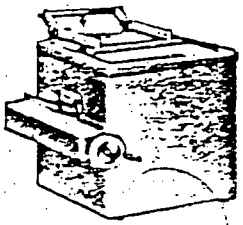
No. IS-3-12

No. IS-3-12 Inventory and Storage Module provides for the inventory of generator prepared reagents and other radiopharmaceuticals. Utilization of this module will facilitate record keeping. The twelve drawers operate on heavy duty roller slides, and are individually lead shielded on the top, bottom and all four sides. All drawers are provided with coved interior plastic inserts for ease of cleaning and/or decontamination.



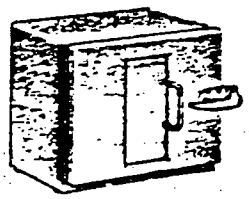
No. IS-3-8

No. IS-3-8 Inventory and Storage Module is similar to No. IS-3-12, except provides only eight drawers.



No. GT-1

No. GT-1 Generator Safe (for top elution generators) is lead shielded on all four sides, top and bottom, and provides radiation protection from the generator during and between elutions. A front remote control is provided to raise the cover partially for elution, or full open for generator replacement. The underside of the cover is equipped with a mirror to allow an indirect view of the generator for positioning elution vials without exposing the technologist to the open safe. Wheels are provided on the bottom of the safe to enable the user to move it to the front of the work surface for elution, and to the rear when it is not being used.



No. GT-1S

No. GT-1S Generator Safe (for front elution generators) is lead shielded on all four sides, top and bottom, and provides radiation protection from the generator during and between elutions. It includes a full swinging front door for generator replacement and a sliding door for the elution process. Wheels are provided on the bottom of the safe to enable the user to move it to the front of the work surface for elution, and to the rear when it is not being used.

ITEM 22

PROCEDURES AND PRECAUTIONS FOR USE RADIOACTIVE MATERIAL IN ANIMALS

Departments of the Army, Navy, and the Air Force; Defense Advanced Research Projects Agency; Defense Nuclear Agency; and the Uniformed Services University of the Health Sciences
Washington, DC
1 June 1984

*Army Regulation 70–18
*SECNAVINST 3900.38B
*AFR 169–2
DARPAINST 18
*DNAINST 3216.1B
*USUHSINST 3203

Research and Development

The Use of Animals in DOD Programs

Summary. This regulation, as revised, has been retitled "The Use of Animals in DOD Programs." It creates uniform policies, procedures, and responsibilities among Department of Defense (DOD) components involved in the use of animals as outlined in this regulation. This regulation references pertinent Federal statutes and regulations and other standards related to the care and use of animals. It establishes policies regarding the care and use of animals. It also sets requirements for monitoring the care and use of animals whether performed by DOD personnel or contract or grant recipients. This regulation implements DOD Directive (DODD) 3216.1.

Applicability. This regulation applies to the active components of the military services. It also applies to Reserve Components engaged in activities involving the use of animals as defined in this regulation.

Impact on New Manning System. This regulation does not contain information that affects the New Manning System.

Supplementation. Army supplementation of this regulation is prohibited without prior approval of HQDA(DASG–RDZ), WASH DC 20310. Send requests for exception, with justification, through command channels to HQDA(DASG–RDZ). Other DOD component supplements will be administered through the appropriate component offices listed in appendix A, according to individual component policies.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration date unless sooner superseded or rescinded.

Suggested improvements. The proponent agency of this regulation is the Office of The Surgeon General. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(SGRD–OP), Fort Detrick, MD 21701. Other DOD users should submit their comments and suggested improvements through the appropriate component offices listed in appendix A according to individual component policies.

Contents

1. Purpose

This regulation sets policies, procedures, and responsibilities for using animals in DOD programs. As revised, this regulation covers transportation, care, use, review, reporting, and certain public affairs aspects for—

a. Research, development, test, and evaluation (RDTE).

b. Clinical investigation.

c. Diagnostic purposes.

d. Instructional programs or exhibitions in military departments and Defense agencies (DOD components).

2. References

Related publications are listed below. (A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.)

a. AFR 125–5 (USAF Military Working Dog (MWD) Program).

b. AR 40–654 (Veterinary Services Nutritional Standards for Military Working Dogs).

c. AR 40–905 (Veterinary Health Services).

*This regulation supersedes AR 70–18, 8 October 1976; SECNAVINST 3900.38A, 21 March 1977; AFR 169–2, 15 October 1982; DNAINST 3216.1B, 4 June 1982; and USUHSINST 3203, 17 December 1982.

d. AR 40–920/AFR 163–9 (Veterinary Laboratory Services).

e. AR 190–12 (Military Police Working Dogs).

f. AR 700–81/AFR 400–8/NAVINST 10570.1/MCO 105–0.1 (DOD Dog Program).

g. NIH 80–23 (Guide for the Care and Use of Laboratory Animals), Institute of Laboratory Animal Resources, National Resource Council. (This guide is available from the Division of Research Resources, National Institutes of Health, Bethesda, MD 20205.)

h. NIH 80–1520 (National Primate Plan), Interagency Research Animal Committee. (This plan is available from the Division of Research Resources, National Institutes of Health, Bethesda, MD 20205.)

i. SECNAVINST 3900.41 (Procurement, Transport, and Maintenance of Marine Mammals).

3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

4. Responsibilities

a. The Under Secretary of Defense for Research and Engineering (USDR&E) will—

(1) Issue policies and procedural guidance under DODD 3216.1 concerning animal use.

(2) Allocate nonhuman primate resources to DOD agencies when their requirements exceed the number of animals available for DOD use.

(3) Designate a veterinarian as the DOD representative to the Interagency Research Animal Committee (IRAC). (This was formerly the Interagency Primate Steering Committee.) This person must have the proper rank or grade and experience. He or she must also be a diplomate of the American College of Laboratory Animal Medicine.

b. The Surgeons General of the Army, Navy, and Air Force; the Directors, Defense Advanced Research Projects Agency and Defense Nuclear Agency; and the President, Uniformed Services University of the Health Sciences will—

(1) Supervise the use of animals by their DOD components and implement this regulation.

(2) Establish a joint working group to identify and conserve nonhuman primate resources. The working group will be chaired by the DOD representative to the IRAC. This group will—

(*a*) Share primates and data.

(*b*) Transfer primates between DOD components.

(*c*) Establish primate breeding programs.

(3) Establish and provide representatives to a joint technical working group (JTWG). The JTWG will assist in the—

(*a*) Periodic review of the care and use of animals in DOD programs.

(*b*) Matters related to developing and issuing joint regulations implementing DODD 3216.1.

c. The Army Assistant Surgeon General for Research and Development (DASG–RDZ), as executive agent, will—

(1) Develop, with other DOD components, plans and procedures to insure adequate supplies of nonhuman primates and other species needed to meet DOD requirements. Plans will be sent to the USDR&E for approval.

(2) Develop and issue joint regulations to implement DODD 3216.1.

d. The Chief, US Army Veterinary Corps, will serve as consultant to the USDR&E for technical and professional matters concerning this regulation.

e. DOD component offices listed in appendix A will administer this regulation.

f. Local commanders will insure that—

(1) RDTE, clinical investigation, diagnostic procedures, or instructional programs are conducted in laboratories that conform to the standards and guidelines cited in this regulation. If there is conflict between the standards of humane care and use of animals, the most humane standards will be used.

(2) Local animal care and use, procurement, and transportation policies and procedures comply with this regulation.

(3) Animals used or intended to be used will experience no unnecessary pain, suffering, or stress, and their use will meet valid DOD requirements.

(4) Alternatives to animal species will be used if they produce scientically satisfactory results.

(5) Dogs, cats, or nonhuman primates are not used in research conducted to develop nuclear, biological, or chemical weapons.

5. Accreditation

All DOD organizations having animals (other than military working, recreational, and ceremonial) will seek accreditation by the American Association for Accreditation of Laboratory Animal Care (AAALAC).

6. Statutes, regulations, and standards

a. The Laboratory Animal Welfare Act of 1966, as amended, and its implementing regulations require licensing of dealers, identification of animals, maintenance of records, submission of reports, and compliance with standards for the humane handling, care, treatment, and transportation of animals by dealers and research facilities (sections 2131–2156, title 7, United States Code (7 USC 2131–2156) and parts 1–4, title 9, Code of Federal Regulations (CFR 1–4)).

b. The Endangered Species Act of 1973, as amended,

Headquarters
Departments of the Army, the Navy and the Air Force; Defense Advanced Research Projects Agency; Defense Nuclear Agency; and the Uniformed Services University of the Health Sciences
Washington, DC
1 August 1984

Army R ılation 70-18/SECNAVINST 3900.38B/AFR 169-2/DARPAINST 18/ DNAINST 3216.1B/USUHINST 3203 Change 1

Effective Upon Receipt

Research and Development

The Use of Animals in DOD Programs

Summary. This is a change to AR 70-18/SECNAVINST 3900.38B/AFR 169-2/DARPAINST 18/DNAINST 3216.1B/USUHSINST 3203, 1 June 1984. A change has been made in paragraph 9*b*.

Suggested improvements. The proponent agency of this regulation is the Office of The Surgeon General. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(SGRD-OP), Fort Detrick, MD 21701. Other DOD users should submit their comments and suggested improvements through the appropriate component offices listed in appendix A according to individual component policies.

AR 70-18/SECNAVINST 3900.38B/AFR 169-2/DARPAINST 18/DNAINST 3216.1B/USUHINST 3203, 1 June 1984, is changed as follows:

Page 3-4, paragraph 9b. In line 3, change "paragraph 6a and b" to paragraphs 8 and 9."

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

By Order of the Secretary of the Navy:

M. R. PAISLEY
Assistant Secretary of the Navy
(Research, Engineering and Systems)

By Order of the Secretary of the Air Force:

CHARLES A. GABRIEL
General, USAF
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Official

JAMES H. DELANEY
Colonel, USAF
Director of Administration

Official

ROBERT S. COOPER
Director
Defense Advanced Research Projects Agency

Official

RICHARD K. SAXER
Lieutenant General, USA
Director, DNA

Official

JAY P. SANFORD
President, USUHS

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and its implementing regulations provide a program, under the Department of the Interior, for conserving threatened and endangered species (16 USC 1531–1543) (50 CFR 10–14, 17, and 217–222). The Marine Mammal Protection Act of 1972, as amended, and its implementing regulations provide a similar program, under the National Oceanic and Atmospheric Administration, for marine mammals and marine mammal products (16 USC 1361–1384) (50 CFR 10–14, 18, and 216). These acts require the US Government to acquire permits, maintain records, make reports, and perform inspections on the care and handling of animals.

c. The Lacey Act prohibits the importation of certain wild animals or their eggs if the Secretary of the Interior determines that they are injurious to humans, the interests of agriculture, or other specified national interests. These wild animals and their eggs are identified within the Lacey Act documentation (18 USC 42) (50 CFR 16 and subpart B).

d. Regulations on the use of harmful or dangerous viruses, serums, toxins, and other similar agents in animals used in research facilities producing or testing biological products are presented in 21 USC 154 and 9 CFR 117.

e. Regulations on the import and export of animals, their shipment interstate and intrastate, and the requirements for their quarantine and inspection are presented in the following documents: 5 USC 301; 19 CFR 120; 21 USC 111–113, 114a, 115–117, 120–126, and 151–158; 9 CFR 71–97 and 122; 42 USC 216 and 264–272; and 42 CFR 71–72.

f. The Department of Health and Human Services provides additional guidance on housing, caring for, and using laboratory animals. Guidance is in NIH 80–23, "Guide for the Care and Use of Laboratory Animals."

g. The Department of Health and Human Services provides guidance on the supply and use of laboratory primates in NIH 80–1520, "National Primate Plan."

7. Animal use proposals

a. Proposals, whether conducted or sponsored by DOD components, that involve using animals will be written. They will include the following information:

(1) Objectives.

(2) Discussion of the need to perform the experiment, procedure, or demonstration.

(3) Review or summary of the scientific literature or experience that led to the proposal.

(4) Rationale for using the animal species and proposed numbers.

(5) Design of the experiment, procedure, or demonstration.

b. The description of methods used in animal experiments, procedures, or demonstrations should be complete and sufficient to indicate that pain and discomfort are minimized without compromising objectives of the experiment. Justification must be given for not using proper drugs when the procedures may cause pain or discomfort.

8. Animal care and use procedures

a. The local commanders of each DOD organization conducting or sponsoring activities involving animals in RDTE, clinical investigation, diagnostic procedures, or instructional programs will form a committee(s) to oversee the care and use of animals.

b. Committee(s) appointed by the local commander will be made up of at least three members. At least one person will not be involved in the proposed project and at least one member will be a veterinarian. Committee(s) will submit recommendations and be responsible to the local appointing official.

c. The committee(s) will—

(1) Periodically review all aspects of animal care to insure established policies, standards, and regulations are complied with.

(2) Review all protocols or proposals to insure that—

(*a*) The information sought by the use of animals is sufficiently important to warrant their use.

(*b*) The design of the experiment, procedure, or demonstration is adequate.

(*c*) The maximum amount of information consistent with good scientific research practice is obtained.

(*d*) The minimum number of animals needed for scientific validity is used.

(*e*) The model selected is the most suitable, based on consideration of the the experimental design, potential alternatives, and laboratory limits.

(*f*) The use of drugs to minimize pain or discomfort is adequate.

(*g*) Established policies on the use of animals are complied with.

d. Commanders responsible for working animals or recreational or ceremonial animals will regularly review and oversee their activities. The oversight will involve the local official attending veterinarian.

9. Centralized review of nonhuman primate use

a. Proposals involving the use of nonhuman primates will receive an additional centralized review by the proper DOD component office (app A). This review will conform with the criteria of NIH 80–1520. A centralized review will confirm that—

(1) The proposed research can be done only with nonhuman primates and that no other species or test system could produce comparable results.

(2) The species of nonhuman primates proposed for

use is the most suitable and that some more plentiful species would not be adequate.

(3) The number of nonhuman primates proposed is the minimum that will produce scientifically acceptable results.

(4) The nonhuman primates will not be euthanatized during or at the end of the study except in cases requiring this as part of the investigation.

(5) If euthanasia is needed, positive action will be taken to share body material when feasible.

b. Each DOD organization using animals will establish review procedures and apply the criteria outlined in paragraph 6a and b. Protocols or proposals that involve using nonhuman primates must be reviewed and approved. The local DOD organization will send one copy of each protocol or proposal to the proper DOD office for centralized review.

10. Contracts and grants

a. RDTE, clinical investigation, diagnostic procedures, or instructional programs involving animals sponsored by a grant, award, loan, or contract from a DOD component will be conducted in facilities that conform to the standards and guidelines cited in this regulation. When conflict between the standards for humane care and use of animals exists, the most humane standards will be used.

b. Each DOD component sponsoring RDTE, clinical investigations, diagnostic procedures, or instructional programs involving animals will insure that the following criteria are met:

(1) Proposals or protocols are prepared according to paragraph 7 and reviewed using the criteria summarized in paragraph 8c and, where applicable, as outlined in paragraph 9.

(2) The care and use of animals are in compliance with prescribed standards and policies and that recipients of funds provide appropriate assurances of compliance. Assurances will include written statements from the recipient's animal care and use committee or other responsible official. Written statements will certify that the laboratories are accredited by AAALAC or that the care and use of animals will be done according to NIH 80–23 or other applicable Federal permits or regulations. The written assurances will also state that the protocol or proposal has been reviewed and approved by the local animal care and use committee or attending veterinarian. Site visits to assess animal care and use will be made as appropriate; the site visit team will include a person knowledgeable in laboratory animal science.

c. All contracts or grants by DOD that may involve using laboratory animals will contain clause 52.235–7003 of the DOD— Federal Acquisition Regulations Supplement (DOD—FAR) (app B).

11. Animal programs in foreign countries

To the extent that the local situation permits, research in foreign countries conducted by DOD personnel or sponsored by DOD funds will comply with the requirements of this regulation.

12. Use of DOD facilities

The use of animals jointly with or on behalf of other DOD, Federal, or civilian agencies in DOD facilities will comply fully with this regulation.

13. Release of information

a. If information about investigations using animals is released in a timely manner, public understanding and acceptance is likely to increase. This is especially so when it is shown that investigation results—

(1) Help solve military problems.

(2) Contribute to improved health and welfare of man and domestic animals.

b. Releasing information about an experiment involving animals before the experiment is completed should be the exception rather than the rule.

c. Material proposed for release to both the scientific community and the public will contain full information relevant to humane procedures used.

d. Publications describing the use of animals involving RDTE, clinical investigation, or instruction will include a statement of compliance with the Animal Welfare Act, when applicable. Publications should also include a statement declaring adherence to the principles enunciated in NIH 80–23.

e. Special attention must be devoted to insuring that all material (written, oral, and visual) will be acceptable to a wide audience, including lay as well as scientific readers, regarding specific techniques involving animals.

f. DOD components will develop public affairs policies, including the specific criteria mentioned in this paragraph. Local commanders will use these criteria when reviewing publishable written and presented materials involving animals.

14. Reports and inspections

a. DOD organizations do not register with the Secretary of Agriculture under the Animal Welfare Act but organizations holding or using animals subject to that Act are subject to inspection. Such organizations will submit reports to the US Department of Agriculture (USDA) as required by USDA regulations implementing the Animal Welfare Act.

b. All DOD organizations using animals subject to this regulation will submit copies of each USDA report, and other data as directed, to the proper office cited in appendix A.

Appendix A
DOD Component Offices

Assistant Surgeon General for Research and Development
Department of the Army
ATTN: DASG-RDZ
Washington, DC 20310

Commander
Aerospace Medical Division (AFSC)
ATTN: AMD/RD
Brooks Air Force Base, TX 78235

Commander
Naval Medical Command (MEDCOM-02E)
Washington, DC 20372

Director
Defense Advanced Research Projects Agency
ATTN: Administrative Office
1400 Wilson Boulevard
Arlington, VA 22209

Director
Defense Nuclear Agency
ATTN: OAMA
6801 Telegraph Road
Alexandria, VA 22310

President
Uniformed Services University of the Health Sciences
ATTN: ADO
4301 Jones Bridge Road
Bethesda, MD 20814

Appendix B
Department of Defense—Federal Acquisiton Regulations Supplement Clause 52.235-7003

Extracted from the DOD—Federal Acquisition Regulations Supplement

35.071(d) Care of Laboratory Animals. In compliance with law and in furtherance of the Department of Defense policy that all aspects of investigative programs involving the use of experimental or laboratory animals be humanely conducted in accordance with recognized principles, the following clause shall be included in all contracts awarded in the United States, its possessions, and Puerto Rico, which may involve the use of such animals.

52.235-7003 CARE OF LABORATORY ANIMALS (1974 APR)

(a) Before undertaking performance of any contract involving the use of laboratory animals, the Contractor shall register with the Secretary of Agriculture of the United States in accordance with Section 6, P.L. 89-544, Laboratory Animal Welfare Act, 24 August 1966 as amended by P.L. 91-579, Animal Welfare Act of 1970, 24 December 1970. The Contractor shall furnish evidence of such registration to the contracting officer.

(b) The Contractor shall acquire animals used in research and development programs from a dealer licensed by the Secretary of Agriculture or from exempted sources in accordance with the Public Laws enumerated in *(a)* above.

(c) In the care of any live animals used or intended for use in the performance of this contract, the Contractor shall adhere to the principles enunciated in the "Guide for Care and Use of Laboratory Animals" prepared by the Institute of Laboratory Animal Resources, National Academy of Sciences—National Research Council, and in the United States Department of Agriculture's regulations and standards issued under the Public Laws enumerated in *(a)* above. In the case of conflict between standards, the higher standard shall be used. Contractor reports on portions of the contract in which animals were used shall contain a certificate stating that the animals were cared for in accordance with the principles enunciated in the "Guide for Care and Use of Laboratory Animals" prepared by the Institute of Laboratory Animal Resources, NAS-NRC, and/or in the regulations and standards as promulgated by the Agricultural Research Service, USDA, pursuant to the Laboratory Animal Welfare Act of 24 August 1966, as amended (P.L. 89-544 and P.L. 91-579).

Note: The Contractor may request registration of his facility and a current listing of licensed dealers from the Regional Office of the Animal and Plant Health Inspection Service (APHIS), USDA, for the region in which his research facility is located. The location of the appropriate APHIS Regional Office as well as information concerning this program may be obtained by contacting the Senior Staff Officer, Animal Care Staff, USDA/APHIS, Federal Center Building, Hyattsville, Maryland, 20782.

(End of clause)

Glossary

Section I
Abbreviations

AAALAC.. American Association for Accreditation of Laboratory Animal Care
DAR ..... Defense Acquisition Regulations
DOD ..... Department of Defense
DODD..... Department of Defense directive
JTWG ..... joint technical working group
RDTE ..... research, development, test, and evaluation
USDA ..... US Department of Agriculture
USDR&E .. Under Secretary of Defense for Research and Engineering
USUHS .... Uniformed Services University of the Health Sciences

Section II
Terms

Alternatives
Any system or method that covers one or more of the following:

a. Replacing the use of laboratory animals altogether.
b. Reducing the number of animals required.
c. Refining an existing procedure or technique to minimize the level of stress endured by the animal.

Animal
Any living nonhuman vertebrate used for RDTE, clinical investigations, diagnostic procedures, and instructional programs or exhibitions.

Clinical investigation
All activities supported by clinical investigative funds.

Commander
Laboratory or unit commander, institute director, or other official having equivalent authority.

Dealer
Any person who, in commerce, for compensation or profit, delivers for transportation (or transports, except as a carrier), buys, sells, or negotiates the purchase or sale of animals.

Endangered species
A species or subspecies of mammal listed as "endangered" under the Endangered Species Act.

Exhibition
The use of animals, including working, recreational, or ceremonial animals, in displays, demonstrations, or ceremonies.

Injurious wildlife
Any wildlife for which a permit is required under the Lacey Act before being imported into or shipped between the continental United States and Alaska, Hawaii, the Commonwealth of Puerto Rico, or any possessions of the United States.

Instructional programs
All educational and training activities, except tactical training of personnel associated with military working dogs or other working, recreational, and ceremonial animals.

Marine mammal
Those species of the following orders, which are morphologically adapted to the marine environment, whether alive or dead, including but not limited to any raw, dressed, or dyed fur or skin: Cetacea (whales, dolphins, and porpoises) and Pinnipedia other than walrus (seals and sea lions).

Nonhuman primate
Any nonhuman member of the highest order of mammals, including prosimians, monkeys, and apes.

Research, development, test, and evaluation
All activities supported by RDTE funds.

Research facility
Any school (except an elementary or secondary school), institution, organization, or person that uses or intends to use live animals in research, tests, experiments, or instructional programs.

Threatened species
A species of mammal listed as "threatened" pursuant to the Endangered Species Act.

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Marine Corps: Marine Corps Lists H & I

Air Force: F

DARPA: Special

DNA: Special

USUHS: Special

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DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES
FORT DETRICK, FREDERICK, MARYLAND 21701

STANDING OPERATING PROCEDURE 24 March 1982
IRCC #6*

PROCEDURE FOR REMOVAL OF RADIOACTIVE CARCASSES FROM USAMRIID

BIOLOGICAL CONTAINMENT

1. Carcasses (an individual monkey or groups of small animals, both infected and non-infected controls) are placed in 20" x 30" Chieftan nylon bags (an American Hospital Supply product). The bag is sealed tightly, rolling the open end and applying autoclave tape. Only this specific type of nylon bag should be used; other types are destroyed by autoclave heat. The bag should be marked with "Radioactive and bio-hazard waste" and identified as outlined in IRCC SOP #4. The properly labeled bag is placed in freezer in Room 704-F.

2. The Health Physics NCOIC will notify the co-worker listed on the bag at least 24 hours before the radioactive waste is to be shipped from the Institute. The co-worker will be responsible for autoclaving the carcasses.

3. Three autoclaves are currently authorized for the sterilizing of radioactive material (Virology Suite 1, Bacteriology Suite 2 and Animal Assessment Suite 2). The co-worker must contact the principal investigator in one of the authorized suites to arrange for "back-end" operation of the autoclave.

4. The Health Physics NCOIC should be notified as to the time that the radioactive carcasses are to be picked up from the autoclave.

5. At the time of pickup, the Health Physics technician will seal and properly relabel the container as radioactive and check to insure that the complete description of radioactive material within the container is listed on its lid.

6. Radioactive carcass waste will be packed for shipping in accordance with HSWP-QHP dated 8 May 1979.

William R. Beisel

WILLIAM R. BEISEL, M.D.
Radiation Protection Officer
HQ, USAMRIID

*This SOP supersedes IRCC SOP #6 dated 16 July 1979.

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES
FORT DETRICK, FREDERICK, MARYLAND 21701-5011

STANDING OPERATING PROCEDURE 1 February 1985

Animal Quality Assurance Program

1. PURPOSE.

This program is directed toward evaluating the health status of research animals as a step in assuring that spontaneous diseases do not compromise animal related research at USAMRIID. Newly received animals are evaluated at once to assure that their health status is appropriate for their intended research use and to establish and maintain a vendor performance file. Animals already in-house are monitored to assure continued appropriateness of their status. This monitoring also provides a continual update on the pathogen burden of animals in the facility and thus allows informed management decisions to be made. All incoming animals and animals already in house should be reasonably free of bacteria, viruses and parasites pathogenic to the particular species and should not have been exposed to pharmacologically active or toxic agents except as an element of the specific research protocol to which they are assigned.

2. SCOPE.

All research animals received from outside sources are included in this Animal Quality Assurance Program. This SOP also establishes routine procedures for monitoring the health status of mice, rats, hamsters, guinea pigs and rabbits. Quality assurance procedures for other species are developed on a case by case basis when they are introduced into USAMRIID facilities. Management of nonhuman primates upon receipt is handled IAW a separate SOP.

It should be noted that this is a surveillance/monitoring program and that the presence of pathogens does not necessarily result in rejection or elimination of the animals. The information sought is incomplete and serves to detect the more serious pathogens and as an indicator of the health status of the animals. Exhaustive microbiological, parasitological and pathological evaluation of t ' animal is not indicated under the circumstances and would not be cost effective. In most cases, information gained through this program will be relied upon in making decisions such as vendor selection, assignment of animals to projects and disposition of animals in question.

3. RESPONSIBILITY.

The Laboratory and Quality Control Officer is responsible for the execution and monitoring of this program. The Laboratory and Quality Control officer is also responsible for periodical review all animal handling procedures associated with receipt, set up and quarantine of animals to assure that acceptable preventative medicine practices are followed.

4. RECORDS

This program provides for the in-house performance of diagnostic laboratory procedures to assess the presence of specified pathogens in research animals. Records should be established to reflect the health status of animals in-house. Records reflecting health status of incoming animals should be established, by vendor and by species, to build a vendor performance file. The Laboratory and Quality Control Officer will request current quality control laboratory results from animal suppliers. Depending on the number and species of animals involved, supplier generated information may be regarded as basic quality control data with in-house information serving as a confirmation.

5. SAMPLE SELECTION AND SIZE.

A. Animals for quality assurance testing upon receipt should be selected at random from the entire shipment of like animals (within species, strain or stock, and age group). Except where specified to be otherwise, sample size is at least two and not more than five animals in a shipment. Samples are to be taken from each shipment, not to exceed one sample per month from each individual strain and species of animal received from a vendor. In addition to the randomly selected sample, animals that die spontaneously or are moribund are necropsied by veterinary pathologists for cause of death.

B. In-house surveillance.

(1) Because of the nature of infectious disease research, few rodents are maintained in long term studies. The bulk of the research is performed in containment areas that do not lend themselves to routine in-house quality assurance surveillance. The few breeding colonies maintained are periodically sampled under the quality control format.

(2) Spontaneous deaths are investigated by the Pathology Division with diagnostic necropsies.

6. PROCEDURES.

In general, the animals covered by this program are transported directly from the delivery conveyance to the AR breakdown area. Samples for quality control monitoring are selected as animals are set up in sanitized caging and the quality control procedures are performed as soon as possible. Quality control animals are held in filter top cages to preclude in-house contamination of animals.

A. Rats, mice and hamsters

(1) Initial observation - upon receipt all animals will be observed by a qualified veterinarian or a trained technician. This observation, which may be done as animals are set up in sanitized cages, is intended to detect morbidity, moribundity, deaths and other grossly apparent illnesses or abnormalities in the shipment of animals. If abnormalities are detected, the OIC, Quality Control Section will determine what further diagnostic effort or corrective actions are to be taken.

In general, dead and moribund animals are necropsied and their tissues are submitted for histopathology.

(2) Quality Control Monitoring

(a) Bacterial culture of cecal contents of mice, rats and hamsters is done utilizing the isolation scheme in the AR Clinical Lab SOP. Organisms identified include:

Salmonella sp
Citrobacter freundii 4280
Pseudomonas aeruginosa
Yersinaia sp
Staphylococcus aureus
Campylobacter fetus supsp. jejuni (Hamsters only)
Proteus mirabilis
Streptococcus sp (Beta hemolytic)

(b) Bacterial culture of upper respiratory tissues and/or lung is done utilizing procedures outlined in the AR Clinical Lab SOP. Organisms identified include:

Corynebacterium kutcheri
Pasteurella sp
Streptococcus sp (Beta hemolytic, groups A & G)
Pseudomonas aeruginosa
Klebsiella pneumoniae
Bordetella bronchiseptica
Campylobacter sp

(c) Direct postmortem examination of pelage for ectoparasites is performed utilizing procedures outlined in Annex A. Hamsters are also examined for Demodex sp by doing a deep skin scraping when indicated.

(d) Examination for endoparasites is performed utilizing the procedures for cellophane tape test, fecal flotation, and direct examination of the gastrointestinal tract outlined in Annex B.

(e) Serology to detect antibody to viruses.

(1) Serology for viral and mycoplasma titer will be performed by an independent laboratory. Procedures are outlined in Annex D.

(2) CBC is performed on each quality control animal with the results included in the final report. A differential is performed if the WBC value is not within the following range:

Mouse	$5.1 - 11.6 \times 10^3/mm^3$
Rat	$6.3 - 17.2 \times 10^3/mm^3$
Hamster	$3.0 - 11.0 \times 10^3/mm^3$

(f) Necropsies are performed in accordance with procedures outlined in Annex C.

B. Guinea Pigs

(1) Initial observation - upon receipt, each guinea pig is examined by a veterinarian or a trained technician. This examination is intended to detect grossly apparent illness or abnormalities in the guinea pigs. If abnormalities are detected, the veterinarian responsible for the animals will determine what further diagnostic efforts or corrective actions are to be taken.

(2) Quality Control Monitoring

(a) Bacterial culture of guinea pig cecal contents is done utilizing the isolation scheme in AR Clinical Lab SOP. Organisms isolated include:

Salmonella sp
Pseudomonas aeruginosa
Klebsiella pneumoniae
Campylobacter sp

(b) Bacterial culture of upper respiratory tract and/or lung is done utilizing the procedures outlined in AR Clinical Lab SOP. Organisms identified include:

Streptobacillus moniliformis
Bordetella bronchiseptica
Psuedomonas sp
Streptococcus sp
Staphylococcus aureus
Pasteurella pneumotropica
Pasteurella multocida
Klebsiella pneumoniae
Corynebacterium pyogenes
Corynebacterium kutscheri
Yersinia pseudotuberculosis

(c) Direct examination of the pelage is done using the procedures for ectoparasite examination outlined in Annex A. Direct examination and skin scraping are used for live animals.

(d) Examination for endoparasites is performed utilizing the procedures for flotation of feces and direct examination of the gastrointestinal tract outlined in Annex B.

(e) Necropsies are performed in accordance with procedures outlined in Annex C.

(f) CBC is performed on each animal with results included in final report. A differential is performed if WBC value is not within the range 6.5 - 18.0 X $10^3/mm^3$.

C. Rabbits

(1) Initial observation - upon receipt all aimals will be physically examined by a qualified veterinarian. This examination specifically includes checking for malocclusion, buphthalmia, ear mites, and lesions of the mucocutaneous junctions of the mouth, eyes and genitalia.

(2) Quality Control Monitoring

(a) Bacterial culture of rectal swabs or fresh fecal droppings are cultured for enteropathogenic bacteria utilizing procedures outlined in Clinical Lab SOP. Organisms isolated include Salmonella sp and Pseudomonas sp.

(b) Bacterial culture of upper respiratory swabs (Calgiswabs®) are performed utilizing procedures outlined in AR Clinical Lab SOP. Organisms isolated include:

Pasteurella multocida
Bordetella bronchiseptica
Streptococcus sp
Straphylococcus aureus
Yersinia pseudotuberculosis
Corynebacterium pyogenes
Pseudomonas sp
Klebsiella pneumoniae
Franciella tularensis

(c) All rabbits receive a complete examination prior to acceptance and entry into the colony. Any abnormality is noted and may result in rejection of the animal and immediate return to the vendor.

(d) Examination for endoparasites of rabbits is performed utilizing the procedure for fecal floatation and anal tapes outlined in Annex B.

(e) Because of the cost of laboratory rabbits, Quality Control necropsies are not routinely performed.

William C Cole

WILLIAM C. COLE
LTC(P), VC
Chief, Animal Resources Div.

ANNEX A

Procedures for Identification of Ectoparasites

A. Materials

1. Applicator, cotton tipped
2. Coverglass
3. Dissecting needle
4. Forceps
5. Jar for waste
6. Microscope
7. Microscope lamp
8. Microslides
9. Light lubricating oil and dispenser
10. Scalpel
11. "Scotch" tape
12. Towels, or "Wipes"

1. Applicator, cotton tipped. Wooden applicator sticks, 15 cm (6 in.) in length, are tipped with absorbent cotton. These are for the removal of mites from the ear canals.

2. Coverglass. Any 18 or 22mm (3/4 or 7/8 in.) square glass or plastic coverglasses are suitable.

3. Dissecting needle. A wooden-or metal-handled needle is used for picking up individual mites.

4. Forceps. To be used for plucking hair.

5. Jar for waste. Mites may live for hours after their removal from the host. Discarded swabs, "wipes," and slides may be disinfected by placing them in a covered jar containing 3 per cent lysol solution.

6. Microscope. The same type of microscope and its equipment is recommended as that used for fecal examination. Lens paper should be used to maintain clean objectives, oculars, condenser, and mirror.

7. Microscope lamp. That used for fecal examination is recommended for mite identification.

8. Microslides. These are standard 75 x 25 mm. (3 x 1 in.) glass slides.

9. Oil and dispenser. Any light-bodied lubricating oil may be used to mount mites temporarily on a microslide under a cover-glass. The oil may be dispensed from a small bottle provided with a dropper-pipette.

10. Scalpel. A detachable-blade scalpel is preferred for scraping the skin. The blade should be convexly curved.

11. Scotch tape. To be used for holding plucked hair(s) to the microslide.

12. Towels or "Wipes." Soft woven towels or disposable laboratory "Wipes" are used for drying microslides and for cleaning the scalpel.

B. Technique for skin examination for suspected skin mite infestation

1. Place a drop of light lubricating oil on a microslide.

2. Clean the scalpel blade by wiping it with paper.

3. Dip the clean scalpel blade into the drop of oil on the microslide.

4. Pick up a fold of the patient's skin at the edge of the suspected area, pinching it firmly between the thumb and forefinger. With the oily scalpel, scrape the crest of the fold several times in the same direction. Scrapings will adhere to the blade. Stop scraping when a slight amount of blood appears.

5. Transfer the scraping from the scalpel blade into the drop of oil on the microslide, using a slight rotating motion.

6. Apply a coverglass to the scraping on the microslide. Additional oil may be added at the coverglass edge in order to full the space beneath it. Do not press on the coverglass.

7. Examine the preparation under low magnification (x 100) in a methodical manner so that all portions of the coverglass area are seen. For best results, manipulate the substage condenser and diaphragm of the microscope so as to provide a relatively low degree of light, evenly distributed. Oily preparations of mites may be kept for days as demonstration of specimens. The mites show motion for many hours.

8. For the detection of ear mites in the rabbit, the patient must be restrained. A cotton swab is introduced into the external auditory canal and gently rotated. The swab is then placed on a microslide to which a drop of lubricating oil has been added. The swab is rolled, back and forth, in the drop of oil so that material on the swab is transferred to the oily suspention on the slide. The slide is then examined microscopically for the presence of ear mites. Living and dead ear mites may be seen.

   An electrically illuminated otoscope cone may be introduced directly into the ear canal for the detection of ear mites, thus making microscopic examination unnecessary.

   The more rapidly-moving, larger skin mites may be captured by touching them with an oily cotton swab. This slows them down so that they may then be transferred to a drop of oil on a microslide for microscopic examination.

C. Method of examining rodents for lice and non-follicle-inhabiting mites

1. Render the animal unconcious (CO_2 euthanasia chamber).

2. Completely examine the animal's pelage under a good, strong light.

3. Using forceps, pluck representative samples of hair from the dorsal neck, shoulder, and central lumbar area.

4. Mount these hair shafts on a microslide, using cellophane tape to hold them in place.

5. Examine the slide microscopically for the presence of external parasites. Possible ectoparasites include the following:

Mouse:	Myobia musculi	Polyplax serrata
	Myocoptes musculinus;	Ornithonyssus bacoti
	Trichoecius romboutsi	Demodex spp.
	Radfordia affinis	
Rat:	Radfordia ensifera	Ornithonyssus bacoti
	Polyplax spinulosa	Demodex spp.
Hamster:	Ornithonyssus bacoti	Demodex spp.
Guinea Pig:	Chirodiscoides caviae	Gyropus ovalis
	Gliricola porcelli	Trixacarus caviae
Rabbit:	Psoroptes cuniculi	
	Cheyletiella parasitivorax	
	Notoedres cati	
	Sarcoptes scabie	
	Listrophorus gibbus	

D. Method of examining rodents for follicle-inhabiting mites

1. Kill the animal and cut through the skin completely around the torso (avoid cutting the peritoneum).

2. Pull the skin forward and backward (turning it inside out) and examine the inside surface for white nodules.

3. If nodules are present, tease out the contents, mount on a slide and examine microscopically (100x).

ANNEX B

Procedures for Identification of Endoparasites

A. Materials:

1. Coverglasses
2. Microslides
3. Microscope
4. Cellophane Tape
5. Glass Marker ("Sharpie")
6. Fecal Test Kits
7. Floatation Solution
8. Lens Paper
9. Wooden Applicator Sticks
10. Gauze, 4" x 4" 's
11. Waste Container

B. Procedures

1. Anal Tape Test

   a. Place a 2 inch strip of cellophane tape over the anal area of the rodent being checked. Manipulate/smooth the tape to insure maximum adhesion to the anal area.

   b. Remove tape from animal and place on a microslide, sticky side down.

   c. Examine the slide, microscopically, under low (100x) magnification.

2. Fecal Smear Test

   a. Place a small amount of small intestinal content (cecum) on a microslide. Add one drop of water, mix well with a wooden applicator stick, then cover with a coverglass.

   b. Examine slide, within 1/2 hour, under phase contrast microscopy (200x). Protozoa and Campylobacter may be identified by their unique motion or characteristics.

3. Fecal Floatation Test

   a. Obtain a small amount of feces from the large intestine. (For rabbits, use fresh fecal pellets collected from the bottom of the cage.)

b. Place feces in a pre-labeled "Fecal Kit" container. Transport to lab and complete fecal floatation in accordance with "Fecal Kit" instructions.

c. Examine floatation slide, microscopically, under low (100x) magnification.

C. Intestinal parasites that might possible be present are listed below:

Mouse:	*Syphacia obvelata*	*Eimeria spp.*
	Aspiculuris tetraptera	*Spironucleus muris*
	Hymenolepis nana	*Giardia spp.*
	Hymenolepis diminuta	Trichomonads
	Klossiella muris	
Rat:	*Syphacia muris*	*Eimeria spp.*
	Aspiculuris tetraptera	*Spironucleus muris*
	Hymenolepis nana	*Giardia spp.*
	Hymenolepis diminuta	Trichomonads
	Nippostrongylus muris	
Hamster:	*Syphacia obvelata*	*Spironucleus muris*
	Aspiculuris tetraptera	*Giardia spp.*
	Hymenolepis nana	Trichomonads
	Hymenolepis diminuta	Other protozoa
	Eimeria spp.	
Guinea Pig:	*Paraspidodera uncinata*	*Eimeria spp.*
	Klossiella cobayae	Trichomonads
Rabbit:	*Passalurus ambiguus*	
	Passalurus nonannulatus	
	Dermatoxys veligera	
	Obeliscoides cuniculi	
	Eimeria spp.	

ANNEX C

Quality Control Necropsy Procedure

A. Purpose: To give detailed instructions on proper necropsy techniques for laboratory animals

B. Materials and Equipment:

1. Blood agar and MacConkey plates (for lung and cecum swabs)
2. Petri dish, small (one for each cecum sample from each QC animal, filled with 0.9% NaCl solution).
3. Autoclaving hat box, small, one quart/half pint (for disposal of carcasses and used/dirty sponges)
4. Betadine solution
5. Alcohol
6. Sterile gauze
7. Calgiswabs® - Type IV
8. Jar with formalin
9. Rubber gloves and mask
10. Alcohol burner (for sterilizing equipment)
11. 30cc syringe plus 18ga needle for large rodents/21ga for small rodents (used to infuse trachea and lungs; also entire intestinal tract)
12. 3.0cc vacutainer tube with EDTA
13. 3.0cc serum vacutainer tube containing 0.6 ml saline
14. Dilutions of Isoton II in Accuvette containers (for diluting blood samples)
15. Disposable 10 microliter micro-pipets (for orbital bleeding)
16. Microscope slides (for making thin smears for differentials when blood samples are taken orbitally).
17. Surgical Equipment:
    a. pins
    b. scissors
    c. hemostatic clamps
    d. forceps
    e. surgical scalpel blades
    f. scalpel
18. 3.0 syringes; 23ga needles, 25ga needles
19. Fecal specimen containers

C. Techniques for Euthanasia

1. Primary Technique (for all rodents)

CO_2 (euthanasia chamber): Place animal in chamber filled with CO_2 and remove when animal rendered unconsious.

2. Secondary Technique [For amphibians (frogs esp.)]

Take a scalpel blade and make an incision between the cranium and vertebral colum, severing the spinal cord from the cerebral cortex.

D. Quality Control Necropsy Procedure

1. Identify each group of animals set aside by Breakdown Technician for "Quality Control" on seperate cage cards. Then fill out a Quality Control and Experimental Necropsy Protocol form using information obtained from cage cards. Assign Quality Control Laboratory numbers and Animal Quality Control Numbers.

2. Bring QC cart, with all materials and equipment, to room where necropsy will be done.

3. Place animals individually into CO_2 chamber filled with CO_2 gas. When the animal reaches the appropriate level of anesthesia take it out of chamber.

a. Initial parasite examination

(1) Complete the procedure outlined in Annex A, "Method of examining rodents for lice and non-follicle inhabiting mites."

(2) Complete the procedure outlined in Annex B, "Anal Tape Test."

b. Blood Sampling techniques:

(1) Anterior Vena Cava vena-puncture technique: insert the 3.0cc syringe, with a 25ga needle, anterior to the manubrium angling posteriorly into the anterior vena cava.

(2) Cardiac Puncture

(a) Palpate for heart beat, then insert syringe, with 25ga needle, between ribs where heart beat is strongest.

(b) Insert syringe, with 25ga needle, into the thoracic cavity at 45° angle just below the xiphoid process, aiming into the heart.

(c) 0.3 ml of blood will be placed in the serum vacutainer tube which contains 0.6 ml saline. The remainder of the blood will be placed in a 3.0 ml vacutainer EDTA tube.

(3) Orbital bleeding technique:

Take a 10 microliter pipet and insert it into the medial canthus of the orbit. Rotate the micropipet to introduce it into the orbital sinus. Fill micropipet up to the blank line. Then discharge into sample of Isoton II (blood dilution media) immediately to avoid blood clotting.

When orbital site bleeding is performed, a droplet of blood may be put on a slide and a thin smear made for differential blood cell count.

4. Place the animals, ice again, into the CO_2 chamber and euthanitize the animal.

5. Take euthanitized animals out of CO_2 chamber and begin necropsy procedure. NOTE: If abnormalities are observed at any time during the necropsy procedure, the help of a qualified veterinarian will be obtained for determining what further action is to be taken.

6. Prepare your equipment for necropsy on the necropsy table:

a. necropsy instruments
b. tack-board and pins
c. squeeze bottle with alcohol
d. squeeze bottle with betadine solution
e. gauze pads
f. alcohol burner

7. Place one animal on tack-board in dorsal recumbency with one pin in each foot.

8. Make a longitudinal incision from the top of the jaw to the pelvis.

9. Separate the skin from the cervical, thoracic and abdominal musculature.

10. Make an incision from the inguinal area to the xiphoid process. Make another pair of incisions or cuts just below the last pair of ribs exposing the entire gastro-intestinal tract.

11. Remove the ventral half of the rib cage including the sternum (exposing the respiratory tract) and place it into the jar of formalin.

12. Cut out the muscles of the neck to expose the trachea. Remove the salivary glands of rats and drop into formalin jar.

13. Clamp hemostats onto upper-most rings of the trachea closing off the esophagus and the trachea.

14. Using a sterile blade, make an incision just below the clamp halfway through the trachea. Take a Calgiswab® and stick it into the trachea, swabbing down into both lungs. Take swab and streak out onto MacConkey's and blood agar plates.

15. a. For all rodents: Remove clamp and reclamp below tracheal incision. Then pull clamp up and away, cutting off the trachea above the clamp and severing the muscles, ligaments and vessels holding the trachea, lungs and heart to the dorsal wall of the chest cavity. Take syringe full of formalin with a 21ga needle, stick it into the trachea below the clamp, and infuse the lungs.

    b. For large rodents (rats and guinea pigs): Remove trachea, heart and lungs (as described in (a)) from the chest cavity and lay down on tack-board. For both right and left halves of the heart, make a cut, with scissors, through the atrium and ventricle (so formalin can seep in and fix the heart). Take syringe of formalin, with 23ga needle, and insert it down into the trachea below the clamps and infuse the lungs.

    c. Take lungs, heart and trachea, with clamp still in place, and place in formalin jar.

16. Remove spleen from the stomach and place in jar.

17. To cut out stomach and intestine: cut off esophagus near stomach, cut bile duct (duct portion that connects liver with duodenum). Start cutting all membranes and ligaments that keep the stomach and intestine attached to the body wall. Finally, remove the entire intestinal tract, down to the rectum. Once the stomach, small intestine, cecum and large intestine have been removed from the abdominal cavity, set aside on tack board until step 22.

18. Remove the liver, being careful not to make any tears in the walls of the liver, and drop into formalin jar.

19. a. Remove the left kidney and make a cut longitudinally down to its pelvis (so as not to sever it into two complete halves).

    b. Remove the right kidney and cut it cross-sectionally (but not severing it) into two halves.

    c. Be sure to remove each adrenal gland. Place both kidneys and adrenal glands into formalin jar.

20. a. For male rodents: Remove the bladder, seminal vesicles, urethra and both testicles in one group. Drop entire grouping into formalin jar.

b. For female rodents: Remove the urinary bladder, vulva, vagina, uterus, uterine horns and ovaries in one complete grouping. Place in jar of formalin.

21. Cut stomach open and empty contents.

22. Cut cecum open and empty a portion into the small petri dish. Empty excess cecal material onto gauze pad and dump into hat box.

23. For guinea pigs and large rats: Make slices in various sections of the large intestine to empty fecal contents.

24. a. Take a Calgiswab® and swab the inside of the cecum. Then streak it out onto the MacConkey's and blood agar plates.

b. Obtain fecal specimens for a fecal floatation and for a fecal smear (Annex B).

25. a. Infuse as much of the large intestine as possible, from the cecum distally.

b. Infuse the small intestine from the duodenum distally to the cecum.

c. Place entire gastro-intestinal tract into formalin jar while infusing with the formalin.

26. Removal of the brain must be done very carefully. Make an incision with the scalpel from the forehead to the base of the neck. Remove the skin from around the cranial vault. Cut the frontal bones of the cranium between the eyes. Then cut through the interparietal bones (starting at the occipital bone), through the parietal bones up to the frontal bone. Carefully pull back both halves of the cranium, exposing the brain. Then pull the brain out and put it into the jar of formalin.

27. For rats only: Remove the lacrimal glands, with eyes, and drop into the formalin jar.

28. Place the body remains and all used gauze pads into the hat box.

29. All instruments must be kept clean throughout the entire procedure. When a sterile scalpel blade is required, the alcohol burner is used to flame the blade.

30. Samples that are submitted to the laboratory:

a. Blood and serum samples in 3 ml tubes (taken from Rats, Guinea Pigs and Hamsters).

b. Blood samples in Isoten II and blood smear slides (Mice, Gerbils, Voles).

c. MacConkey's and blood agar plates (from lung and cecum swabs) for culturing.

d. Cecum samples: for determination/identification of parasites.

31. Take jars of formalin containing the tissue specimens and the Necropsy Request Form to the Histopathology Laboratory, Pathology Division, 2nd Floor.

32. Record all laboratory results obtained from submitted specimens (blood, bacteriology and parasitology) on the Quality Control Record Sheet (Annex D). Place Record Sheet in log book. Take xerox of Record Sheet and fasten it to Necropsy form (when returned from Histopathology) and then file in Vendor file by animal species.

33. Blood sample (EDTA) tubes will be used for hematology screening.

34. Serum sample tubes (0.6 ml saline + 0.3 ml blood) will be used for viral titer screening, in accordance with Annex E.

ANNEX D

Viral and Mycoplasma Serology Procedures

1. Serum sample tubes will be allowed to form a "soft clot" (approximately 1 hr.). Tubes will be centrifuged and the supernatant serum decanted into fresh, clean serum tubes.

2. Label tubes with the Animal Quality Control Number only. Transfer tubes to freezer (-20°F).

3. Serum tubes will be processed and submitted for serology (titers) every two weeks. A separate "Animal Health Diagnostic Serology Submission Form" will be completed for each species of animal serum submitted. (Example - Annex D-2.)

4. Sera and request forms will then be transported to testing facility. Test results will be annotated on the Quality Control Record Sheet of the appropriate animals.

ANIMAL HEALTH DIAGNOSTIC SEROLOGY SUBMISSION FORM

Sample type 11 and/or 88

Reviewed by _____

Name TRAHAN | JACKSON,

Quarantine # _____, AHDL# or Range _____

Request Date 19 Mar 85, Invest.# _____, Project# _____, Page _____ of _____

USAMRIID

Building 1425, Room _____, I.D.# _____, Species/Strain Mice, Age _____, Sex _____

Check	Group Requested		HEMAGGLUTINATION INHIBITION											COMPLEMENT FIXATION						ELISA								Plasma only	
Diluted 1:5 YES	and/or		KRV	H-1	SV5	K	Reo3	MVM	GDVII	PVM	Polyoma	Ectro	Sendai	Sendai	LCM	M.Ad	MHV	AC	AC/ABS	MHV	Ectro	Sendai	PVM	Reo3	MVM	GDVII	Mycop		
Inact. NO	circle single tests		20	20	20	10	20	20	20	10	20	20	10	10	10	10	10												
AHDL#	ACC#	Inves ID	1004	1015	1002	1014	1008	1003	1006	1001	1005	1007	1018	1013	1010	1009	1011	1021	1022	1043	1052	1047	1048	1049	1050	1051	1045	1019	COMMENTS
Harlan WAAG ♂ 5WKS	C57BL/10SnN	01/ 086																											
	C57BL/10SnN	02/ 087																											
	C57BL/10SnN	03/ 088																											
	C57BL/10SnN	04/ 089																											
	C57BL/10SnN	05/ 090																											
		06/																											
		07/																											
WR CRUM ♂ 3-4 WKS	ICR	08/ 091																											
	ICR	09/ 092																											
	ICR	10/ 093																											
	ICR	11/ 095																											
		12/																											
		13/																											
WR FRICKE ♂ 3WKS	ICR	14/ 096																											
	ICR	15/ 097																											
	ICR	16/ 098																											
	ICR	17/ 099																											
	ICR	18/ 100																											
		19/																											
		20/																											
JAXX Velkos ♀ 5WKS	CAF1/J	21/ 1080																											
	CAF1/J	22/ 109																											
	CAF1/J	23/ 110																											
	CAF1/J	24/ 111																											
	CAF1/J	25/ 112																											

BLANK SPACE = Negative AC = Anticomplementary serum AE = Serum autoagglutinates RBC's

IS = Insufficient serum NS = Sample not submitted for test TC = Reacts with tissue culture

122-84

A-2

ANIMAL RESOURCES DIVISION
U.S. ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES
FORT DETRICK, FREDERICK, MARYLAND 21701-5011

STANDING OPERATING PROCEDURES 4 December 1985

WEEKEND/HOLIDAY/NONDUTY HOUR ANIMAL CARE

1. PURPOSE

To insure that all animals maintained by USAMRIID receive quality husbandry, veterinary medical care, and emergency service on the weekends and holidays.

2. REFERENCES

a. Guide for the Care and Use of Laboratory Animals, Dept of HHS, PHS, NIH; 1985.

b. Biosafety in Microbiological and Biomedical Laboratories, Dept of HHS, PHS, NIH; 1984.

c. Classification of Etiologic Agents on the Basis of Hazard, Dept of HEW Public Health Service, CDC; 1975.

3. RESPONSIBILITIES

a. Chief, Animal Resources Division is responsible for:

(1) The total animal care program at USAMRIID.

(2) Administrative guidance concerning institute policy impacting upon the USAMRIID Non Duty Hour Animal Care (NDHAC)

(3) Advising the Chief, Department Laboratory Animal Medicine of requirements originating at Division level, or above, of importance to the NDHAC mission.

b. Chief, Department of Laboratory Animal Medicine (LAM) is responsible for:

(1) Implementation of this SOP.

(2) Coordinating authority for those persons involved in the NDHAC mission.

(3) General and technical guidance for those persons actually performing the NDHAC.

(4) Annual review and update of this SOP.

c. Chief, Department of Animal Husbandry, is responsible for:

(1) Developing and administrating a duty roster of animal caretakers who will maintain acceptable standards of husbandry and sanitation throughout weekend and holiday periods.

(2) Developing and revising, as needed, comprehensive guidance for animal caretakers for the NDHAC mission. This will include specific details of duties and responsibilities expected of caretaker personnel during nonduty hour (overtime) periods. (See Annex A)

(3) Monitoring the performance of caretaker personnel during non-duty hours, insuring that overtime is not abused, and that minimum standards are maintained.

d. NCOIC, Animal Resources Division, is responsible for:

(1) Developing and administrating the non-duty hour and holiday duty roster comprised of all Animal Resorces Division Veterinarians and of all other company grade veterinary officers at USAMRIID. This will not include Duty Veterinarians listed on the Pathology Division duty roster.

(2) Developing and administrating the non-duty hour and holiday duty roster of enlisted animal technicians. The Duty Technician will be trained to assist the Duty Veterinarian and to perform those tasks normally done by technicians.

e. NCOIC, Animal Resources Division Large Animal Research Facility (LARF), is responsible for developing and administrating the non-duty hour and holiday duty roster of enlisted animal technicians. The Animal Farm Technician will be trained to assist the Duty Veterinarian and to perform those tasks normally done by technicians.

f. The Chief, Department of Veterinary Pathology, Pathology Division, is responsible for:

(1) Maintaining a duty roster of veterinary pathologists that will be responsive to requests for diagnostic necropsies during non-duty hour periods. This roster will include current phone numbers.

(2) Coordinating with the Chief, Department Laboratory Animal Medicine, Animal Resources Division, on matters of material interest concerning non-duty hour patholgy support.

4. GENERAL

a. Duty Hours

(1) The duty week/holiday week begins at 0800 hrs on Friday morning of each week and runs until 0800 hrs on the following Friday. Those on the duty roster are responsible for colony animal care needed during the non-duty hour periods.

(2) Overtime hours for caretaker personnel are detailed in Annex A.

b. Non-Duty Hour Briefing

(1) Animal Resources Division Duty Veterinarian:

(a) Responsible for contacting the OIC, or NCOIC, of the Rodent and Rabbit Colony, Primate Colony, and Large Animal Research Facility (LARF) prior to 1500 hrs on Fridays. Personnel contacted will be queried about specific requirements for impending duty.

(b) Responsible for coordinating with the Duty Technician and the Animal Farm Technician on work hours and tasks to be accomplished during impending duty. The briefing will be completed prior to the end of the duty day on Fridays.

(c) Responsible for carrying out nonduty animal care program (Annex B).

(2) Chief, Dept. LAM:

(a) Responsible for insuring that the Duty Veterinarian has coordinated with Section OIC's (or NCOIC's), and has been contacted by Duty Technician and Animal Farm Technician before the end of the duty day on Fridays.

(b) Responsible for insuring that the non-preceptee Duty Veterinarian is briefed, prior to the end of the duty day on Friday, on special requirements for weekend duty.

(c) Responsible for insuring that the Duty Technician and Animal Farm Technician assigned to non-preceptee Duty Veterinarians are briefed on work hours and tasks to be accomplished during the upcoming duty period.

(3) Non-preceptee Duty Veterinarian will contact the Chief, Dept. LAM, prior to 1630 hrs on Friday of the impending duty period. Special instructions and treatment regimens requiring veterinary supervision will be discussed.

WILLIAM C. COLE
LTC(P), VC
Ch, Animal Resources Div.

ANNEX A

Animal Care and Husbandry
Weekend Animal Care

1. Weekend care is provided by rotating four animal caretakers on an overtime basis.

   a. The animal caretakers will be assigned only to suites they are capable of and immunized to enter.

   b. The work hours are from 0600-1200 hrs and will be strictly adhered to.

2. The responsibilities of the weekend animal caretakers are:

   a. Observe all animals and report any deviations to the Duty Technician or Duty Veterinarian.

   b. Nonhuman Primates will be fed as soon as possible after arrival for duty in the morning and just before leaving the shift.

   c. Rabbits and rodents will be fed and watered in accordance with established schedules.

   d. Check automatic watering devices for proper functioning.

   e. Report any malfunction of air supply and temperature to Building Engineers, Ext. 7373.

   f. Check for dead and remove, if instructions are such to remove the animals.

      (1) Dead animals should be labeled, placed in proper container.

      (2) Place labeled container in proper refrigerator.

   g. Wash down all primate cages.

   h. If rodent and rabbit pans are excessively wet, they should be changed.

3. If problems arise that cannot be handled by available personnel, the Chief, Dept Animal Husbandry, or the Chief, LAM, will be contacted and briefed on the matter.

ANNEX B

Non-Duty Hour Animal Care Veterinarian

1. The Duty Veterinarian has primary responsibility for ensuring that animal care is maintained at an acceptable level during non-duty hour periods. As the ranking member of the team, he must remain cognizant of his duty to oversee the total animal care package provided the Institute. It is imperative that the importance of the NDHAC mission not be overlooked by any member of the team, especially the Duty Veterinarian.

2. Responsibilities (all statements refer to weekend/holiday or non-duty hour periods)

   a. Ensure that all caretaker personnel are present for duty at appropriate time (Annex A).

   b. Ensure that the Duty Technician is present for duty at the agreed upon time.

   c. Ensure that the Animal Farm Technician is present for duty at the agreed time.

   d. Rounds

      (1) The Duty Veterinarian is responsible for completion of rounds of all accessible animal rooms within Bldg 1412 and Bldg 1425 on each day of his duty. Watering systems will be checked to insure proper operation. Rounds should occur after the initial feeding period for Nonhuman Primates. Problems noted during rounds should be corrected as needed.

      (2) Scheduled treatments should be performed as requested by the appropriate clinician. Records should be accurately annotated after each treatment.

      (3) General conditions of the facilities should be noted during rounds and significant problem areas reported to the appropriate personnel.

      (4) If Project animals are found ill during rounds, investigators should be notified prior to treatment (short of emergency life saving measures). Treatment may introduce variables unacceptable to a protocol.

      (5) NOTE: All rounds in Bldg 1412, Bldg 1425, and the LARF WILL BE COMPLETED BY 0930 hrs. The Duty Veterinarian will be advised of the status of the animals and facilities checked by the Duty Technician and the Animal Farm Technician. Contact with the Duty Veterinarian will be made prior to departure from the facilities.

e. Pathologist Notification

(1) Dead or moribund animals will be necropsied by a pathologist. A current duty roster of veterinary pathologists is kept at the Engineers desk and in the AR Division Office. The Duty Veterinarian is responsible for contacting the pathologist.

(2) A complete necropsy request form (USAMRIID Form 607), with pertinent history, will be completed prior to the arrival of the duty pathologist. It is the responsibility of the Duty Veterinarian to ensure that pertinent information is provided on the form.

f. Caretaker Personnel

The Duty Veterinarian should make contact with one of the caretakers during the work period to inquire about any general conditions or problem areas. If the caretakers are unavailable, the Duty Veterinarian will periodically check with the Engineers desk for messages from the animal caretaker staff.

g. USAMRIID Large Animal Research Farm

(1) All personnel working directly with Rift Valley Fever Virus (RVFV) or RVFV-Infected Animals will sign the certification statement at Annex C. This prohibits them from having contact with cattle, sheep, and goats for a period of seven (7) days after last directly working with the RVFV or the RVFV-infected animals.

(2) The Animal Farm Technician will contact the Duty Veterinarian during the duty period. This should be arranged at the Friday briefing. The Animal Farm Technician will report on the conditions at the barn and advise the veterinarian of any problems encountered. Animal Farm Technician will be responsible for:

(a) Ensuring animals receive adequate care on nonduty day(s) assigned.

(b) Making personal contact with Duty Veterinarian before leaving for the day (prior to 0930 hrs).

(c) Daily surveillance of herd for problems during the tour of duty.

(d) Signing in and out at the Engineer Desk in Bldg 1425 for tour of duty.

h. Any safety or engineering deficiencies noted during NDHAC should be reported ASAP to the surveillance technician at the Engineers desk.

1. Duty Technician

The Duty Veterinarian will coordinate with, and direct the work of, the Duty Technician. Normally the veterinarian and the technician will perform treatments together. The veterinarian will make nonhuman primate colony rounds and the technician will perform the required duties in the Primate, Rabbit, Rodent and Strain 13 Guinea Pig breeding colony IAW the SOP dealing with that operation. Cooperation and coordination are essential in this endeavor.

ANNEX C

TO: Safety Officer, USAMRIID

ANIMAL EXPOSURE CERTIFICATION FOR PERSONS WORKING DIRECTLY WITH RIFT VALLEY FEVER VIRUS (RVFV)

I certify that I will avoid contact with domestic cattle, sheep and goats for a period of seven days after last working directly with RVFV or RVFV - infected animals.

_____
Signature

_____
Name (Print)

_____
Date

ITEM 23

PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL

HEALTH PHYSICS
WALTER REED ARMY MEDICAL CENTER
Washington, D.C. 20307-5001

HSHL-HP
SOP Number 1-3*

30 April 1987

BIOASSAY PROGRAM

1. PURPOSE. To establish requirements and procedures for internal personnel exposure monitoring except for radioactive iodine, tritium and phosphorus-32. Bioassay requirements for using any one of these three radionuclides are contained in Condition No. 7 for Radioactive Material Authorizations.

2. REFERENCES. Models, equations, assumptions and requirements for internal dosimetry are derived from concepts found in International Commission on Radiological Protection Publications 2, 6, 9, 10, 10a and 12; NCRP Report 57 and MIRD.

3. REQUIREMENTS.

a. The objectives of the program are to:

(1) Identify the conditions under which bioassay should be performed.

(2) Indicate whether entry of radionuclides into the body has occurred.

(3) Determine the extent of an individual's exposure to concentrations of radioactive material.

b. Monitoring for internal deposition of radionuclides will be normally performed only under the following circumstances:

(1) When laboratory surveys indicate frequent or gross contamination.

(2) When air sampling indicates levels of airborne concentration that might lead to internal deposition exceeding 10% of maximum permissible body (organ) burdens.

(3) When operations are performed utilizing large quantities of particulate, gaseous or volatile materials in unsealed form.

(4) When internal deposition of radioactive material is known or suspected.

4. METHODS.

a. One or more of the following methods will be used, as appropriate, for internal exposure monitoring:

(1) Estimation of body burden by analysis of radioactivity in excreta and relation of excretion rate to body burden through biological models.

* This SOP supersedes HP SOP 1-3, dated 22 July 1983

(2) Estimation of body burden by whole body counting and pulse height analysis.

(3) Estimation of body burden from survey data which permit estimates of intake of radioactive material followed by estimates of body (organ) burden based on biological models.

(4) Chromosomal Analysis.

b. The frequency of measurements depends on the effective half-life of the material in question, variations of excretion rate with time and the recent experience of individuals with respect to internal contamination levels.

c. Body burden values will be assigned and entered on DA Form 4700 and appropriate annotations made on the individual's DD Form 1141.

5. INVESTIGATIONS AND REPORTS.

a. All exposures resulting in a body burden larger than $^1/_{10}$ of the annual limit will be investigated by the Health Physics Officer and will be submitted to the WRAMC Radiation Control Committee.

b. Such reports will include pertinent information regarding the exposure such as:

(1) Analysis

(2) Time and nature of exposure

(3) Chemical form of isotope

(4) Body burden calculations

(5) Action taken or recommendations

Gerald M. Connock
GERALD M. CONNOCK
MAJ, MS
Health Physics Officer