NRC FORM 313M (9-81) 10 CFR 35	U.S. NUCLEAR REGULATORY COMMISSION APPLICATION FOR MATERIALS LICENSE – MEDICAL	Approved by OMB 3150-0041

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

Department of the Air Force
USAF Medical Center Keesler
Keesler Air Force Base, Mississippi 39534

TELEPHONE NO.: AREA CODE (601) 377-6291

1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED *(If different from 1.a.)* INCLUDE ZIP CODE

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Terry L. Boston, Ph.D.
Medical Radiation Physicist

TELEPHONE NO.: AREA CODE (601) 377 6291

3. THIS IS AN APPLICATION FOR: *(Check appropriate item)*

a. ☐ NEW LICENSE
b. ☐ AMENDMENT TO LICENSE NO.
c. ☒ RENEWAL OF LICENSE NO. 23-01002-02

4. INDIVIDUAL USERS *(Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)*

Andre B. Whiteley, M.D.
John L. Campbell, II, M.D.
Others approved by Radiation Safety Committee

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.)*

Terry L. Boston, Ph.D.
Medical Radiation Physicist

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
10 CFR 31.11 FOR IN VITRO STUDIES	X	100
10 CFR 35.100, SCHEDULE A, GROUP I	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP II	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP III	X	2000 for each isotope listed
10 CFR 35.100, SCHEDULE A, GROUP IV	X	AS NEEDED
) CFR 35.100, SCHEDULE A, GROUP V	X	AS NEEDED
) CFR 35.100, SCHEDULE A, GROUP VI	X	1500

ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM	X	150
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES	X	50
PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.	X	50
GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.	X	200
IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA	X	500
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.	X	400

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
137-Cs	Sealed, solid	100	Calibration of instruments
63-Ni	Sealed, foil	16	Internal calibration source
51-Cr	Any	15	In vitro animal research studies
141-Ce	Any	15	" "
3-H	Any	50	" "
14-C	Any	50	" "
125-I	Any	12	" "
131-I	Any	12	" "
32-P	Any	10	" "
59-Fe	Any	10	" "
99mTc	Any	100	" "
90-Sr	Sealed, solid	900	Calibration of instruments

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. 1 Date: Oct 1980

7. MEDICAL ISOTOPES COMMITTEE	
X	Names and Specialties Attached; and
X	Duties as in Appendix B; or *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
	Supplements A & B Attached for Each Individual User; and
	Supplement A Attached for RSO.
9. INSTRUMENTATION *(Check One)*	
	Appendix C Form Attached; or
X	List by Name and Model Number
10. CALIBRATION OF INSTRUMENTS	
X	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*
	Equivalent Procedures Attached; and
X	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*
X	Equivalent Procedures Attached Calicheck Kit
11. FACILITIES AND EQUIPMENT	
	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
	Appendix F Procedures Followed; or
X	Equivalent Procedures Attached

15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL *(Check One)*	
X	Appendix G Rules Followed; or
	Equivalent Rules Attached
16. EMERGENCY PROCEDURES *(Check One)*	
X	Appendix H Procedures Followed; or
	Equivalent Procedures Attached
17. AREA SURVEY PROCEDURES *(Check One)*	
	Appendix I Procedures Followed; or
X	Equivalent Procedures Attached
18. WASTE DISPOSAL *(Check One)*	
X	Appendix J Form Attached; or
	Equivalent Information Attached
19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
	Appendix K Procedures Followed; or
X	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
X	Detailed Information Attached; and
	Appendix L Procedures Followed; or *(Check One)*
X	Equivalent Procedures Attached
21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
	Detailed Information Attached
22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
	Detailed Information Attached
23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
	Detailed Information Attached

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY		FILM		
	X	TLD	USAF OEHL/RZD, Brooks AFB, TX 78235	Monthly
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	USAF OEHL/RZD, Brooks AFB, TX 78235	Monthly
		OTHER (Specify)		
c. WRIST		FILM		
		TLD		
		OTHER (Specify)		

d. OTHER (Specify)

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

(2) LICENSE FEE ENCLOSED $

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

(1) NAME *(Type or Print)*

(2) TITLE

c. DATE

FORM NRC-313M (8-78)

Item 7. Radiation Safety Committee

The responsibilities, duties and meeting frequency will be as described in Appendix B to Reg. Guide 10.8 Rev 1 dated Oct 1980.

The membership of this committee is listed below:

1.	Lt Col Andre B. Whiteley, M.D. Certified by the American Board of Radiology in Therapeutic Radiology	Radiation Therapy
2.	Maj William W. Orrison, M.D. Certified by the American Board of Radiology in Radiology	Radiology
3.	Lt Col Michael E. Shahan, M.D.	Nuclear Medicine
4.	Maj Terry L. Boston, Ph.D.	Medical Physics
5.	Maj William R. Hardy, B.S.	Hospital Associate Administrator
6.	Capt David Potts, B.S.	Bioenvironmental Engineering
7.	Capt Robert Mathis, B.S.	Chief of Chemistry
8.	Maj William Ottinger, M.S.	Clinical Research Laboratory
9.	Lt Thomas E. Peterson, B.S.	Medical Equipment Repair
10.	Maj R. Manning Stroup, Jr., B.S.	Nursing Service

APPENDIX B

RADIATION SAFETY COMMITTEE

Responsibility:

The Committee is responsible for:

1. Ensuring that all individuals who work with or in the vicinity of radioactive material have sufficient training and experience to enable them to perform their duties safely and in accordance with NRC regulations and the conditions of the license.

2. Ensuring that all use of radioactive material is conducted in a safe manner and in accordance with NRC regulations and the conditions of the license.

Duties:

The Committee shall:

1. Be familiar with all pertinent NRC regulations, the terms of the license, and information submitted in support of the request for the license and its amendments.

2. Review the training and experience of any individual who uses radioactive material (including physicians, technologists, physicists, and pharmacists) and determine that the qualifications are sufficient

to enable them to perform their duties safely and in accordance with NRC regulations and the conditions of the license.

3. Establish a program to ensure that all individuals whose duties may require them to work in the vicinity of radioactive material (e.g., nursing, security and housekeeping personnel) are properly instructed as required by Section 19.12, of 10 CFR Part 19.

4. Review and approve all requests for use of radioactive material within the institution.

5. Prescribe special conditions that will be required during a proposed use of radioactive material such as requirements for bioassays, physical examinations of users and special monitoring procedures.

6. Review the entire radiation safety program at least annually to determine that all activities are being conducted safely and in accordance with NRC regulations and the conditions of the license. The review shall include an examination of all records, reports from the radiation safety officer, results of NRC inspection, written safety procedures and management control system.

7. Recommend remedial action to correct any deficiencies identified in the radiation safety program.

8. Maintain written records of all committee meetings, actions, recommendations, and decisions.

9. Ensure that the byproduct material license is amended, when necessary, prior to any changes in facilities, equipment, policies, procedures, and personnel.

Meeting Frequency:

The radiation safety committee shall meet as often as necessary to conduct its business, but not less than once in each calendar quarter.

8. Training and Experience - Authorized Users

FORM NRC-313M SUPPLEMENT A
(8-78)

U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
ANDRE B. WHITELEY	TX, OK, CO

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Board of Radiology	Therapeutic Radiology	June 1982

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING	
		LECTURE/ LABORATORY COURSES (Hours) C	SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Univ of Texas Health Science Center San Antonio, TX	175	30
b. RADIATION PROTECTION	Aug 1979 thru Jul 1982	50	10
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY		35	30
d. RADIATION BIOLOGY		75	0
e. RADIOPHARMACEUTICAL CHEMISTRY		0	0

5. EXPERIENCE WITH RADIATION. *(Actual use of Radioisotopes or Equivalent Experience)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Cesium 137 IR 192 Co 60 Gold 198 Radium 222 St 90	48 hrs 80 hrs 2 min 72 hrs 96 hrs 30 sec	Univ of Texas Health Scient Center, San Antonio, TX	Aug 1979 thru Jul 1982	Human therapy

18012

FORM NRC-313M-SUPPLEMENT B
(8-78)

U. S. NUCLEAR REGULATORY COMMISSION

PRECEPTOR STATEMENT

Supplement B must be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each.

1. APPLICANT PHYSICIAN'S NAME AND ADDRESS

FULL NAME
ANDRE B. WHITELEY

STREET ADDRESS
5515 King Richard

CITY | STATE | ZIP CODE
San Antonio | TX | 78229

KEY TO COLUMN C

PERSONAL PARTICIPATION SHOULD CONSIST OF:

1-Supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation for prescribed dosage.

2-Collaboration in dose calibration and actual administration of dose to the patient including calculation of the radiation dose, related measurements and plotting of data.

3-Adequate period of training to enable physician to manage radioactive patients and follow patients through diagnosis and/or course of treatment.

2. CLINICAL TRAINING AND EXPERIENCE OF ABOVE NAMED PHYSICIAN

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS (Additional information or comments may be submitted in duplicate on separate sheets.) D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION		
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING		
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING		
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		
OTHER			
Tc-99m	BRAIN IMAGING		
	CARDIAC IMAGING		
	THYROID IMAGING		
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING		
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING		
	LUNG IMAGING		
	BONE IMAGING		
OTHER			

PRECEPTOR STATEMENT *(Continued)*

2. CLINICAL TRAINING AND EXPERIENCE OF ABOVE NAMED PHYSICIAN *(Continued)*

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA		
	TREATMENT OF HYPERTHYROIDISM		
Au-198	INTRACAVITARY TREATMENT	3	
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT	33	
I-125 or Ir-192	INTERSTITIAL TREATMENT	6	
Co-60 or Cs-137	TELETHERAPY TREATMENT	210	
Sr-90	TREATMENT OF EYE DISEASE	3	
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR		
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS		
Other			

3. DATES AND TOTAL NUMBER OF HOURS RECEIVED IN CLINICAL RADIOISOTOPE TRAINING

5440 hours, Jul 1979 thru Aug 1982.

4. THE TRAINING AND EXPERIENCE INDICATED ABOVE WAS OBTAINED UNDER THE SUPERVISION OF:

a. NAME OF SUPERVISOR
T.C. Pomeroy, M.D.

b. NAME OF INSTITUTION
Univ of Texas Health Science Center

c. MAILING ADDRESS
4450 Medical Drive

d. CITY
San Antonio, TX

5. MATERIALS LICENSE NUMBER(S)
9-1279 (TX)

6. PRECEPTOR'S SIGNATURE
T.C. Pomeroy MD

7. PRECEPTOR'S NAME *Please type or print*
T.C. POMEROY, M.D.

8. DATE
15 May 84

FORM NRC-313M-SUPPLEMENT B
(8-78)

The American Board of Radiology

Organized through the cooperation of the
American College of Radiology, the American Roentgen Ray Society,
the American Radium Society, the Radiological Society of North America,
the Section on Radiology of the American Medical Association
and the American Society of Therapeutic Radiologists
Hereby certifies that

Andre Burr Whiteley, M.D.

Has pursued an accepted course of graduate study
and clinical work, has met certain standards and qualifications and
has passed the examinations conducted under the authority of
The American Board of Radiology
On this fourth day of June, 1982
Thereby demonstrating to the satisfaction of the Board
that he is qualified to practice the specialty of

Therapeutic Radiology

THE AMERICAN BOARD OF RADIOLOGY
INCORPORATED IN THE DISTRICT OF COLUMBIA
1934

AMERICAN BOARD OF MEDICAL SPECIALTIES

Harold B. Jacobson, M.D.
President

Secretary

CURRICULUM VITAE

1. IDENTIFICATION:

   a. Date Prepared: 21 September 1982
   b. Name: Andre B. Whiteley
   c. Rank: Lt Colonel
   d. Specialty: Radiation Therapy
   e. AFSC: R9596
   f. Social Security Number: 446-40-1845

2. CURRENT ASSIGNMENT: Wilford Hall USAF Medical Center
   Radiation Oncology Service (SGHQRT)
   Lackland AFB, TX 78236

3. EDUCATION & TRAINING:

   a. Undergraduate
      (1) School: Oklahoma State University
      (2) Major: Chemistry
      (3) Degree: BA
      (4) Date: August 1964

   b. Graduate (non-professional)
      (1) School: Oklahoma State University
      (2) Major: Chemistry
      (3) Degree: MS
      (4) Date: August 1971

   c. Professional Education
      (1) School: University of Colorado School of Medicine
      (2) Degree: MD
      (3) Date: May 1978

   d. Post-graduate Education
      (1) Hospital: Wilford Hall USAF Medical Center
      (2) Specialty: Internal Medicine
      (3) Dates: 1978-1979

      (1) Hospital: University of Texas Health Science
          Center at San Antonio
      (2) Specialty: Radiation Oncology
      (3) Dates: 1979-1982

4. BOARD CERTIFICATIONS/LICENSURES

   a. Specialty Board Certification
      (1) Specialty: Therapeutic Radiology
      (2) Certification Number:
      (3) Date: 6 June 1982

b. Professional Licensures
(1) State: Texas
(2) License Number: F5800
(3) Date: March 1979

5. IMPORTANT MILITARY ASSIGNMENTS:

a. USAF Academy
USAF Academy, Colorado
1971 - 1974

b. HQ 3rd AF
South Ruislip, England
1968 - 1969

*6. ACADEMIC APPOINTMENTS:

Assistant Professor (Chemistry)
USAF Academy, Colorado

7. MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

PHI KAPPA PHI
PHI LAMBDA UPSILON

* Clinical Assistant Professor
UTSA

CURRICULUM VITAE

NAME: John LeRoy Campbell, II

DATE AND PLACE OF BIRTH: 11 January 1933, New Castle, Pa.

MARITAL STATUS: Married, two children

EDUCATION:

University of Pittsburgh The College 1950-54 B.S.
" " Graduate School 1954-5
" " School of Medicine 1955-59 M.D.

POST GRADUATE EDUCATION:

Rotating Internship; Allegheny Valley Hospital Tarentum, Pa. 1959-1960

General Radiology Resident
Cincinnati General Hospital, University of Cincinnati 1965-1968

Fellow in Radiation Therapy
M.D. Anderson Hospital and Tumor Institute
University of Texas, Houston, Texas 1968-1969

[redacted]CENSURE:

1. Commonwealth of Pennsylvania 1960
2. State of Ohio 1965

BOARD CERTIFICATION:

1. American Board of Radiology in Radiology 1969
2. American Board of Nuclear Medicine 1973

ACADEMIC APPOINTMENT:

Graduate Teaching Assistant
Department of Zoology
University of Pittsburg The College 1954-55

MEMBERSHIP:

1. American College of Radiology
2. Society of Nuclear Medicine
3. American College of Nuclear Physicians

JOHN L. CAMPBELL, II

MILITARY EXPERIENCE:

1. Entered active duty 4 September 1960
2. USAF Medical Field Service School, Gunter AFB, AL.
   a. Instructor Medicine and Surgery - 1960-1963
   b. Instructor Aerospace Medicine - 1963-1965
3. Appointed to Regular Air Force - 1962
4. USAF Sponsored Civilian Residency - 1965-1969
5. Malcolm Grow USAF Hospital, Chief, Radiation Therapy, 1969 to 1975; Chief, Nuclear Medicine, 1970 to Aug 1975.
6. USAF Medical Center Keesler AFB, MS, Aug 1975 to present, Chief, Nuclear Medicine Department

MILITARY EDUCATION:

1. Basic Orientation Course for Medical Officers, Gunter AFB, AL - 1960
2. Primary Course Aerospace Medicine, Brooks AFB, TX - 1963
3. Medical Aspects of Advanced Warfare, Gunter AFB, AL - 1963
4. Medical Aspects of Missile Operations, Brooks AFB, TX - 1964

CLINICAL INVESTIGATION:

1. Management of NOdes in Cervical Region from an Unknown Primary, M. D. Anderson Hospital - 1968-1969
2. Bone Imaging Using 99mTc Polyphosphate, Malcolm Grow USAF Medical Center, Andrews AFB, Washington DC - 1973

PUBLICATIONS:

1. "Cobalt-60 Teletherapy Simulation Device for Simple Treatment Fields," accepted for publication, Phys. Med. Biol., 1974
2. "A Simple Beam Defining and Localization System for Cobalt-60 Teletherapy," U. S. Air Force Medical Service Digest, April 1974
3. "Accumulation of Tc99m-Diphosphonate in Malignant Pleural Effusions: Detection and Verification" with M. E. Siegel and W. J. Walker, submitted for publication, Journal of Nuclear Medicine, 1975

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE—MEDICAL

SUPPLEMENT A—PRECEPTOR STATEMENT

...is to be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document ...ce, obtain a separate statement from each. Back of page may be used for comments.

...E AND ADDRESS OF APPLICANT PHYSICIAN (Include ZIP Code)

Lt. Col. John L. Campbell, II, USAF MC
Malcolm Grow USAF Medical Center
Andrews AFB, Washington, D.C. 20331

10. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 9 ABOVE

(A) ISOTOPE	(B) CONDITIONS DIAGNOSED OR TREATED	(C) No. Cases Observed (See 1 in key below)	(D) No. Cases Involving Personal Participation (See 2 in key below)
I-131	Diagnosis of thyroid function	240	240
	Dilution studies		
	Excretion studies		
	Brain tumor localization		
	Scanning studies	1	1
	Treatment of hyperthyroidism	325	325
	Treatment of cardiac conditions	6	6
	Treatment of thyroid carcinoma	1	1
P-32 Soluble	Treatment of polycythemia	6	6
	Treatment of leukemia		
	Treatment of bone metastases		
	Tumor localization	3	3
	Intracavitary treatment		
	Interstitial treatment		
[illegible]	Intracavitary treatment		
	Interstitial treatment	7	7
	Scanning studies		
Cr-51	Blood determinations	40	40
	Scanning studies	10	10
Co-58 or Co-60	Diagnosis of pernicious anemia	1	1
Co-60	Interstitial treatment		
I-192	Intracavitary treatment		
Co-60 or Cs-137	Teletherapy treatment		
Sr-90	Treatment of superficial diseases of the eye		
Other isotopes see back of page			

Key to Column (C) and (D) above

1. Observation should consist of observing radioisotope administration techniques and discussion with preceptor the case histories to establish most appropriate diagnostic and/or therapeutic procedure, limitation, contraindications, etc.

2. Personal participation should consist of (a) supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation on dosage to be prescribed; (b) collaboration in calibration of the dose and the actual administration of the dose to the patient, including calculation of the radiation dose, related measurements, and plotting of data; and (c) adequate period of training to enable the physician to manage radioactive patients and to follow patients through diagnosis and/or the course of treatment.

DATES AND TOTAL NUMBER OF HOURS OF CLINICAL RADIOISOTOPE TRAINING 2 Jan 67 through 31 Mar 67 480 hours

THE TRAINING AND EXPERIENCE INDICATED ABOVE WAS OBTAINED UNDER THE SUPERVISION OF Eugene L. Saenger, MD

AT University of Cincinnati College of Medicine
Cincinnati General Hospital
Cincinnati, Ohio 45229
(Institution) Name and Address

34-6903-05
(Byproduct Material License Number)

Eugene L. Saenger
(Signature of Preceptor)

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE, MEDICAL

SUPPLEMENT A — PRECEPTOR STATEMENT

This is to be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each. Page 2 may be used for comments and additional information.

NAME AND ADDRESS OF APPLICANT PHYSICIAN (Include ZIP Code)

John L. Campbell II 186261376
Col USAF MC
Malcolm Grow USAF Medical Center., Andrews AFB, Maryland 20331

11. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 10 ABOVE

(A) ISOTOPE	(B) CONDITIONS DIAGNOSED OR TREATED	(C) No. Cases Observed (See 1 in key below)	(D) No. Cases Involving Personal Participation (See 2 in key below)
I-131 or I-125	Diagnosis of thyroid function		2218
	Determination of blood and blood plasma volume		105
	Liver function studies		30
	Fat absorption studies		0
	Kidney function studies		214
	In vitro studies		1034
Cr-51	Gastrointestinal protein loss studies		2
	Determination of red blood cell volume and studies of red blood cell survival		14
Fe-59	Iron turn over studies		2
Co-58or Co-60	Intestinal absorption studies		204
K-42	Potassium space determinations		0
I-131	Thyroid imaging		1779
	Brain tumor localization and cardiac imaging		0
	Cisternography		0
	Lung imaging		132
	Liver imaging		48
	Kidney imaging		41
	Placenta localization		7
Cr-51	Placenta localization		0
	Spleen imaging		2
Au-198	Liver imaging		83
Hg-197	Brain imaging		0
	Kidney imaging		130
Hg-203	Brain imaging		0
Sr-85	Bone imaging		66
Tc-99m	Brain imaging		2079
	Thyroid imaging		20
	Salivary gland imaging		4
	Blood pool imaging		45

J. L. CAMPBELL II

APPLICATION FOR BYPRODUCT MATERIAL LICENSE—MEDICAL

SUPPLEMENT A—HUMAN USE

(A)	(B) CONDITIONS DIAGNOSED OR TREATED	(C) No. Cases Observed (See 1 in key below)	(D) No. Cases Involving Personal Participation (See 2 in key below)
99m	Placenta localization		3
	Liver and spleen imaging		1848
	Lung imaging		392
	Bone imaging		342
Xe-133	Blood flow studies and pulmonary function studies		14
Se-75	Pancreas imaging		4
P-32	Treatment of polycythemia, leukemia, and Bone metastases		1
	Intracavitary treatment		2
I-131	Treatment of thyroid carcinoma		8
	Treatment of hyperthyroidism and cardiac condition		48
Au-198	Intracavitary treatment		
Co-60 or Cs-137	Interstitial treatment		0
	Intracavitary treatment		0
Ir-192	Interstitial treatment		0
Co-60 CO-137	Teletherapy treatment		179
Sr-90	Treatment of eye disease		2

Key to Column (C) and (D) above

1. Observation should consist of observing radioisotope administration techniques and discussion with preceptor the case histories to establish most appropriate diagnostic and/or therapeutic procedure, limitation, contraindications, etc.

2. Personal participation should consist of (a) supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation on dosage to be prescribed; (b) collaboration in calibration of the dose and the actual administration of the dose to the patient, including calculation of the radiation dose, related measurements, and plotting of data; and (c) adequate period of training to enable the physician to manage radioactive patients and to follow patients through diagnosis and/or the course of treatment.

12. DATES AND TOTAL NUMBER OF HOURS OF CLINICAL RADIOISOTOPE TRAINING

13. THE TRAINING AND EXPERIENCE INDICATED ABOVE WAS OBTAINED UNDER THE SUPERVISION OF MAY 75

The foregoing is a summary of the clinical experience from 1969 to present of Col. John L. Campbell II., 186 26 1376. He was appointed Chief Nuclear Medicine Service in Feb 1970 and Chief Radiation Therapy Service Sep 1969 at the Malcolm Grow USAF Medical Center, Andrews AFB, Maryland 20331.

Terence F McGuire

AT Malcolm Gfow USAF Med Ctr
Andrews AFB, Md 20331
(Institution) Name and Address

08-08401-01 & 02
(Byproduct Material License Number)

Terence F McGuire Col USAF M
Director of Hospital Services
(Signature of Preceptor)

CURRICULUM VITAE

DATE PREPARED: 17 July 1984

RANK/NAME: Boston, Terry L., Major, USAF, BSC

SPECIALTY: Medical Physics

CURRENT POSITION:
Medical Physicist
USAF Medical Center Keesler
Keesler AFB, MS 39534

Telephone: (601) 377-6291

PERSONAL:

Date of Birth:	18 January 1950
Place of Birth:	Bradenton, Florida
Spouse:	Mary Owen
Children:	Daniel Wesley
Residence:	108 Laurie Court Ocean Springs, MS 39564
Telephone:	(601) 875-2061

EDUCATION:

B.S. Physics, University of Florida
Gainesville, Florida, 1972

M.S. Radiological Health, University of Florida
Gainesville, Florida, 1973

Ph.D. Medical Radiation Physics, University of Florida
Gainesville, Florida, 1978

ADDITIONAL TRAINING:

External Beam, Interstitial and Intracavitary Dosimetry--
Manual and Computer Methods of Calculation
University of Texas System Cancer Center,
M.D. Anderson Hospital and Tumor Institute
Houston, Texas, 1979

Hospital Preparation for the Management of Radiation
Accidents, The E.L. Saenger Radioisotope Laboratory
University of Cincinnati Medical Center
Cincinnati, Ohio, 1980

Medical Effects of Nuclear Weapons
Armed Forces Radiobiology Research Institute
Bethesda, Maryland, 1980

ADDITIONAL TRAINING (Cont'd)

High Energy Electron, X-Ray and Neutron Dosimetry
University of Texas System Cancer Center
M.D. Anderson Hospital and Tumor Institute
Houston, Texas 1982

MILITARY HISTORY:

Entered active duty, U.S. Air Force, 15 July 1973
Current Grade: Major

Air Force Eastern Test Range, Health Physicist
Patrick AFB, Florida, 1973-1975

Air Force Institute of Technology, 1975-1978

Medical Physicist, Radiotherapy Service
Wilford Hall USAF Medical Center
Lackland AFB, Texas 1978-1984

Medical Physicist, Radiotherapy Service
USAF Medical Center Keesler
Keesler AFB, Mississippi 1984-present

APPOINTMENTS:

Clinical Associate Professor, Department of Radiology
University of Texas Health Science Center at San Antonio
San Antonio, Texas

MEMBERSHIPS:

American Association of Physicists in Medicine
Health Physics Society
Texas Regional Medical Physicists
Southwest Chapter of American Association of Physicists in Medicine

PUBLICATIONS:

Kopp, D.T., and Boston, T.L.: "Radioactivity and Production of Medical Isotopes", Handbook of Medical Physics, Chemical Rubber Company.

THESIS:

Ph.D. - Polystyrene - Rare Earth Phosphor Scintillation Dosimeter

PRESENTATIONS:

Role of the Air Force Eastern Test Range Physicist, Bioenvironmental Engineering Symposium, April 1974.

EXHIBITS:

Schlichtemeier, A.L., Johnston, L., Kopp, D.T., Boston, T.L.: "The Programmable Calculator in Radiation Therapy Treatment Planning", Radiological Society of North America, Annual Meeting, 1979.

TEACHING EXPERIENCE:

1979 - 1984

Lecturer, "Physics of Diagnostic Radiology"
An annual eight month course for radiology residents at Wilford Hall USAF Medical Center, San Antonio, Texas

1980 - 1983

Course organizer and lecturer, "Physics of Diagnostic Radiology". An annual eight month course for radiology residents at Wilford Hall USAF Medical Center, San Antonio, Texas

TEACHING EXPERIENCE:
(Cont'd)

1979 - 1984	Faculty lecturer, "Basic Radiological Health Course". A thrice annual medical continuing education course at University of Texas Health Science Center, San Antonio, Texas
1982 - 1984	Guest lecturer, "Advanced Radiological Health". A semiannual medical continuing education course at the University of Texas Health Science Center, San Antonio, Texas.

NRC FORM 313M SUPPLEMENT A
(9-81)

U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
Terry L. Boston	

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING	
		LECTURE/ LABORATORY COURSES (Hours) C	SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Univ. of Florida, Gainesville Fl. June 72 to June 73 Aug 75 to Aug 78	343	
b. RADIATION PROTECTION	"	192	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	120	
d. RADIATION BIOLOGY	"	5	
e. RADIOPHARMACEUTICAL CHEMISTRY			

5. EXPERIENCE WITH RADIATION. *(Actual use of Radioisotopes or Equivalent Experience)*

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

5. Experience with Radioactive Materials

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use
60-Co Calibration Source	580 mCi	Univ. of Florida	3 mos.	Calibration and Lab Work
Various Lab Isotope I-131, Cs-137, Co-60, Mn-54, Am-241, Sr-90, etc.	1 mCi or less	Univ. of Florida and Wilford Hall Medical Center	7 yrs.	Calibration and Lab Work
Various Industrial Radiographic Sources and Several SNAP Devices		Patrick AFB	2 yrs.	Space program
Ra-226	780 mCi	Wilford Hall Med Ctr.	*	Clinical
Co-60	10,000 Ci	Wilford Hall Med Ctr.	*	Clinical
I-131	150 mCi	Wilford Hall Med Ctr.	*	Clinical
Ir-192	80 mCi	Wilford Hall Med Ctr.	*	Clinical
Tc-99m	700 mCi	Wilford Hall Med Ctr.	*	Clinical
I-125	50 mCi	Wilford Hall Med Ctr.	*	Clinical
Au-198	35 mCi	Wilford Hall Med Ctr.	*	Clinical

* From August 1978 to June 1984

I have been the Radiation Oncology Service Medical Physicist from August 1978 to June 1984 at Wilford Hall Medical Center, Lackland AFB, TX. During that period I performed full Cobalt-60 teletherapy calibration on a semi-annual basis, all the monthly spot checks, and periodic source leak tests. I performed the source replacement radiation safety survey on 29 Jan 83 as required by NRC License 42-02682-02. I have received, stored, assayed, and shipped therapeutic amounts of radionuclides; surveyed and posted rooms containing implant patients; and I have instructed hospital personnel on the safe handling of radioactive materials and patients containing radioactive materials. I prepared the license renewal packages for NRC License 42-02682-02 and NRC License 42-02682-01 in 1982.

Item 9. Instrumentation

Listing attached

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(NUCLEAR MEDICINE DEPARTMENT)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Ionization Chamber, (Open Air) Victoreen 470A	1	β γ	0-1000 R/hr		7 Oct 81
Chamber, pocket, Victoreen Model 541/A	12	γ	0-200 mR	Dosimetry	
Charger-Reader, Victoreen Model 2000A	1			Charge Pocket Chambers	
G-M Lab Monitor, audio alarm, Picker Nuclear, Model 600081	2	β γ	0-30K cpm 0-15 mR/hr	Monitor Lab (constant)	29 Jan 79
Well Scintillation Detector, with Spectroscaler III, Picker Nuclear Model 2804E	1	γ	0-100 cpm	Assay and Measurement	
Uptake System, Single probe, Picker	1	γ		Thyroid uptakes and bioassays	
Magnascanner V, 5 in Detector, with colorprint, Picker Model 2806F	1	γ	0-600K cpm	Rectilinear Scanning	
Localization Monitor Model 145 Jasins & Sayles Associates ID 3541	1	γ	0-3000 cps	Monitor Lab	

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(NUCLEAR MEDICINE DEPARTMENT continued)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Isotope Dose Calibrator, automatic, ionization chamber, digital readout, Picker Model 632-501	1	γ	10 uc to 1000 mc	Dose assay	
Isotope Dose Calibrator, RADX, meletron/melecord	1			Dose assay	
Camera System, Gamma Scintillation, Picker Dynacamera, Model IV	1	γ		Dynamics and Static Imaging	
Camera System, Gamma Scintillation, Picker Dynacamera, Model IIIC	1	γ		Dynamics and Static Imaging	
Well Counter, automatic, Beckman	1	γ	uCi to mCi	Radioisotope Assay	
GM Survey Meter, portable, Victoreen, Model 491 Serial No. 1845, ID 5347	1	β α	0-150K cpm	Survey	19 Jun 80
GM Lab Monitor Model SML-2, Technical Associates Serial No. 110119, ID 5711	1	β α	0-500,000 cpm	Lab monitor	9 Dec [illegible]
Camera System, Gamma Scintillation, Technicare 420/550 Portable	1	γ		Dynamic and Static Imaging	

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(RADIATION THERAPY)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Thin end window G-M (Victoreen 491 with 469-35 probe)	1	α β γ	0-150K cpm 0-50 mR/hr	Survey	25 Mar 81 by Victoreen
Ionization chamber (open air) (Victoreen 470A)	1	β γ	0-1K R/hr	Survey	1 Jul 81 by Victor[redacted]
Pocket Dosimeters, digital, self-reading, and audible (Victoreen 885) G-M type	6	γ	0-999 mR	Personnel monitoring	
Dosimeter Charger (Victoreen model 2000A)	1	N/A	-	Charge pocket ion chambers	
Pocket dosimeters, ion chamber	5	γ	0-200 mR	Personnel monitoring	
Ionization chamber (Victoreen 444)	1	β γ	0-33 R/hr	Survey	
Medical Physics Radiation Electrometer (Keithley Model 35025 with 2505/3, 96035, and 96070 probes)	1	γ		Therapy calibration	4 Jun 81 M.D.A. R[redacted]
Diagnostic X-Ray Monitor (MDH Model 1015 with 10X5-6 and 10X5-180 probes)	1	γ		Diagnostic x-ray evaluation	23 Feb 82
GM Survey Meter Victoreen 490 with 489-110, 425-110 and 490-50 probes	1	β γ		Survey	23 Jul 81
Ionization chamber, Keithly 36100	1	β γ	0-20 R/hr	Survey	

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(RADIATION THERAPY continued)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Automatic Planchet System (Baird-Atomic)	1	α β γ		Leak tests, contamination surveys, research	N/A
Radiation Physics Dosimetry System (Victoreen 500)	1	γ	mR to kR/hr	Therapy calibration	Scheduled March 81
Multichannel Analyser (Tracor Northern TN1710 with NAI well detector)	1	γ		Leak tests, contamination surveys, research	N/A
Nuclear Associates, Inc. Primalert 10 Room Monitor	1	γ		Room Radiation Monitor	N/A

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(RADIATION THERAPY continued)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Set 1					
Victoreen Model 570 Electrometer	1		2.5 - 250R (full scale)	Read/Charge R-Chambers	80 by Victor
R-Chamber Model 651	1	X Y	250R	6-35 KeV eff.	RCL
R-Chamber Model 131	1		100R	30-660 KeV eff.	
R-Chamber Model 154	1		250R	30-660 KeV eff.	
R-Chamber Model 621	1		100R	250-1300 KeV eff.	
R-Chamber Model 130	1		0.25R	42-660 KeV eff.	
R-Chamber Model 633	1		2.5R	30-660 KeV eff.	
R-Chamber Model 188	1		0.025R	30-660 KeV eff.	
Set 2					
Victoreen Model 570 Electrometer	1		2.5-250R (full scale)	Read/Charge R-Chamber	29 Aug 78 M.D.A. RCL
R-Chamber Model 130	1	X Y	0.25R	42-660 KeV eff.	
R-Chamber Model 651	1		250R	6-35 Kev eff.	
R-Chamber Model 154	1		250R	30-660 KeV eff.	
R-Chamber Model 326	1		10R	30-660 KeV eff.	
R-Chamber Model 621	1		100R	250-1300 KeV eff.	
R-Chamber Model 131	1		100R	30-660 KeV eff.	

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(RADIATION THERAPY continued)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Set 3					
Victoreen Model 570 Electrometer	1		2.5 - 250R (full scale)	Read/Charge R-chambers	
R-Chamber Model 130	1	X Y	0.25R	42-660 KeV eff.	
R-Chamber Model 228	1		5.0R	30-660 KeV eff.	
R-Chamber Model 633	1		2.5R	30-660 KeV eff.	
R-Chamber Model 70-5	1		25.0R	30-660 KeV eff.	
R-Chamber Model 131	1		100.0R	30-660 KeV eff.	
R-Chamber Model 326	1		10.0R	30-660 KeV eff.	

9 April 1980

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(CLINICAL RESEARCH LABORATORY)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
G-M Counter, Victoreen 493	1	X γ β	0-50 mR/hr	Monitor and survey	17 Sep 81 by Victoreen Instrument Division
Pocket Chamber, self-reading, Victoreen, 541A	4	X γ	0-200 mR		
Pocket Chamber Charger, Victoreen, Model 2000A	1				
Liquid Scintillation Counter, Beckman LS 3133P	1	β		Radioisotope assay	
Well Counter, automatic, Nuclear-Chicago	1	γ	uCi, mCi	Radioisotope assay	
Twin-Probe Scintillation Detector System, Picker-Nuclear, components as follows:					
Omniprobe, Scintillation Probe, Model 2830	2				
Spectroscaler III, Model 5833A	1		0-100K cpm		
Clinical Analyzer, Model 6000002	2	γ			
Dual Ratemeter, Model 600046	1		0-1M cpm		
Dual Strip Chart Recorder, Model PDR600-091	1				
GM Monitor "Frisken" Victoreen 425	1	α β γ X	0-500,000 cpm		30 Jul 81

ATTACHMENT 8

USAF MEDICAL CENTER KEESLER - Radiation Detection Instrumentation

(ENVIRONMENTAL HEALTH SERVICES)

TYPE OF INSTRUMENT, MAKE & MODEL NO.	NUMBER ON HAND	RADIATION DETECTED	RANGE	APPLICATION (USE)	DATE OF CALIBRATION
Scintillation Detector, Eberline, PAC1S	1	α	0-200,000 cpm	Survey	Jun 81 by PMEL
G-M Survey Meter, Radiacmeter AN/PDR 27K	1	β γ	0-500 mR/hr	Survey	29 Oct 81 by PMEL
Scintillation Detector, Eberline, PAC/S	1		0-200,000 cpm	Survey	15 Jan 82

Item 10. Calibration of Instruments

a. Survey Instruments

CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items

X 1. Survey instruments will be calibrated at least annually and following repair.

X 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 ± 10% of the calculated or known values for each point checked. Readings within ± 20% are considered acceptable if a calibration chart or graph is prepared and attached to the instrument.

____ 3. Survey instruments will be calibrated

X a. By the manufacturer

or

X b. At the licensee's facility

(i) Calibration source
Manufacturer's name New England Nuclear
Model no. NER-401H
Activity in millicuries 104.6
Accuracy ± 4% of calibration dose rate
Traceability to primary standard N.B.S.

X (ii) The calibration procedures in Appendix D, Section I will be used.

or

(iii) The step-by-step procedures, including radiation safety procedures are attached.

____ c. By a consultant or outside firm

(i) Name _____

(ii) Location _____

(iii) Procedures and sources

____ have been approved by NRC and are on file in License No. _____

____ are attached

Item 10.

B. Calibration of Instruments - Dose Calibrator

The methods for calibration of the dose calibrators will be those identified in Appendix D of Reg. Guide 10.8 Rev 1 dated Oct 1980.

As an alternate to our present procedure, the dose calibrator can be checked for activity linearity with the use of a device called Calicheck from Calcorp, Inc. The manufacturer's instructions for use will be followed. Test results will be recorded and retained for inspection. Corrective action as stated in our license application will be followed if unacceptable linearity is demonstrated.

C. Calibration of Instruments - Liquid Scintillation Counter

The liquid scintillation counter will be calibrated using H-3 and/or C-14 standards prepared by the manufacturer and by controls prepared in the laboratory. At approximately 10% counting efficiency, 0.001 and 0.005 uCi controls will produce 200 to 1100 cpm above background for comparison of swipe samples of work areas.

Calcorp, Inc.

P.O. BOX 25589
CLEVELAND, OHIO 44125
(216) 663-1773

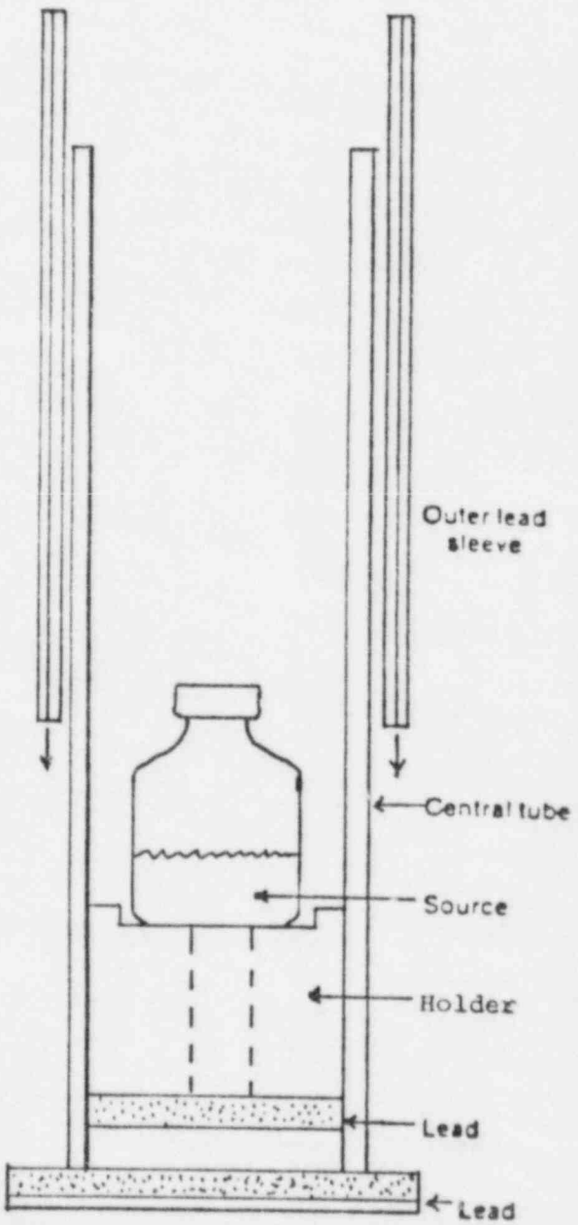
PRODUCT DESCRIPTION

Calicheck is a kit designed to perform the activity linearity test on a dose calibrator quickly and accurately. The kit consists of seven tubes, six of which are lead-lined. The seventh, an unlined tube, is used to center a source of Tc-99m, whether in a syringe or vial, in the dose calibrator chamber. Each lead-lined tube is manufactured with various thicknesses of lead. This allows attenuation of gamma radiation from the radioactive source by different orders of magnitude which simulates various stages of radioactive decay. The tubes are sequentially placed over a Tc-99m source in the dose calibrator and, within minutes, seven successive measurements are acquired. The displayed readings represent measurements that would have been obtained at approximately 0, 6, 12, 20, 30, 40 and 50 hours after the initial assay of Tc-99m.

The displayed readings from the tubes are then multiplied by specific correction factors, which were determined by the operator upon receipt of the kit. With only some simple calculations, the operator can then confirm whether or not the measurements are within the acceptable error for activity linearity allowed by their license.

The kit comes complete with a storage cylinder, instruction manual, work sheets, and a parts order form. Any component of the kit can be ordered separately, if needed.

In some agreement states and all NRC licensed states, the use of the kit requires that your radioactive materials license be amended. An amendment application form is included with the kit for this purpose.



Item 11. Facilities and Equipment

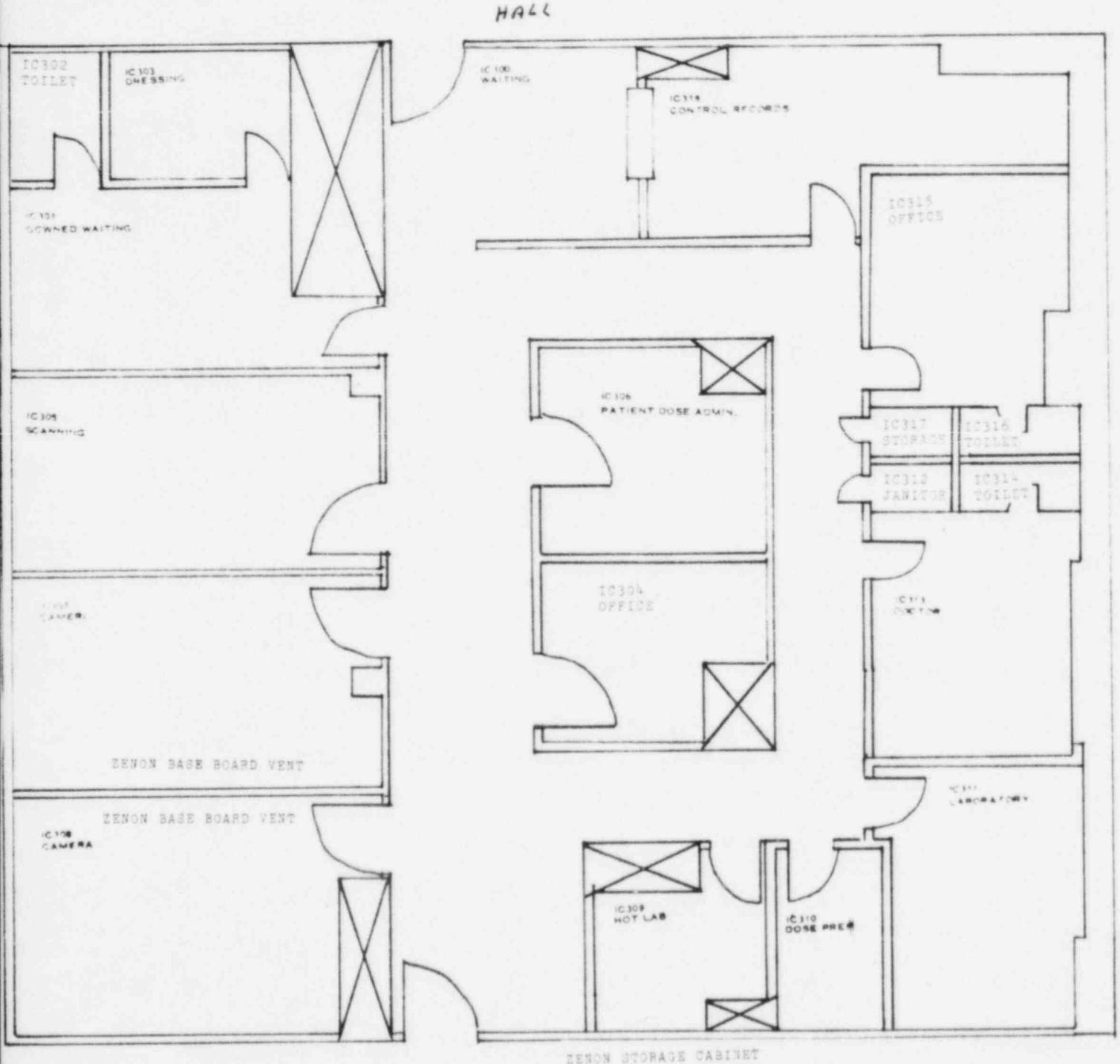
A. Department of Nuclear Medicine

The attached floor plan shows the Department of Nuclear Medicine which is located on the first floor in the north central part of the Medical Center. Adjacent occupied areas are as described on the drawing.

The "hot" room 1C309 contains the shielded hood where Xenon is stored. Also a refrigerator is located there for storage of isotopes requiring refrigeration. Room 1C310 is where the dose preparation takes place. Lead storage drawers are used to place used syringes. The dose calibrator is also located in this room. Rooms 1C307 and 1C308 contain Xenon vents for lung ventilation studies. The department contains two fixed gamma cameras and one portable gamma camera.

Room 1C301 is used for patients who have been administered isotopes and are awaiting scanning. The patient dose administration room is 1C304.

DEPARTMENT OF NUCLEAR MEDICINE



ALL ZENON VENTS PULL 450 CFM'S.

AIR CONDITION SUPPLIED AIR IN BOTH CAMARA ROOMS HAS 300 CFM IN AND 275 CFM OUT.
AIR CONDITION SUPPLIED AIR IN THE HOT LAB HAS 280 CFM IN AND 155 CFM OUT.

Item 11. (cont'd) Facilities and Equipment

B. Department of Radiology - Radiation Therapy Section

The Radiation Therapy Section of the Department of Radiology is located on ground level on the north side of the Keesler Medical Center (Fig. 12). Isotope storage within this department is located in Room MB29. The door to this area is labeled with a "Caution-Radiation Area" sign and a smaller radioactive material symbol placed on a 3" x 5" white index card containing the names and phone numbers of people to contact in case of emergency.

The general arrangement of this room can be noted in Figure 13. Work with mCi quantities of radioactive material is performed primarily in a lead cave (Fig. 14) constructed from standard 2" x 4" x 6" lead bricks. Two 2" thick Radium Chemical L-blocks are also located within this cave with the larger block containing a lead glass viewing shield (Fig. 14).

The ^{90}Sr-^{90}Y beta eye applicator and ^{90}Sr-^{90}Y R-chamber constancy check source are stored in their normal containers on top of the stainless steel counter next to the lead cave (Fig. 14). Small check sources and reference standards are kept in a lead container which originally served as additional shielding for a Squibb ^{99m}Tc generator (Fig. 15). Gold-198 seeds are ordered on an as needed basis. After arrival they are kept in the lead shipping pig and stored in a smaller cave arrangement located between the two radium safes (Fig. 15). Iridium-192 seeds will also be stored in the same location.

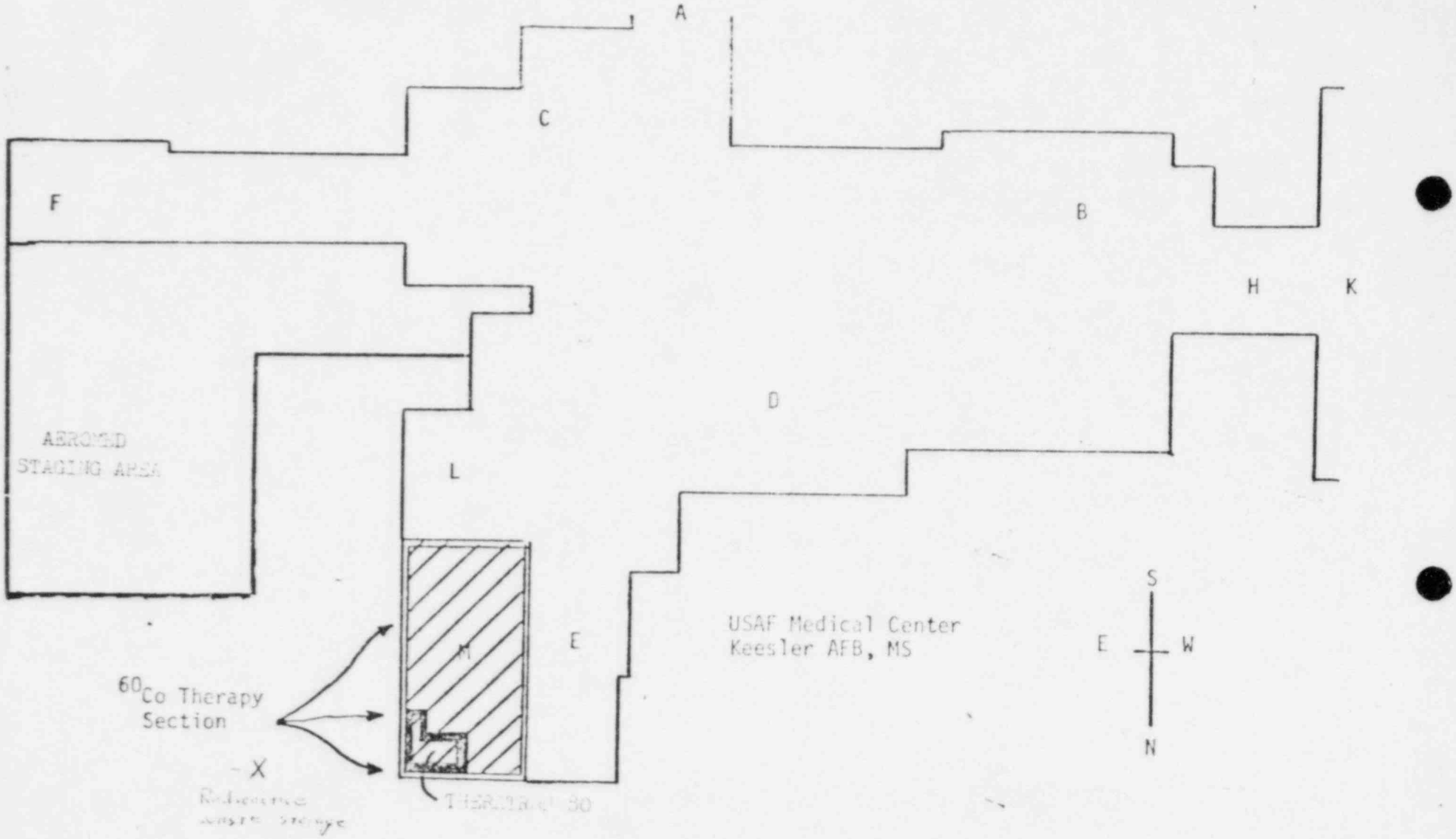
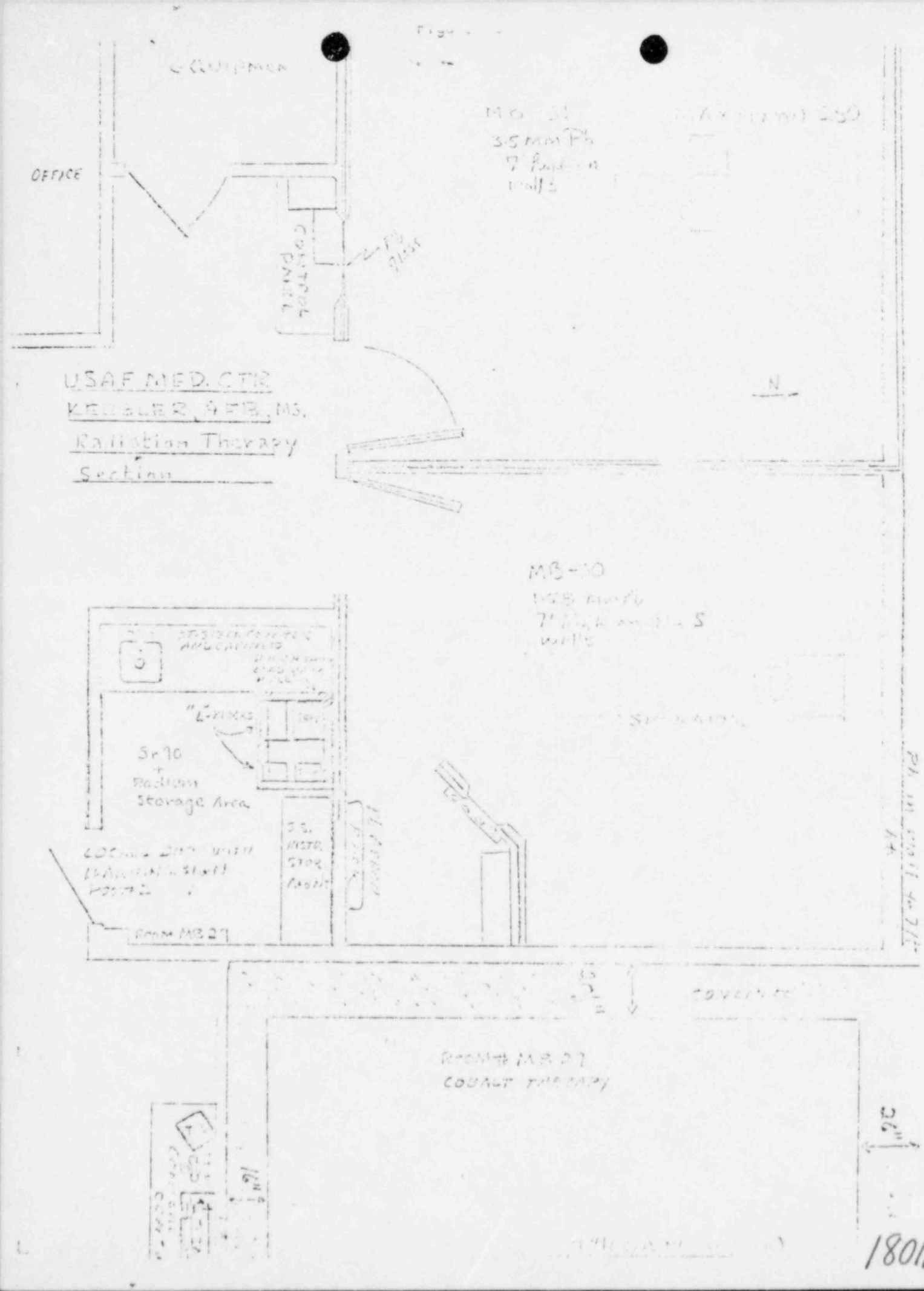

A
C
F
B
H
K
D
L
M
E
ABROMED
STAGING AREA
USAF Medical Center
Keesler AFB, MS
S
E
W
N
60Co Therapy
Section
X

FIGURE 12.


OFFICE
USAF MED. CTR
KEESLER A.F.B., MS.
Radiation Therapy
Section
N
Sr90
+
Radium
Storage Area
Room MB 27
COBALT THERAPY

18012

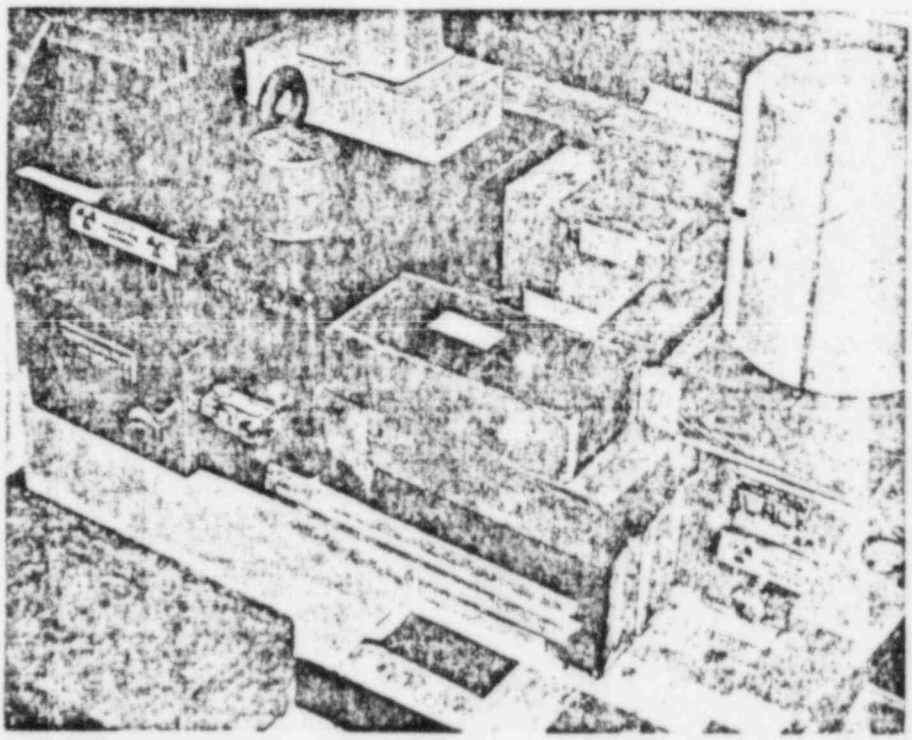


FIGURE 15.

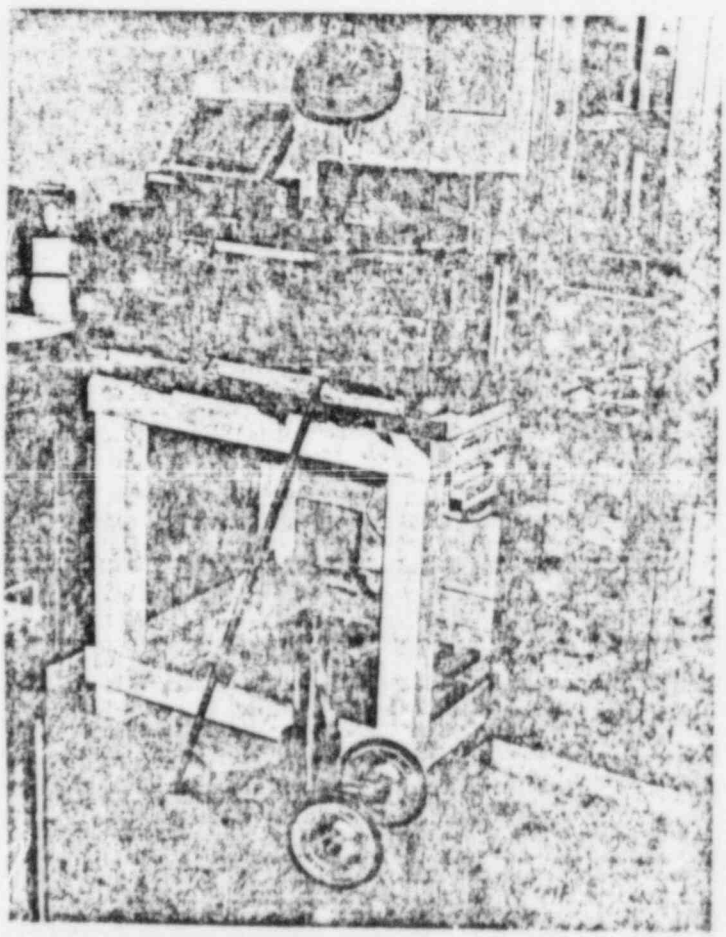
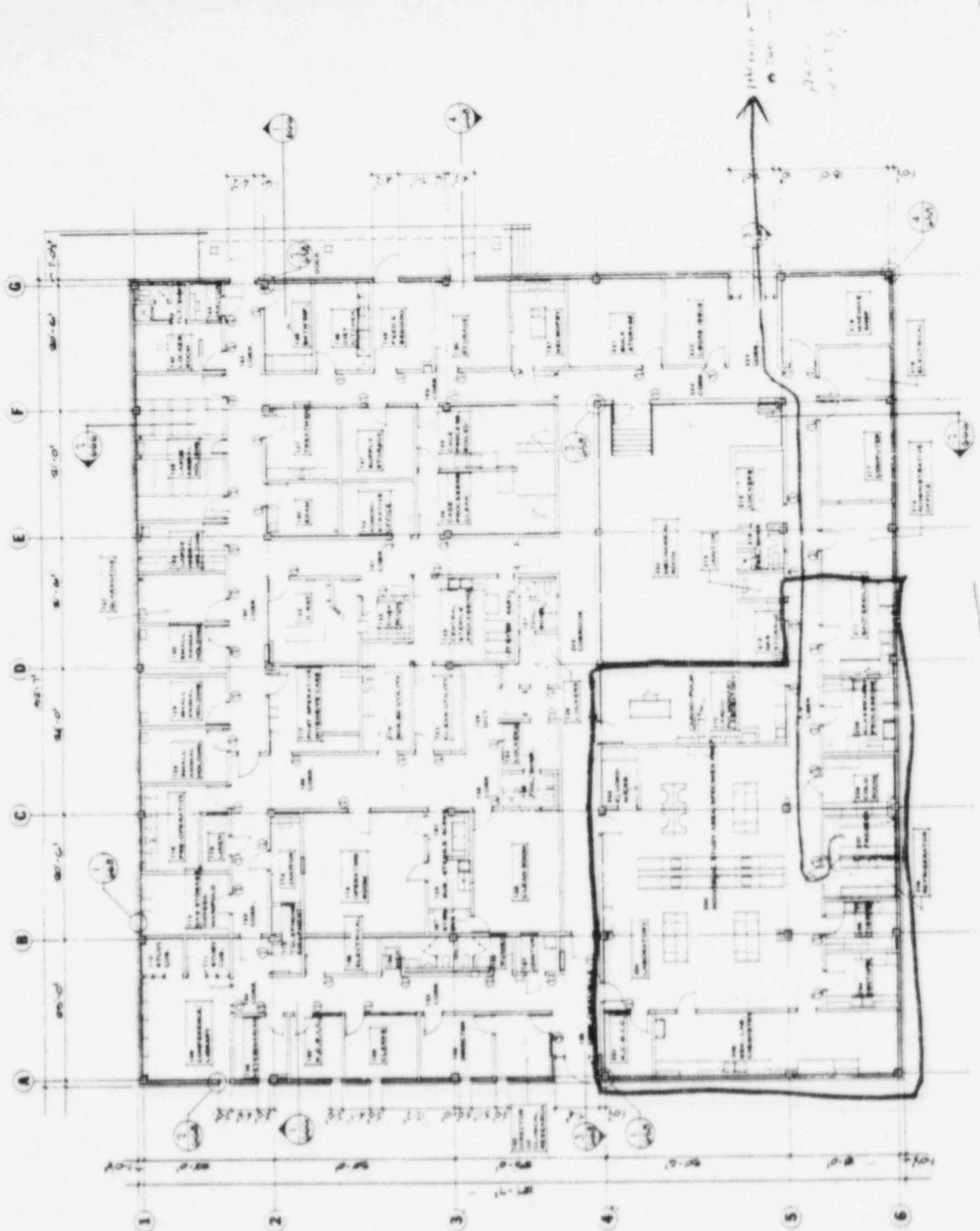


FIGURE 14.

Item 11. (Cont'd) Facilities and Equipment

D. Clinical Research Facility

Isotopes are stored in Rm 204. Rm 206-207 is used as a refrigerated radioactive waste storage area.



ATT-14

Item 11. (Con't) Facilities and Equipment

E. Radioactive Waste Shed

All waste from Nuclear Medicine and Radiation Therapy are held here for decay.

Item 12. Personnel training program and frequency

Handlers of radioisotopes are given formal instruction in laboratory rules, handling procedures and safety. Their experience and training are reviewed by the Radiation Safety Committee. The location of pertinent parts of 10CFR is posted in the department and is available for inspection upon request.

Nuclear medicine technologists are graduates of an American Registry of Radiologic Technologists approved school. They receive continuing informal in-house reviews of techniques, handling practices, etc. In addition, formal outside continuing education has been obtained annually.

Other casual employees, i.e. equipment repairmen, fire inspectors, maintenance personnel, etc. are escorted within the department by one of the staff.

Janatorial service is performed after normal duty hours and after radioisotopes have been secured in the "hot room". The janitor does not clean the "hot room".

Physician and nursing personnel are given educational briefings by the Radiation Safety Officer and Radiotherapist from Radiation Therapy or a Physician from Nuclear Medicine.

Item 13. Procedures for Ordering and Receipt of Radioactive Material.

DEPARTMENT OF THE AIR FORCE
USAF MEDICAL CENTER, KEESLER (ATC)
KEESLER AIR FORCE BASE, MS 39534

REPLY TO ATTN OF: SGHR

SUBJECT: Requests for Radioactive Materials

TO: All Departments

The Chief Technologist of the Nuclear Medicine Section has been designated by the Radiation Safety Officer to countersign all requests for radioactive materials and will insure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

Glen I. Reeves, MD

GLEN I. REEVES, Lt Col, USAF, MC
Chairman, Radiation Safety Committee

RECEIPT OF RADIOACTIVE PACKAGES

1. Any package containing radioactive material that arrives between 1615 and 0730 hours or on weekends or holidays shall be signed for in the Emergency Room by ER personnel. The package will be immediately locked in the lead-lined storage module located in the ER (BG 649).

2. If the package is too big for the storage vault, call x-ray to open the ER x-ray room (BG 622) and place package in control booth.

3. If the package is wet or appears damaged, immediately contact the Nuclear Medicine Technician or call by dialing Beeper #453. Ask the carrier to remain until the Nuclear Medicine Technician can ascertain that neither he nor his delivery vehicle is contaminated.

4. Nuclear Medicine personnel will pick up radioactive packages each duty day by 0730 hours.

Item 14. Procedure for safely opening packages containing radioactive material.

APPENDIX F

PROCEDURES FOR OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

1. Visually inspect package for any sign of damage (e.g., wetness, crushed). If damage is noted stop procedure and notify Radiation Safety Officer.

2. Measure exposure rate at 3 feet from package surface--record. If >10 mR/hr--stop procedure and notify Radiation Safety Offier.

3. Measure surface exposure rate and record. If >200 mR/hr--stop procedure and notify Radiation Safety Officer.

4. Put on gloves.

5. Open the outer package (following manufacturer's directions, if supplied) and remove packing slip. Open inner package to verify contents (compare requisition, packing slips, and label on bottle) check integrity of final source container (inspect for breakage of seals or vials, loss of liquid, discoloration of packing material). Check also that shipment does not exceed possession limits.

Item No. 14
Date: _____

6. Wipe external surface of final source container with moistened cotton swab or filter paper held with forceps, assay and record.

7. Monitor the packing material and packages for contamination before discarding:

   a. if contaminated, treat as radioactive waste.

   b. if not, obliterate radiation labels before discarding in regular trash.

Item 15. General Laboratory Rules for the Safe Use of Radioactive Materials.

Laboratory rules described in Appendix G to Reg. Guide 10.8 Rev 1 dated Oct 1980 will be followed for use with all non-sealed radioactive sources.

Item 16. Emergency procedures

Emergency procedures as described in Appendix H to Reg. Guide 10.8 Rev 1 dated Oct 1980 will be followed.

Item 17. Area Survey Procedures

Survey procedures outlined in Appendix I to Reg. Guide 10.8 Rev 1 dated Oct 1980 will be followed with one modification.

Note that paragraph F has been changed to read:

"Area will be cleaned if the removeable contamination level exceeds 100 cpm/100 cm^2."

APPENDIX I

SURVEY PROCEDURES

A. All elution, preparation and injection areas will be surveyed daily with a G-M survey meter and decontaminated if necessary.

B. Laboratory areas where only small quantities of radioactive material are used (less than 100 μCi) will be surveyed monthly.

C. All other laboratory areas will be surveyed weekly.

D. The weekly and monthly survey will consist of:

1. A measurement of radiation levels with a survey meter sufficiently sensitive to detect 0.1 mR/hr.

2. A series of wipe tests to measure contamination levels. The method for performing wipe tests will be sufficiently sensitive to detect 100 dpm.

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

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

2. Name of person conducting the survey.

3. Drawing of area surveyed, identifying relevant features such as active storage areas, active waste areas, etc.

4. Measured exposure rates, keyed to location on drawing (point out rates that require corrective action).

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

6. Corrective action taken in the case of contamination or excessive exposure rates, reduced contamination levels or exposure rates after corrective action, and any appropriate comments.

F. Area will be cleaned if the removable contamination level exceeds 100 cpm/ 100 cm^2.

NOTE: For daily surveys where no abnormal exposures are found, only the date, the identification of the person performing the survey, and the survey reports will be recorded.

Item 18. Waste disposal procedures

APPENDIX J

WASTE DISPOSAL PROCEDURES

1. Liquid Waste will be disposed of

Check as appropriate

____ By commercial waste disposal service (See also No. 4 below)

X In the sanitary sewer system in accordance with Section 20.303 of 10 CFR Part 20.

____ Other (specify): _____

2. Mo-99/Tc-99m generators will be:

(Check as appropriate)

X Returned to the manufacturer for disposal

____ Held for decay until radiation levels as measured with a low-level survey meter and with all shielding removed, have reached background levels. All radiation labels will be removed or obliterated and the generators disposed of as normal trash. (Note: this method of disposal may not be practical for generators containing long-lived radioactive contaminants)

____ Disposed of by commercial waste disposal service (See also No. 4 below)

X Other (specify): Will be held for decay and then disposed of in accordance with AF Tech Order 00-110N-2.

3. Other Solid Waste will be:

(Check as appropriate)

____ Held for decay until radiation levels as measured with a low-level survey meter and with all shielding removed) have reached background levels. All radiation labels will be removed or obliterated and the waste will be disposed of in normal trash.

Item No. 18
Date: _____

____ Disposed of by commerical waste disposal service (See also No. 4 below)

__X__ Other (Specify): Short half-life isotope (< ∿ 60d) will be held for decay; longer lived isotopes and sealed sources will be disposed of IAW AF Tech Order 00-110N-2.

4. The commerical waste disposal service used will be: A.F. Tech Order 00-110N-2 prescribes contacting San Antonio Air Materiel Area for
(Name) (City, State)
disposal instructions. SAAMA sends written instructions regarding exact handling procedures. Most recent experience has involved shipment to Barnwell.

Item No. 18
Date: _____

Item 19. Therapeutic use of radiopharmaceuticals

Procedures for the use of Groups IV and V radiopharmaceuticals for treatment of patients as described in Appendix K to the Reg. Guide 10.8 Rev 1 dated October 1980 will be followed with the noted exceptions.

The exceptions concern collection of urine. 10 CFR 20.303 exempts excreta from individuals undergoing medical diagnosis or therapy with radioactive material from the limits in Appendix B, Table 1, Column 2; thus urine collection is not required.

APPENDIX K

PROCEDURES FOR USE OF GROUPS IV AND V RADIOPHARMACEUTICALS
FOR TREATMENT OF PATIENTS

1. All patients treated with iodine-131 or gold 198 greater than 30 mCi will be placed in a private room with a toilet.

2. The patient's room will be properly posted in accordance with Section 20.203, 10 CFR Part 20.

3. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after administration of the treatment dose. Exposure rates will be measured at the patient's bedside, three feet away and the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these times in the patient's chart and on his door. The results of daily surveys will be used to recalculate permitted times which will be posted on the patient's chart and on his door.

4. The form, Nursing Instructions for Patients Treated with Phosphous-32, Gold-198, or Iodine-131, will be completed immediately after administration of the treatment dose. A copy will be posted in the patient's chart.

10. Before a therapy patient's room is reassigned to another patient, the room will be surveyed for contamination (and decontaminated if necessary) and all radioactive waste and waste containers will be removed.

11. Nursing Instructions

a. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the precaution sheet in the patient's chart. Nurses should read these instructions before administering to the patients. Call the Nuclear Medicine Department if you have any questions about the care of these patients.

b. Visitors will be limited to those 18 years of age or over, unless other instructions are noted on the precautions sheet in the patient's chart.

c. Patients must remain in bed while visitors are in the room and visitors should remain at least three feet from the patient.

d. Radioactive patients are to be confined to their rooms except for special medical or nursing purposes approved by Nuclear Medicine and/or Radiation Safety Officer.

e. No nurse, visitor or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic amount of radioactivity until the patient no longer presents a radiation hazard. Female visitors should be asked whether they are pregnant.

f. Attending personnel must wear rubber or disposable plastic gloves when handling urinals, bedpans, emesis basins or other containers having any material obtained from the body of the patient. Wash gloves before removing and then wash hands. The gloves must be left in the patient's room in the designated waste container. These gloves need not be sterile or surgical in type.

g. Disposable items should be used in the care of these patients, whenever possible. These items should be placed in the designated waste container. Contact the Radiation Safety Office for proper disposal of the contents of the designated waste container.

h. All clothes and bed linens used by the patient should be placed in the laundry bag provided and left in the patient's room to be checked by a member of the Radiation Safety Office.

i. All non-disposable items should be placed in a plastic bag and left in the patient's room to be checked by the Radiation Safety Officer or his designee.

j. Surgical dressings should be changed only as directed by physician. Gold-198 leaking from a puncture wound will stain the dressings dark red or purple. Such dressings should not be discarded but should be collected in plastic bags and turned over to the Radiation Safety Officer. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

k. For iodine-131 patients:

(1) If the patient is bedridden, a separate urinal or bed pan should be provided. The urinal or bed pan should be flushed several times with hot soapy water after use.

(2) If the nurse helps to collect the excreta, she should wear disposable gloves. Afterwards she should wash her

hands with the gloves on and again after the gloves are removed. The gloves should be placed in the designated waste container for disposal by the Radiation Safety Officer.

(3) Disposable plates, cups, and eating utensils will be used by patients who are treated with iodine-131.

(4) Vomiting within 24 hours after oral administration, urinary incontinence, or excessive sweating within the first 48 hours may result in contamination of linen and/or floor. In any such situations or if radioactive urine and/or feces is spilled during collection, call the Radiation Safety Officer, Ext. 6291. Meanwhile, handle all contaminated material with disposable gloves and avoid spreading contamination.

(5) All vomitus must also be kept in the patient's room for disposal by the Radiation Safety Officer. Feces need not be routinely saved, unless ordered on the chart. The same toilet should be used by the patient at all times and it should be well flushed (3 times).

l. Utmost precautions must be taken to see that no urine or vomitus, is spilled on the floor or the bed. If any part of the patient's room is suspected to be contaminated, notify the Radiation Safety Officer.

m. If a nurse, attendant or anyone else knows or suspects that his skin, or clothing, including shoes, is contaminated, notify the Radiation Safety Officer immediately. This person should remain in the patient's room and not walk about the hospital. If the hands become contaminated, wash immediately with soap and water.

n. If a therapy patient should need emergency surgery or should die, notify the Nuclear Medicine Department and Radiation Safety Officer immediately.

o. When the patient is discharged call the Radiation Safety Officer and request that the room be surveyed for contamination before remaking the room.

Date: _____

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH PHOSPHORUS-32, GOLD-198, or IODINE-131

Patient's Name: _____

Room No.: _____ Physician's Name: _____

Radioisotope Administered: _____

Date and Time of Administration: _____

Dose Received: _____ Method of Administration: _____

Exposure Rates in MR/hr

Date	3 feet from bed	10 feet from bed

(Comply with all Check Items)

_____1. Visting time permitted: _____

_____2. Vistors must remain _____ from patient.

_____3. Patient may not leave room

_____4. Vistors under 18 not permitted.

_____5. Pregnant visitors not permitted.

_____6. **Dosimeter** must be worn.

_____7. Use and complete the following tags:

_____door

_____bed

_____chart

_____wrist

ITEM 20

Item 20. Therapeutic Use of Sealed Sources

20a. Areas where sources will be stored.

Please refer to Item 11.B entitled "Facilities and Equipment - Department of Radiology - Radiation Therapy Section".

20b. Special precautions to be used while handling sealed sources - therapeutic quantities.

(1) Therapeutic quantities of sealed sources will be handled only by qualified users, the medical radiation physicist, health physicist, or those whose training and experience has been approved by the Radiation Safety Committee.

(2) TLD finger badges will be worn whenever possible.

(3) Sources will never be touched by the fingers.

(4) All sources will be accounted for and records maintained in the radiation therapy department.

Item 20 (cont'd) Therapeutic Use of Sealed Sources

20c. Procedures for the use of Group Vi sources for treatment of patients as described in Appendix L of Reg. Guide 10.8 Rev 1 dated Oct 1980 will be followed.

Item 20 (cont'd) Therapeutic Use of Sealed Sources.

20d. Extremities monitoring

Personnel handling therapeutic quantities of sealed sources will wear finger TLD badges unless other precautions (e.g. sterility) preclude their use.

20e. Shielding for transport

A radium transport device will be used to transport sources from storage sites to the place of use. In the case of gold seeds, the seeds will be placed in the lead pig which in turn will be transported on the radium cart.

20f. Source accountability

A log book will be utilized for the checkout of all therapeutic sealed sources. This log book will contain the following items when pertinent:

1. Patient's name
2. Ordering physician
3. Type applicator
4. Number and strength of sources
5. Total activity
6. Person to whom issued
7. Signature of person receiving order
8. Date and time of issue
9. Date of expected return

Item 20 (cont'd) Therapeutic Use of Sealed Sources.

10. Date of actual return
11. Signature of person certifying issue and return
12. Quantity remaining

20a. Surveys

A 3" x 5" card is made for all patients undergoing therapy with sealed sources. This card contains the following information when pertinent:

1. Patient's name and identification number
2. Room number
3. Date
4. Isotope
5. Responsible physician
6. Numbers and strength of sources
7. Total quantity administered
8. Date and time of administration
9. Date and time of removal
10. Barrier transmission readings
    a. edge of bed
    b. foot of bed
    c. at one meter from edge of bed
    d. at door - door opened
    e. at door - door closed
    f. adjacent areas

Item 20 (cont'd) Therapeutic Use of Sealed Sources.

20g. (cont'd)

11. Results of readings after source removal.

When pertinent, sources will be counted upon removal from the patient. The patient and room will then be checked with a GM survey meter for the potential presence of any radioactive sources.

APPENDIX L

PROCEDURES FOR USE OF GROUP VI SOURCES FOR TREATMENT OF PATIENTS

1. All patients treated with brachytherapy sources will be placed in a private room with toilet.

2. The patient's room will be properly posted in accordance with Section 20.203, 10 CFR Part 20.

3. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after sources are implanted. Exposure rate measurements will be taken at the patient's bedside, three feet away and at the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these times in the patient's chart.

4. The form, Nursing Instructions for Patients Treated with Brachytherapy Sources, will be completed immediately after sources are implanted and placed in the patient's chart.

5. Radiation levels in unrestricted areas will be maintained less than the limits specified in Section 20.105(b), 10 CFR Part 20.

6. Nurses caring for brachytherapy patients will be given audible digital reading dosimeters. In addition they will be provided a dosimeter log sheet on which to record readings each time they enter a room containing a brachytherapy patient and these records will be reviewed and maintained by the Radiation Safety Officer.

7. At the conclusion of treatment, a survey will be performed to ensure that all sources have been removed from the patient and that no sources remain in the patient's room or any other area occupied by the patient. At the same time all radiation signs will be removed and pocket dosimeter exposure log sheet used by nurses will be collected.

8. Instructions to Nurses

   a. Special restrictions may be noted on the precaution sheet in the patient's chart. Nurses should read these instructions before administering to the patient. Call the Radiation Therapy Section if you have any questions about the care of these patients.

b. Nurses should spend only the minimum necessary time near a patient for routine nursing care, but must obtain and wear a ...

c. Pregnant nurses should not be assigned to the personal care of these patients.

d. Never touch needles, capsules or containers holding brachytherapy sources. If a source becomes dislodged use long forceps and put it in the corner of the room or in the shielded container provided; contact the Nuclear Medicine Department at once.

e. Bed bath given by the nurse should be omitted while the sources are in place.

g. Perineal care is not given during gynecologic treatment; the perineal pad may be changed when necessary, unless orders to the contrary have been written.

h. Surgical dressings and bandages used to cover the area of needle insertion may be changed only by the attending physician or or radiologist, and MAY NOT BE DISCARDED until directed by the radiologist. Dressings should be kept in a basin until checked by the radiologist or **Radiation Safety Officer.**

Special orders will be written for oral hygiene for patients with oral implants.

i. No special precautions are needed for sputum, urine, vomitus, stools, dishes, instruments, utensils or bedding unless specifically ordered.

j. These patients must stay in bed unless orders to the contrary are written.

k. Visitors will be limited to those 18 years of age or over, unless other instructions are noted on the precaution sheet in the patient's chart.

l. Visitors should sit at least three feet from the patient and should remain no longer than the times specified on the form posted on the patient's door and in his chart.

m. No nurse, visitor or attendent who is pregnant should be permitted in the room of a patient while brachytherapy sources are implanted in the patient. Female visitors should be asked whether they are pregnant.

n. Emergency Procedures

(1) If an implanted source becomes loose or separated from the patient, or

(2) If the patient dies, or

(3) If the patient requires emergency surgery, immediately call _____. Phone No. (days) _____, (nights) _____.

o. At the conclusion of treatment, call the Radiation Safety Officer and request that the patient and room be surveyed to be sure all radioactive sources have been removed.

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH BRACHYTHERAPY SOURCES

Patient's Name: _____

Room Number: _____ Physician's Name: _____

Isotope Activity: _____

Date and Time of Administration: _____

Date and Time Sources are to be removed: _____ Isotope: _____

Exposure Rates in mR/hr

Bedside 3 feet from bed 10 feet from bed

_____

_____

(Complete checked items)

_____ 1. Wear Dosimeter

_____ 2. Wear rubber gloves

_____ 3. Place laundry in linen bag and save.

_____ 4. Housekeeping may not enter the room.

_____ 5. Patient may not have visitors.

_____ 6. No pregnant visitors.

_____ 7. No visitors under 18 years of age.

_____ 8. A dismissal survey must be performed before patient is discharged.

_____ 9. Patient must have a private room.

_____ 10. Other Instructions

RSO _____ , _____ / _____

name on duty/off duty telephone number

Item 21. Use of Radioactive Gases.

The conditions of letter dated 8 September 1980 'Amendment Request to NRC Byproduct Material License No. 23-01002-02' continue to apply for use of Xenon-133.

Item 22. Procedures and precautions for use of radioactive material in animals.

CLINICAL RESEARCH LABORATORY
USAF Medical Center Keesler (ATC)
Keesler Air Force Base, MS 39534

Laboratory Operating Instruction 163-1

30 April 1979

Veterinary Sciences

MANAGEMENT OF RESEARCH ANIMALS CONTAINING RADIONUCLIDES

This instruction establishes policy and outlines procedures for the use and care of research animals containing radionuclides in the Clinical Research Laboratory. These guidelines apply to all personnel working with such animals, their excreta, tissues, or fluids, and various equipment items in contact with such animals.

1. References.

MCR 160-12, Nuclear Medicine
LOI 160-1, Management of Radionuclides
NBS Handbook 92, Safe Handling of Radioactive Materials
NBS Handbook 48, Control and Removal of Radioactive Contamination in Laboratories
NBS Handbook 65, Safe Handling of Bodies Containing Radioactive Isotopes

2. Personnel Protection.

a. Research proposals involving the use of radioisotopes in animals will be reviewed by the Radiation Safety Committee and the Radiation Protection Officer (RPO).

b. The RPO will review the proposed use of the isotope and will inspect the animal housing facilities regarding the management practices and caging facilities available. The RPO will recommend appropriate personnel safeguards and/or monitoring procedures as may be necessary, and any deviation or modification of the general guidelines given below.

c. Technical personnel working with the animals, their caging, and their tissues or excreta will be briefed by the RPO or his representative concerning appropriate personnel protection practices before the initiation of the project. Female personnel of child-bearing age may require special consideration. Written instructions will be provided on the attached form.

d. Protective clothing will be worn by personnel working with radionuclide-containing animals, their wastes, and their caging. This protective clothing will include laboratory coats or other suitable outergarments, and rubber or plastic gloves. If indicated due to the nature of their duties, personnel will also wear protective shoe covers. These protective garments will not be worn into other areas of the laboratory, but will be held in designated areas when not in use. If necessary, they will be disposed of as

radioactive waste after use. If the clothing is to be re-used, the level of activity will be at safe levels (NBS Handbook 48; MCR 160-12) before release to the laundry. (Keesler Medical Center maintains a storage facility for holding contaminated clothing for decay prior to laundering.) Monitoring will be done with a portable G-M Survey Meter.

e. If indicated by the nature of the work or level of activity being used, personnel will wear film badges or pocket dosimeters during their exposure periods.

f. Personnel working in animal rooms contaminated with radionuclides or containing animals that have been administered radionuclides will practice good hygiene. No eating, drinking, or smoking will be allowed, and no foodstuffs will be taken into the rooms. Hands will be thoroughly washed upon completion of duties within these rooms. Should an accidental wound or break in the skin occur while working in these areas, the wound will be thoroughly washed with soap and water and the supervisor and RPO notified. Medical attention will be sought if necessary.

3. Animal Housing.

a. Animal rooms, cages, and racks holding animals containing radionuclides will be posted with appropriate warning signs/labels. Before such rooms, cages, and associated animal equipment are recycled for subsequent use they will be monitored with a portable G-M Survey Meter and/or a "wipe" test, and decontaminated as necessary. Rooms and equipment will be released for reuse provided the surface contamination does not exceed acceptable levels (NBS Handbook 92; MCR 160-12).

b. Animal rooms and reusable caging equipment will be thoroughly washed and sanitized before reuse. Such equipment will be washed separately from other items of similar equipment in order to avoid inadvertent spread of contamination. If necessary, such equipment will be washed by hand to avoid contamination of mechanical washing equipment.

c. Cages containing animals dosed with radionuclides will be labeled with a card containing the project number, investigator, date of dose, the type and amount of isotope administered, and the animal's identification number. Unattended rooms containing such animals will be kept locked to preclude unauthorized entry.

d. Wastes (feces, urine) produced by animals administered radioisotopes may be handled in several ways, depending on the type and amount of isotope involved. If appropriate, the animal wastes may be flushed into the sewer system with copious amounts of water (MCR 160-12; 10 CFR 20). Wastes may also be collected, if necessary, using disposable absorbent materials with impervious backing or various contact bedding materials. Disposable cages

or caging equipment may also be used for waste containment if indicated. Animal wastes and ancillary materials or equipment for disposal will be disposed of appropriately as radioactive waste.

e. Animals containing radioisotopes will be provided drinking water in water bottles, bowls, or some other method that will avoid the possibility of contaminating the automatic watering system of the building.

4. Animal Carcasses.

a. Animal carcasses containing radionuclides will be placed in double layered plastic bags. These bags will be sealed and labelled with the name of the investigator, project number, type and activity of isotope, date of administration of isotope, and decay date. These carcasses will then be stored in an appropriately labelled freezer until decay to safe levels, at which time appropriate disposal may be made.

b. Should autopsy examination or tissue collection be necessary involving carcasses containing radioisotopes, appropriate safeguards for personnel will be practiced as noted in paragraph 3 above. Contaminated equipment will be handled as outlined in paragraph 3a above.

Marion J Stansell

MARION J. STANSELL, Colonel, USAF, BSC
Chief, Clinical Research Laboratory

Animal Handling Facilities

1. The animal handling facilities of the Clinical Research Laboratory (CRL) include eight rooms which may be used to house animals in the main laboratory building (building 0404). All rooms in the building are supplied with conditioned, non-recirculated air. The floor plan of the building is presented in figure ___. Rooms 128, 129, 130, 131, 138, 139, 140, and 145 are available for animal housing. These rooms have terrazo floors coved at the wall/floor junction, walls of epoxy-painted blocks, plaster ceilings, drains, hot and cold water, hose bibs, and sinks (except room 145). Locks are available on all room doors except room 145. Other features of these rooms are noted below:

a. Rooms 128, 129, 130, 131, 138, and 145 are approximately 8' X 15' in size. Room 139 is 15' X 24' and room 140 is 9' X 12'.

b. Room 139 contains ten animal runs, 31" X 72" in size, with solid block wall dividers and chain link fence front and rear panels.

c. Rooms 131, 138, 139, and 140 contain recessed troughs sloped to floor drains.

d. Room 140 contains a built-in metal cabinet with a laminated plastic counter top.

2. Other rooms in the building are used to support the research animal activities of the CRL in various capacities. These rooms are listed below:

a. Room 132, 14' X 15', contains diagnostic radiographic equipment. This room has plaster walls, acoustical tile ceiling, and terrazo floor . The perimeter of the room is equipped with lead shieldings 1/32 or 1/16 inch thick, to a height of seven feet.

b. Room 117, 14' X 15', is a post-operative recovery room. It contains one built-in animal run (similar to those in room 139), a floor drain, and a sink. . The floor is terrazo, the walls are epoxy-painted blocks, and the ceiling is plaster.

c. Room 118, 20' X 20', is the operating (surgery) room, The walls are covered with ceramic tile, the floor is terrazo, and hot and cold water is available as is a floor drain. The ceiling is plaster.

d. Room 116, 9' X 14', is the room used to prepare animals for surgery or to perform various technical procedures. This room has a terrazo floor, epoxy-painted block walls, and a plaster ceiling. A sink and stainless steel counter are built into the room.

e. Room 141, 12' X 16', is used for examinations, treatment, and various technical procedures with animals This room has a terrazo floor, epoxy-painted block walls, and a built-in sink and cabinet with laminated plastic countertop. The ceiling is plaster.

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f. Room 210, 16' X 30', is the cardiopulmonary room. It contains specialized radiographic equipment. The floor is vinyl-asbestos tile, the walls are epoxy-painted plaster, and the ceiling is acoustical tile. The perimeter of the room is equipped with lead shielding, 1/32, or 1/16 inch thick, to a height of seven feet.

g. Room 151, 9' X 14', is the necropsy room. The floor is terrazo, the walls are epoxy-painted blocks, and the ceiling is acoustical tile. There is a built-in sink and metal cabinetry, with a stainless steel counter. A stainless steel autopsy table is also present, as is a stainless steel clad refrigerator for storage of animal carcasses.

h. Room 136/149 is the cage washing area, 21' X 23' in size This area is equipped with a mechanical cage/rack washer, autoclave, floor drains, and hot/cold water. The floor is terrazo, the walls are epoxy-painted blocks, and the ceiling is plaster.

3. The corridors within the animal support area of the building also have terrazo floors, epoxy-painted block walls, and plaster ceilings.

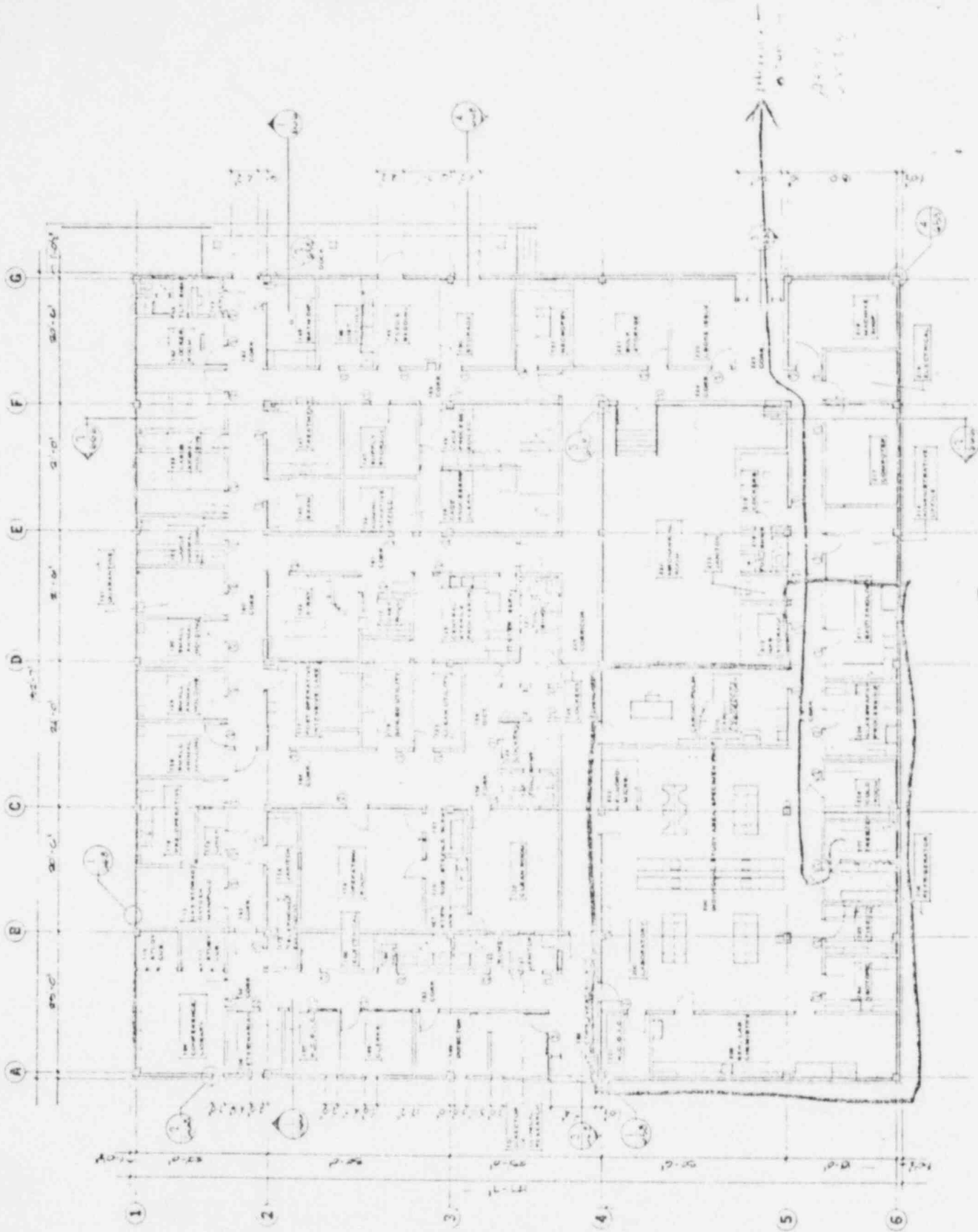
4. There are several types of cages available for housing the research animals in the CRL. The runs in room 139, as mentioned above, are available for housing dogs, primates, swine, calves, or goats. These runs are supplied with automatic waterers. Stainless steel cages are also available, primarily for housing canines. . Other species (cats, rabbits) may also be housed in these cages. The animal excrement falls through the perforated floor and is flushed out the back of these cages with a hose. Drinking water may be supplied to these cages by automatic waterers or bowls.

Rack mounted, suspended stainless steel cages are available for housing rabbits . Plastic drop pans beneath the cages collect the excreta. Automatic waterers or bottles may be used to supply water to these cages.

Rodents are routinely housed in suspended polycarbonate cages of two designs One type of cage has a solid floor and is used with contact bedding. The second type has a wire mesh floor and stainless steel drop pans are used to collect the excreta. Automatic waterers or bottles may be used with these cages.

Suspended stainless steel cages are available for housing primates They have perforated floors of wire rods and the excreta collects on stainless steel drop pans beneath the cages. These drop pans are sloped to facilitate flushing with a hose. These cages are supplied with automatic waterers.

A large aluminum cage is available for group housing of primates. This cage is made of aluminum and may be used for housing other laboratory species also. Excreta collects directly on the floor and is flushed to a drain.



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Item 23. Other Procedures and Precautions

No additional safety procedures or precautions will be required except for the following directions concerning ^{3}H and ^{14}C.

MANAGEMENT OF TRITIUM AND CARBON-14 LABELING MATERIALS

ISOTOPE:

Beta emitting such as thymidine methyl ^{3}H (and any ^{14}C compounds which may be used at a later date, subject to Clinical Radioisotope Committee sanction).

PROCUREMENT:

AF Form 1801 will be properly coordinated and submitted (e.g., for ordering the thymidine methyl ^{3}H, 50 uCi/test, 4-8 tests/week) from an acceptable licensed supplier. All purchase requests for radioactive compounds must be approved by the Chief Technologist, Nuclear Medicine.

STORAGE OF THE ISOTOPE:

The vials of unused radioisotope (no more than 10 millicuries total of ^{3}H and ^{14}C) will be stored in a 4 degree Centigrade refrigerator designated for radioisotope storage within the Keesler Medical Research Facility (Bldg 0108). No stored blood and/or plasma samples will contain radioactivity. The storage unit will be marked indicating the presence of radioactive materials. (In accordance with Title 10 CFR 20 and Air Force Technical Order No. 00-110N-3.)

TRANSPORTATION OF THE ISOTOPE:

The radioactive materials will be delivered to the Department of Nuclear Medicine at the USAF Medical Center Keesler. Records of the amount of the isotope received and used will be kept in a separate ledger in the Department of Nuclear Medicine.

The vials of $^{3}HTdR$ will be transported to the Clinical Research

Laboratory (Bldg. 0108) within a double walled plastic container surrounding the container in which it is shipped from the manufacturer.

RECORDS OF ISOTOPE USE:

A card will be prepared for each newly received shipment of radioisotopes. This will include the following information: Isotope, total amount, concentration, manufacturer, lot number, date and time received, assay dates, amount used in assay, and final disposition methods. These records will be maintained until facility inactivation, then ultimately retired as prescribed by AFM 12-50, Table #T160-5, R1, and Title 10, Code of Federal Regulations, Part 2 C.401 and 30.51 (USNRC).

The methodology of the assay is described in detail in the individual investigation proposal which has prior approval by the radioisotope and research committees.

USE OF THE ISOTOPE:

The assay will be performed by the principal investigator or an approved handler under his supervision in the designated radioactive work area within the Clinical Research Laboratory (Phone 2806, Bldg 0108) in accordance with the following safety procedures.

SAFETY PRECAUTIONS:

1. General

a. There will be no indiscriminate disposal of radioactive supplies or used equipment, or contaminated tissue specimens. No eating or smoking will be allowed in the area where isotopes are used or stored.

b. Newly received containers of radioactive materials will be checked for evidence of leakage. A note of this check, the lot number, date, and quantity in the shipment will be made. If there is evidence of leakage or breakage the Radiation Protection Officer will be notified immediately. The container will be treated as contaminated material until it is determined safe.

2. Monitoring and Decontamination

a. During the periods of active research, weekly swipe samples will be used to check working surfaces. The swipes will be made with filter paper discs approximately 3 cm in diameter which will be checked with a thin end window GM tube and then counted with the liquid scintillation detector.

b. If there is a "spill" of radioactive materials, immediate decontamination and swipe samples will be accomplished.

c. Any surface found to be contaminated will be scrubbed with detergent using disposable towels and/or brushes until that surface indicates less than twice normal background count rate on "blank" swipes. The used cleaning materials will be treated as radioactive waste material and handled accordingly by putting them into a waste can especially used for radioactive materials.

d. Large spills, injuries or unusual circumstances will be reported to the Radiation Protection Officer as soon as possible (phone 377- 6291. Nuclear Medicine Section personnel (phone 6398) may also be called for advice and aid.

GENERAL WORKING INSTRUCTIONS:

1. Only the designated radioisotope work area in the Clinical Research Lab will be used when working with the isotope.

2. No flammables are to be discarded down a drain.

3. No eating or smoking will be allowed in the work area.

4. All pipetting will be done by non-mouth methods.

5. All persons handling the radioisotopes will wear moisture proof laboratory aprons and rubber gloves.

6. Work must be done on good counter tops with no cracks, on a stainless steel tray, and with absorbent toweling over an undersurface of plastic material covering all work areas.

7. The work area will be monitored at the end of each experiment or test procedure using swipe sample techniques (a 100 cm^2 area of the working surface) to insure no radioactive contamination has occurred. The swipe filter paper is to be placed in liquid scintillation counting fluid and counted and compared to blank and standards' counts.

8. Disposable equipment will be used when feasible and such items will be checked for contamination before being discarded.

RADIOACTIVE WASTE DISPOSAL:

Contaminated scintillation vials and other disposable equipment containing radioactive label (less than 1 uCi/vial) + toluene which is highly flammable will be retained for disposal as follows: They will be placed into a 25-gallon steel drum triple lined with watertight polyethylene bags filled with absorbent material, e.g., Vermiculite. These drums will

be sealed air-tight, labeled appropriately, and shipped per SAAMA, (Kelly AFB, Texas) instructions to a commercial disposal facility licensed by the Nuclear Regulatory Commission and in accordance with the appropriate I.C.C., D. O. T. and USAF directives.

BIOASSAYS:

Annual baseline 24-hour urine samples will be performed on all workers who handle millicurie quantities of ^{3}H or ^{14}C. For those workers who handle during any one week period more than 10 mCi of ^{3}H or ^{14}C in organic form or more than 100 mCi in nonorganic form a weekly 24 hour sample will be acquired and analyzed. Duplicate aliquots of the urine samples will be tested for the presence of ^{3}H and ^{14}C using liquid scintillation methods. Counts exceeding ten minute background counts by 3 s.d. will be repeated and another sample collected to rule out accidental contamination. If there is still evidence of ^{3}H or ^{14}C, then an aliquot will be sent to either the USAF Radiological Health Laboratory for analysis or to a commercial company such as New England Nuclear Company. Furthermore, a determination of the activity present would be made by using methods such as those cited in the literature, e.g.: "Improved Radiobioassay of Urine for Tritium," Health Physics, Vol. 17, pp. 727-729, 1969. A 1976 Beckman model LS-3113P three hundred sample analyzer will be used to count the specimens. The manufacturer has provided quench series samples and ^{3}H and ^{14}C calibration standards traceable to the National Bureau of Standards. The machine's performance will be checked weekly for stability and at the beginning and end of each experimental run.