NRC FORM 313M
(9-81)
10 CFR 35

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIALS LICENSE – MEDICAL

Approved by OMB
3150-0041
Expires 9-30-83

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 Army
Martin Army Community Hospital
Fort Benning, Georgia 31905

TELEPHONE NO.: AREA CODE (404) 544 - 4618

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

Same as 1a

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Mary E. Thompson, 1LT, MSC

TELEPHONE NO.: AREA CODE (404) 544 - 1554/2458

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

a. ☐ NEW LICENSE
b. ☐ AMENDMENT TO LICENSE NO. _____
c. ☒ RENEWAL OF LICENSE NO. 10-06493-02

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

Use will be by or under the supervision of a physician for human use or individual for medical use approved by the 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.)*

Mary E. Thompson - RPO

See Item 8, Supplement A attached

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	4 mCi
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 mCi
10 CFR 35.100, SCHEDULE A, GROUP IV		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI		

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

6.b. RADIOACTIVE MATERIAL FOR USES NOT LISTED IN ITEM 6.a.

(Sealed sources up to 3 mCi used for calibration and reference standards are authorized under Section 35.14(d), 10 CFR Part 35, and NEED NOT BE LISTED.)

ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	MAXIMUM NUMBER OF MILLICURIES OF EACH FORM	DESCRIBE PURPOSE OF USE
Co-57	Sealed	5 mCi	Gamma Camera Calibration
Co-57	Sealed	5 mCi	Dose Calibrator check source

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

7. MEDICAL ISOTOPES COMMITTEE	
X	Names and Specialties Attached; and
X	Duties as in Appendix B; or _____ *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
X	Supplements A & B Attached for Each Individual User; and
X	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 Linearity check using a device called Lineator *(Check One)*
	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	
X	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
X	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
X	Appendix F Procedures Followed; or
	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)*	
X	Appendix I Procedures Followed; or
	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
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
	Detailed Information Attached; and
	Appendix L Procedures Followed; or _____ *(Check One)*
	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

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

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X	Duties as in Appendix B; or *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
X	Supplements A & B Attached for Each Individual User; and
X	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 Linearity check using a device called Lineator *(Check One)*
	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	
X	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
X	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
X	Appendix F Procedures Followed; or
	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)*	
X	Appendix I Procedures Followed; or
	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
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
	Detailed Information Attached; and
	Appendix L Procedures Followed; or *(Check One)*
	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	X	FILM	Lexington-Blue Grass Depot Activity	Monthly
		TLD		
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	Lexington-Blue Grass Depot Activity	Monthly
		OTHER (Specify)		
c. WRIST	X	FILM	Lexington-Blue Grass Depot Activity	Monthly
		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: Exempt under 10 CFR 170.11

(2) LICENSE FEE ENCLOSED: $ _____

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

(1) NAME *(Type or Print)*
JOHN C. RICHARDS, M.D., COL, MC

(2) TITLE
Commander
Martin Army Community Hospital

c. DATE
7 May 1985

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313M. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. **AUTHORITY** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).

2. **PRINCIPAL PURPOSE(S)** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30-36 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.

3. **ROUTINE USES** The information may be used: (a) to provide records to State health departments for their information and use; and (b) to provide information to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for a NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you. A copy of the license issued will routinely be placed in the NRC's Public Document Room, 1717 H Street, N.W., Washington, D.C.

4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed.

5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

ITEM 7

MEDICAL ISOTOPE COMMITTEE

ITEM 7

Medical Isotope Committee

Radiation Safety Committee Membership:

COL Ronald G. Williams, MC		Chairperson, Deputy Commander for Clinical Services
Dr. Teofredo Aranas		Chief, Department of Radiology Nuclear Medicine Service
MAJ Ross B. Pollack, MC,	for	Chief, Department of Medicine
CPT Edward C. Garner, MSC,	for	Chief, Department of Pathology
CPT Kenneth Bryant, MC,	for	Chief, Department of Surgery
1LT Mary E. Thompson, MSC		Recorder, Radiation Protection Officer
Mr. Milton Carroll		MEDDAC/DENTAC Safety Manager
LTC Charles H. Baer, DC		DENTAC Representative
MAJ Anna Maria Santiago, ANC		Department of Nursing Representative
WO3 Robert Dondelinger		Chief, Medical Maintenance

APPENDIX B

MEDICAL ISOTOPES 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 all individuals who use radioactive material (including physicians, technologists, physicists, and pharmacists) and determine that their 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 §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 the adequacy of the institution's 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, as specified in the license.

Meeting Frequency

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

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*A rule is expected in 1981 that would change the name, composition, and functions of this committee.

ITEM 8

TRAINING AND EXPERIENCE

ITEM 8

Physician Training and Experience

For all routine procedures, the qualifications and experieince of a physician desiring to use radioisotopes in humans are evaluated by the Radiation Safety Committee against the criteria listed in Regulatory Guide 10.8, Appendix A.

Dr. Teofredo Arnas, Chief of Nuclear Medicine, and Dr. Ildefonso Almonte, M.D., have been authorized as users of Radioactive Materials Groups I-III under NRC License 10-06493-02.

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
HSXB-PM-HP	Certification of Radioisotope Users

TO C, Dept of Radiology FROM Chairman, Radiation Safety Committee DATE 17 April 1985 CMT 1 /gbl/544-1554

1. Pursuant to the request from Doctors Teofredo C. Aranas and Ildefonso G. Almonte, this committee authorized full medical use privileges of the radioactive materials listed in 10 CFR 35.100, Schedule A, Groups I, II, and III.

2. All users are subject to the provisions of NRC BML 10-06493-02.

3. This DF supercedes the DF of 3 March 1981, subject as above, for the above named individuals.

Daniel C. Warren MD

DANIEL C. WARREN, M.D.
Colonel, Medical Corps
Acting Chairman, RSC

CF:
each individual concerned

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
TEOFREDO C. ARANAS	CONNECTICUT

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
DIAGNOSTIC RADIOLOGY		

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	YALE-NEW HAVEN HOSP. BRIDGEPORT HOSPITAL	12 7	160
b. RADIATION PROTECTION	BRIDGEPORT HOSPITAL	2	100
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	BRIDGEPORT HOSPITAL	3	12
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY	BRIDGEPORT HOSPITAL	2	40

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

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

FORM NRC-313M-SUPPLEMENT B
(7-77)
10 CFR 30

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

Teofredo C. Aranas

STREET ADDRESS

59 Ford Place, Bridgeport, CT.

CITY | STATE | ZIP CODE

Bridgeport, Conn. 06610

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	59	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
GA67	[illegible]	10	
OTHER	T-3 Suppression TSH Stimulation	3	
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING	53	
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING	4	
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	5	
OTHER	Cerebral Flow Study &		
Tc-99m	BRAIN IMAGING	328	
	CARDIAC IMAGING		
	THYROID IMAGING	6	
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING	3	
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING	199	
	LUNG IMAGING	119	
	BONE IMAGING	180	
OTHER	Cisternogram In111	2	

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		(laboratory prepared kits)
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	1 1	
I-131	TREATMENT OF THYROID CARCINOMA	1 1	
	TREATMENT OF HYPERTHYROIDISM AND CARDIAC CONDITION		
Au-198	INTRACAVITARY TREATMENT		
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT		
I-125 or Ir-192	INTERSTITIAL TREATMENT		
Co-60 or Cs-137	TELETHERAPY TREATMENT		
Sr-90	TREATMENT OF EYE DISEASE		
	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

August - October 1976
Total hours 640

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

a. NAME OF SUPERVISOR
John A. Creatura, M.D., Chief

b. NAME OF INSTITUTION
Bridgeport Hospital

c. MAILING ADDRESS
267 Grant St.

d. CITY
Bridgeport, Conn. 06602

5. MATERIALS LICENSE NUMBER(S)
06-01060-05

6. PRECEPTOR'S SIGNATURE
John A. Creatura MD

7. PRECEPTOR'S NAME *(Please type or print)*
John A. Creatura, M.D.

8. DATE
June 21, 1979

FORM NRC-313M-SUPPLEMENT B
(7-77)

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
Teofredo C. Aranas

STREET ADDRESS
Martin Army Community Hospital

CITY	STATE	ZIP CODE
Fort Benning	GA	31905

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		
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT		
I-125 or Ir-192	INTERSTITIAL TREATMENT		
Co-60 or Cs-137	TELETHERAPY TREATMENT		
Sr-90	TREATMENT OF EYE DISEASE		
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR	5	
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS	5	
Other			

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

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

a. NAME OF SUPERVISOR
VICENTE P. ALMARIO, JR., MD.

b. NAME OF INSTITUTION Radiology Department
Martin Army Community Hospital

c. MAILING ADDRESS
Fort Benning, GA 31905

d. CITY

5. MATERIALS LICENSE NUMBER(S)
10-06493-02

6. PRECEPTOR'S SIGNATURE
Vicente P. Almario Jr M.D

7. PRECEPTOR'S NAME *(Please type or print)*
VICENTE P. ALMARIO, JR,, M.D.

8. DATE
10 Feb 81

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

CURRICULUM VITAE

Name: Teofredo C. Arenas

Born in Carcar, Cebu, Philippines on Nov. 11,1940.

Male, married to Catalina E. Tojong, blessed with one child.

V.S. Stands 5'5". Has brown complexion, black hair, black eyes, weighs 137 lbs.

Primary Education:

St. Catherine's School, Carcar, Cebu,1952-1960.

Honor student from Kindergarten to Grade six.

Business Manager of the School Organ.

Secondary Education:

San Carlos Seminary, Cebu City,1960-1964.

Medalist from the first to the fourth year.

Vice-Mayor of the Minor Community,1963-1964.

Collegiate Education:

University of San Carlos,1964-1967.

Graduated B.S. in Pre-Medicine, Cum Laude.

Medical Education:

Cebu Institute of Medicine,1967-1972.

Graduated at the top 20% of the class.

Honors-Excellence in the Study of Anatomy.

Member, SPHAIRA-School organization.

Rotating Internship (Phil.): Cebu Velez General Hospital, Cebu Community Hospital, Chong Hua Hospital, Perpetual Succour Hospital, Southern Islands Hospital, Cebu City.

Passed the ECFMG examination of February, 1972.

Post Graduate Training: (1972-1974)

Chong Hua Hospital & Cebu Doctor's Hospital in the Department of Radiology, under Dr. Alejo A. Tiu, CARR.

Classroom Instructor in Pediatrics for Nursing, Cebu City Hospital, July-november, 1973.

Rotating Internship (U.S): De Paul Hospital, Norfolk,

Virginia, from July, 1974 - June, 1975.
Residency in Diagnostic Radiology with rotations
in Nuclear Medicine, Angiography, Ultrasound &
CAT Scan, from July, 1975 - June, 1978.
Passed the FLEX in the State of Connecticut in June, 1978.
Passed the Visa Qualifying Examination given by the ECFMG
in September, 1978.
Certified by the American Board of Radiology in June, 1979.

STATE OF GEORGIA 1984-
MAX CLELAND, SECRETARY OF STATE

[illegible] OF MEDICAL EXAMIN.
MEDICAL LICENSE NO. 023561
ARANAS, [illegible] CAMOMOT
6925 SPRINGLAKE DRIVE
COLUMBUS GA 31904

EXPIRES: DECEMBER 31, 1985

William B. Matthews
Joint Secretary

Max Cleland
Secretary of State

VOID UNLESS VALIDATED BELOW

STATE OF CONNECTICUT
Department of Health Services

Pursuant to the provisions of the General Statutes of the State of Connecticut

•TEOFREDO J ARANAS MD
6925 SPRINGLAKE DR
COLUMBUS GA 31904

EXPIRATION DATE		
MONTH	DAY	YEAR
11	30	84

FEE$ 160.00

020213

SERIAL NUMBER

is Licensed and is hereby registered with this Department as a

PHYSICIAN AND SURGEON

Douglas D. Lloyd, M.D.
COMMISSIONER OF HEALTH

SIGNATURE OF LICENSEE OR REGISTRANT

ALABAMA GREAT SEAL

STATE OF ALABAMA
MEDICAL LICENSURE COMMISSION

NO. [illegible]3

P.O. BOX 887 • 848 WASHINGTON AVENUE
MONTGOMERY, ALABAMA 36101-0887
205 832-5051

CERTIFICATE OF REGISTRATION

S IS TO CERTIFY THAT ANNUAL REGISTRATION HAS BEEN MADE AND LICENSE TO PRACTICE MEDICINE IN THE STATE OF ALABAMA HAS
N GRANTED FOR THE YEAR ENDING DECEMBER 31, 19[illegible]4

PAID: $[illegible]0.00

[illegible] ARANAS
[illegible] SPRINGLAKE DR.
[illegible] GA 31904

Leon C. Kowal M.D.
EXECUTIVE OFFICER

ENSE # [illegible]7727 DATE ISSUED 01/01/[illegible]4

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
Ildefonso Gabriel D. Almonte M.D.	Washington, D.C.

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Diagnostic Radiology	Board Eligible	Eligible as of July 1979

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	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Sloan Kettering Mem Hospital New York, NY 5/7/79 - 5/25/79	20	10
	Long Island College Hosp Brooklyn, N Y 7/1/76 to 6/30/79	90	3
b. RADIATION PROTECTION	Sloan Kettering Mem Hospital New York, N Y 5/7/79 - 5/25/79	5	2
	Long Island College Hospital Brooklyn, N.Y. 7/1/76 - 6/30/79	30	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Sloan Kettering Mem Hospital New York,N Y 5/7/79 - 5/25/79	30	10
	Long Island College Hosp Brooklyn, N W 7/1/76 - 6/30/79	10	5
d. RADIATION BIOLOGY	Sloan Kettering Mem Hospital New York, N Y 5/7/79 - 5/25/79	5	2
	Long Island College Hosp Brooklyn, N.Y. 7/1/76 to 6/30/79	15	
e. RADIOPHARMACEUTICAL CHEMISTRY	Sloan Kettering Mem Hospital New York, N Y 5/7/79 - 5/25/79	5	2
	Long Island College Hosp Brooklyn, N Y 7/1/76 to 6/30/79	30	2

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

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

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
Ildefonso Gabriel D. Almonte

STREET ADDRESS
Martin Army Community Hospital

CITY | STATE | ZIP CODE
Fort Benning | GA | 31905

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	63	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	10	
	LIVER FUNCTION STUDIES	5	
	FAT ABSORPTION STUDIES	2	
	KIDNEY FUNCTION STUDIES	6	
	IN VITRO STUDIES	5	
OTHER			
I-125	DETECTION OF THROMBOSIS	0	
I-131	THYROID IMAGING	63	
P-32	EYE TUMOR LOCALIZATION	0	
Se-75	PANCREAS IMAGING	2	
Yb-169	CISTERNOGRAPHY	6	
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	20	
OTHER			
Tc-99m	BRAIN IMAGING	50	
	CARDIAC IMAGING	3	
	THYROID IMAGING	9	
	SALIVARY GLAND IMAGING	1	
	BLOOD POOL IMAGING	7	
	PLACENTA LOCALIZATION	0	
	LIVER AND SPLEEN IMAGING	50	
	LUNG IMAGING	15	
	BONE IMAGING	36	
OTHER	Testicular Scan	3	

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	1	
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	0	
I-131	TREATMENT OF THYROID CARCINOMA	2	
	TREATMENT OF HYPERTHYROIDISM	2	
Au-198	INTRACAVITARY TREATMENT	0	
Co-60 or Cs-137	INTERSTITIAL TREATMENT	0	
	INTRACAVITARY TREATMENT	0	
I-125 or Ir-192	INTERSTITIAL TREATMENT	0	
Co-60 or Cs-137	TELETHERAPY TREATMENT	0	
Sr-90	TREATMENT OF EYE DISEASE	0	
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR	3	
Sn-113/ In-113m	GENERATOR	0	
Tc-99m	REAGENT KITS	5	
Other	Gallium scan Tc Renal Scan Schilling Test	6 5 3	

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

June 1 - 20, 1977 Plus: Call duties involving nuclear medicine

June 1 - 30, 1978

January 1 - 31, 1979 Total No. of hours = 780 hours

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

a. NAME OF SUPERVISOR
Prudencio Avendanio, M.D.

b. NAME OF INSTITUTION
Long Island College Hospital

c. MAILING ADDRESS
340 Henry St.

d. CITY
Brooklyn, New York 11201

5. MATERIALS LICENSE NUMBER(S)
69-1

6. PRECEPTOR'S SIGNATURE
Prudencio Avendanio, M.D.

7. PRECEPTOR'S NAME *(Please type or print)*
Prudencio Avendanio, M.D.

8. DATE
June 4, 1979

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

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

Ildefonso Gabriel D. Almonte

STREET ADDRESS

Martin Army Community Hospital

CITY	STATE	ZIP CODE
Fort Benning	GA	31905

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		
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT		
I-125 or Ir-192	INTERSTITIAL TREATMENT		
Co-60 or Cs-137	TELETHERAPY TREATMENT		
Sr-90	TREATMENT OF EYE DISEASE		
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR	2	
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS		
Other			

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

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

a. NAME OF SUPERVISOR: Radiology Department
VICENTE P. ALMARIO, JR., M.D.

b. NAME OF INSTITUTION
Martin Army Community Hospital

c. MAILING ADDRESS
Fort Benning, GA 31905

d. CITY

5. MATERIALS LICENSE NUMBER(S)

6. PRECEPTOR'S SIGNATURE
Vicente P. Almario Jr M.D.

7. PRECEPTOR'S NAME *(Please type or print)*
VICENTE P. ALMARIO, JR., M.D.

8. DATE
10 Feb 81

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

STATE OF GEORGIA 1984-8

MAX CLELAND, SECRETARY OF STATE

COMPOSITE ST. BD OF MEDICAL EXAMINER

MEDICAL LICENSE NO. 024196

ALMONTE, ILDEFONSO GABRIEL, D.

1901 LANCASTER DRIVE

COLUMBUS GA 31904

EXPIRES: DECEMBER 31, 1985

William G. Miller Jr.
Joint Secretary

Max Cleland
Secretary of State

Ildefonso G. D. Almonte
1901 Lancaster Drive
Columbus, GA 31904
Telephone: (404) 323-9992

WORKING EXPERIENCE:

1979 to present	Staff Radiologist Martin Army Community Hospital Fort Benning, Georgia 31905 Full hospital privileges granted since 1979. Performs routine procedures such as gastro-intestinal barium studies. Interprets daily studies which include pyelographies, Nuclear Medicine and Ultrasound studies. Performs and/or interprets special diagnostic procedures wuch as angiographies, operative and percutaneous cholangiographies, percutaneous lung biopsies and arthrographies. Also actively involved in the Family Practice Residence and Physician Assistants Training Programas.

TRAINING EXPERIENCE

United States:

1976 - 1979	Residency, Daignostic Radiology Long Island College Hospital 340 Henry St. Brooklyn, New York 11201
1975 - 1976	Flexible Internship St. John's Episcopal Hospital 780 Herkimer St. Brooklyn, New York 11226

Philippines:

Dec '72 - May '75	Residency, General Practice Medical Center Manila Manila, Philippines
Aug '72 - Nov '72	Externship, Surgery Veterans Memorial Hospital Hilaga Ave., Quezon City, Philippines
1971 - 1972	Rotating Internship Veterans Memorial Hospital Hilaga, Ave., Quezon City, Philippines

EDUCATION

Medical School	University of Santo Tomas Manila, Philippines 1967 - 1972 Doctor of Medicine
College	Xavier University Cagayan de Oro City, Philippines 1963 - 1967 B.S. Pre-Med, graduated CUM LAUDE

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
Mary Ellen Thompson	

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	Incarnate Word College San Antonio, TX 1980-1982	60	300
b. RADIATION PROTECTION	" "	40	40
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	" "	60	30
d. RADIATION BIOLOGY	" "	25	15
e. RADIOPHARMACEUTICAL CHEMISTRY	" "	35	40

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
I-131	2 Curies	USAF School of Aerospace Medicine, Brooks AFB, TX	1977-1982	in vivo; in vitro; calibration

CURRICULUM VITAE

NAME:	Mary Ellen Thompson	SSN:	481-76-8882
ADDRESS:	15-A Michael Loop Ft Benning, Georgia 31905	PHONE:	(404)544-2458/work (404)689-2303/home
TITLE:	Nuclear Medicine Science Officer US Army Medical Service Corps	MARITAL STATUS:	Married
DATE & PLACE OF BIRTH:	Dubuque, Iowa	NUMBER OF CHILDREN:	Two (2)
CITIZENSHIP:	United States		

CIVILIAN EDUCATION:

Bachelor of Science in Nuclear Medicine, Minor in Chemistry
Incarnate Word College, San Antonio, Texas

Bachelor of Science in Biology
Loras College, Dubuque, Iowa

MILITARY EDUCATION:

AMEDD Officer's Basic Course, Fort Sam Houston, Texas 1982

Basic Training, Lackland Air Force Base, Texas 1977

PROFESSIONAL DEVELOPMENT COURSES IN RADIOLOGICAL HEALTH:

Nuclear Weapons Hazards Course
Length: One (1) week
Location and Year: Inter Service Nuclear Weapons School, Kirtland Air Force Base, New Mexico 1984

Laser-Microwave Hazards Workshop
Length: One (1) week
Location and Year: Aberdeen Proving Ground, Maryland 1983

AMEDD Radiation Protection Officer Workshop
Length: One (1) week
Location and Year: Aberdeen Proving Ground, Maryland 1983

Medical X-ray Survey Technique
Length: Two (2) weeks
Location and Year: Fort Sam Houston, Texas 1983

Radiation Accident Preparedness; Medical and Managerial Aspects
Correspondence: Completed 1983

ADDITIONAL EDUCATION:

Military Supervisor Course, Fort Benning, Georgia 1984

PDP 11/70 Basic Course and Fortran Programming Course, Data Sciences Division, Brooks AFB, Texas 1979

Animal Health Technology Course, San Antonio College, San Antonio, Texas 1979

USAF Phase I NCO Orientation Course, Brooks AFB, Texas 1980

USAF Phase II NCO Supervisors Course, Brooks AFB, Texas 1981

MILITARY ASSIGNMENTS:

Health Physics Office, Martin Army Community Hospital, Fort Benning, Georgia
December 1982 - Present

Officers Basic Course, Academy of Health Sciences, Fort Sam Houston, Texas
October 1982 - December 1982

Brooks AFB USAF School of Aerospace Medicine, Nuclear Medicine
August 1979 - August 1982

Brooks AFB USAF School of Aerospace Medicine, Radiation Biology
August 1977 - August 1979

WORK EXPERIENCE:

Radiation Protection Officer, Health Physics Office, Martin Army Community Hospital, Fort Benning, Georgia
December 1982 - Present

Radiation Protection Officer for Nuclear Medicine Section; Nuclear Medicine Technologists, Nuclear Medicine Function, USAF School of Aerospace Medicine
October 1979 - October 1982

Health Physics Technician, Health Physics, Fort Sam Houston, Texas
August 1980 - December 1980 (Bootstrap)

Scientific Assistant, USAF School of Aerospace Medicine, Radiation Biology Division
August 1977 - August 1979

CERTIFICATION:

Eligible for:

American Registry of Radiology Technologists (ARRT)
Society of Nuclear Medicine Technologists

PROFESSIONAL AFFILIATIONS:

Society of Nuclear Medicine - Member

Health Physics Society - Member

PUBLICATIONS AND PRESENTATIONS:

(Listed as co-author of the following publication)

1. School of Aerospace Medicine Technical Report - Evaluation of Simulated Radiofrequency Heating Process, June 1979.

(Listed as co-researcher of the following presentations)

2. Multiple Gated Acquisition Thallium Scintigrams with Computer Enchancement: Improved Sensitivity in Asymptomatic Men With Abnormal Treadmill Tests. Presented at the 25th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1980, Houston, Texas.

3. Computer Analysis of Thallium - 201 Myocardial Perfusion Scintigraphy: Circumferential Mapping. Presented at the 25th S.W. Chaper Meeting, Society of Nuclear Medicine, March 1980, Houston, Texas.

4. Myocardial Sarcoidosis Detection. Presented at the 25th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1980, Houston, Texas.

5. An On-Going Study in the Use of Thallium - 201 Chloride as an Adjunctive Aid in the Study of the Non-Healing Wound Treated With Hyperbaric Oxygen. Presented at the 25th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1980, Houston, Texas.

6. Rest Stress Gated Thallium Studies - A New Methodology for Detecting Wall Motion Abnormalities. Presented at the 26th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1981, New Orleans, Louisiana.

7. Adaption of the Anger Camera for Chromagogra[illegible] Quality Control of Nuclide Binding Affinity. Presented at the 27th S.[illegible] apter Meeting, Society of Nuclear Medicine, March 1982, Dallas, [illegible]

8. Thallium Image Analysis at Time Zero. Presented at the 27th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1982, Dallas, Texas.

9. Thallium Redistribution in Serial Studies of the Myocardium Observations Based Upon Quantitative Analysis of Circumferential Mapping, Thallium T-Zero and Derivative Image Analysis. Presented at the 27th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1982, Dallas, Texas.

10. Automatic Interpolative Background Subtraction of Thallium Images: A Unique Computer Process. Presented at the 27th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1982, Dallas, Texas.

11. Derivative Thallium Perfusion Images. Presented at the 27th S.W. Chapter Meeting, Society of Nuclear Medicine, March 1982, Dallas, Texas.

ITEM 9

INSTRUMENTATION

ITEM 9

Radiation Detection Instruments

TYPE OF INSTRUMENTS	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE	WINDOW THICKNESS (Mg/cm^2)	USE
Ludlum Measurements, Inc Model 3	4	Beta-Gamma	0-5 K 0-200 mr/hr	2.0	Surveying
Ludlum Measurements, Inc Micro R Meter Model 12S	1	X- and Gamma	0-3000 micro R/hr	2.0	Surveying
Eberline Gieger Counter Model 520 with HP260 Hand Probe	3	Beta-Gamma	0-2000 mr/hr 1.4 - 2.0	30	Surveying
Ludlum Measurements, Inc Micro R Meter Model 19	1	Beta-Gamma	0-50,000 micro R/hr		Surveying
Victoreen, Inc Low Energy Survey Meter Model 440	2	X- and Gamma	0-300 mr/hr		Surveying
Victoreen, Inc Survey Meter Model 471A	2	Alpha-Beta Gamma, X-ray	0-10 R/hr 0-1000 mr/hr		Surveying
Victoreen, Inc Frisker Radiation Monitor Model 425	2	Alpha-Beta Gamma	0-500,000 cpm	1.4	Surveying
Picker Nuclear Micro Calibrator Model 632513-1	1	Beta-Gamma			Calibration
Picker Nuclear Dyna Camera 4/15 System Model 882696-1	1	Beta-Gamma			Scanning
Nuclear Medical Laboratory Inc. Model 5000	1	Gamma			Assay
Picker Nuclear Combination Well/Uptake System Model 626970	1	Beta-Gamma			Scanning

TYPE OF INSTRUMENT	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE	WINDOW THICKNESS (Mg/cm^2)	USE
Eberline Instrument Corp Geiger Counter Model 120	2	Beta-Gamma	0-50 mr/hr 0-600 K cpm	30	Surveying
Victoreen, Inc XenoGard Model 36-751	2				Surveying
Capintec Dose Calibrator Model CRC-30	1	Beta-Gamma			Calibration
Victoreen, Inc Decade GM Survey Meter Model 198	2	X-ray, Beta Gamma	0-1, 0-10, 0-100 mr/hr 0-1 R/hr	Not Listed	Surveying

ITEM 10

CALIBRATION OF INSTRUMENTS

CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items.

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

X 2. Calibration will be performed at two points on each scale used for radiation protection purposes, i.e., at least up to 1 R/hr.

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 percent of the calculated or known values for each point checked. Readings within ± 20 percent are considered acceptable if a calibration chart, graph, or response factor is prepared, attached to the instrument, and used to interpret readings to within ± 10 percent. Also, when higher scales are not checked or calibrated, an appropriate precautionary note will be posted on the instrument.

3. Survey instruments will be calibrated

_____ a. By the manufacturer

_____ b. At the licensee's facility

(1) Calibration source

Manufacturer's name _____
Model no. _____
Activity in millicuries _____
or
Exposure rate at a specified distance _____
Accuracy _____
Traceability to primary standard _____

_____ (2) The calibration procedures in Section I of Appendix D will be used
or

_____ (3) The step-by-step procedures, including radiation safety procedures, are attached.

X c. By a consultant or outside firm

(1) Name Lexington Bluegrass Army Depot Activities (U.S. Army)

(2) Location Lexington, Kentucky 40511

(3) Procedures and sources

X have been approved by NRC and are on file in License No. 16-05033-01

_____ have been approved by an Agreement State; a copy of the Agreement State license, the procedures, and a description of the sources are attached, and the consultant's report will contain the information on

_____ the attached "Certificate of Instrument Calibration."
_____ the consultant's reporting form as attached.

_____ are described in the attachment, and the consultant's report will contain the information on

_____ the attached "Certificate of Instrument Calibration."
_____ the consultant's reporting form as attached.

Section 2

METHODS FOR CALIBRATION OF DOSE CALIBRATOR*

All radiopharmaceuticals must be assayed for activity to an accuracy of 10 percent. The most common instrument for accomplishing this is an ionization-type dose calibrator. The instrument must be checked for accurate operation at the time of installation and periodically thereafter.

A. Test for the following:

1. Instrument constancy (daily)
2. Instrument accuracy (at installation and annually thereafter)
3. Instrument linearity (at installation and quarterly thereafter)
4. Geometrical variation (at installation)

B. After repair or adjustment of the dose calibrator, repeat all the appropriate tests listed above (dependent upon the nature of the repairs).

C. Test for Instrument Constancy

Instrument constancy means that there is reproducibility, within a stated acceptable degree of precision, in measuring a constant activity over time. Assay at least one relatively long-lived reference source such as Cs-137, Co-57,** or Ra-226** using a reproducible geometry before each day's use of the instrument. Preferably, at least two reference sources (for example, 3-5 mCi of Co-57 and 100-200 μCi of Cs-137 or 1-2 mg Ra-226 (with appropriate decay corrections) will be alternated each day of use to test the instrument's performance over a range of photon energies and source activities.

1. Assay each reference source using the appropriate instrument setting (i.e., Cs-137 setting for Cs-137).
2. Measure background level at same instrument setting, or check that automatic background subtraction is operating properly when blanks are inserted in the calibrator.
3. Calculate net activity of each source subtracting out background level.
4. For each source, plot net activity versus the day of the year on semilog graph paper.
5. Log the background levels.
6. Indicate the predicted activity of each source based on decay calculations and the ±5 percent limits on the graph.
7. Repeat the procedure used for the Cs-137 source for all the commonly used radionuclide settings.
8. Variations greater than ±5 percent from the predicted activity indicate the need for instrument repair or adjustment.
9. Investigate higher than normal background levels to determine their origin and to eliminate them if possible by decontamination, relocation, etc.

D. Inspect the instrument on a quarterly basis to ascertain that the measurement chamber liner is in place and that instrument zero is properly set (see manufacturer's instructions).

E. Test of Instrument Linearity

The linearity of a dose calibrator should be ascertained over the entire range of activities employed. This test will use a vial of Tc-99m whose activity is equivalent to the maximum anticipated activity to be assayed (e.g., the first elution from a new generator).

1. Assay the Tc-99m vial in the dose calibrator, and subtract background level to obtain net activity in millicuries.
2. Repeat step 1 at time intervals of 6, 24, 30, and 48 hours after the initial assay.
3. Using the 30-hour activity measurement as a starting point, calculate the predicted activities at 0, 6, 24, and 48 hours using the following table:

---

* See ANSI N42.13-1978, "Calibration and Usage of Dose Calibrator Ionization Chambers for the Assay of Radionuclides" (American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018).

** Co-57 and Ra-226 are not subject to NRC licensing; the respective State agency should be consulted to determine its requirements for possessing this material.

Assay Time (hr)*	*Correction Factor*
0	31.633
6	15.853
24	1.995
30	1
48	0.126

Example: If the net activity measured at 30 hours was 15.625 mCi, the calculated activities for 6 and 48 hours would be 15.625 mCi x 15.853 = 247.7 mCi and 15.625 mCi x 0.126 = 1.97 mCi, respectively.

4. On log-log coordinate paper, plot the measured net activity (for each time interval) versus the calculated activity (for the same time interval).

5. The activities plotted should be within ±5 percent of the calculated activity if the instrument is linear and functioning properly. Errors greater than ±5 percent indicate the need for repair or adjustment of the instrument.

6. If instrument linearity cannot be corrected, it will be necessary in routine assays to use either (a) an aliquot of the eluate that can be accurately measured or (b) the graph constructed in step 4 to relate measured activities to calculated activities.

F. Test for Geometrical Variation

There may be significant geometrical variation in activity measured as a function of sample volume or configuration, depending on the volume and size of the ionization chamber used in the dose calibrator. The extent of geometrical variation should be ascertained for commonly used radionuclides and appropriate correction factors computed if variations are significant, i.e., greater than ±2 percent. (Even though correction factors may be provided by the manufacturer, the accuracy of these should be checked.) When available from the manufacturer, certified data on geometrical variations may be used in lieu of these measurements.

To measure variation with volume of liquid, a 30-cc vial containing 2 mCi of Co-57 or other appropriate radionuclide in a volume of 1 ml will be used.

1. Assay vial at the appropriate instrument setting, and subtract background level to obtain net activity.

2. Increase the volume of liquid in the vial in steps to 2, 4, 8, 10, 20, and 25 ml by adding the appropriate amount of water or saline. After each addition, gently shake vial to mix contents and assay as in step 1. (Follow good radiation safety practices to avoid contamination and to minimize radiation exposure.)

3. Select one volume as a standard (such as the volume of reference standard used in performing the test for instrument accuracy), and calculate the ratio of measured activities for each volume to the reference volume activity. This represents the volume correction factor (CF).

Example: If activities of 2.04, 2.02, and 2.00 mCi are measured for 4, 8, and 10 ml volumes and 10 ml is the reference volume selected,

$$4 \text{ ml Volume CF} = \frac{2.00}{2.04} = 0.98$$

4. Plot the correction factors against the volume on linear graph paper. Use this graph to select the proper volume correction factors for routine assay of that radionuclide.

5. The true activity of a sample is calculated as follows:

True Activity = Measured Activity x Correction Factor

where the correction factor used is for the same volume and geometrical configuration as the sample measured.

6. Similarly, the same activity of Co-57 in a syringe may be compared with that of 10 ml in a 30-cc vial, and a correction factor may be calculated.

7. It should be noted that differences of 200 percent in dose calibrator readings between glass and plastic syringes have been observed for lower-energy radionuclides such as I-125, which should be assayed in a dose calibrator only if the reliability of such an assay can be established. Glass tubes and syringes may also vary enough in thickness to cause significant errors in assaying I-125. Hence, adequate correction factors must be established.

An alternative to providing syringe calibration factors is to simply assay the stock vial before and after filling the syringe. The activity in the syringe is then the difference in the two readings (with a volume correction if significant).

G. Test for Instrument Accuracy

Check the accuracy of the dose calibrator for several radionuclides, including Cs-137, Co-57, and Ba-133, using appropriate reference standards whose activities have been calibrated by comparisons with standard sources that have been assayed by NBS and documented.

* Assay times should be measured in whole hours and correction factors should be used to the third decimal place as indicated. The more recent half-life of $T_{1/2}$ = 6.02 hours has been used in calculating these correction factors.

The activity levels of the reference sources used should approximate those levels normally encountered in clinical use (e.g., Co-57, 3-5 millicuries) giving adequate attention to source configuration. Identify in your application the three sources that you will use. State nuclide, activity, and calibration accuracy. The lower-energy reference standards (Tc-99m, Xe-133, I-125) must be in vials with the same thickness of glass as the actual samples to be measured for best accuracy.

1. Assay the reference standard in the dose calibrator at the appropriate setting, and subtract the background level to obtain the net activity.

2. Repeat step 1 for a total of 3 determinations, and average results.

3. The average activity determined in step 2 should agree with the certified activity of the reference source within ±5 percent after decay corrections.

4. Repeat the above steps for other commonly used radionuclides for which adequate reference standards are available.

5. Keep a log of these calibration checks.

6. Calibration checks that do not agree within ±5 percent indicate that the instrument should be repaired or adjusted. If this is not possible, a calibration factor should be calculated for use during routine assays of radionuclides.

7. At the same time the instrument is being initially calibrated at the licensee's facility with the reference standards, place a long-lived source in the calibrator, set the instrument, in turn, at the various radionuclide settings used (Cs-137, I-131, Tc-99m, I-125, etc.), and record the readings. These values may later be used to check instrument calibration at each setting (after correcting for decay of the long-lived source) without requiring more reference standards. Keep a log of these initial and subsequent readings.

CALIBRATION OF DOSE CALIBRATOR

A. Sources Used for Linearity Test

(Check as appropriate)

_____ First elution from new Mo-99/Tc-99m generator

or

X Other* (specify) 30-35 mCi unit patient dose obtained from Nuclear Medicine Pharmacy Inc.

B. Sources Used for Instrument Accuracy and Constancy Tests

Radionuclide	Suggested Activity (mCi)	Activity (mCi)	Accuracy
Co-57	3-5	5.2 mCi	± 4.5%
Ba-133	0.1-0.5	278 uCi	± 3.7%
Cs-137	0.1-0.2	226 uCi	± 4.0%
Ra-226	1-2		

C. X The procedures described in Section 2 of Appendix D will be used for calibration of the dose calibrator

or

_____ Equivalent procedures are attached.

*For licensees who are not authorized for Mo-99/Tc-99m generators, activity must be equivalent to the highest activity used.

LINEATOR INSTRUCTIONS

086-507

LINEATOR Reid 4-24-85

DATE 04-24-1985
CAL. TIME 1200
EXP. TIME
DOCTOR ARANAS 100849302
HOSPITAL MARTIN ARMY HOSPITAL
ADDRESS FORT BENNING, GEORGIA
PATIENT DEPT USE

R NO. 50854
VOL. 1.00 LINI
ACTIVITY / LINI

2750

NUCLEAR MEDICINE PHARMACY, INC.
1016 VIRGINIA STREET
COLUMBUS, GEORGIA 31901
(404) 324-0066

CAUTION
RADIOACTIVE MATERIAL

Atomic Products Corporation
ATOMLAB DIVISION • ESTABLISHED 1949
P.O. BOX 1157 CENTER MORICHES, NEW YORK 11934 USA
(516) 878-1074
TWX #510-228-0449

Rev. 6/20/83

LINEATOR INSTRUCTIONS

Introduction- the lineator is a simple device for testing linearity and dynamic range of isotope calibrator instruments. Its use simplifies compliance with the Nuclear Regulatory Commission Appendix D of Regulatory Guide 10.8, October, 1980 and various state requirements.

The Nuclear Regulatory Commission, and other licensing agencies typically require a license amendment before use of the Lineator is authorized. A sample license amendment form is included in these instructions as Appendix D. This form should be transferred to your stationary, signed by authorized personnel, and sent to the appropriate agenices with any required fees. When the amendment is received use of the Lineator is authorized. Note that the NRC Regulatory Guide 10.8 Appendix D dated October, 1980 requires test of calibrator linearity at installation and quarterly thereafter. State and local requirements may differ. The Lineator may be used for this quarterly calibration. The concentration of Mo 99 should be less than .1 uCi per mCi of Tc99m.

The Lineator consists of four tubes, three of which are lead lined, which can be arranged concentrically. The smallest diameter tube is labeled 0 and is used to contain and position a source of Tectnetium 99m of the maximum activity to be measured in the dose calibrator in normal service. The lead lined tubes, labeled A,B & C, slide over the central tube, and are used singularly, or in combination. Each of these outer tubes absorbs some of the radiation from the source and reduces the effective source activity seen by the dose calibrator. Use of the lineator thus allows the operator to simulate a total of eight different source strengths with only one source. The effective reduction increases from tubes A to B to C, and is affected slightly by the shape of the source used, and by the characteristics of the isotope calibrator.

The principle of operation of the Lineator is reproducibility over a wide dynamic range, rather than absolute calibration. Initially the linearity of the dose calibrator must be established by conventional means, such as dilution or decay of a Technetium source. The initial calibration using the Lineator then establishes the effective reductions in activity (ratios of activity with lead tube(s) inserted relative to source in central tubes alone). All subsequent use of the Lineator will show the same effective ratios unless:

1. The dose calibrator becomes defective, at which time it must be repaired, or

2. The Lineator components are damaged or replaced. Care should be taken that the bottom end of the Lineator components are not damaged.

OPERATION

General Instructions-

1- Remove all sources from the region of the calibrator to be tested.

2- Remove the source holder/hanger from the calibrator. Remove the chamber liner, if necessary, to allow insertion of the central Lineator tube, tube 0.

3- Set the calibrator to TC-99m, check background reading using most sensitive scales. Zero out the background reading or note the value for later calculations. Check zero on all ranges. Note that background readings which vary widely may indicate a defective machine or a changing radiation environment which will affect the calibration.

4- The Lineator is designed for use ONLY with TC-99m. Load tube 0 with a vial of 99mTc whose activity is equivalent to the maximum anticipated activity to be assayed (e.g., the first elution from a new generator). The base is formed to center a 10ml or a 20ml vial. Place the tube in the calibrator chamber with the open end up. Use caution to avoid damaging the calibrator or the Lineator. The source and central tube will stay in place until the calibration procedure is complete.

5- Be prepared to work quickly. Arrange Lineator components, data sheets and clock for ease of operation. A complete calibration requires less than 5 minutes. Completion in 7 minutes introduces only a 1% total error due to decay of TC-99m. If linearity test duration exceeds 7 minutes the procedure should be repeated.

6- Set the range switch, as necessary, to read the activity to three significant figures.

CALIBRATION PROCEDURE

Having established the linearity of the calibrator by standard means, an initial calibration provides the factors to be expected for all future linearity checks, so long as the calibrator maintains its linearity and the Lineator components are not damaged.

After performing the steps given in the General Instructions continue with the following steps, adjusting range switch to obtain 3 significant figures:

7- Record the time and the initial activity with the source in the central tube, and only the central tube inserted in the calibrator. Use a data sheet similar to or a copy of Appendix B.

8- Place tube A over the central tube and lower gently. Record reading A.

9- Remove tube A and place tube B carefully over the central tube, record reading B.

10- Insert tube A between central tube and tube B, record reading AB.

11- Remove tubes A & B, insert tube C, record reading C.

12- Add tube A, record reading AC.

13- Remove tube A, add tube B record reading BC.

14- Add tube A, record reading ABC.

15- Record time.

16- Remove and store lineator components, store source in shield.

17- Calculate the eight factors as indicated on the work sheet, Appendix A: Divide the value for the central tube only by the value for each reading for each tube combination and enter results in column headed "Present Factors". Be sure all readings are in the same units (e.g. mCi or uCi). If this is an initial calibration the factors should be retained for future reference and transferred to a master work sheet similar to or a copy of Appendix C, in the column labeled "Initial Factors". Copies of this master work sheet will be used for subsequent calibrations.

If not performing an initial calibration continue with the following steps.

18- Divide each entry in "Present Factors" column by corresponding entry in column labeled "Initial Factors". Enter results times 100 in column labeled Percent Ratio. The ratios should have values near 100.

19- Examine entries in Percent Ratio column (3) to be sure that each is within the allowed tolerance limit for the present radioactive material license. For example, if the license allows 5% variation, all the values in the ratio column should be between 95 and 105. If all ratio values are within acceptable range the calibration is complete and the isotope calibrator has been proven to have acceptable linearity.

If any value of the Percent Ratio is outside the acceptable range renormalize by finding an average value for all eight percent ratio values and dividing each ratio by this average, then multiplying each by 100.

If still beyond tolerance, the problem may be due to:

a- Changing background conditions, including activity in nearby patients. stabilize background activity and repeat.

b- Failure to properly subtract background for each reading. check and repeat procedure if appropriate.

c- Damage to lineator components. Inspect and replace as necessary. Each component may be purchased separately but will require a new initial calibration.

d- A defect in the dose calibrator. This requires repair of the calibrator, followed by a demonstration of linearity using conventional methods, and an initial calibration to establish the factors to be expected with future operation with the Lineator.

20- Sign data sheet and retain for future proof of calibration and compliance with regulations.

APPENDIX A: SAMPLE WORK SHEET

Date: Jan. 2, 1982

Calibrator Serial No.:

Operator: J R.

Source: Tc-99m

ZERO (Background) Reading: 0.00

Range: 0.20 mci (200 uci)

Start Time: 1610

TUBE(S)	Reading-Background	Present Factor (1)	Initial Factor (2)	Percent Ratio (3)
0 only	8.64 mci	1	1	100
0 + A	2.38	3.63	3.64	99.7
0 + B	1.65	5.24	5.28	99.2
0 + AB	0.450	19.20	19.39	99.0
0 + C	0.216	40.0	40.2	99.5
0 + AC	.0615	140.5	141.6	99.2
0 + BC	.0430	201.0	202.5	99.3
0 + ABC	.0123	702	716	98.0

Completion Time: 1615

NOTES: (1) Each factor is the ratio of the reading-background for tube 0 only to the reading-background for that entry.

(2) Values determined from the initial calibration.

(3) % Ratios of entries: 100 x Col. (1)/Col. (2) If any entry in this column differs from 100 by an amount greater than the license allowance see instructions.

APPENDIX B: INITIAL CALIBRATION WORK SHEET

Date: _____

Calibrator Serial No: _____

Operator: _____

Source: _____

ZERO (Background Reading): _____

Range: _____

Start Time: _____

TUBE(S)	Reading-Background	Present Factor (1)	Initial Factor (2)	Percent Ratio (3)
0 only	_____	1	1	100
0 + A	_____	_____	_____	_____
0 + B	_____	_____	_____	_____
0 + AB	_____	_____	_____	_____
0 + C	_____	_____	_____	_____
0 + AC	_____	_____	_____	_____
0 + BC	_____	_____	_____	_____
0 + ABC	_____	_____	_____	_____

Completion Time: _____

NOTES:

(1) Each factor is the ratio of the reading-background for tube 0 only to the reading-background for that entry.

(2) Values determined from the inital calibration.

(3) % Ratios of entries: 100 x col. (1)/Col. (2) If any entry in this column differs from 100 by an amount greater than the license allowance see instructions.

APPENDIX C: WORK SHEET

Date: _____

Calibrator Serial No: _____

Operator: _____

Source: _____

ZERO (Background) Reading: _____

Range: _____

Start Time: _____

TUBE(S)	Reading-Background	Present Factor (1)	Initial Factor (2)	Percent Ratio (3)
0 only	_____	1	1	100
0 + A	_____	_____	_____	_____
0 + B	_____	_____	_____	_____
0 + AB	_____	_____	_____	_____
0 + C	_____	_____	_____	_____
0 + AC	_____	_____	_____	_____
0 + BC	_____	_____	_____	_____
0 + ABC	_____	_____	_____	_____

Completion Time: _____

NOTES:

(1) Each factor is the ratio of the reading-background for tube 0 only to the reading-background for that entry.

(2) Values determined from intial calibration.

(3) % Ratios of entries: 100 x Col. (1)/Col. (2) If any entry in this column differs from 100 by an amount greater than the license allowance see instructions.

APPENDIX D:

AMMENDMENT REQUEST

In order to be in compliance please send the following to your license authority (state or NRC). Remember to use your facility stationary and reference the license number.

NRC or State License #: _____

Facility: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact: _____
(Technologist, Consultant, Doctor, Administrator or RSO)

Phone: _____

Gentlemen:

Please ammend our license to allow our dose calibrator to be checked for dose linearity with the model 086-507 Lineator manufactured by Atomic Products Corporation. Test results will be maintained in forms similar to those provided in the manufacturers instruction manual. The test will be performed as per the instruction manual. All corrective actions indicated will be made.

ITEM 11

FACILITIES AND EQUIPMENT

Building 9200

Facilities and Equipment

Nuclear Medicine

1. Nuclear Medicine Services is located on the first floor of Martin Army Community Hospital, Rooms 142, 144, 146, and 147. Radioactive waste is stored on the ground floor in a locked sub-basement beneath the stairwell.

2. Major equipment and facilities in these areas:

a. Room 146 - Hot lab. Hot sink, lead brick lined waste storage area, lead brick lined fume hood (150 cfm fully open) with Tc-99m generator shield, leaded glass castle for dose preparation, safe for sealed source storage, dose calibrators, dosing table, survey instruments, and files.

b. Room 144 - Computer room (door blocked). Computer terminal, disk drive, technician's desk, collimator carts.

c. Room 142 - Imaging room. Gamma camera, scanning table, well counter, thyroid probe.

d. Room 147 - Stress test room. Treadmill, desk, PT table, refrigerator, cardiac monitoring equipment.

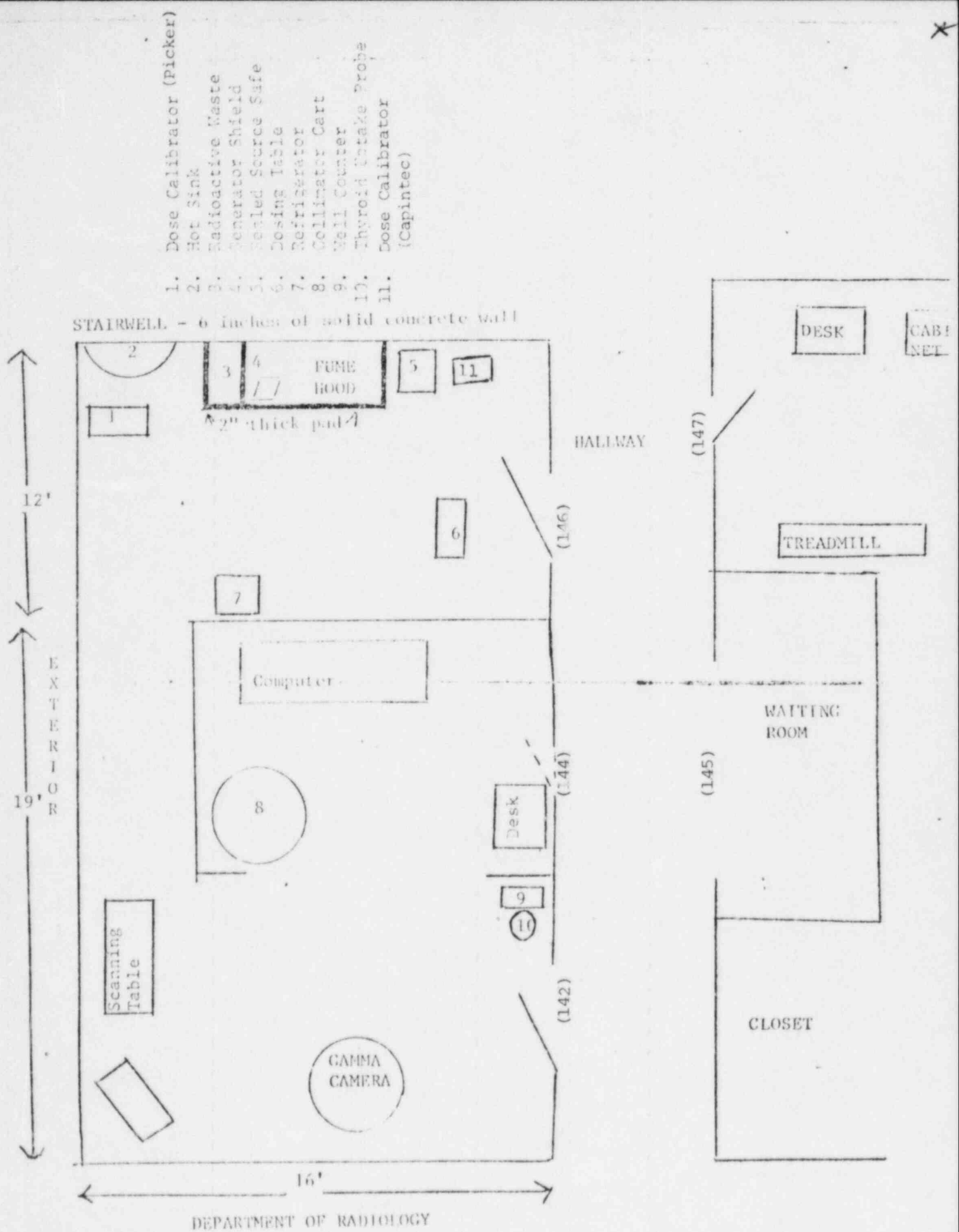
e. Waiting room. Directly across from room 144.

f. Sub-basement - Waste Storage. Locked room with 6 inch thick concrete floor, walls and ceiling, and 55 gallon drums.

Pathology

1. The Radioimmunoassay Lab is located on the ground floor in the Department of Pathology, Martin Army Community Hospital, Room 5. Bagged radioactive waste is stored in the stairwell sub-basement.

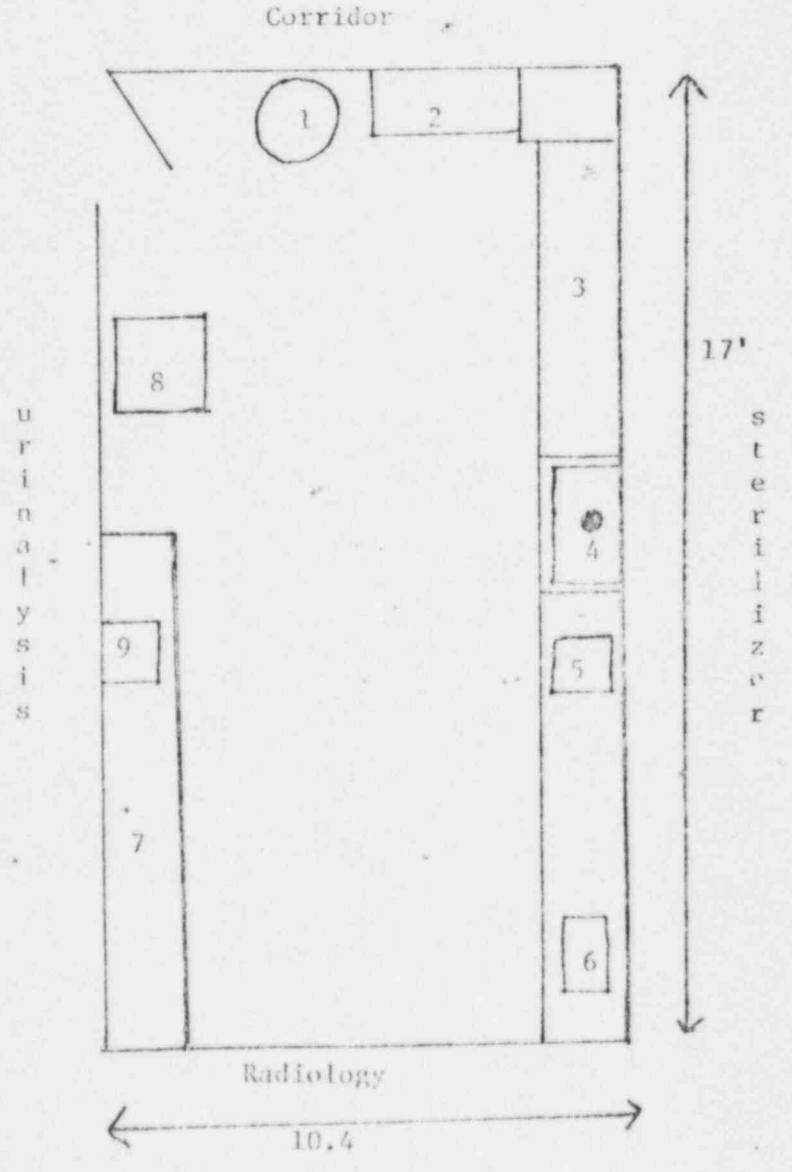
2. Major equipment and facilities in this area include lab bench, hot sink, water bath, fume hood, refrigerator, and well counter.

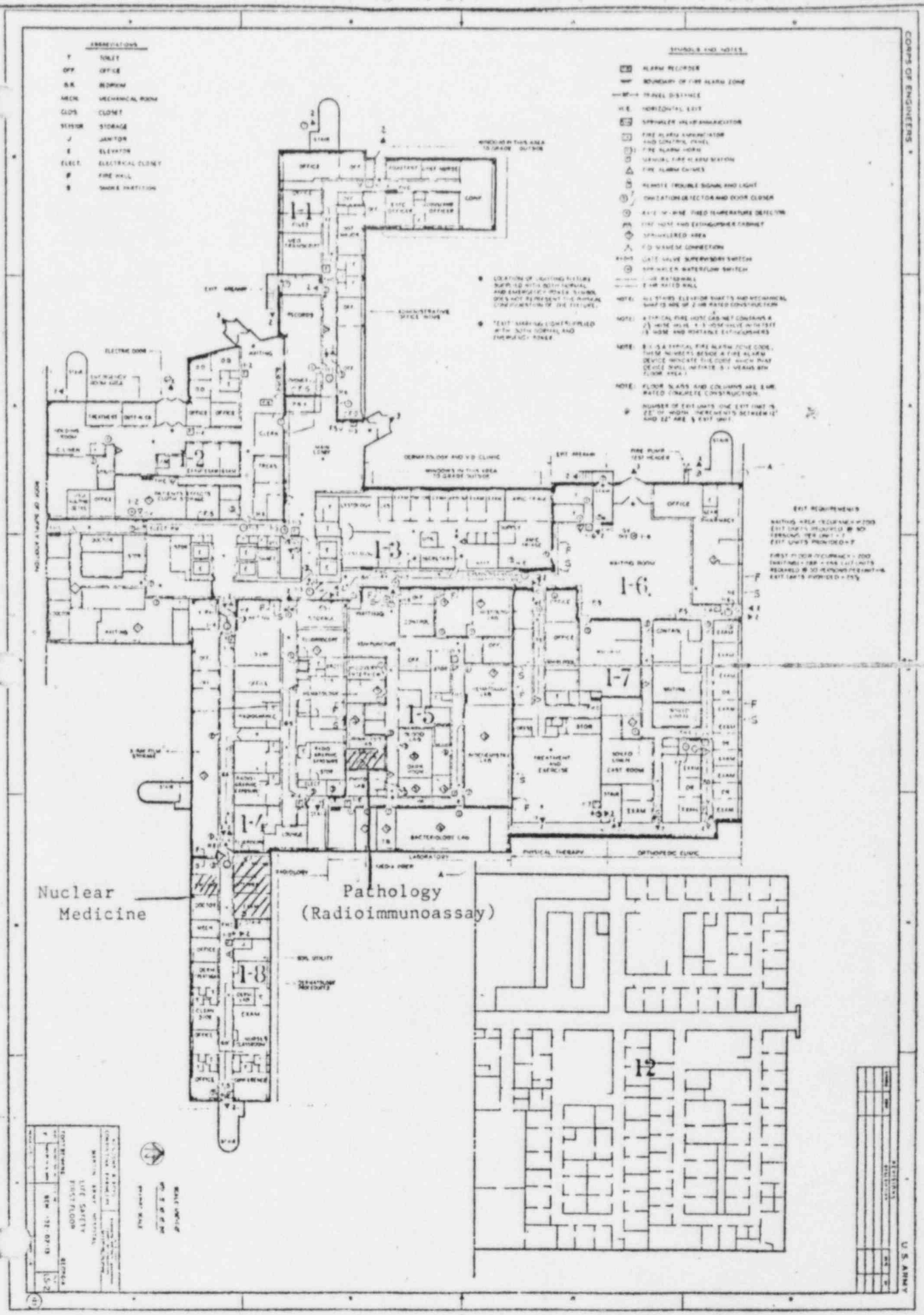

1. Dose Calibrator (Picker)
2. Hot Sink
3. Radioactive Waste
4. Generator Shield
5. Sealed Source Safe
6. Dosing Table
7. Refrigerator
8. Collimator Cart
9. Well Counter
10. Thyroid Uptake Probe
11. Dose Calibrator (Capintec)
STAIRWELL - 6 inches of solid concrete wall
FUME HOOD
2" thick pad
HALLWAY
DESK
CABINET
TREADMILL
WAITING ROOM
CLOSET
Computer
Desk
Scanning Table
GAMMA CAMERA
12'
19'
16'
EXTERIOR
(142)
(144)
(145)
(146)
(147)
DEPARTMENT OF RADIOLOGY

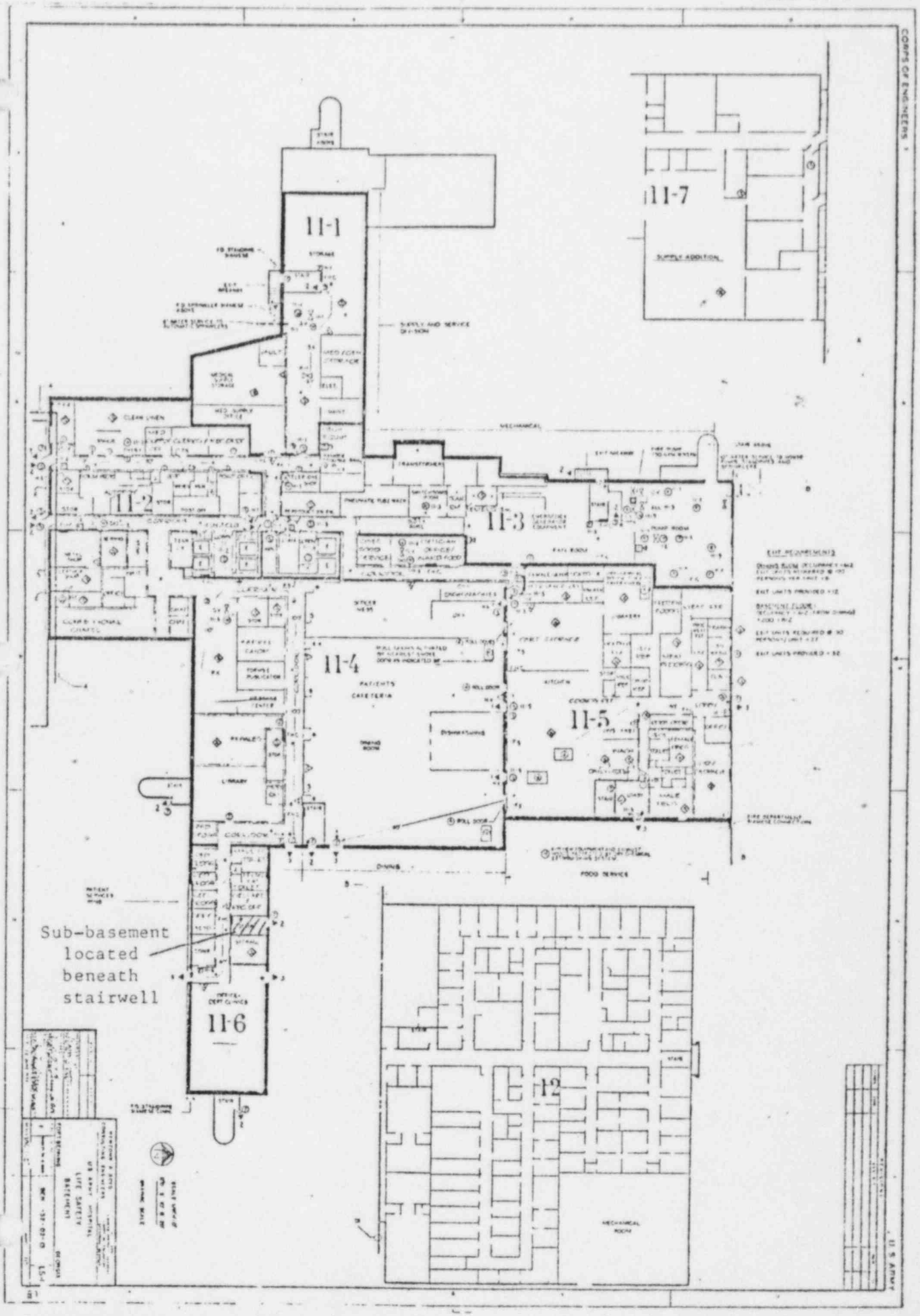
PATHOLOGY - RADIOIMMUNOASSAY LAB

ROOM #5

1. Hot Waste
2. Fume Hood
3. Lab Bench
4. Hot Sink
5. Water Bath
6. Centrifuge
7. Desk
8. Well Counter
9. Refrigerator




Nuclear Medicine
Pathology (Radioimmunoassay)
1-1
1-2
1-3
1-4
1-5
1-6
1-7
1-8
12
CORPS OF ENGINEERS
U.S. ARMY


11-1
11-2
11-3
11-4
11-5
11-6
11-7
12
Sub-basement
located
beneath
stairwell

ITEM 12

PERSONNEL TRAINING PROGRAM

ITEM 12

Radiation Safety Instructions

Personnel Training Program

1. All radiation workers will be given a copy of the MEDDAC/DENTAC Radiation Safety Program and instructions concerning radiological safety prior to actual use of radioactive material. Essentially, an overview of radiation protection stressing safe handling and laboratory procedures are accomplished during the session. Other topics include terms and definitions encountered in radiation work, basic radiation physics concept, ALARA, other subject matter contained in 10 CFR parts 19 and 20. The training usually lasts between one and two hours. Instruction is given by the Radiation Protection Officer or the alternate Radiation Protection Officer.

2. Refresher/review classes for all radiation workers are conducted on a yearly basis utilizing viewgraphs, video tapes, and slides as aids to student comprehension. All items contained in the license pertinent to user needs are discussed including radiation safety, storage of radioactive material, potential hazards, emergency procedures, reporting unsafe conditions to the Radiation Protection Officer, and the right to be informed of radiation exposure, bioassay results, and location of exposure records.

3. Ancillary personnel (housekeeping) will be instructed initially and annually in the above subject areas with emphasis on radiation hazards and associated precautions. Training will be tailored to their relative involvement with radioactive material.

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY MEDICAL DEPARTMENT ACTIVITY
FORT BENNING, GEORGIA 31905

HSXB-PM-HP

THE MEDDAC/DENTAC RADIATION SAFETY PROGRAM

In order to prevent any conflict of interest, Health Physics is assigned to the MEDDAC Preventive Medicine Activity - separate from Department of Radiology, Nuclear Medicine, Urology Clinic, Veterinary Activity, DENTAC, and other areas using radiation sources, but still ultimately responsible to the MEDDAC and DENTAC Commanders.

Your cooperation is needed to help us insure a work environment that is safe for both patients and staff members. Please read the different articles inside, and feel free to ask for more information about anything radiation-oriented. Safety is everyone's business.

Mary E. Thompson

MARY E. THOMPSON
1LT, MSC
Radiation Protection Officer

TABLE OF CONTENTS

OBJECTIVES OF THE RADIATION PROTECTION PROGRAM

There are two basic objectives of the Radiation Protection Program.

(1) Keep radiation exposure (internal and external) to everyone at a level As Low As Reasonably Achievable (ALARA).

(2) Insure that all radioactive materials and radiation producing devices are used safely.

Maintaining radiation exposure ALARA requires:

(1) Management/surpervisory/staff commitment and support and

(2) Careful design of the facility and equipment and

(3) Good Radiation Protection practices, including good planning and the proper use of appropriate equipment by qualified, well-trained personnel.

A copy of the hospital ALARA program is on pages 15 -20 of this handout.

WHAT DOES HEALTH PHYSICS DO?

Health Physics is responsible for operating the radiation safety program at MEDDAC and DENTAC. We do this in several ways:

1. Technical Administration:

   a. Maintain Nuclear Regulatory Commission (NRC) license and Department of the Army (DA) Radiation Authorization for the use of radioactive materials.

   b. Keep all radiation related records required by NRC, DA, and OSHA regulations.

2. Technical Services:

   a. Perform radiation protection and x-ray surveys.

   b. Operate a personnel dosimetry program.

   c. Operate a radioactive material waste disposal system.

   d. Provide technical assistance to all personnel regulatory guidance, dosimetry, and shielding calculations in support of clinical and non-clinical projects.

   e. Provide direct support to patients receiving therapeutic amounts of radioactive materials.

3. Educational Support:

   a. Provide Radiation protection instructions to workers.

   b. Provide instruction to staff members in selected topics in radiation physics, protection, and licensing.

4. Radiological Emergency Response:

   a. Provide guidance on receipt and handling of radiation, radioactive and radioactively contaminated casualties.

   b. Investigate all radiation related incidents and overexposures.

The Radiation Protection Officer can be reached during duty hours at 544-2458 or by page at 544-9151, and after duty hours through the AOD (544-2041/2042).

HOW CAN YOU HELP PROVIDE A SAFE WORK AREA?

Your Supervisor's Responsibilities

Insure that the people working for you are properly supervised, trained with regard to safe working habits, and properly equipped to accomplish their duties safely. (See MEDDAC Regulation 40-8 for detailed responsibilities).

Inform Health Physics when (1) anyone working with or in the vicinity of radiation or radioactive materials is or might be pregnant; (2) anyone appears to have an injury or illness which could possibly be related to the use of radioactive materials or radiation emitting devices.

Explain the ALARA (As Low As Reasonably Achievable) concept and your commitment to maintain exposures ALARA to all persons under your supervision.

Notify Occupational Health (545-2187/2188) when you know that a film badge wearer will be changing jobs. This lets them schedule any type of medical surveillance procedures that might be needed.

YOUR RESPONSIBILITIES

Apply accepted safety practices and standards.

Avoid unnecessary exposure to radiation sources to both yourself and those working with you.

Always wear your film badge when you are working in or around a radiation source.

Report to your supervisor or Health Physics any condition which may lead to an unsafe situation, to a violation of the military or Nuclear Regulatory Commission regulations or license conditions, or of unnecessary radiation exposure.

Report any deviations from the ALARA principles to your supervisor or Health Physics.

Tell your supervisor if you are or think you might be pregnant.

RADIATION SOURCE USE AND STORAGE AREAS

Primary areas of potential radiation hazard in MEDDAC and DENTAC are as follows:

Nuclear Medicine Service (1st floor of hospital)

Department of Radiology (1st floor of hospital)

Department of Pathology Clinic (1st floor of hospital)

Urology Clinic (1st floor of hospital)

Operating Room (2nd floor of hospital)

Dermatology Clinic (9th floor of hospital)

MACH Dental Clinic (basement floor of hospital)

Physical Exam Section (Bldg 323)

Diagnostic Center - TMC 8A (Bldg 5310)

Veterinary Activity (Bldg 265)

Dental Clinic #1 (Bldg 9240)

Dental Clinic #2 (Bldg 4695)

Dental Clinic #3 (Bldg 9052)

Berheim Dental Clinic (Bldg 2828)

Salomon Dental Clinic (Bldg 3255)

The following precautions are to be followed when entering areas of possible radiation hazard:

(1) No access without permission of the clinic supervisor.

(2) No access without a personnel dosimeter.

All laboratories using radioactive materials are posted with RADIOACTIVE MATERIAL signs. Access is NOT permitted unless you are wearing the appropriate personnel monitoring device and are escorted by authorized personnel.

In addition to the above areas, individual patient rooms are periodically designated a RADIATION AREA whenever a patient has been administered a large therapeutic dose of radioisotope. Access to these rooms is authorized ONLY by the Radiation Protection Officer.

EFFECTS OF IONIZING RADIATION

Introduction

Federal law (section 19.12 of Title 10, Code of Federal Regulations, Part 19 and section 1910.96 of Title 29, Code of Federal Regulations, Part 1910) requires that all individuals working in any portion of a radiation area must be instructed in the health protection problems associated with exposure to radioactive material or radiation. The next 6 pages will provide you with information relative to your occupational exposure to ionizing radiation.

Discussion of Radiation

The amount of radiation a person receives called the "dose" and is measured in "rems". The average person in the United States accumulates a dose of one rem from natural sources every 12 years. The dose from natural radiation is higher in some states, such as Colorado, Wyoming, and South Dakota, primarily because of cosmic radiation. There the average individual gets one rem every 8 years.

Many people receive additional radiation for medical reasons. In 1970, an estimated 212 million x-ray examinations were performed in the United States. The estimated average surface skin dose per abdominal x-ray is 0.62 rem.

Because you wear a film badge, you are considered an "occupational worker." This means that you can receive a dose of 5 rems each year. The dose that you receive when your doctor orders x-rays for you does not count against your yearly total because your doctor considers that the benefit you receive outweighs any possible risk associated with the radiation. The average yearly dose for people at MEDDAC and DENTAC is less than 0.2 rem.

Biological Effects

Some of the health effects that exposure to radiation may cause are cancer (including leukemia), cataracts, and birth defects in the future children of exposed parents. Cancer and cataracts have been observed in studies of radiologists. radium workers, uranium miners, and radiotherapy patients who have received large doses of radiation. Studies of people exposed to radiation from atomic weapons and radiation effects studies of laboratory animals have also provided a large body of data on radiation effects.

The observations and studies mentioned above involve levels of radiation doses that are much higher (hundreds of rems) than the premitted 5 rem per year occupational dose. Genetic effects (such as birth defects) have not been observed in human populations exposed to radiation over the past 50 years. It has been observed that radiation can change the genes in cells of the human body, and it is possible that genetic effects can be caused in humans by low radiation doses although no direct evidence exists as yet.

Sterility or impotency is not an effect you need to worry about. It would take a dose of about 500-800 rems to the gonads to produce permanent sterility. This large a dose would probably result in death within 60 days. Exposure at the permitted occupational levels has no observed effect on fertility and also has no effect on the ability to function sexually.

Risk Estimates and Comparisons

Risk can be defined as the chance of injury, illness, or death resulting from some activity. We don't know exactly what the chances are of getting cancer from a low-level radiation dose, but we can make estimates based on extensive scientific knowledge. These estimates indicate that health risks from occupational radiation exposure are smaller than the risk associated with many other activities we encounter and accept each day. Some representative numbers are presented in the table below.

Health Risk	Estimates of Days of Life Expectancy lost, Average
Smoking 20 cigarettes/day	2370 (6.5 years)
Overweight (by 20%)	985 (2.7 years)
All accidents combined	435 (1.2 years)
Auto Accidents	200
Alcohol consumption (U.S. average)	130
Home accidents	95
Drowning	41
Natural background radiation, calculated	8
Medical diagnostic x-rays (U.S. average), calculated	6
All catastrophes (earthquake, etc.)	3.5
1 rem occupational radiation dose, calculated (industry average for the higher-dose job categories is 0.65 rem/yr)	1
1 rem/yr for 30 years, calculated	30

Summary

Radiation, like many things, can be harmful. A large dose to the whole body (such as 600 rems in one day) would probably cause death in about 30 days, but such large doses result only from rare accidents. Control of exposure to radiation is based on the assumption that any exposure, no matter how small, involves some risk. The occupational exposure limits are set so low, however, that medical evidence gathered over the past 50 years indicated no clinically observable injuries to individuals due to radiation exposures when the established radiation limits are not exceeded. This was true even for exposures received under the early occupational exposure limits, which were many times higher than the present limits. This is why the risk to individuals at the occupational exposure levels is considered to be very low. However, it is impossible to say that the risk is zero. To decrease the risk still further we at MEDDAC and DENTAC keep actual exposures far below the limits as is reasonably achievable.

The current exposure limits for people working with radiation have been developed and carefully reviewed by nationally and internationally recognized groups of scientists. It must be remembered, however, that these limits are for adults. Special consideration is appropriate when the individual being exposed is, or may be, an expectant mother, because the exposure of an unborn child may also be involved.

Extract from USNRC Regulatory Guide 8.29, Instruction Concerning Risks from Occupational Radiation Exposure (July 1981).

PRENATAL RADIATION EXPOSURE

Basic Radiation Exposure Limits

As a worker exposed to radiation sources, you may be exposed to more radiation than the general public. The amount of radiation an individual receives is called the "dose" and it is measured in "rems". The average individual in the United States accumulates a dose of 1 rem from natural radiation sources every 12 years. Department of the Army has established a basic radiation exposure limit for all occupationally exposed adults of 1.25 rems per calendar quarter, which is 5 rems per year. Individuals under 18 years of age and members of the general public are permitted to be exposed to only 0.125 rem per calendar quarter or one-tenth of the occupational limits.

It must be remembered, however, that these limits are for adults. Internationally recognized groups of scientists have considered the special situation that exists when an unborn child may be exposed to radiation as a result of occupational exposure of the mother.

Recommendations of Scientific Organizations

The scientific organization called the National Council on Radiation Protection and Measurements (NCRP) has recommended that because the unborn are more sensitive to radiation than adults, their radiation dose from occupational radiation exposure of the mother should not exceed 0.5 rem. The International Commission on Radiological Protection (ICRP) recommends that occupational radiation of women of reproductive capacity be received gradually in small increments so that it would be unlikely for an unborn baby to receive more than 0.5 rem in the first 2 months when a woman may not be aware that she is pregnant. After a woman knows she is pregnant, the ICRP recommends that she not work in areas where the annual exposure would probably exceed 1.5 rems.

Regulatory Requirements

Regulations require that we inform all individuals who work in a restricted radiation area of the risks associated with radiation exposure. This instruction also includes information on the risks to the unborn. The regulations also require us to keep radiation exposures as low as is reasonably achievable. For radiation protection purposes, we assume that there is some potential risk associated with any amount of radiation exposure (down to zero). According to the NCRP, vigorous efforts should be made to keep the radiation exposure of the unborn at the very lowest practicable level during the entire pregnancy.

Therefore, it is the responsibility of us to take all practicable steps to reduce your radiation exposure and to keep you informed of the exposures you are receiving.

Your Responsibility

It is your responsibility to decide whether the risks to you or to a known or potential unborn child are acceptable. The following facts will help you make your decision:

1. The first 3 months of pregnancy are the most important, so you should make your decision early.

2. In most work situations, the actual dose received by an unborn child would be less than the dose you would receive yourself because some of the dose would be absorbed by your body.

3. The dose to the unborn child can be reduced, where possible, (a) by decreasing the amount of time you spend in an area where you will be exposed to radiation, (b) by increasing the distance between yourself and the source of radiation, and (c) by shielding your abdominal area.

4. If you do become pregnant, you could ask your supervisor to reassign you to areas involving less exposure to radiation.

5. When your occupational exposure is below the 5 rems-per-year limit, the risk to an unborn child may be small in relation to other day-to-day risks to the unborn during pregnancy. Experts disagree on the exact amount.

6. There is no need to be concerned about sterility, that is, loss of your ability to bear children. The radiation dose required to produce this effect is more than 100 times greater than the Nuclear Regulatory Commission's basic dose limits for adults of 5 rems per year, 1.25 rems per calendar quarter.

7. Even if you work in an area where you receive only 0.5 rem per 3-month period, in 9 months you could receive 1.5 rems, and your unborn baby could receive more than 0.5 rem (the full-term limit recommended by the NCRP). Therefore, if you decide to restrict your unborn baby's radiation exposure as recommended by the NCRP, be aware that the 0.5 rem limit to the unborn applies to the full 9-month pregnancy.

Your Additional Rights as a Worker

It is up to you to compare the benefits of your employment against the possible risks involving occupational radiation exposure to a known or potential unborn child. You should know that the Pregnancy Discrimination Act, an amendment of Title VII of the Civil Rights Act of 1964, states that "...women affected by pregnancy, childbirth, or related medical conditions; shall be treated the same for all employment-related purposes, including receipt of benefits under fringe benefit programs, as other persons not so affected but similar in their ability or inability to work." In addition, the Equal Employment Opportunity Commission (a Federal agency) is responsible for examining cases for compliance with this Act.

Why the Unborn Are More Sensitive

The unborn baby is more sensitive to radiation than the adult because of its rapid rate of development. At certain times during development, those cells forming a specific organ or body function are dividing very rapidly and therefore are most likely to be damaged. In addition, the unborn's organs and systems for fighting infections and harmful substances are not yet developed.

Four to six percent of the live births show some birth defect. Most often it is not possible to say what caused a particular birth defect. Out of 100 children born with birth defects, 2 to 3 can be attributed to drugs and chemicals. Defects in the genetic material of the parents are thought to cause another 25 out of 100 birth defects. About 1 out of 3 naturally aborted fetuses show abnormal genetic material. Other factors in the mother's life (including the exposure of the unborn to naturally occurring radiation) are thought to cause another 6 out of 100 birth defects. However, it is not known what causes the remaining birth defects, that is, about 65 out of 100. It is estimated that 70 out of 100 fertilized eggs will not result in the birth of a living infant.

Summary

Occupational exposures to radiation are being kept low, and are monitored by Health Physics, However, qualified scientists have recommended that the radiation dose to an embryo or fetus as a result of occupational exposure of the expectant mother should not exceed 0.5 rem because possible increased risk of childhood leukemia and cancer. Since this 0.5 rem is lower than the dose generally permitted to adult workers, you may want to take special actions to avoid receiving higher exposures, just as you might stop smoking during pregnancy or might climb stairs more carefully to reduce possible risks to their unborn children.

For additional information, please contact Health Physics.

Extract from USNRC Regulatory Guide 8.13 (Instruction Concerning Prenatal Radiation Exposure), August 1981.

Radiation Protective Measures

The key to minimizing radiation exposure is avoidance. All x-ray technicians, for example, are taught three ways of lessening their own exposure: time, distance and shielding.

Obviously by minimizing the length of your exposure, you are exposed to less radiation. The further you stand from a radiation source, the less you are exposed to. If one doubles the distance from a radiation source, your exposure is reduced by 3/4. If the distance is again doubled, the exposure or "dose rate" falls to 1/16 of its initial value.

Shielding is probably the most widely known device for reducing exposure and lead is probably the most widely known shielding material. Use of a lead apron or standing behind a leaded area will reduce your whole-body radiation exposure to almost zero.

In the final analysis, minimizing radiation exposure can be accomplished by you and your supervisor. Specific protection techniques vary depending on the source and use of radiaton. All services at MEDDAC/DENTAC that use radiation sources have prepared SOP's detailing procedures to be followed. In addition, Health Physics will provide specific instruction on an as required basis as well as monitoring capability.

If you have any questions, be sure to contact the Health Physics Office at one of the phone numbers listed on page 4.

Film Badge Service

The film badge is the standard personnel dosimeter for the Department of the Army. The exposures indicated by the film badge are recorded on a form that is a permanent part of your medical record and is maintained separately by the Health Physics Office.

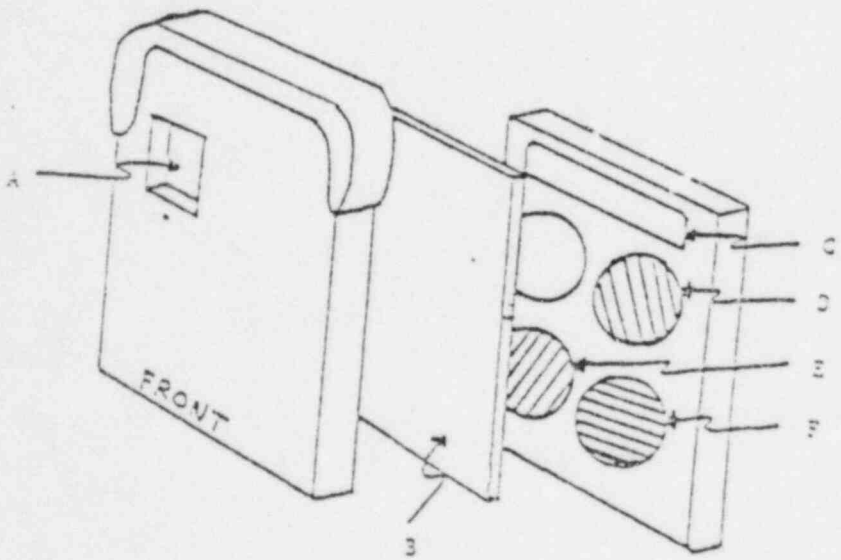
Because the exposure recorded by the film badge should be indicative of whole body exposure, it is worn between the neck and the waist. If a lead apron is worn, the film badge must be worn under your lead apron.

You may request an annual report of your history at any time, or may review your radiation exposure data with Health Physics at anytime.

Please notify Health Physics when you know you will be leaving your job at MEDDAC or DENTAC so that we can add your radiation exposure to your medical records and also complete your medical surveillance procedures.

All badges will be left at the designated storage area when leaving the work area.

If you intend to work at an installation other than MEDDAC or DENTAC where you could possibly be exposed to sources of ionizing radiation (e.g, an x-ray technician moonlighting at a civilian hospital), please inform Health Physics prior to the start of your off duty responsibility to insure that Health Physics is furnished with your, radiaton exposure during off duty employment (AR 40-14).



A BETA WINDOW
B FILM PACKET
C CADMIUM BAR FOR SHIELDING OF FILM IDENTIFICATION NUMBER
D ALUMINUM SHIELD
E COPPER SHIELD
F CADMIUM-TUNGSTEN SHIELD

PROGRAM FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES ALARA
MARTIN ARYI COMMUNITY HOSPITAL

February 25, 1981

1. MANAGEMENT COMMITMENT

a. We, the management of this medical facility, are committed to the program described in this paper for keeping exposures (individual and collective) as low as is reasonably achievable (ALARA). In accord with this commitment, we hereby describe an administrative organization for radiation safety and will develop the necessary written policy, procedures, and instructions to foster the ALARA concept within our institution. The organization will include the Radioisotope and Radiation Protection/Control Committee (RRPCC) and the Radiation Protection Officer (RPO).

b. We will perform a formal annual review of the radiation safety program, including ALARA considerations. This shall include reviews of operating procedures and past exposure records, inspections, etc., and consultations with the radiation protection staff or outside consultants.

c. Modification to operating and maintenance procedures and to equipment and facilities will be made where they will reduce exposures unless the cost, in our judgment, is considered to be unjustified. We will be able to demonstrate, if necessary, that improvements have been sought, that modifications have been considered, and that they have been implemented where reasonable. Where modifications have been recommended but not implemented, we will be prepared to describe the reasons for not implementing them.

d. In addition to maintaining doses to individuals as far below the limits as is reasonably achievable, the sum of the doses received by all exposed individuals will also be maintained at the lowest practicable level. It would not be desirable, for example, to hold the highest doses to individuals to some fraction of the applicable limit if this involved exposing additional people and significantly increasing the sum of radiation doses received by all involved individuals.

2. RADIOISOTOPE AND RADIATION PROTECTION/CONTROL COMMITTEE (RRPCC)

a. Review of Proposed Users and Uses

(1) The RRPCC will thoroughly review the qualifications of each applicant with respect to the types and quantities of

materials and uses for which he has applied to ensure that the applicant will be able to take appropriate measures to maintain exposure ALARA.

(2) When considering a new use of byproduct material, the RRPCC will review the efforts of the applicant to maintain exposure ALARA. The user should have systematized procedures to ensure ALARA and shall have incorporated the use of special equipment, such as syringe shields, rubber gloves, etc., in his proposed use.

(3) The RRPCC will ensure that the user justifies his procedures and that dose will be ALARA (individual and collective).

b. Delegation of Authority

(1) The RRPCC will delegate authority to the RPO for enforcement of the ALARA concept.

(2) The RRPCC will support the RPO in those instances where it is necessary for the RPO to assert his/her authority. Where the RPO has been overruled, the committee will record the basis for its action in the minutes of the committee's quarterly meeting.

c. Review of ALARA Program

(1) The RRPCC will encourage all users to review current procedures and develop new procedures as appropriate to implement the ALARA concept.

(2) The RRPCC will perform a quarterly review of occupational radiation exposure with particular attention to instances where investigational levels in Table 1 below are exceeded. The principal purpose of this review is to assess trends in occupational exposure as an index of the ALARA program quality and to decide if action is warranted when investigational levels are exceeded (see Section 6).

(3) The RRPCC will evaluate our institution's overall efforts for maintaining exposures ALARA on an annual basis. This review will include the efforts of the RPO, authorized users, and workers as well as those of management.

3. RADIATION PROTECTION OFFICER (RPO)

a. Annual and Quarterly Review

(1) Annual review of the radiation safety program. The RPO will perform an annual review of the radiation safety program for adherence to ALARA concepts.

(2) Quarterly review of occupational exposures. The RPO will review at least quarterly the external radiation exposures

of authorized users and workers to determine that their exposures are ALARA in accordance with the provisions of Section 6 of this program.

(3) Quarterly review of records of radiation level surveys. The RPO will review radiation levels in unrestricted and restricted areas to determine that they were at ALARA levels during the previous quarter.

b. Education Responsibilities for ALARA Program

(1) The RPO will schedule briefings and educational sessions to inform workers of ALARA program efforts.

(2) The RPO will ensure that authorized users, workers, and ancillary personnel who may be exposed to radiation will be instructed in the ALARA philosophy and informed that management, the RRPCC, and the RPO are committed to implementing the ALARA concept.

c. Cooperative Efforts for Development of ALARA Procedures

Radiation workers will be given opportunities to participate in formulation of the procedures they will be required to follow.

(1) The RPO will be in close contact with all users and workers in order to develop ALARA procedures for working with radioactive materials.

(2) The RPO will establish procedures for receiving and evaluating the suggestions of individual workers for improving health physics practices and will encourage the use of those procedures.

d. Reviewing Instances of Deviation from Good ALARA Practices

The RPO will investigate all known instances of deviation from good ALARA practices and, if possible, will determine the causes. When the cause is known, the RPO will recommend changes in the program to maintain exposures ALARA.

4. AUTHORIZED USERS

a. New Procedures Involving Potential Radiation Exposures

(1) The authorized user will consult with, and receive the approval of, the RPO and/or RRPCC during the planning stage before using radioactive materials for a new procedure.

(2) The authorized user will evaluate all procedures before using radioactive materials to ensure that exposures will be kept ALARA. This may be enhanced through the application of trial runs.

b. Responsibility of Authorized User to Persons Under His/Her Supervision

(1) The authorized user will explain the ALARA concept and his/her commitment to maintain exposures ALARA to all persons under his/her supervision.

(2) The authorized user will ensure that persons under his/her supervision, who are subject to occupational radiation exposure, are trained and educated in good health physics practices and in maintaining exposures ALARA.

5. PERSONS WHO RECEIVE OCCUPATIONAL RADIATION EXPOSURE

a. The worker will be instructed in the ALARA concept and its relationship to working procedures and work conditions by the supervisor.

b. The worker will know what recqurses are available if he/she feels that ALARA is not being promoted on the job.

6. ESTABLISHMENT OF INVESTIGATIONAL LEVELS IN ORDER TO MONITOR INDIVIDUAL OCCUPATIONAL EXTERNAL RADIATION EXPOSURES

This institution hereby establishes investigational levels for occupational external radiation exposure which, when exceeded, will initiate review or investigation by the RSPCC and/or the RPO. The investigational levels that we have adopted are listed in Table 1 below. These levels apply to the exposure of individual workers.

TABLE 1

	Investigational Levels (mrems per calendar quarter)	
	Level I	Level II
1. Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads	125	375
2. Hands and forearms; feet and ankles	1875	5625
3. Skin of whole body	750	2250

The Radiation Protection Officer will review and record on DD Form 1141, Record of Occupational Exposure to Ionizing Radiation, or an equivalent form (e.g., dosimeter processor's report) results of personnel monitoring not less than once in any calendar quarter as required by Paragraph 20.401 of 10 CFR Part 20. The following actions will be taken at the investigational levels as stated in Table 1:

a. Quarterly exposure of individuals to less than investigational level 1 --

Except when deemed appropriate by the RPO, no further action will be taken in those cases where an individual's exposure is less than Table 1 values for investigational level 1.

b. Personnel exposures equal to or greater than investigational level I, but less than investigational level II --

The RPO will review the exposure of each individual whose quarterly exposures equal or exceed investigational level I and will report the results of the reviews at the first RRPCC meeting following the quarter when the exposure was recorded. If the exposure does not equal or exceed investigational level II, no action related specifically to the exposure is required unless deemed appropriate by the committee. The committee will, however, consider each such exposure in comparison with those of others performing similar tasks as an index of ALARA program quality and will record the review in the committee minutes.

c. Exposure equal to or greater than investigational level II --

The RPO will investigate in a timely manner the cause(s) of all personnel exposures equalling or exceeding investigational level II and, if warranted, will take action. A report of the investigation, actions taken, if any, and a copy of the individual's DD Form 1141 or its equivalent will be presented to the RRPCC at the first RRPCC meeting following completion of the investigation. The details of these reports will be recorded in the RRPCC minutes. Committee minutes will be sent to the management of this institution for review. The minutes, containing details of the investigation, will be made available to NRC inspectors for review at the time of the next inspection.

d. Reestablishment of an individual occupational worker's investigational level II to a level above that listed in Table 1 --

In cases where a worker's or a group of workers' exposures need to exceed investigational level II, a new, higher investigational

level II may be established on the basis that it is consistant with good ALARA practices for that individual or group. Justification for a new investigational level II will be documented.

The RRPCC will review the justification for, and will approve, all revisions of investigational level II. In such cases, when the exposure equals or exceeds the newly established investigational level II, those actions listed in paragraph 6c above will be followed.

7. SIGNATURE OF CERTIFYING OFFICIAL

I hereby certify that this institution has implemented the ALARA Program set forth above.

JOHN C. RICHARDS, M.D.
Colonel, Medical Corps
Commanding

Institution Name and Address:

Martin Army Community Hospital
Fort Benning, Georgia 31905

ITEM 13

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

ITEM 13

Procedures for Ordering and Receiving Radioactive Material

1. The Nuclear Medicine Technologist will place all orders for radiopharmaceuticals and will insure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded. The Radiation Protection Officer, MACH, shall review all purchase requests for radioactive materials, to include initial Blanket Purchase Agreements.

2. During normal duty hours carriers will be instructed to deliver radioactive packages directly to the Nuclear Medicine Department.

3. Radioactive materials for MACH which arrive after normal duty hours, shall be delivered to the office of the AOD/SDNCO. They will immediately take the material to the Nculear Medicine Department, secure the shipment in the HOT LAB, Room 146, then notify the Nuclear Medicine Technologist on call of the receipt of the radioactive shipment. Telephone numbers are appropriately posted on the Nuclear Medicine Department door, and in the AOD Instruction Manual.

4. The packages may be visually inspected for possible leakage or dampness. In the event this occurs, the packages are to be left in an isolated area. People must be warned to stay away from the material and the Radiation Protection Officer notified immediately.

5. Under no circumstances are the packages to be opened or tampered with in any way.

Radiation Protection Officer:	1LT Mary E. Thompson
Office Phone:	404-544-1554/2458
Home Phone:	404-689-2303
Nuclear Medicine Tech:	Ms. Pamela Gaultney
Office Phone:	404-544-3787/2313
Pager:	544-9-151

608-07
SF 5

NUCLEAR MEDICINE PHARMACY, INC.

Of Georgia

1016 Virginia Street
Columbus, Georgia 31901, Phone: (404) 324-0066

LICENSE VERIFICATION

Nuclear Pharmacy:

1. Georgia Radioactive Materials License No. GA 746-1 ND
2. Georgia Pharmacy Permit No. 5662
3. Alabama Pharmacy Permit No. 107236

Nuclear Pharmacists:

1. Kenneth M. Duke
   a. Georgia Pharmacist No. 13122
   b. Alabama Pharmacist No. 10243
   c. Training: University of Georgia School of Pharmacy
      Oak Ridge Associated Universities
2. John W. McManus
   a. Georgia Pharmacist No. 11115
   b. Training: University of Georgia School of Pharmacy
      Oak Ridge Associated Universities

All licenses and permits are open for inspection and maintained on the premises, located at:

1016 Virginia Street
Columbus, Georgia 31901

10/3/83
DATE

Kenneth M. Duke
Kenneth M. Duke
Manager, Nuclear Pharmacy

ITEM 14

PROCEDURES FOR SAFELY OPENING PACKAGES
CONTAINING RADIOACTIVE MATERIALS

APPENDIX F

PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

1. Special requirements will be followed for packages containing quantities of radioactive material in excess of the Type A quantity limits as specified in paragraphs 20.205(a)(1) and (c)(1) of 10 CFR Part 20 (more than 20 Ci for Mo-99 and Tc-99m). They will be monitored for surface contamination and external radiation levels within 3 hours after receipt if received during working hours or within 18 hours if received after working hours, in accordance with the requirements of paragraphs 20.205(a) through (c). All shipments of liquids greater than exempt quantities will be tested for leakage. The NRC Regional Office will be notified in accordance with the regulations if removable contamination exceeds 0.01 μCi/100 cm^2 or if external radiation levels exceed 200 mR/hr at the package surface or 10 mR/hr at 3 feet (or 1 m).

2. For all packages, the following additional procedures for opening packages will be carried out:

   a. Put on gloves to prevent hand contamination.

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

   c. Measure exposure rate at 3 feet (or 1 m) from package surface and record. If >10 mR/hr, stop procedure and notify Radiation Safety Officer.

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

   e. Open the package with the following precautionary steps:

      (1) Open the outer package (following manufacturer's directions, if supplied) and remove packing slip.

      (2) Open inner package and verify that contents agree with those on packing slip. Compare requisition,* packing slip, and label on bottle.

      (3) Check integrity of final source container (i.e., inspect for breakage of seals or vials, loss of liquid, and discoloration of packaging material).

      (4) Check also that shipment does not exceed possession limits.

   f. Wipe external surface of final source container and remove wipe to low background area. Assay the wipe and record amount of removable radioactivity (e.g., μCi/100 cm^2, etc.). Check wipes with a thin-end-window G-M survey meter, and take precautions against the spread of contamination as necessary.

   g. Monitor the packing material and packages for contamination before discarding.

      (1) If contaminated, treat as radioactive waste.

      (2) If not contaminated, obliterate radiation labels before discarding in regular trash.

3. Maintain records of the results of checking each package, using "Radioactive Shipment Receipt Record" (see next page) or a form containing the same information.

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* In the case of special orders (e.g., therapy doses), also compare with physician's written request.

RADIOACTIVE SHIPMENT RECEIPT REPORT

NUCLEAR MEDICINE

1. ORDER# _____ SURVEY DATE _____ TIME _____ TECH _____

2. CONDITION OF PACKAGE: _____ OK _____ PUNCTURED _____ STAINS

_____ CRUSHED _____ OTHER

3. RADIATION UNITS OF LABEL: _____ UNITS (mR/hr)

4. MEASURED RADIATION LEVELS: (A) PACKAGE SURFACE _____ (mR/hr)
(B) 3' FROM SURFACE _____ (mR/hr)

5. DO PACKING SLIP AND VIAL CONTENTS AGREE?

RADIONUCLIDE _____ YES _____ NO _____ NO DIFFERENCE
AMOUNT _____ YES _____ NO _____ NO DIFFERENCE
CHEM FORM _____ YES _____ NO _____ NO DIFFERENCE

6. WIPE RESULTS FROM: a. OUTER _____ CPM= _____ DPM
eff=( )

b. FINAL SOURCE CONTAINER _____ CPM= _____ DPM
eff=( )

7. SURVEY RESULTS OF PACKING MATERIAL AND CARTONS _____ (mR/hr)
CPM ABOVE BKG.

8. IF PACKAGE WAS SHIPPED WITH DRY ICE, WAS DRY ICE PRESENT IN PACKAGE AT TIME OF RECEIPT? _____ YES _____ NO _____ N/A

9. DISPOSITION OF PACKAGE AFTER INSPECTION: SAVE FOR NUC. MED. PHARMACY

10. IF NRC/CARRIER NOTIFICATION REQUIRED, GIVE TIME, DATE, PERSONS NOTIFIED.

RX #	LOT #	RADIO-PHARMACEUTICAL	DOSE ACTIVITY	CPM/DPM
		99m Tc FLOOD		

FR(MED)FM 776 (REVISED) 1 AUG 83

RADIOACTIVE SHIPMENT RECEIPT REPORT

1. P.O. No.: _____ Survey Date _____ Time _____

   Surveyor _____

2. CONDITION OF PACKAGE:

   _____ O.K. _____ Punctured _____ Status _____ Wet

   _____ Crushed _____ Other

3. RADIATION UNITS OF LABEL: _____ Units (mR/hr)

4. MEASURED RADIATION LEVELS:

   a. Package surface _____ mR/hr

   b. 3 feet or 1 meter from surface _____ mR/hr

5. DO PACKING SLIP AND VIAL CONTENTS AGREE?

   a. Radionuclide _____ yes _____ no, difference _____

   b. Amount _____ yes _____ no, difference _____

   c. Chem Form _____ yes _____ no, difference _____

6. WIPE RESULTS FROM:

   a. Outer _____ CPM = _____ DPM

      eff = ( )

   b. Final source container _____ CPM = _____ DPM

      eff = ( )

8. SURVEY RESULTS OF PACKING MATERIAL AND CARTONS _____ mR/hr, CPM

9. DISPOSITION OF PACKAGE AFTER INSPECTION _____

10. IF NRC/CARRIER NOTIFICATION REQUIRED, GIVE TIME, DATE, AND PERSONS NOTIFIED.

_____

Signature Date

ITEM 15

GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIALS

APPENDIX G

GENERAL RULES FOR SAFE USE OF RADIOACTIVE MATERIAL

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

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

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

4. Always use syringe shields for routine preparation of patient doses and administration to patients, except in circumstances such as pediatric cases when their use would compromise the patient's well-being. In these exceptional cases, use other protective methods such as remote delivery of the dose (e.g., through use of a butterfly valve).

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

   b. Do not store food, drink, or personal effects with radioactive material.

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

   b. For therapeutic doses, also check the patient's name, the radionuclide, the chemical form, and the activity vs. the order written by the physician who will perform the procedure.

7. Wear personnel monitoring devices (film badge or TLD) at all times while in areas where radioactive materials are used or stored. These devices should be worn at chest or waist level. Personnel monitoring devices when not being worn to monitor occupational exposures should be stored in a designated low background area.

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

9. Dispose of radioactive waste only in specially designated and properly shielded receptacles.

10. Never pipette by mouth.

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

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

13. Always transport radioactive material in shielded containers.

ITEM 16

EMERGENCY PROCEDURES

APPENDIX H

EMERGENCY PROCEDURES

Minor Spills

1. NOTIFY: Notify persons in the area that a spill has occurred.

2. PREVENT THE SPREAD: Cover the spill with absorbent paper.

3. CLEAN UP: Use disposable gloves and remote handling tongs. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves.

4. SURVEY: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination.

5. REPORT: Report incident to the Radiation Safety Officer.

Major Spills

1. CLEAR THE AREA: Notify all persons not involved in the spill to vacate the room.

2. PREVENT THE SPREAD: Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

3. SHIELD THE SOURCE: If possible, the spill should be shielded, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

4. CLOSE THE ROOM: Leave the room and lock the door(s) to prevent entry.

5. CALL FOR HELP: Notify the Radiation Safety Officer immediately.

6. PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

RADIATION SAFETY OFFICER: Mary E. Thompson
OFFICE PHONE: (404) 544-2458/1554
HOME PHONE: (404) 689-2303

ALTERNATE NAMES AND TELEPHONE NUMBERS DESIGNATED BY RADIATION SAFETY OFFICER:

_____

_____

_____

* The appropriate information for your facility should be supplied in these blanks when posting these procedures or submitting them with the application.

ITEM 17

AREA SURVEY PROCDURES

APPENDIX I

AREA SURVEY PROCEDURES

1. All elution, preparation, and injection areas will be surveyed daily with an appropriately low-range survey meter and decontaminated if necessary.*

2. Laboratory areas where only small quantities of radioactive material are used (less than 200 μCi) will be surveyed monthly.

3. Waste storage areas and all other laboratory areas will be surveyed weekly.

4. The weekly and monthly surveys will consist of:

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

   b. A series of wipe tests to measure contamination levels. The method for performing wipe tests will be sufficiently sensitive to detect 200 dpm per 100 cm^2 for the contaminant involved. Wipes of elution and preparation areas or other "high background" areas will be removed to a low background area for measurement.

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

   a. Location, date, and identification of equipment used, including the serial number and pertinent counting efficiencies.

   b. Name of person conducting the survey.

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

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

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

   f. 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.

6. Area will be cleaned if the contamination level exceeds 200 dpm/100 cm^2.

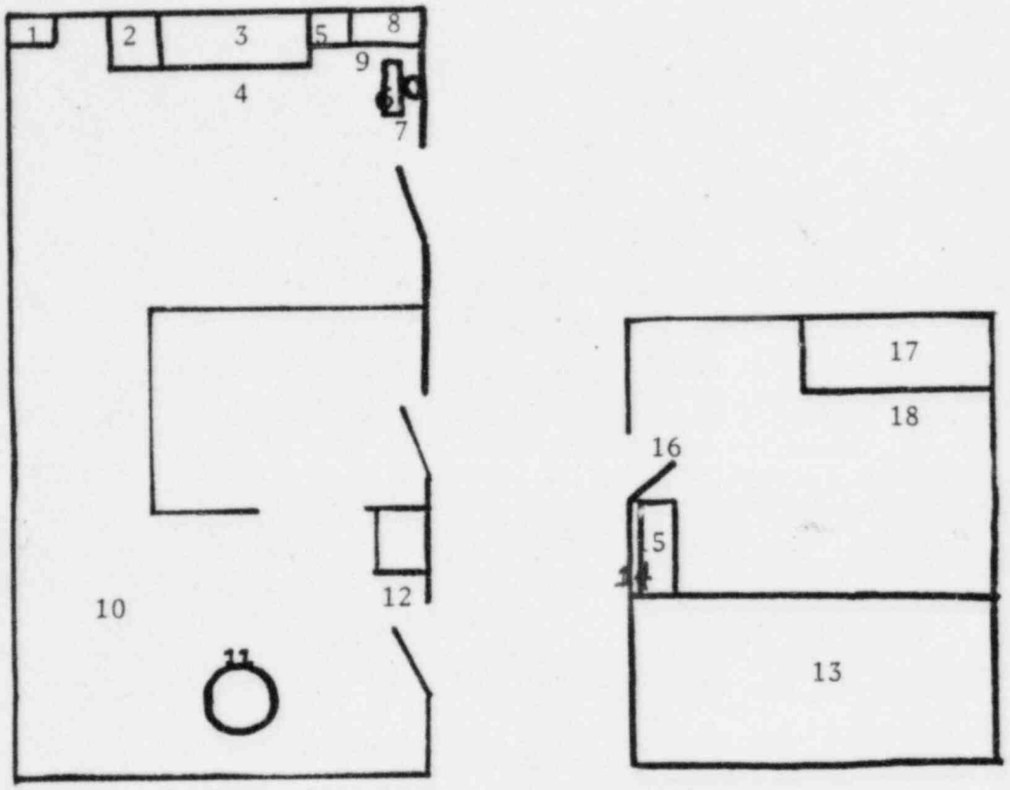
* For daily surveys where no abnormal exposures are found, only the date, the identification of the person performing the survey, and the survey results will be recorded.

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
ATZB-MAH-X	Area Survey

TO	FROM	DATE	CMT 1
Health Physics	Nuclear Medicine		



1. Hot Sink
2. Floor- front of rad waste area
3. Fume Hood
4. Floor- in front of fume hood
5. Floor- sealed source storage safe
6. Dose Table
7. Floor- in front of dosing area
8. Dose Calibrator
9. Floor- in front of calibrator
10. Floor- Imaging Room
11. Floor- Dynamic flow dosing area
12. Floor- Thyroid Uptake area
13. Waiting Room
14. Floor- injecting area
15. Treadmill
16. Floor- entrance of treadmill area
17. Patient table
18. Floor- In front of table

Technician: _____ BKG= _____

Instrument Used: _____

RESULTS

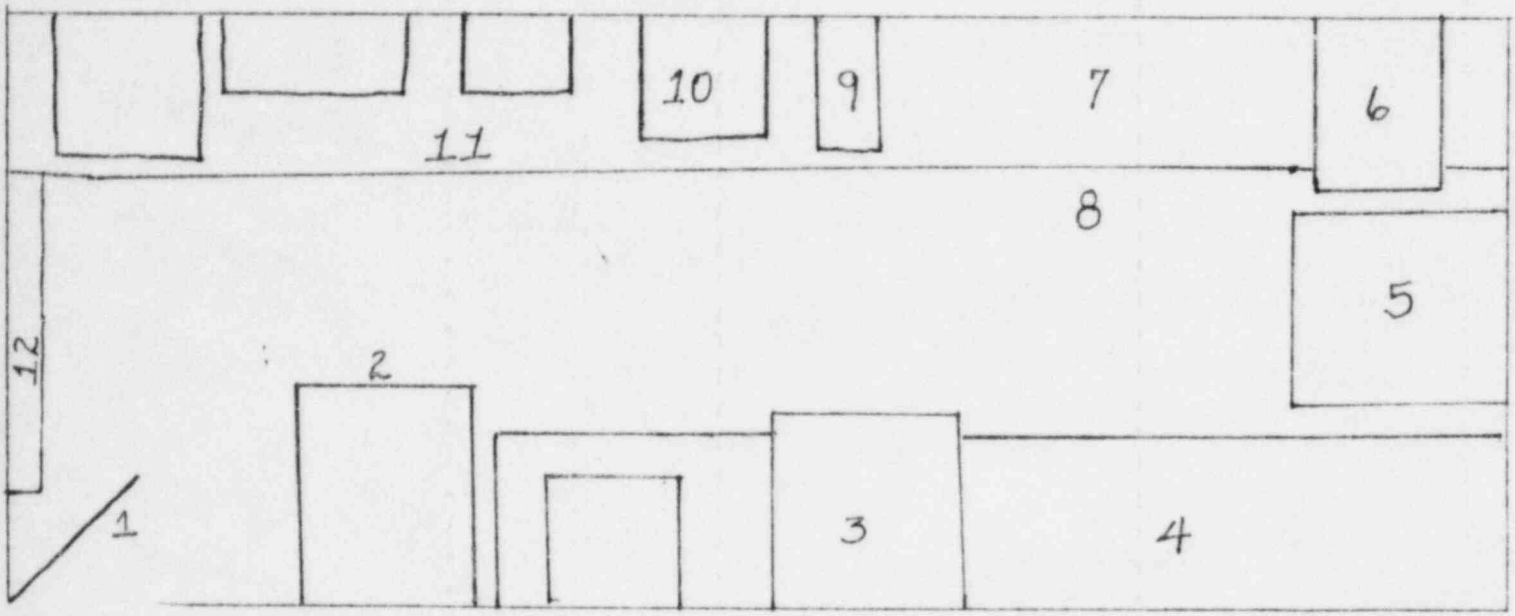
	mR/hr	cpm	dpm						
1.				7.			13.		
2.				8.			14.		
3.				9.			15.		
4.				10.			16.		
5.				11.			17.		
6.				12.			18.		

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO

REFERENCE OR OFFICE SYMBOL	SUBJECT
HSXB-L	RIA Weekly Survey

TO Health Physics FROM Dept of Pathology DATE CMT 1



1. Floor (entrance)
2. Floor (refrigerator)
3. Gamma-Counter
4. Desk area
5. Work table
6. Centrifuge
7. RIA area
8. RIA floor
9. Waterbath area
10. Hot Sink (top)
11. Blotting area (hot)
12. Fume hood

mR/HR Daily Counter Results

	Mon	Tue	Wed	Thu	Fri
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

Instrument: _____
BKG: _____
Surveyor: _____

Weekly Results (WIPE)

	cpm	dpm	MR/HR
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

$dpm = \frac{cpm}{\text{efficiency (expressed as dec.)}}$

SWIPES should not exceed 200 dpm.

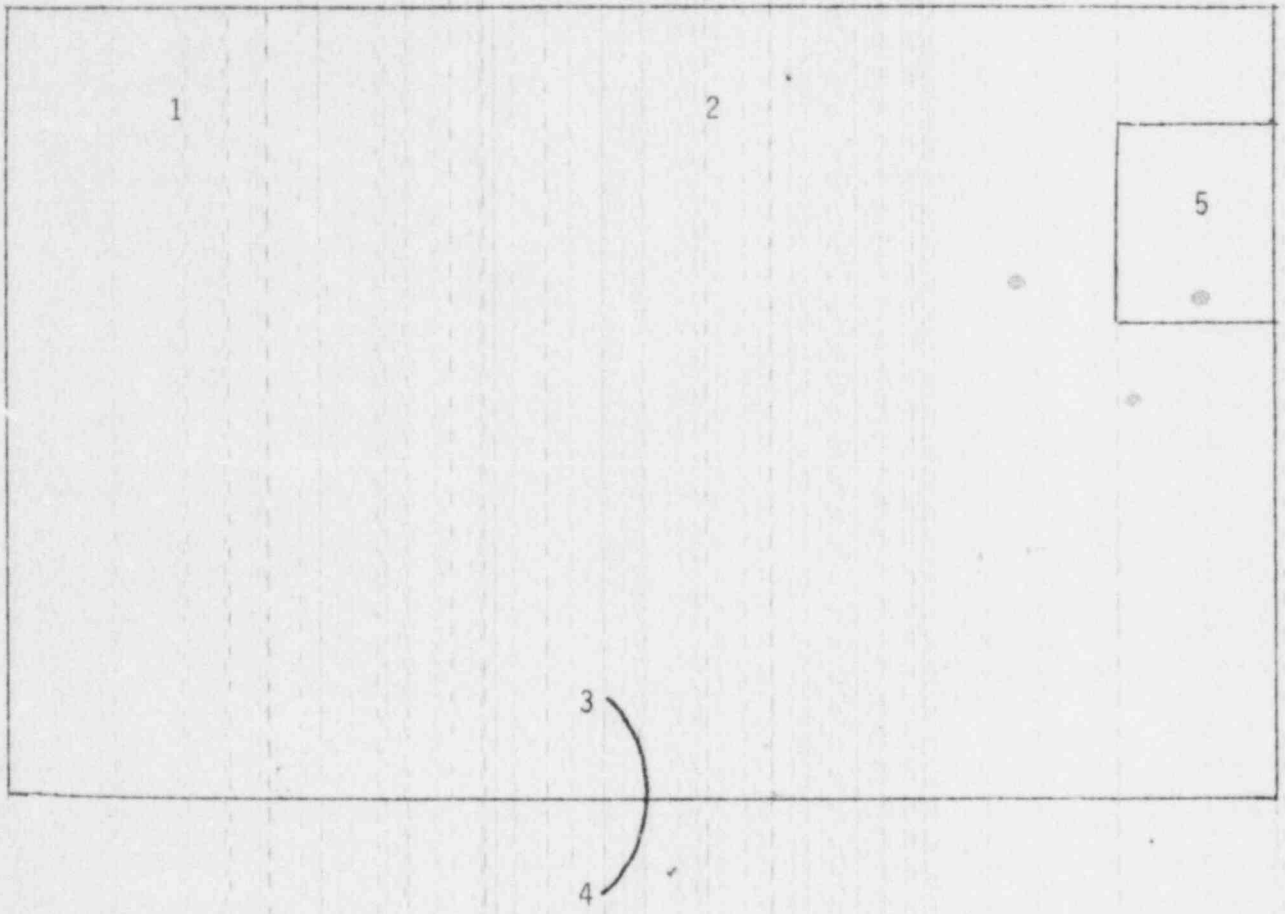
Call Health Physics Dept. if ranges are exceeded.
(See Radiation Safety in RIA Admin SOP)

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
HSXB-PM-HP	Rad Waste Area Survey

TO Health Physics Office FROM RPO DATE CMT 1



RESULTS

	mR/hr	cpm	dpm
1. Floor - front of drums			
2. Floor - front of drums			
3. Floor - front of door			
4. Exterior floor - front of door			
5. Sealed Source area			

Instrument used: _____

Surveyor: _____

BKG: _____

ITEM 18

WASTE DISPOSAL

18

APPENDIX J

WASTE DISPOSAL

Note: In view of the recent problems with shallow-land burial sites used by commercial waste disposal firms, NRC is encouraging its licensees to reduce the volume of wastes sent to these facilities. Important steps in volume reduction are to segregate radioactive from nonradioactive waste, to hold short-lived radioactive waste for decay in storage, and to release certain materials in the sanitary sewer in accordance with § 20.303 of 10 CFR Part 20.

1. Liquid waste will be disposed of (check as appropriate)

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

____ By commercial waste disposal service (see also Item 4 below).

____ Other (specify): _____

2. Mo-99/Tc-99m generators will be (check as appropriate)

____ Returned to the manufacturer for disposal.

X Held for decay* until radiation levels, as measured in a low background area 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 will be disposed of as normal trash.**

Currently generators have been discontinued Radiopharmaceuticals are procured in patient unit doses.

* Be sure that waste storage areas were described in Item 11 and that they are surveyed periodically (Item 17).

** These generators may contain long-lived radioisotopic contaminants. Therefore, the generator columns will be segregated so that they may be monitored separately to ensure decay to background levels prior to disposal.

____ Disposed of by commercial waste disposal service (see also Item 4 below).

____ Other (specify): _____

3. Other solid waste will be (check as appropriate)

X Held for decay* until radiation levels, as measured in a low background area 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.

____ Disposed of by commercial waste disposal service (see also Item 4 below).

____ Other (specify): _____

4. The commercial waste disposal service used will be

_____
(Name) (City, State)

NRC/Agreement State License No. _____