NRC FORM 313
(1-84)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires: 5-31-87

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 760

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

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

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

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [X] C. RENEWAL OF LICENSE NUMBER 04-01496-01

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*

Department of the Army
Letterman Army Medical Center
ATTN: HSHH-PM-HP (Health Physics)
Presidio of San Francisco, CA 94129-6700

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Letterman Army Medical Center and Letterman Army Institute of Research
Presidio of San Francisco, California 94129-6700

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Carl E. Bergsagel, MAJ, MS, Chief, Health Physics Office

TELEPHONE NUMBER: (415) 561-2794

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

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

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

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

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

9. FACILITIES AND EQUIPMENT. TAB E

10. RADIATION SAFETY PROGRAM. TAB F

11. WASTE MANAGEMENT. TAB G

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY: EXCEPTED
AMOUNT ENCLOSED: $ 0

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

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

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

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
Paul L. Shetler	PAUL L. SHETLER, COL, MC	Commander Letterman Army Medical Ctr.	20 DEC 1988

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS

- [ ] <$250K
- [ ] $250K–500K
- [ ] $500K–750K
- [ ] $750K–1M
- [ ] $1M–3.5M
- [ ] $3.5M–7M
- [ ] $7M–10M
- [ ] >$10M

b. NUMBER OF EMPLOYEES *(Total for entire facility excluding outside contractors)*

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(dollar and/or staff hours)* ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? *(NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)*

- [ ] YES
- [ ] NO

FEE EXEMPT

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY

AMOUNT RECEIVED	CHECK NUMBER		DATE
		8909150111 890505 REG5 LIC30 04-01496-01 PDR	

PRIVACY ACT STATEMENT ON THE REVERSE

ITEM 5

Radioactive Materials

Isotope	Chemical Form	Quantity	Purpose
1. Byproduct materials Atomic Nos. 3-83 with a half life of less than 120 days	1. Any	1. 500 millicuries each with a maximum possession limit of 10000 millicuries	1. See Item 6
2. Byproduct materials Atomic Nos. 3-83	2. Sealed	2. 500 millicuries each	2. See Item 6
3. Americium 241	3. Sealed	3. 2 millicuries	3. See Item 6
4. Cadmium 109	4. Any	4. 10 millicuries	4. See Item 6
5. Calcium 45	5. Any	5. 15 millicuries	5. See Item 6
6. Carbon 14	6. Any	6. 1000 millicuries	6. See Item 6
7. Cesium 137	7. J.L Shepard Model 28-6A with Amersham X.19 Cs-137 Source	7. 1000 millicuries ? x.9	7. Calibration Range
8. Cesium 137	8. Any	8. 20 millicuries	8. See Item 6
9. Hydrogen 3	9. Any	9. 1000 millicuries	9. See Item 6
10. Iodine 131	10. Any	10. 1000 millicuries	10. See Item 6
11. Manganese 54	11. Any	11. 10 millicuries	11. See Item 6
12. Molybdenum 99	12. Any	12. 5000 millicuries	12. See Item 6
13. Technetium 99m	13. Any	13. 5000 millicuries	13. See Item 6
14. Any byproduct material in 10 CFR 35.400	14. IAW 10CFR 30.32	14. 3500 millicuries	14. Medical use 10 CFR 35.400
15. Any byproduct material in 10 CFR 35.500	15. IAW 10CFR 30.32	15. 8000 millicuries	15. Medical use 10 CFR 35.500
16. Uranium depleted in U-235	16. Plated metal	16. 136.4 kilograms	16. Linear accelerator shield

ITEM 6

Authorized Uses

Authorized Uses.

a. Medical uses as defined in 10 CFR 35.2.

b. Research in humans as approved either:

1) by the FDA, or

2) by an RDRC approved by the FDA.

c. Research in animals.

d. Research as defined in 10 CFR 30.4(q).

e. *In vitro* testing.

f. Instrument calibration.

g. Training.

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

1. Criteria for Authorization of Radioisotope Users.

a. The following excerpt of our local regulation LAMC 40-34, details the criteria used for the authorization of radioisotope users. The forms included below are examples and should not be misinterpreted otherwise. If the need arises, these forms are subject to change. Any changes would be initiated to more closely comply with the regulations and would be approved by the Radiation Control Committee before being used.

POLICY ON USE OF RADIOACTIVE MATERIALS

Radioactive materials are to be used only by, or under the direct supervision of, individuals approved by the Radiation Control Committee and in accordance with procedures approved by the Radiation Control Committee.

PROCEDURES FOR OBTAINING AUTHORIZATION
TO USE RADIOACTIVE MATERIALS

1. GENERAL. This Annex outlines the procedures for individuals to obtain authorization to use radioactive materials under the Letterman Army Medical Center's Nuclear Regulatory Commission Byproduct Materials License and Department of the Army Authorization.

2. DEFINITIONS.

a. PRINCIPAL AUTHORIZED USER: The "principal authorized user" is the individual who bears the ultimate responsibility for possession, inventory, and implementation of the safety procedures necessary to assure the safe use of the materials specified in the application. The principal authorized user is directly responsible to the Radiation Control Committee and to the Radiation Protection Officer for matters relevant to radiation safety.

b. AUTHORIZED USER: An "authorized user" is an individual who possesses adequate training and experience with radioactive material to qualify him as a principal authorized user for those materials specified in the application. The authorized user works under the direction of and is directly responsible to the principal authorized user for the safe and proper use of the material specified in the application. He must demonstrate training and experience in radiation safety procedures and submit documentation of previous training and experience for all materials specified in the application.

c. TECHNOLOGIST: A "technologist" is an individual who by virtue of training and experience is capable of making routine decisions commensurate with his duties involving the use of radioactive materials. This individual should require minimal supervision and should be capable of supervising subordinate technologists and trainees. The technologist is responsible to the principal authorized user for the safe and proper handling of radioactive material. Professional certification is desirable but not a prerequisite for classification as a technologist; however, documentation of training and experience equivalent to requirements for certification must be submitted in lieu of the certification.

d. RESIDENT USER: A "resident user" is an individual who works under the direct supervision of a principal authorized user, or authorized user for the purpose of performing certain routine duties associated with use of materials specified in the application. He may not possess the necessary training or experience to be classified as a principal authorized user or authorized user. He must demonstrate previous training and experience comparable with use of radioactive material specified in the application. The principal authorized user must assure that resident users have been trained in the safe use of radioactive materials.

e. TRAINEE: A "trainee" is an individual who does not possess adequate training and experience to be designated in any of the above categories. He is assigned to this category so that he may obtain the necessary training and experience under immediate supervision. It is the goal of the trainee to obtain suitable training and experience to become qualified for a higher classification.

f. RADIATION PROTECTION OFFICER: The "Radiation Protection Officer" is the individual identified by the Nuclear Regulatory Commission as the person responsible for ensuring compliance with the applicable regulations associated with the radioisotope license. This person is named on the NRC license and on orders by the Radiation Control Committee.

g. RADIATION CONTROL COMMITTEE: This group of individuals are persons who have demonstrated the training and experience with radioisotopes required to implement and oversee a broad scope radioisotope program. This group convenes at least quarterly or more frequently as needed. They address all questions regarding radioactive materials used at LAMC and LAIR.

h. DIRECT SUPERVISION: Direct supervision means being either physically present or immediately available by phone and within one hour of the facility.

i. IMMEDIATE SUPERVISION: Immediate supervision means being physically present or in the immediate area where isotopes are being used.

3. PROCEDURE.

a. To obtain authorization to use radioactive materials, to renew, or modify an existing authorization, individuals will submit an "Application for Authorization to Use Radioactive Materials" (Human Use/Non-Human Use) to the Radiation Protection Officer. This form will be reviewed by the Radiation Control Committee to assure compliance with established procedures and regulations.

b. In addition to the above form, each individual listed on the authorization is required to submit a completed "Summary of Radiological Qualifications" and an NRC Form 313M, Supplement A, "Training and Experience - Authorized User or Radiation Safety Officer," and a current *curriculum vitae*. Physicians requesting a Human Use Authorization are also required to submit a completed NRC 313M, Supplement B, "Preceptor Statement", or applicable board certification. Training and experience documentation submitted by the principal authorized user, authorized users, and technologists will be reviewed by the Radiation Control Committee for the purpose of making recommendations to the Commander, LAMC, regarding the granting of privileges to receive, store, use, and dispose of radioactive materials under the LAMC radioactive material license and the pertinent LAMC regulations.

c. Individuals who want to perform research with radioisotopes will complete a "Research Protocol for Radioisotope Use." This form addresses procedures that will be utilized to insure proper and safe use of the authorized materials.

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

4. EVALUATION.

a. "Application for Authorization to Use Radioactive Materials" will be individually reviewed by the Radiation Protection Officer and by the Radiation Control Committee to assure adequate training and experience of users for the use of radioactive material requested in the authorization. The applicant is expected to demonstrate in the application that, based upon education, experience, and the equipment and the facilities available, the radioactive materials requested will be used in a safe manner and in accordance with existing directives.

b. The applicant may be required to obtain additional education, experience, or equipment, if it is deemed necessary.

c. The Radiation Protection Officer will review each application to ensure that:

1) Individuals listed on the application have sufficient training and experience to safely conduct the proposed procedures;

2) Proposed procedures do not violate applicable regulations; and

3) Facilities and equipment at the proposed work site provide an adequate margin of safety for individuals performing the procedure and for public safety. Unacceptable applications will be returned to the applicant for correction or modification. Applications recommended for approval are signed by the Radiation Protection Officer and transmitted to the Chairman, Radiation Control Committee with a recommended list of conditions that should apply to the authorization on a "Conditions For Authorized Use of Radioactive Materials at LAMC."

d. The Radiation Control Committee will review the training and experience of all principal authorized users, authorized users, and technologists to assure that the documented training and experience of all users of radioactive material is adequate for the material being authorized or requested and for the individual's level of responsibility. Criteria to be utilized in this determination will be those specified in 10 CFR Part 35, Subpart J, 10 CFR 33.15, and this Annex as appropriate. Principal authorized users, and authorized users listed on an authorization must be credentialed by the Committee or receive interim approval prior to their initiating or participating in any work under the authorization. Technologists and trainees may receive interim approval to use radioisotopes by the Radiation Protection Officer. These approvals must be received before beginning work with any radioisotopes.

e. The Chairman of the Radiation Control Committee reviews applications to assure compliance with established procedures, precedents, and regulations. Unacceptable applications are returned to the applicant *via* the Radiation Protection Officer. Aporoved applications are signed by the Chairman and transmitted to the applicant *via* the Radiation Protection Officer.

f. Notification of the granting of interim approval to utilize radioactive material as specified in the application will be transmitted in writing to the principal authorized user by the Radiation Protection Officer following required approvals in paragraph c, and e above.

g. Final approval/disapproval action will be accomplished for each authorization presented to the Radiation Control Committee during quarterly meetings.

h. The Radiation Control Committee is the final approving authority for radioactive material authorizations and will adjudicate any conflicts with regard to approval of authorizations.

5. TERMINATION OF AN AUTHORIZATION.

   a. An authorization may be terminated by the principal user at any time. When such termination occurs, it is the responsibility of the principal user to notify the Radiation Protection Officer in a timely manner so that a close-out survey of the area involved may be completed prior to the time the area is to be used for other purposes and/or the principal authorized user leaves the present assignment.

   b. An authorization may be terminated by the Radiation Control Committee if it is determined that the principal user has not complied with his/her authorization provisions. The Radiation Protection Officer has the authority to suspend the use of radioactive material by a principal user if in his/her opinion a condition exists necessitating such action. However, in such a case, the principal authorized user will be permitted to make on-the-spot corrections, if possible, to preclude such action. If such conditions are not corrected the Radiation Control Committee may, after review of the situation, terminate the authorization, continue the suspension pending correction of the condition, or rescind the suspension.

6. APPLICATION PROCEDURES.

   Application packets are available from the Health Physics Office located in Bldg. 1007, phone # 561-2794. A supply of these application packets will also be available in the LAIR Radioisotope Branch Office, phone # 561-3318.

TRAINING AND EXPERIENCE REQUIREMENTS FOR
PRINCIPAL AUTHORIZED USER; AUTHORIZED USER; TECHNOLOGIST

1. To qualify as adequately trained to use or directly supervise the use of radioactive materials listed on the "Application For Authorization to Use Radioactive Materials", individuals should have sufficient training and experience with all types and quantities of radioactive materials requested to assure safe receipt, transport, use, transfer and disposal procedures as permitted by the LAMC authorization.

2. Each individual authorized to directly supervise the use of radioactive materials (Principal Authorized User, Authorized User, Technologist) should have:

   a. Training in basic radioisotope handling techniques applicable to the use of sealed/unsealed sources. This training should consist of lectures, laboratory sessions, discussion groups or supervised experience in the following areas as appropriate.

      1) Radiation Physics and Instrumentation

      2) Radiation Protection

      3) Mathematics Pertaining to the Use and Measurement of Radioactivity

      4) Radiation Biology

      5) Radiopharmaceutical Chemistry (Human Use)

   b. Experience with the types and quantities of radioactive materials listed on the authorization.

   c. Supervised clinical training in an institutional Nuclear Medicine program, Radiation Oncology program, or equivalent. (For Human Use Authorizations)

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

3. The minimum number of hours necessary to satisfy the training and experience requirements is dependent on the type and quantities of all radioactive materials listed on an authorization. Designation as a principal authorized user, authorized user or technologist is based on the particular authorization. Such designation is not necessarily transferable to another authorization. For example, an individual designated as an authorized user on an authorization for RIA I-125 would not necessarily have the training and experience to be designated as an authorized user or technologist on an authorization or utilization of volatile iodine. Training and experience must be evaluated relative to the particular radioactive material to be utilized and the potential hazards associated with the use of that material.

4. Examples of minimum acceptable training and experience are listed below for various broad categories of radioactive materials. Each LAMC authorization must be reviewed individually to assure that the individual authorized has adequate training and experience to supervise the safe use of these radioactive materials.

5. This training and experience must be documented, reviewed and approved by the Radiation Control Committee and maintained by the Radiation Protection Officer, LAMC, as a part of the documentation for each authorization.

	HUMAN USE			NON-HUMAN USE		
TRAINING	Prin Auth User	Auth User	Tech-nolo gist	Prin Auth User	Auth User	Tech-nolo-gist
TOTAL HOURS (Didactic)	200	200	200	40	40	20
(1) Radiation Physics & Instrumentation	100	100	100	14	14	7
(2) Radiation Protection	30	30	30	10	10	5
(3) Mathematics Pertaining to the Use and Measurement of Radioactivity	20	20	20	8	8	4
(4) Radiation Biology	20	20	20	8	8	4
(5) Radiopharmaceutical Chemistry	30	30	30	NA	NA	NA

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Individuals Responsible for Radiation Safety Program Their Training and Experience

TRAINING	HUMAN USE			NON-HUMAN USE		
	Prin Auth User	Auth User	Tech-nolo gist	Prin Auth User	Auth User	Tech-nolo-gist
Supervised Training & Experience Relevant to Radioisotope Usage	500	500	500	500	500	500
Supervised Clinical Training in an Institutional Nuclear Medicine Program or Radiation Oncology Program Relevant to Diagnostic/Therapeutic Procedures Authorized	500	500	NA	NA	NA	NA
Supervised Training as a Nuclear Medicine Technician or Equivalent	NA	NA	500	NA	NA	NA

REGULATORY BASIS

1. The Regulatory basis for required training is as follows:

   a. Title 10 ("Energy" - Nuclear Regulatory Commission), Code of Federal Regulations, Part 30 ("Rules of General Applicability to Domestic Licensing of By-Product Material") states in:

   Section 30.3:

   "No person shall manufacture, produce, transfer, receive, acquire, own, possess or use by-product material except as authorized in this chapter."

   and in Section 30.33:

   "(a) An application for a specific license will be approved if:..(3) The applicant is qualified by training and experience to use the material requested in such manner as to protect health and minimize danger to life or property; (4) The applicant satisfied any special requirements contained in Parts 32-35."

   b. The criteria utilized to determine the acceptability of training and experience for a Principal Authorized User, or Authorized User, for human use of radioactive material will, at a minimum, be as follows:

      1) The licensee's Radiation Control Committee may permit any physician to use byproduct material for medical use, research, and development. The physician must meet the appropriate training and experience criteria in 10 CFR Part 35, Subpart J.

      2) The use of licensed material in or on humans shall be by a physician as defined in 10 CFR 35.2.

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Individuals Responsible for Radiation Safety Program Their Training and Experience

c. The criteria utilized to determine the acceptability of training and experience for a Principal Authorized User, or Authorized User, for non-human use of byproduct material in greater than exempt quantities will, at a minimum, be that specified in 10 CFR 33.15 in that radioactive materials will be used only by, or under the direct supervision of, individuals who have received:

1) A college degree at the bachelor level, or equivalent training and experience in the physical or biological sciences or in engineering

2) At least 40 hours of training and experience in the safe use and handling of radioactive materials, and in the characteristics of ionizing radiation, units of radiation dose and quantities, radiation detection and instrumentation and biological hazards of exposure to radiation appropriate to the type and forms of byproduct material to be used

INSTRUCTIONS FOR PREPARATION OF
"APPLICATION FOR AUTHORIZATION TO USE RADIOACTIVE MATERIAL"
(HUMAN USE/NON-HUMAN USE)

1. An individual desiring authorization to use radioactive material shall complete an "Application For Authorization To Use Radioactive Material" (Human Use/Non-Human Use), and submit in duplicate to the LAMC Health Physics Office.

2. All proposed locations where the applicant desires to use, store, or dispose of radioactive material should be coordinated with the Health Physics Office prior to submission of the application in order to assure expeditious processing of the application. Submission of an incomplete application will often result in a delay in the issuance of an authorization because of the correspondence necessary to obtain information requested on the application.

EXPLANATION OF APPLICATION FOR AUTHORIZATION.

1. The form "Application For Authorization to Use Radioactive Material" (Human Use/ Non-Human Use) is designed to supply information on radioactive material programs of varying complexity. The applicant should provide complete information on the proposed program for the possession and use of radioactive material. For those items that do not apply, indicate with N/A (not applicable).

2. Application for new authorizations should be completed in their entirety. Applications for amendment to existing authorizations may be completed as follows:

   a. Complete items 1, 2, and 6

   b. For those items that do not require amendment, indicate as N/C (no change)

   c. For those items that require amendment, indicate the proposed changes to the current authorization

3. All authorizations will be granted for an indefinite period of time but must be reviewed by the RCC on a biennial basis. The principal user must submit an "Application for Authorization to Use Radioactive Materials" completing items 2. (a, b, and c) above as appropriate. Failure to submit a request for review will result in the termination of the authorization.

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Individuals Responsible for Radiation Safety Program Their Training and Experience

EXPLANATION OF NUMBERED ITEMS

1. Self-explanatory.

2. The "Principal Authorized User" is the individual who bears ultimate responsibility for possession, inventory, and implementation of the safety procedures necessary to assure the safe use of the materials specified in the application. He is directly responsible to Radiation Control Committee. Attach a completed training packet pages, B-13 - B-17, if a current copy is not on file with the Health Physics Office. The applicant's address should include organization, activity, building, room number, and reference or office symbol.

3. Users.

   a. An "authorized user" is an individual who possesses adequate training and experience with radioactive material to qualify as a "principal user". He works under the direction of and is directly responsible to the "principal authorized user" for the safe and proper use of the materials specified in the application. List all authorized users alphabetically by last name. Each authorized user should be identified as follows: Last name, first name, middle initial, and grade. Attach a completed training packet, pages B-13 -B-17, for each authorized user if a current copy is not on file with the Health Physics Office.

   b. A "technologist" is an individual who by virtue of training and experience is capable of making routine decisions commensurate with his duties involving the use of radioactive materials. This individual should require minimal supervision and should be capable of supervising subordinates (technologists, and trainees). List all technologists alphabetically by last name. Each technologist should be identified as follows: Last name, first name, middle initial, and rank/grade. Attach a completed training packet, pages B-13 - B-17, for each technologist if a current copy is not on file with the Health Physics Office. Certification as a technologist or documentation of training and experience equivalent to certification requirements is necessary to be designated as a technologist.

   c. A "resident user" is an individual who works under the direct supervision of a principal authorized user, or authorized user, for the purpose of performing certain duties associated with the use of materials specified in the application. He may not possess adequate training or experience to be classified as a principal authorized user. List all resident users alphabetically by last name. Each resident user should be identified as follows: Last name, first name, middle initial, and rank/grade. Attach a completed training packet, pages B-13 -B-17, for each resident user if a current copy is not on file with the Health Physics Office.

   d. A "trainee" is an individual who does not possess adequate training and experience to be designated as an authorized user or a technologist. He is assigned to this category to obtain the necessary experience under the immediate supervision of authorized users/technologists. List all trainees alphabetically by last name. Each trainee should be identified as follows: Last name, first name, middle initial, and rank/grade.

4. RADIOISOTOPES.

   a. List radioisotopes by ascending mass number, i.e., the isotope with the smallest mass number is placed at the top of the column and the isotope with the greatest mass number is placed at the bottom of the column.

   b. List the chemical form of the radioisotope.

c. Indicate whether the physical form is solid, liquid, or gaseous form. Additionally, state whether it is a sealed or unsealed source. In order for radioactive material to qualify as a "sealed source," the radioactive source must be sealed in an impervious container which has sufficient mechanical strength to prevent contact with and dispersion of the radioactive material under the conditions of use and wear for which it was designed.

d. State the maximum activity (in units of millicuries) for each chemical form of the radioisotope authorized or requested that must be kept in the inventory, in order to satisfy the mission requirements.

e. State in column e., the intended use of each chemical form of the radioisotopes listed in column a.

f. Items 5-8 - self-explanatory.

EXPLANATION OF TRAINING FORMS

All persons listed on an authorization will complete the worksheet "Summary of Radiological Qualification." From the information contained on that form, complete NRC 313M, Supplement A, "Training and Experience of an Authorized User or Radiation Safety Officer." Persons desiring a "Human Use Authorization" must complete an NRC 313M, Supplement B, "Preceptor Statement" or supply applicable Board Certification Certificates.

EXPLANATION OF RESEARCH PROTOCOL FOR RADIOISOTOPE USE

Persons requesting authorization to use radioisotopes for research must complete the "Research Protocol For Radioisotope Use" form. Insure that a complete description of the "Life Cycle of Radioisotopes" is given. This description should detail the intended use in full and should include all procedures to be implemented to insure compliance with the regulations and maximum safety of personnel.

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

APPLICATION FOR AUTHORIZATION TO USE RADIOACTIVE MATERIAL*

1. ___New Authorization ___Human Use

___Renewal of Authorization # ___Non-Human Use

___Amendment of Authorization #_____

---

2. Principal Authorized User (Applicant)

NAME:_____SSAN_____ PHONE:_____
(Last, First, MI)

OFFICE:_____
(Dept/Activity/Service) (Organization/Station)

3. USERS: List all users by name and rank/grade. Attach a training packet if a current one is not on file with the Health Physics Office.

a. Authorized Users

b. Technologist

c. Trainee

d. Resident User

4. RADIOISOTOPES:

Radioisotope	Chemical Form	Physical Form	Possession Limit	Use

*If more space is needed to complete any item, use additional pages properly identified by a consecutive numbering sequence.

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Individuals Responsible for Radiation Safety Program Their Training and Experience

5. Management of Radioactive Materials:

USE	LOCATION		
RECEIPT	_____		
STORAGE	_____		
MATERIAL USE	_____		
FUME HOOD	_____		
RAD WASTE DISPOSAL SINK	_____		
INTERIM WASTE STORAGE	_____	_____	_____
	solid	liquid	gas

Other Associated Hazards:

6. CERTIFICATION: (This item must be completed by Principal Authorized User)

I certify compliance with relevant provisions of AR 40-7 (Clinical Use of Investigational Drugs), TB Med 525 (Control of Hazards to Health from Ionizing Radiation Used by the Army Medical Department), AR 70-25 (Use of Volunteers as Subjects of Research), LAMC Reg 40-34 and that all information contained herein, including any supplements attached hereto are true and correct to the best of my knowledge and belief.

_____ _____ _____
Typed Name/Grade Date Signature

ADMINISTRATIVE APPROVAL

Approve/Disapprove _____ _____
Typed Name/Grade/Position Date

_____
Signature

Radiation Control Committee Approval

Interim Approval

_____ _____ _____ _____
Radiation Protection Officer Date Chairman, Radiation Control Committee Date

Final Approval

_____ _____ _____ _____
Radiation Protection Officer Date Chairman, Radiation Control Committee Date

Authorization Review Date _____

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

RESEARCH PROTOCOL FOR RADIOISOTOPE USE

Title of Project:

Beginning Date: _____ Ending Date:_____ Repetitive Study? YES___ NO___

Principal Authorized User for Protocol

Principal Investigator for Protocol Telephone No

Other Personnel Involved with Protocol:

AUTHORIZED USERS TECHNOLOGISTS RESIDENT USERS TRAINEES

RADIOISOTOPE SOURCE

PHYSICAL/CHEMICAL FORM & QUANTITY PER EXP(mCi)

UTILIZATION OF RADIOISOTOPE:
MAXIMUM mCi

LOCATIONS

STORAGE OF RADIOISOTOPE:
MAXIMUM mCi

LOCATIONS

RADIOACTIVE WASTE STORAGE:
MAXIMUM mCi

LOCATIONS

All radioactive waste will be transferred to the Health Physics Office, LAMC or the Radioisotope Branch, LAIR, IAW pertinent sections of LAMC Reg 40-34, Annex M, RADIOACTIVE WASTE

LIFE CYCLE OF RADIOISOTOPES UTILIZED FOR RESEARCH PROCEDURES.
Describe the intended use of radioisotopes in full. Use the back of the form if required.

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

LABELING AND TRANSPORT OF RADIOACTIVE MATERIAL.

All radioactive solutions, tissues, animals and waste will be identified by proper label. Transport of radioactive material between authorized work areas will be conducted in a manner that precludes the spread of contamination and inadvertent exposure of non-participating personnel.

LABORATORY ANIMAL USAGE: ___NO ___YES SPECIES:_____

Location of Animal Usage:

Animals ____WILL be sacrificed at the conclusion of the experiment.
___WILL NOT

ROOM SURVEY: All room surveys will be conducted IAW LAMC Reg 40-34, Annex O.

PERSONNEL DOSIMETRY: ___WHOLE BODY BADGES

___WRIST BADGES will be requested.

___RING BADGES

Assigned dosimetry monitors will be worn by all participating personnel

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The research protocol enumerated above is designed to insure that occupational radiation exposures and release of radioactive effluents to the environment will be "as low as reasonably achievable," ALARA, during all phases of the research procedures.

Administrative Approval: Applicant:

Signature _____ Signature _____
Radiation Protection Officer

_____
(Print Name)

Date _____ Date _____

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

CONDITIONS FOR
AUTHORIZED USE OF RADIOACTIVE MATERIALS
AT
LETTERMAN ARMY MEDICAL CENTER

Authorization Number _____ Principal Authorized User _____

Date _____ Department/Service _____

THE PRINCIPAL AUTHORIZED USER FOR LAMC RADIOACTIVE MATERIAL AUTHORIZATIONS IS RESPONSIBLE FOR COMPLIANCE WITH THE FOLLOWING PROVISIONS:

a. Maintaining occupational, occasional and environmental ionizing radiation exposures as low as reasonably achievable (ALARA). Current dose limitations are detailed in LAMC Reg 40-34, Annex E. In addition to these limits, pregnant radiation workers shall be required to consult with their immediate supervisor and the Radiation Protection Officer with respect to an evaluation of their work environment. The names of all pregnant radiation workers will be reported to the Radiation Protection Officer at the earliest possible time to assure appropriate review and continued monitoring of the worker's radiation environment during the gestation period. Exposures to pregnant occupational workers should be kept as far below 0.5 rem as possible in keeping with the ALARA principle.

b. Obtaining and using the proper personnel dosimetry devices as determined by the Radiation Protection Officer and Annex E, LAMC Reg 40-34.

c. Having available and using appropriate radiation detection/monitoring devices.

d. Performing Surveys of Working Areas required by Annex O, LAMC Reg 40-34, to insure that external radiation levels for occupational workers do not exceed the limits specified by the Radiation Control Committee and that contamination in lab areas does not exist in excess of limits specified in Annex S, LAMC Reg 40-34. Surveys for contamination should include any protective clothing used, the bottoms of shoes and all potentially exposed areas of the body. The Radiation Protection Officer will be notified of areas of contamination in excess of 100 dpm/100cm^2 and any contamination on clothing or personnel.

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

f. Complying with the provisions of LAMC Reg 40-34, Annex C, RESPONSIBILITIES OF PRINCIPAL USERS OF RADIOACTIVE MATERIALS.

g. Maintaining an inventory of radioactive materials as specified in LAMC Reg 40-34, Annex K, ACCOUNTABILITY AND INVENTORY OF RADIOACTIVE MATERIAL AND MACHINES WHICH PRODUCE IONIZING RADIATION.

h. Utilization of appropriate radiation warning signs and labels.

ITEM 7

Individuals Responsible for Radiation Safety Program Their Training and Experience

i. Instructing authorized users, technologists, trainees, and resident users concerning the safe handling and usage of the radioactive materials listed in the authorization and concerning their responsibilities and rights as occupational radiation workers. Ensuring that each authorized user, technologist, trainee and resident user attends annual radiation protection training.

j. Ensuring the proper disposal of radioactive materials in accordance with LAMC Reg 40-34 Annex M, RADIOACTIVE WASTE and any other provisions specified in the authorization.

k. Notifying the Radiation Protection Officer promptly of any changes in personnel, use, location, or possession of radioisotopes from the terms of this authorization.

l. Radioactive materials shall be stored such that they are secured from unauthorized removal. Radioactive materials in an area not designated for use, storage, or disposal, must be kept under constant surveillance and the immediate control of the principal user, authorized user, resident user, or technologist.

m. Compliance with applicable provisions of LAMC Reg 40-34, Annex J, RECEIPT, TRANSFER, AND SHIPMENT OF RADIOACTIVE MATERIAL and in particular, ensuring that all NRC licensed or DA authorized radioactive materials entering Letterman Army Medical Center, Letterman Army Institute of Research, or supported activities have either been processed through the Health Physics Office, LAMC, Radioisotope Branch, LAIR, or have been documented by the Health Physics Office as having been received.

n. Ensuring that NRC licensed or DA authorized radioactive materials are not transferred between users, facilities, or outside of LAMC/LAIR, without prior approval of either the Radiation Protection Officer or Alternate Radiation Protection Officer.

o. In the event of an emergency situation, accomplishing the emergency procedures outlined in LAMC Reg 40-34, RADIOLOGICAL EMERGENCIES.

p. The form "Research Protocol for Radioisotope Use" will be submitted for each new usage of radioactive material.

End of Excerpt

b. Radiation Control Committee.

1) Composition: The Radiation Control Committee will be composed of certain members who, by virtue of their training and experience, will make up the "core" of the Committee. They will be specifically named and submit *Curricula vitae* indicating their qualifications. Other members of the Committee will be named only by title and/or position and will be approved by the "core" membership. To establish a quorum and to conduct business, at least one-half of the Committee's members must be present, including the Radiation Protection Officer and the management representative. The Radiation Control Committee will be comprised of the following personnel:

- Deputy Commander for Clinical Services, Chairman, Member
- Radiation Protection Officer, Recorder, Core Member
- Nuclear Medical Science Officer, Core Member
- Chief, Department of Radiology, Core Member
- Chief, Nuclear Medicine Service, Core Member
- Chief, Radiation Therapy Service, Core Member
- Chief, Nuclear Pharmacy Service, Core Member
- Chief, Radioisotopes Services Branch, LAIR, Core Member
- Hospital Safety Manager, Member
- Chief, Department of Pathology, Member
- Chief, Department of Clinical Investigation, Member
- Chief, Department of Nursing, Member
- Medical Physicist, Nuclear Medicine Service, Member
- Commanding Officer, LAIR, Member
- Research Scientist, LAIR, Member
- Research Scientist, WHNRC, Member
- Chief, Logistics Division, Non-voting Member

2) Core Members: The Core members of the Radiation Control Committee at the time of this submission are identified below. Their *Curriculum vitae* are attached.

- Daniel L. Glaubiger, COL, MC, Chief, Radiation Therapy Service
- Robert J. Lull, COL, MC, Chief, Nuclear Medicine Service
- Raoul O. Hagen, COL, MC, Chief, Department of Radiology
- Richard Stotler, LTC, MS, Chief, Nuclear Pharmacy Service
- Carl E. Bergsagel, MAJ, MS, Chief, Health Physics Office
- Louie L. Tonry, 1LT, MS, Nuclear Medical Science Officer
- Donald K. Green, SFC, USA, Chief, Radioisotope Services Branch

2. Authorized Users for Non-Medical Use.

Individuals approved by the RCC in accordance with paragraph 1, this item.

3. Radiation Protection Officer.

The Radiation Protection Officer is MAJ Carl E. Bergsagel. Alternate Radiation Protection Officers are 1LT Louie L. Tonry and SFC Donald K. Green. Their credentials have been reviewed and approved by the Radiation Control Committee, LAMC. The credentials reviewed included a NRC Form 313M, Supplement A, and a *Curriculum vitae*. Their training and experience meet the requirements for Radiation Protection Officers defined in 10 CFR Part 35.900.

CURRICULUM VITAE

NAME: Daniel Leo Glaubiger

CITIZENSHIP: U.S.

EDUCATION:

1961 - B.A., Harvard University

1966 - Ph.D.,(Chemistry), University of California at Berkeley

1969 - M.D., University of California School of Medicine (S.F.)

MEDICAL LICENSURE:

California
Maryland
North Carolina

SPECIALTY BOARD CERTIFICATION:

Pediatrics
Pediatric Hematology-Oncology
Radiation Therapy

POSITIONS HELD:

1969-70 Intern (Pediatrics), Stanford University Medical Center, Palo Alto, California

1970-72 Staff Associate, Molecular Pharmacology Section, Laboratory of Chemical Pharmacology, National Cancer Institute, Bethesda, Maryland

1972-73 Resident (Pediatrics), Stanford University Medical Center, Palo Alto California

1973-75 Fellow, Hematology-Oncology, Stanford University Medical Center, Palo Alto, California

1975-76 Staff Oncologist, Childrens' Hospital at Stanford, Assistant Professor of Clinical Pediatrics, Stanford University Medical Center, Palo Alto, California

POSITIONS HELD (continued):

1976-1982 Senior Investigator, Attending Physician, Pediatrics Branch, National Cancer Institute, Bethesda, Maryland

1982-1985 Fellow, Radiation Therapy, Uniformed Services University of the Health Sciences, Bethesda, Maryland

1985- Chief, Radiation Therapy Service, Letterman Army Medical Center, San Francisco, California

1986- Associate Clinical Professor, Department of Radiation Oncology, University of California School of Medicine, San Francisco, California

COMMITTEES AND OTHER OFFICES:

National Cancer Institute Clinical Research Committee	1976-1978
National Cancer Institute Decision Network Committee	1977-1980
National Institutes of Health Pharmacy and Therapeutics Committee	1978-1983

MILITARY SERVICE:

USPHS, U.S. Army

PROFESSIONAL SOCIETIES:

American Association for Cancer Research
American Society of Clinical Oncology
American Society for Radiation Therapy and Oncology

RESEARCH INTERESTS:

Radiation-Chemotherapy interactions
Mechanisms of human tumor cell resistance to anticancer therapy

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Daniel L. Glaubiger, M.D., Ph.D.

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3. Glaubiger, D., Lloyd, D.A., and Tinoco, I., Jr.: Temperature-dependent optical properties of torsional oscillator model for dinucleoside phosphates. Biopolymers 6: 409, 1968.

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The American Board of Radiology

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

Daniel L. Glaubiger, M.D.

Has pursued an accepted course of graduate study
and clinical work, has met certain standards and qualifications and
has passed the examinations conducted under the authority of
The American Board of Radiology
On this sixth day of June, 1986
Thereby demonstrating to the satisfaction of the Board
that he is qualified to practice the specialty of

Therapeutic Radiology

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1934

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President

James H. L. Kirklin, M.D.
Secretary

FORM NRC-313M-SUPPLEMENT A (8-78) U.S. NUCLEAR REGULATORY COMMISSIO

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
Daniel L. Glaubiger, M.D.	Calif., Md.

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	USUHS - 1982-1985	180	
b. RADIATION PROTECTION	USUHS - 1982-1985	50	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	USUHS - 1982-1985	60	
d. RADIATION BIOLOGY	USUHS - 1982-1985	180	
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
137 Cs	90 mg.Ra.eq/use	USUHS	1982-1985	Clinical
192Ir	70mci./use	USUHS	1982-1985	Clinical
125I	60mci/use	USUHS	1982-1985	Clinical
198Au	60mci/use	USUHS	1982-1985	Clinical

FORM NRC-313M Supplement A

On 8 Jul 85, the undersigned contacted the Board of Pediatric and spoke with Ms Vick at 919-929-0461 and verified this certificate as valid.

Rose S. Young
ROSE S. YOUNG

American Board of Pediatrics

hereby certifies that

Daniel Leo Glaubiger, M.D.

has successfully fulfilled the requirements of this board as to competency to practice Pediatrics as a specialty and is declared a

Diplomate of The American Board of Pediatrics

No. 19983 December 5, 1976

AMERICAN BOARD OF PEDIATRICS · THE SEAL ·

William E. Layton M.D.
President

Stanley Crawford
Secretary

AMERICAN BOARD OF MEDICAL SPECIALTIES

I certify that this is a true copy of the original presented.
1LT Esparza, admin asst, Dept of Rad 18 Nov 85

DEC 20 1983

FORM NRC-313M-SUPPLEMENT B (5-78)

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: Daniel Leo Glaubiger, M.D.

STREET ADDRESS: 2290 Francisco

CITY | STATE | ZIP CODE: San Francisco, CA 94123

KEY TO COLUMN C

PERSONAL PARTICIPATION SHOULD CONSIST OF:

1. Supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation for prescribed dosage.
2. Collaboration in dose calibration and actual administration of dose to the patient including calculation of the radiation dose, related measurements and plotting of data.
3. Adequate period of training to enable physician to manage radioactive patients and follow patients through diagnosis and/or course of treatment.

2. CLINICAL TRAINING AND EXPERIENCE OF ABOVE NAMED PHYSICIAN

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

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS (Additional information or comments may be submitted in duplicate on separate sheets.) D
P-32 (Soluble)	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 (Colloidal)	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA		
	TREATMENT OF HYPERTHYROIDISM		
Au-198	INTRACAVITARY TREATMENT	3	
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT	35	
I-125 or Ir-192	INTERSTITIAL TREATMENT	20	
Co-60 or Cs-137	TELETHERAPY TREATMENT	350	
Sr-90	TREATMENT OF EYE DISEASE	2	
	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

July 1982-June 1985. 4500 hrs.

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

a. NAME OF SUPERVISOR: Eli J. Glatstein, M.D.

b. NAME OF INSTITUTION: Nat'l. Cancer Institute

c. MAILING ADDRESS: Rm. B3B69, Bldg. 10, NIH

d. CITY: Bethesda, Maryland

5. MATERIALS LICENSE NUMBER(S): 19-00296-10

6. PRECEPTOR'S SIGNATURE: Eli Glatstein

7. PRECEPTOR'S NAME (Please type or print): ELI J. GLATSTEIN, M.D.

8. DATE: 2/3/86

TO WHOM IT MAY CONCERN:

This is to certify that, in my opinion, Daniel L. Glaubiger, M.D., is fully qualified to independently perform Group VI therapy procedures (involving sealed sources).

Eli Glatstein, M.D.
Chief, Radiation Oncology Branch

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
F. EDWARD HÉBERT SCHOOL OF MEDICINE
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799

GRADUATE AND
INTINUING EDUCATION

TEACHING HOSPITALS
WALTER REED ARMY MEDICAL CENTER
NAVAL HOSPITAL, BETHESDA
MALCOLM GROW AIR FORCE MEDICAL CENTER
WILFORD HALL AIR FORCE MEDICAL CENTER

31 January 1986

To Whom It May Concern:

This is to certify that the training program in Radiation Therapy at the Uniformed Services University of the Health Sciences is approved by the Residency Review Committee for Radiology of the Accreditation Council for Graduate Medical Education.

John W. Bullard, Ph.D.
Associate Dean for Continuing Education
and Assistant Dean for Graduate Education

The Sub-Board of Pediatric Hematology-Oncology

of the

American Board of Pediatrics

hereby certifies that

Daniel L. Glaubiger, M.D.

has satisfied the requirements of this Sub-Board as to competency in the specialty of

Pediatric Hematology-Oncology

No. 341

October 6, 1978

Laurence Finberg
President, American Board of Pediatrics

Alvin N. Mauer
Chairman, Sub-Board of Pediatric Hematology-Oncology

Frank A. Oski
Secretary, American Board of Pediatrics

THE SEAL OF THE AMERICAN BOARD OF PEDIATRICS

AMERICAN BOARD OF MEDICAL SPECIALTIES

On 8 Jul 85, the undersigned contacted American Bd of Pediatric and spoke with Ms Tina at 919-929-0461 and verified this certificate is valid.
Rose S. Young
ROSE S. YOUNG

I certify that this is a true copy of the document presented
LT Evans, Admin Asst. Dept of Ped. 18 Nov 85

PUBLIC HEALTH SERVICE 1798

U.S. Department of Health and Human Services

Public Health Service

National Institutes of Health

In recognition that

Daniel Leo Glaubiger, M.D.

has faithfully and satisfactorily completed the duties and responsibilities of

Medical Staff Fellow in Clinical Oncology Program

National Cancer Institute

June 28, 1982 to June 23, 1985

this certificate is awarded.

Vincent T. DeVita
Director, National Institutes of Health

James B. Wyngaarden
Director, National Institutes of Health

On 9 Jul 85, the undersigned verified this certificate at NIH, Ms Coukline at 496-5457, as being valid.
Rose S. Young
ROSE S. YOUNG

I certify that this is a true copy of document presented
LT Evans, admin asst. Dept of Ped 18 Nov 85

DEC 20 1988

The Board of Medical Examiners
OF THE STATE OF MARYLAND

TO ALL WHOM IT MAY CONCERN, GREETING:

This Certifies that Daniel Lee Glaubiger M.D.
having presented due evidence of Authority to Practice Medicin
and Surgery in the State of California is hereby license
in accordance with the provisions of the State of Maryland to practi
MEDICINE AND SURGERY in the STATE OF MARYLAND.

And in testimony whereof have caused the names of th
President and Secretary of our board to be subscribed, and the sea
of our Society to be affixed hereto.

Witness our hand and the seal of our Societ
this 7th day of November A.D. 1974

Debbitt E. DeLauter
PRESIDE

Chas. L. Bagley
SECRETAR

On 28 Jun 85, the undersigned contacted (Med Examin in Med) and spoke with Sand
301-225-5840, and verified the License is current.
ROSE S. YOUNG

I certify that this is a true copy of document presented.
1LT Ed Chn. Admin asst Dept of Rad 18 NOV 85

Stanford University Medical Center

STANFORD UNIVERSITY HOSPITAL / STANFORD UNIVERSITY SCHOOL OF MEDICINE

THIS IS TO CERTIFY THAT

Daniel L. Glaubiger, M.D.

HAS SERVED AS

Fellow in Pediatrics-Pediatric Hematology: February 1, 1973 to June 30, 1975

John H. Lee
Physician-in-Chief

Paul B. Hoffmann
Director of Hospital

Clayton Rich
Dean of the School of Medicine

On 18 Jun 85, the undersigned contacted (Stanford Univ Med Ctr) and spoke with
Christy at 415-497-6013 and verified this certificate is valid.
[illegible]
CPT, MSC
AMEDD Pers Proc.

I certify that this is a true copy of original presented.
1LT Ed Chn. Admin asst. Dept of Rad. 18 Nov 85

DEC 20 1988

On 28 Jun 85, the undersigned contacted (Med Examiners in Calif.) and verified with Carol that the License is valid and current. (916)920-6411.
Rose S. Young
ROSE S. YOUNG

DEPARTMENT OF PROFESSIONAL AND VOCATIONAL STANDARDS

The Board of Medical Examiners

of the State of California

This is to Certify, that DANIEL LEO GLAUBIGER, M.D. a graduate of UNIVERSITY OF CALIFORNIA, SCHOOL OF MEDICINE on the 14th day of JUNE 1969, having shown to the satisfaction of this Board that he is possessed of the qualifications required by law, and having successfully passed a personal Examination by this Board as to h is qualifications, is hereby granted a

Physician and Surgeon Certificate

To Practice Medicine and Surgery in this State

In Testimony Whereof, THE BOARD OF MEDICAL EXAMINERS of the STATE OF CALIFORNIA has issued this CERTIFICATE and caused the same to be signed by its PRESIDENT and SECRETARY-TREASURER, and its SEAL to be hereto affixed this 17th day of JULY A. D. 1970

The Board of Medical Examiners
OF THE STATE OF CALIFORNIA

M. D.
President

M. D.
Secretary-Treasurer

No. A - 23848

I certify that this is a true copy of document presented.
Grace. Admin asst. Dept of Rad. 18 Nov 85

On 28 Jun 85, the undersigned contacted (Stanford Univ Med Ctr) and spoke with Beverly at 415-497-6154 this certificate is valid .
Rose S. Young
ROSE S. YOUNG

Stanford University Medical Center

STANFORD UNIVERSITY HOSPITAL / STANFORD UNIVERSITY SCHOOL OF MEDICINE

THIS IS TO CERTIFY THAT

Daniel Leo Glaubiger, M.D.

HAS SERVED AS

Resident in Pediatrics: July 1, 1972–June 30, 1973

Department Chairman & Physician-in-Chief

Thomas A. Gonda, M.D., Director of Hospital & Associate Dean of the School of Medicine

Clayton Rich, M.D., Vice President for Medical Affairs & Dean of the School of Medicine

DEC 2 0 1988

I certify that this is a true record the original presented.

ROSE S. YOUNG

Stanford University Medical Center

STANFORD UNIVERSITY HOSPITAL / STANFORD UNIVERSITY SCHOOL OF MEDICINE

THIS IS TO CERTIFY THAT

Daniel Leo Glaubiger, M.D.

HAS SERVED AS

Resident in Pediatrics: July 1, 1972–June 30, 1973

Department Chairman & Physician-in-Chief

Thomas A. Gonda, M.D., Director of Hospital & Associate Dean of the School of Medicine

Clayton Rich, M.D., Vice President for Medical Affairs & Dean of the School of Medicine

I certify that this is a true copy of the original presented.
1LT Evans, Admin Asst, Dept of Rad 18 Nov 85

On 28 Jun 85, the undersigned contacted [illegible] and verified that the License is valid and current. (916)920-6411.

ROSE S. YOUNG

DEPARTMENT OF PROFESSIONAL AND VOCATIONAL STANDARDS

The Board of Medical Examiners

of the State of California

This is to Certify, that DANIEL LEO GLAUBIGER, M.D. a graduate of UNIVERSITY OF CALIFORNIA, SCHOOL OF MEDICINE on the 14th day of JUNE 1969, having shown to the satisfaction of this Board that he is possessed of the qualifications required by law, and having successfully passed a personal Examination by this Board as to h is qualifications, is hereby granted a

Physician and Surgeon Certificate

To Practice Medicine and Surgery in this State

In Testimony Whereof, THE BOARD OF MEDICAL EXAMINERS of the STATE OF CALIFORNIA has issued this CERTIFICATE and caused the same to be signed by its PRESIDENT and SECRETARY-TREASURER, and its SEAL to be hereto affixed this 17th day of JULY A. D. 1970

No. A - 23848

The Board of Medical Examiners
OF THE STATE OF CALIFORNIA

M. D. President

M. D. Secretary-Treasurer

I certify that this is a true copy of document presented.
1LT Evans, Admin Asst. Dept of Rad. 18 Nov 85

DEC 20 1988

Stanford University Medical Center

STANFORD UNIVERSITY HOSPITAL / STANFORD UNIVERSITY SCHOOL OF MEDICINE

THIS IS TO CERTIFY THAT

Daniel L. Glaubiger, M.D.

HAS SERVED AS

Intern in Pediatrics: June 24, 1969–June 23, 1970

Herbert C. Schwartz, MD — Department Chairman & Physician-in-Chief

Thomas A. Gonda — Thomas A. Gonda, M.D., Director of Hospital & Associate Dean of the School of Medicine

Robert J. Glaser — Robert J. Glaser, M.D., Vice-President for Medical Affairs and Dean of the School of Medicine

On 28 Jun 85, the undersigned contacted (Stanford Univ Med Ctr) and spoke with Beverly at 415-497-6154.

~~I certify that this is a photostat of~~
I Certify that this is a true copy of the original. 1LT Grade Admin Asst, Dept of Rad 18 Nov 85

Rose S. Young
ROSE S. YOUNG

THE REGENTS OF THE UNIVERSITY OF

ON THE NOMINATION OF THE FACULTY OF THE SCHOOL
HAVE CONFERRED UPON

DANIEL LEO GLAUBIGER

THE DEGREE OF DOCTOR OF MEDICINE
WITH ALL THE RIGHTS AND PRIVILEGES THERETO PE

GIVEN AT SAN FRANCISCO THIS FOURTEENTH DAY OF JUN
NINETEEN HUNDRED AND SIXTY-NINE

On 28 Jun 85, the undersigned contacted Univ of Calif and verified the certificate is valid per Registrar office 415-666-1742.

Rose S. Young
ROSE S. YOUNG

Ronald Reagan
GOVERNOR OF CALIFORNIA AND
PRESIDENT OF THE REGENTS

PRESIDENT OF THE UNIVERSITY

I certify that this is a true copy of the document presented. 1LT Grade Admin Asst. Dept of Rad 18 Nov 85

DEC 20 1988

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
Daniel L. Glaubiger, M.D.	Calif., Md.

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
The American Board of Radiology	Therapeutic Radiology	June 1986

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			
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

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

DEC 20 1988

CURRICULUM VITAE

6 April 1987

ROBERT J. LULL, M.D.

Address:

Office: Letterman Army Medical Center
Presidio of San Francisco, CA 94129
Phone: (415) 561-3088

Education:

Canisius College (A.B.), Buffalo, N.Y., 1958-1962.

Albany Medical College of Union University (M.D.), Albany, N.Y., 1962-1966.

Internship (Rotating), Brooke General Hospital, San Antonio, TX; 1967-1970.

Residency (Internal Medicine), Brooke General Hospital, San Antonio, TX; 1967-1970.

Residency (Nuclear Medicine), William Beaumont General Hospital, El Paso, TX; 1970-1972.

Scholarships and Honors:

New York Regent's Scholarship (1958-1962)

Canisius College Scholarship (1958-1962)

Albany Medical College Alumni Scholarship (1962-1966)

American Business Women's Association
Northern California Chapter Boss of the Year Award (1979)

"A" Professional Designator Award in Nuclear Medicine from U.S. Army Surgeon General (1983)

Who's Who in California (1984-1986)

CURRICULUM VITAE
Robert J. Lull, M.D.

Current Positions & Appointments:

Chief, Nuclear Medicine Service, Letterman Army Medical Center
Presidio of San Francisco, CA (1976-Present)

Director, ACGME Approved Nuclear Medicine Residency Program (1976 - Present)

Medical Director, ASHP Approved Residency in Nuclear Pharmacy (1983 - Present)

Medical Director, AMA Approved Training Program for Nuclear Medicine Technologists U.S. Army portion of Tri-Service Program (1976 - Present)

Nuclear Medicine Consultant to U.S. Army Surgeon General (1977 - Present)

Executive Committee Member, Nuclear Medicine Technology Training Program at University of California San Francisco (1978 - Present)

Clinical Associate Professor of Radiology, George Washington University School of Medicine, Washington, D.C. (1978 - Present)

Clinical Assistant Professor of Radiology, University of California School of Medicine, San Francisco, CA (1978 - Present)

Consulting Staff, Roseville Community Hospital, Roseville CA (1980 - Present)

Member, Letterman Army Medical Center Speaker's Bureau (1985 - Present)

Previous Positions and Appointments

Chief, Nuclear Medicine Service
Brooke Army Medical Center
San Antonio, TX (1972 - 1976)

Nuclear Medicine Consultant to U.S. Army Health Services Command, San Antonio, TX (1972 - 1978)

Medical Consultant and Guest Lecturer at Nuclear Hazards Training Course and Flag Officers' Nuclear Accident Course, Interservice Nuclear Weapons School, Kirtland AFB, New Mexico (1976 - 1986)

Clinical Assistant Professor of Radiology, George Washington University School of Medicine, Washington, D.C. (1973 - 1978)

Clinical Associate Professor of Radiology, University of Texas Health Science Center, San Antonio, TX (1973 - 1976)

Chief Resident in Internal Medicine, Brooke General Hospital, San Antonio, TX (1970)

Clinical Instructor in Internal Medicine, University of Texas Medical School, San Antonio, TX (1970)

Visiting Resident in Internal Medicine at Harvard Medical Service, Peter Bent Brigham Hospital, Boston, MA (1970)

Certification

Diplomate National Board of Medical Examiners (1967)

Diplomate American Board of Internal Medicine (1972) 19 Jun 72; #36031

Diplomate American Board of Nuclear Medicine (1972) 5 May 72; #1492

Professional Societies:

American College of Physicians:
- Fellowship - 1983

American College of Nuclear Physicians:
- Charter Member
- Fellowship, 1983
- Member, California Chapter
- Delegate for U.S. Army 1977 - 1985
- Chairman Fellowship Committee, 1980 - 1982
- Member, Executive Committee, 1982 - 1985
- Member, Instrument Standardization and Performance Committee, 1984-Present
- Member, Speaker's Bureau, 1980 - Present
- House of Delegates Council, 1978 - 1982
- Vice-Speaker, House of Delegates, 1982
- Speaker, House of Delegates, 1983 - 1984
- Regent, Western United States, 1985 - Present

Society of Nuclear Medicine - Chapter Level:

Southwest Chapter:
- Member, 1970 - Present
- Member, Program Committee, 1976
- Trustee, 1975 - 1978; 1979 - 1981

Northern California Chapter:
- Member, 1976 - Present
- Councillor (Trustee), 1982 - 1984
- Chairman, Scientific Program Committee, 1983 - 1986
- Member, Executive Committee, 1983 - Present
- Chairman, Membership Committee, 1985 - 1986
- President-Elect 1985 - 1986
- President 1986 - Present

Western Regional Chapters:
Member, Program Committee, 1983 - 1986
Member, Hawaii Spring Conference Program Committee, 1984 - Present
Member, Winter Brainstorm Conference Program Committee, 1986
Member, Steering Committee, 1984 - Present
Chairman, Scientific Program Committee, 1986

Society of Nuclear Medicine - National Level:
Member, 1970 - Present
Member, Scientific Exhibits Committee 1974, 1978
Co-Director, Annual S.N.M. Meeting Review Course, 1983 - Present
Academic Council: Member, 1976 - Present
Executive Committee, 1980 - 1984
Chairman Issues Committee, 1980 - 1984
Computer Council: Member, 1976 - Present
Radioassay Council: Member, 1976 - Present
Cardiovascular Imaging Council: Member, 1986 - Present
Chapter Presidents Committee, 1986 - Present
Trustee, 1985 - 1989

Council on Cardiovascular Radiology of the American Heart Association, 1976 - 1984

Radiological Society of North America: Member, 1984 - Present

Texas Association of Physicians in Nuclear Medicine, 1972 - Present

Texas Medical Association, 1972 - Present

Bexar County Medical Association, 1972 - Present

California Medical Association Nuclear Medicine Advisory Board, 1986 - 1989

Cal-Rad Forum, 1985 - Present

Journal Peer Review:

Chest, 1983

Non-Invasive Imaging, 1983 - 1985

Journal of Nuclear Medicine, 1985 - 1986

Arthritis and Rheumatism, 1986

Medical Licenses:

New York State (#78216)
Texas (D9841)
California (G23180)
NRC Institutional Broad Medical License (04-1496-01; Region VI)

CURRICULUM VITAE
Robert J. Lull, M.D.

Scientific Exhibits:

"A Clinician's Guide to the Modulation Transfer Function."
Silver Medal Award for Teaching Scientific Exhibit at 19th Annual Meeting of Society of Nuclear Medicine, Boston, MA (1972).
Certificate of Merit at 60th Annual Meeting of Radiological Society of North America, Chicago, IL (1974).

"Radionuclide Evaluation of Inhalation Injury."
Honorable Mention for Clinical Scientific Exhibit at 21st Annual Meeting of The Society of Nuclear Medicine, San Diego, CA (1974).
Invited Historical Exhibit at 22nd Annual Meeting of Society of Nuclear Medicine, Philadelphia, PA (1975).

"Natural History of Technetium-99m MDP Bone Scan in Asymptomatic Total Hip Protheses." Silver Medal Award at 30th Annual Society of Nuclear Medicine Meeting, St. Louis, MO (1983). American Academy of Orthopaedic Surgeons 51st Annual Meeting, Atlanta, GA (1984)

CURRICULUM VITAE
Robert J. Lull, M.D.

Military Service

June 1966-June 1967	Internship Brooke General Hospital San Antonio, TX
July 1967-Aug 1967	Medical Field Service School Fort Sam Houston, TX
Sept 1967-Aug 1970	Internal Medicine Residency Brooke General Hospital San Antonio, TX
Sept 1970-Aug 1972	Nuclear Medicine Fellowship William Beaumont Army Medical Center El Paso, TX
Sept 1972-May 1976	Chief, Nuclear Medicine Service Brooke Army Medical Center Fort Sam Houston, TX
Aug 1973-May 1976	Nuclear Medicine Consultant to Health Services Command
May 1976-Present	Chief, Nuclear Medicine Service (Director, Nuclear Medicine Residency Program) Letterman Army Medical Center Presidio of San Francisco, CA
Aug 1977-Present	Nuclear Medicine Consultant to The Surgeon General, U.S. Army
June, 1980	Awarded "A" Professional Designator, Nuclear Medicine
July, 1980	U.S. Army Representative on U.S. Radiation Policy Council Public Hearing, San Francisco, CA
1978 - 1984	U.S. Army Delegate to American College of Nuclear Physicians
December 1985	U.S. Army Medical Department Representative to F.E.M.A. Relocation Tabletop Exercise at National Emergency Training Institute, Emmittsburg, PA

CURRICULUM VITAE
Robert J. Lull, M.D.

Military Training Courses:

1967 - Basic Officer's Course, Medical Field Service School
Fort Sam Houston, TX

1975 - Nuclear Hazards Training Course, Interservice Nuclear Weapons School,
Kirtland AFB, NM

1975 - Nuclear Emergency Team Exercise, Interservice Nuclear Weapons School
Kirtland AFB, NM, Training Course

1979 - Medical Effects of Nuclear Weapons Course at Armed Forces
Radiobiological Research Institute, Bethesda, MD

1981 - Flag Officer Nuclear Accident Course, Interservice Nuclear Weapons
School, Kirtland AFB, NM

1981 - O.P.M. Executive Training Workshop on Sexual Harassment at Letterman
Army Medical Center, San Francisco, CA

CURRICULUM VITAE
Robert J. Lull, M.D.

Lectures and Honoraria

1. "The Diagnosis of Pulmonary Emboli and Other Pulmonary Perfusion-Ventilation Disorders", at 2nd Annual Symposium in Clinical Nuclear Medicine. El Paso, TX (1971).

2. "The Liver Scan in Patients with Cancer", at 1st Scientific Assembly of the World Federation of Nuclear Medicine and Biology. Los Angeles, CA (June, 1971).

3. "Recent Diagnostic Advances in the Evaluation of Neurological Disorders and how They Can Help the Busy Clinician", at 3rd Annual Symposium in Clinical Nuclear Medicine. El Paso, TX (1972).

4. "Lung Imaging Techniques", at Southwestern Chapter of Society of Nuclear Medicine Technologist Symposium. San Antonio, TX (October, 1973).

5. "Cisternography", at New Concept in Nuclear Medicine Symposium for Technologists. San Antonio, TX (August, 1974).

6. "Inhalation Injuries". at Annual Scientific Session of Texas Association of Physicians in Nuclear Medicine, Lakeway, TX (November, 1974).

7. "Radioisotope Imaging of Trauma", at Continuing Education Course: Radiology for Trauma and Acute Care, by University of Texas Health Science Center at San Antonio, TX (January, 1975).

8. "Hyperthyroidism - A Choice of Treatments", at Therapeutics Seminars Series, at University of Texas Health Science Center at San Antonio, TX (March, 1975).

9. "Nuclear Medicine in Pulmonary Disease", at 28th KOPPA Memorial Pulmonary Disease Conference, Hunt, TX (August, 1975).

10. "Role of the Computer in Clinical Nuclear Medicine", at 3rd Annual Fall Meeting of Texas Association of Physicians in Nuclear Medicine, Salado, TX (November, 1975).

11. "Radionuclide Evaluation of Burn Patients", at Texas Medical Association Annual Meeting, San Antonio, TX (May, 1975).

12. "Radionuclide Evaluation of Inhalation Injury", at 22nd Annual Meeting of Society of Nuclear Medicine, Philadelphia, PA (June, 1975).

Lectures and Honoraria (continued)

13. "Iodocholesterol Imaging of Adrenal Gland", at Meeting of San Antonio Endocrine Club, San Antonio, TX (February, 1976).

14. "Thyroid Imaging Pitfalls", at North Texas Technologist Symposium on Thyroid Disease, Dallas, TX (March, 1976).

15. "Clinical Role of Computerized Whole Body Scanning Camera", at International Modumed Users Group Symposium, Lausanne, Switzerland (May, 1976).

16. "Medical Aspects of Nuclear Accidents", at Interservice Nuclear Weapons School, Kirtland A.F.B., New Mexico (3 times per year: 1976-Present).

17. "Medical Principles of Dealing with Patients Contaminated by Radioactivity", at Monthly Meeting of San Luis Obispo County Medical Society, San Luis Obispo, CA (September, 1976).

18. "Clinical Role of a Computerized Whole Body Scanning Camera", at 22nd Annual Meeting of Southwestern Chapter Society of Nuclear Medicine. El Paso, TX (March, 1977).

19. "Quantitative Analysis of 133-Xenon Washout in Acute Inhalation Injuries: An Animal Model", at 22nd Annual Meeting of Southwestern Chapter Society of Nuclear Medicine, El Paso, TX (March 1977), and 25th Annual Meeting of Society of Nuclear Medicine, Anaheim, CA (June, 1978).

20. "Current and Future Role of Nuclear Medicine Computers," at Texas Association of Physicians in Nuclear Medicine Annual Meeting, Austin,TX (November, 1978).

21. "Radionuclide Evaluation of Inhalation Injury: Implications For Diagnosis and Therapy in Burn Patients", at 4th Annual Western Regional Meeting of Society of Nuclear Medicine, Monterey, CA (October, 1979).

22. "Time Sequence of Bone and Gallium Scan Changes in Acute Osteomyelitis: An Animal Model", at 26th Annual Meeting of Society of Nuclear Medicine, Atlanta, GA (June, 1979) and 26th Anuual Meeting of Southwest Chapter of Society of Nuclear Medicine, New Orleans, LA (March, 1981).

23. "Multiple Imaging Modalities: How to Select the Best Tests for Your Patient", at Faculty of ACP Course: Advances in Internal Medicine, San Francisco, CA, (October, 1981).

24. "The Use of Radionuclides to Diagnose Gastrointestinal Hemorrhage", at University of California San Francisco (March, 1982).

Lectures and Honoraria (continued)

25. "Radionuclide Evaluation of Gastrointestinal Hemorrhage and Biliary Imaging Studies", at Present Concepts in Diagnostic Radiology, San Francisco, CA (May, 1982).

26. "Nuclear Medicine Resident Job Market Experience Survey Results", at Academic Council Meeting at 29th Annual Meeting of Society of Nuclear Medicine, Miami, FLA (June, 1982).

27. "G.I. Bleeding - Problems in Detection and Localization", at 7th Annual Western Regional Meeting of Society of Nuclear Medicine, San Diego, CA (October, 1982).

28. "Scintigraphic Evaluation of G.I. Bleeding," at Stanford University Nuclear Medicine Grand Rounds, Stanford, CA (March, 1983).

29. "G.I. Bleeding Studies", at Society of Nuclear Medicine Hawaii Spring Conference, Kauai, HI (April, 1983).

30. "Nuclear Medicine Resident Job Market Experience Survey II Results", at Academic Council Meeting at 30th Annual Meeting of Society of Nuclear Medicine, St. Louis, MO (June, 1983).

31. "New Advances in Nuclear Medicine-Gastrointestinal Function Studies", at Roseville Community Hospital, Roseville, CA (September, 1983).

32. "G.I. Bleeding - An Update on Problems in Detection and Localization", at 8th Annual Western Regional Meeting of the Society of Nuclear Medicine, Seattle, WA (October, 1983).

33. "Radionuclide evaluation of joint disease" at Annual Midwinter Meeting of Northern California Chapter of the Society of Nuclear Medicine, San Francisco, CA (January, 1984).

34. "Radionuclide Evaluation of Lung Trauma" at Nuclear Medicine Grand Rounds at Stanford University School of Medicine, Stanford, CA (April 1984).

35. "Controversies in scintigraphic detection of lower G.I. bleeding" at Present Concepts in Diagnostic Radiology Course at Letterman Army Medical Center, San Francisco, CA (May, 1984).

36. "Radionuclide evaluation of joint disease" at Clinical Nuclear Medicine Course at Baptist Memorial Hospital, Memphis, TN, (November, 1984).

37. "Radionuclide Evaluation of gastrointestinal bleeding," at XV Annual Meeting of Mid-Eastern Chapter of Society of Nuclear Medicine, Charlottesville, VA (March, 1985).

Lectures and Honoraria (continued)

38. "Radiation Risk in Perspective" at Quad-Service Public Health Meeting at Travis AFB, CA (April, 1985).

39. "Panel: Management of Pulmonary Embolism," at Present Concepts in Internal Medicine Post Graduate Course and 2nd Annual ACP Army Regional Meeting, San Francisco, CA (October, 1985)

40. "Risks and Benefits of Nuclear Medicine" at Annual Meeting of the Hawaii Medical Association, Kona, HI (October, 1985).

41. "Nuclear Scintigraphy in the evaluation of G.I. Hemorrhage" at University of Hawaii Medical Grand Rounds, Honolulu, HI (October, 1985).

42. "G.I. Bleeding - Pitfalls" at Refresher Course Symposium at 10th Annual Western Regional Society of Nuclear Medicine Meeting, Palm Springs, CA (October, 1985).

43. "Acute Radiation Syndromes" at University of California San Francisco Nuclear Medicine Seminar, San Francisco, CA (November, 1985).

44. "Radiation Medicine" at meeting of Kiwanis Club, San Francisco, CA (November, 1985).

45. "Detection of Acute G.I. Bleeding" at 12th Annual meeting of the American College of Nuclear Physicians, West Palm Beach, FL (February, 1986).

46. "Imaging of Infection and Inflammation: Joints and Prothesis" at 12th Annual meeting of the American College of Nuclear Physicians, West Palm Beach, FL (February, 1986).

47. "Evaluation of Infection and loosening of Joint Prostheses," Nuclear Medicine Grand Rounds, Straub Clinic and Hospital, Honolulu, HI (April, 1986).

48. "Can the benefits of Nuclear Medicine be used to justify low-level waste management risks?" at the American Nuclear Society Annual meeting, Reno, NV (June, 1986).

49. "Introduction to Nuclear Medicine" and "Low level radiation exposure in perspective" at Annual Radioisotope Safe Use and Handling Course, Letterman Army Medical Center, San Francisco, CA (1978 - 1986).

50. "Nuclear Medicine Overview" and "Biological effects of ionizing radiation" at Annual Introduction to Nuclear Pharmacy Course, LAMC, SF, CA (1976 - 1986).

51. "Nuclear Medicine Instrument Safety Assurance Testing at 11th Annual Meeting of NEMA Diagnostic Imaging and Therapy Systems Division, Monterey, CA (September, 1986).

Lectures and Honorarium (continued)

52. "Evaluation of G.I. Bleeding via Scintigraphy" at Annual Clinical Nuclear Medicine course Bethesda Naval Medical Center, Bethesda, MD (October 1986).

53. "Radionuclide evaluation of Joints" at Annual Clinical Nuclear Medicine course Bethesda Naval Medical Center, Bethesda, MD (October 1986).

54. "Nuclear Medicine Role in Evaluating Gastrointestinal Hemorrhage" Johns Hopkins University School of Medicine, Baltimore, MD (October 1986).

55. "Nuclear Medicine's Role in Biliary and Gastrointestinal Bleeding Disorders" at Internal Medicine Update Course at California Medical Associations Annual Session and Western Scientific Assembly, Anaheim, CA 1 March 1987).

AudioVisual Productions

Society of Nuclear Medicine Audiotape SNM 204: "Lung Trauma."

Baptist Memorial Hospital Nuclear Medicine Audiotape #4: "Radionuclide evaluation of joint disease."

University of California Videotape: Current Topics in Nuclear Medicine, Series 1: "Scintigraphic identification and localization of gastrointestinal hemorrhage."

American College of Nuclear Physicians Audiotape 8: "Detection of Acute G.I. Bleeding."

American College of Nuclear Physicians Audiotape 12B: "Nuclear Medicine Role in evaluating Joints and Protheses."

CURRICULUM VITAE
Robert J. Lull, M.D.

BIBLIOGRAPHY

1. Strader WJ, Lull RJ: Bone Scanning: a very useful and commonly performed procedure in evaluation of patients with carcinoma. Southwestern Medicine 51: 252-253, 1970.

2. Volpe AJ, Lull RJ, Nusynowitz ML: The liver scan in patients with cancer: histologic correlation. J of Surg Oncology 3: 649-655, 1971.

3. Lull, RJ, Strader WJ, Blumhardt R: Tests of vitamin B-12 absorption. Southwestern Med 52:198-200, 1972.

4. Lull RJ: Further observations on I-131 rose bengal clearance in Gilbert's disease (Letter to Ed). J of Nucl Med 12:5789, 1971.

5. Blumhardt R, Lull RJ, Strader WJ: Thyroid nodules and carcinoma. Southwestern Med 53:61-64, 1972.

6. Lull RJ: Stereo cisternography (Letter to Editor). J of Nucl Med 13: 289, 1972.

7. Lull RJ, Dunn BE, Gregoratos G, Cox WA, and Fisher GW: Ventricular aneurysm due to cardiac sarcoidosis with surgical cure of refractory ventricular tachycardia. Amer J of Card 30:282-287, 1972.

8. Lull RJ (Letter to Editor): "Hot" hepatic lesions on liver scans. J of Nucl Med 13:703, 1972.

9. Milstein D, Nusynowitz M, Lull RJ: Radionuclide diagnosis in chest disease resulting from trauma. Semin in Nucl Med IV:339-356, 1974.

10. Roy JE, Lull RJ: P-32 Uptake in ocular tumor localization (Abstract). Health Physics 27: 619, 1974.

11. Nusynowitz M, Lull RJ: Modulation transfer function (Book chapter in Textbook of Nuclear Medicine Technology). PJ Early, MA Razzak, BD Sodee, Eds. Pg. 222-229. C.V. Mosby Co, St. Louis, 1975.

12. Lull RJ, Agee RN, Long JK, Petroff PA, and Andrews JA: Radionuclide evaluation of inhalation injury in patients with thermal injury (Abstract). J of Nucl Med 16, 547, 1975.

13. McGuinnis EW, Lull RJ: Bronchial adenoma causing unilateral absence of pulmonary perfusion. Radiol 120:367-368, 1976.

14. Agee RN, Long JM, Hunt SL, Petroff PA, Lull RJ, Mason AD and Pruitt BA Jr: Use of 133Xenon in early diagnosis of inhalation injury. J of Trauma 16: 218-224, 1976.

15. Cutter P, Arney GK, Lull RJ, Pestana C, Woeber KA, Becker RA: Your hyperthyroid patients: will drugs be enough? Current Prescribing 1: 20-29, 1977.

16. Welch GW, Lull RJ, Petroff PA, Hander EW, McLeod CG Jr, and Clayton WH: The use of steroids in inhalation injury. Surg, Gyn and Obst 145:539-544, 1977.

17. Henry WH, Staples D, Lull RJ, Kiser SR, Kehn BD, Yuille D, Telepak RJ, Lambrecht RW, McAuley RJ: Radionuclide marshmallow swallow for evaluation of dysphagia (Abstract). J of Nucl Med 19:738, 1978.

18. Kiser SR, Lehman HG, Lull RJ, Yuille DL, Dewey BT, Kehn BD: A general purpose radioassay program for obtaining the best fit in constructing the standard radioassay curve (Abstract). J of Nucl Med 19:748, 1978.

19. Nusynowitz M, Lull RJ: Modulation transfer function. Book chapter in Textbook of Nuclear Medicine Technology, 3rd Ed(PS Early, MA Razzak, ... BD Sodee, Eds). Pg 283-291, CV Mosby Co., St. Louis, 1979.

20. Dye SF, Lull RJ, McAuley RJ, Van Dam BE, Young W: Time sequence of bone and gallium scan changes in acute osteomyelitis: an animal model (Abstract). J of Nucl Med 20:647, 1979.

21. Lull RJ, Anderson JH, Telepak RJ, Brown JM, Utz JA: Radionuclide imaging in the assessment of lung injury. Sem in Nucl Med X:302-310, 1980.

22. Utz JA, Lull RJ, Anderson JH, Lambrecht RW, Brown JM, Henry W: Hepatoma visualization with Tc-99m pyridoxylidene glutamate. J of Nucl Med 21: 747-749, 1980.

23. Bunker SR, Lull RJ, McAuley RJ, Brown JM, Jackson JH, Hattner RS, Huberty JP: Advantages of in-vitro labelled Tc-99m red blood cells in the detection of gastrointestinal bleeding sites (Abstract). Clin Nucl Med 6:445, 1981.

24. Brown JM, White CJ, Sobel SM, Lull RJ: Increased left ventricular ejection fraction after a meal: potential source of error in performance of radionuclide angiography (Abstract). Clin Nucl Med 6:447, 1981.

25. Utz JA, Galvin EG, Lull RJ: Tc-99m bone scan in the evaluation of the Wagner "Cup Type" hip prosthesis (Abstract). Clin Nucl Med 6:456, 1981.

26. Sobel SM, Brown JM, Bunker SR, Patel J, Lull RJ: Noninvasive diagnosis of cardiac amyloidosis by technetium-99m-pyrophosphate myocardial scintigraphy. Amer Heart J 103:563-6, 1982.

27. Brown JM, White CJ, Sobel SM, Lull RJ: Increased left ventricular ejection fraction after a meal: potential source of error in performance of radionuclide angiography (Abstract). Am J Cardiol 49:991, 1982.

28. Bunker SR, Brown JM, McAuley RJ, Lull RJ, Jackson JH, Hattner RS, Huberty JP: Detection of gastrointestinal bleeding sites: use of in-vitro Tc-99m-labelled RBCs. JAMA 247:789-792, 1982.

29. Bunker SR, Lull RJ, Brown JM, McAuley RJ, Redwine MD, Jackson JH, Hattner RS (Abstract): Clinical comparison of Tc-99m-sulfur colloid and in-invtro labelled Tc-99m-red blood cells in the detection of gastrointestinal hemorrhage. J Nucl Med 23:p52, 1982.

30. Utz JA, Galvin EG, Lull RJ: Natural history of technetium-99m-MDP bone scan in asymptomatic total hip prostheses (Abstract). J Nucl Med 23:28-29, 1982.

31. Bunker SR, Lull RJ, Hattner RS, Brown JM: The ideal tracer in gastrointestinal bleeding detection. Amer J Roentgen 138:982-984, 1982.

32. Utz JA, Lull RJ, Anderson JH, Lambrecht RW, Brown JM, Henry HW: Hepatoma visualization with 99m-Tc-pyrodoxylidene glutamate. Yearbook of Nuclear Medicine (Ed. PB Hoffer) 1982:365-366.

33. Lull RJ, Anderson JH, Telepak RJ, Brown JM, Utz JA; Radionuclide imaging in assessment of lung injury. Yearbook of Nuclear Medicine (Ed. PB Hoffer) 1982:151-153.

34. Kaplan KA, White CJ, Watson TJ, Redwine MD, Jackson JH, Lull RJ: Diastolic filling of the left ventricle as a predictor of coronary artery disease: a simplified approach (Abstract). Clin Nucl Med 7:34, 1982.

35. Jackson JH, Utz JA, Lull RJ, Galvin EG, Kolina JS, Boll DA, Kaplan KA, Turnbull GL, Redwine MD: "Hot Shaft Sign": a confusing finding in asymptomatic hip prosthesis patients (Abstract). Clin Nucl Med 7: 43, 1982.

36. Lull RJ: G.I. bleeding -- problems in detection on localization. chapter III in 7th Western Regional Review Course Syllabus. Pg 10-18. Society of Nuclear Medicine Western Region, San Francisco, CA 1982.

37. Bunker SR, Lull RJ, Jackson JH, McAuley RJ, Forster MJ, Warren RW: The nuclear enema: a technique for scintigraphically demonstrating colonic anatomy. Radiology 145:213, 1982.

38. Bunker SR, Kolina JS, Kaplan KA, McAuley RJ, Lull RJ: Scintigraphic detection of occult hemorrhage using red blood cells labelled in-vitro with Tc-99m. Arch Int Med 143:1027-1028, 1983.

39. Brown JM, White CJ, Sobol SM, Lull RJ: Increased left ventricular ejection fraction after a meal: Potential Source of Error in performance of Radionuclide angiography. Amer J Cardiol 51:1709-1711, 1983.

40. Lull RJ, Utz JA, Jackson JH, Redwine MD, Turnbull GL, Kolina JS, Boll DA, and Kaplan KA: Radionuclide evaluation of joint disease. Book chapter in 1983 Nuclear Medicine Annual (LM Freeman and HS Weissman, Eds). Pg 281-328, Raven Press, New York, 1983.

41. Lull RJ, Tatum JL, Sugerman HJ, Hartshorne MF, Boll DA, and Kaplan KA: Radionuclide evaluation of lung trauma. Semin Nucl Med X111:223-237, 1983.

42. Utz JA, Lull RJ, Galvin EG: The variability of follow-up bone scans after asymptomatic total hip protheses (Abstract): J Nucl Med 24:5, p72, 1983.

43. Kilbride HW, Lull RJ, Lehmann HC: Screening for Hypothyroidism (Letter to Editor) Pediatrics 73:263-264, 1983.

44. Lull RJ: Radionuclide detection of acute lower gastrointestinal tract bleeding site. West J Med. 139: 697-698, 1983.

45. Weber DA, Paras P, Harris CC, Benua RS, Brill AB, Brown ML, Croft BY, Lull RJ, Wiley AL: Initial Testing and Quality Control for radionuclide dose calibrators. ACNP monograph. Washington, D.C., 1984.

46. Bunker SR, Lull RJ, Tanasescu DE, Redwine MD, Rigby J, Brown JM, Brachman MB, McAuley RJ, Ramanna L, Landry A, Waxman A: Scintigraphy of gastrointestinal hemorrhage: superiority of ^{99m}Tc red blood cells over ^{99m}Tc sulfur colloid. AJR 143: 543-548, 1984.

47. McAuley RJ, Lull RJ, Ice RD: ^{82}Br Contamination in fission product ^{99m}Tc Generator Eluate. Europ J. Nucl Med 10: 60-62, 1985.

48. Nusynowitz M, Lull RJ: Modulation transfer function. Book chapter in Principles and Practice of Nuclear Medicine (PS Early, BD Sodee, Eds) Pg 463-471, CV Mosby Co., St. Louis, 1985.

49. Orrecchia PM, Hensley EK, McDonald PT, Lull RJ: Localization of lower gastrointestinal hemorrhage: Experience with red blood cells labeled in vitro with Technetium Tc-99m. Arch Surg 120:621-624, 1985.

50. Lull RJ, Morris GL: Scintigraphic detection of gastrointestinal hemorrhage: Current status. J Nucl Med Tech 14: 79-88, 1986.

51. Lull RJ: Can the benefits of nuclear medicine be used to justify low level waste management risks? Transactions (L. Palagi, Ed) Pg 38-39, American Nuclear Society, La Grange Park, IL, 1986.

52. Weber DA, Paras P, Harris CC, Benua RS, Brill AB, Brown ML, Croft BY, Lull RJ, Wiley AL: Initial testing and quality control for radionuclide dose calibrators. ACNP monograph. Nuclear Medicine Communications 7: 555-565, 1986.

53. Utz JA, Lull RJ, Galvin MG: Asymptomatic total hip prothesis: natural history determined using Tc-99m MDP bone scans. Radiology 161: 509-512, 1986.

54. Lull, RJ, Tatum JL, Hartshorne MF, Algeo JH: Assessment of lung function following injury to toxic agents. Book chapter in Pulmonary Nuclear Medicine (M Loken, Ed.) pg xxx-xxx, Appleton-Century-Crofts, East Norwalk, CT, 1987. (in Press).

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
Robert J. Lull, M.D.	Calif., N.Y., Texas

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
The American Board of Nuclear Medicine	Nuclear Medicine	May 1972

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			
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

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

DEC 20 1988

CURRICULUM VITAE

NAME: Raoul O. Hagen

PREMEDICAL EDUCATION: B.A., University of Iowa, 1955

MEDICAL EDUCATION:

School: M.D., Univ. of Iowa Medical School, 13 June 1958

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

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

MILITARY ASSIGNMENTS:

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

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

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

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

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

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

Consultant in Radiology, USARV
June-August 1969.

Radiologist, Brooke General Hospital
September 1969 - July 1970

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

Radiology Consultant to Health Services Command
1975 - June 1979

Radiology Consultant to The Surgeon General
January 1978 - July 1982

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

Chief, Department of Radiology, Walter Reed Army Medical Center
September 1984 - July 1987

Radiology Consultant to The Surgeon General
September 1984 - present

Chief, Department of Radiology, Letterman Army Med Ctr - May 88-present

ACADEMIC APPOINTMENTS:

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

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

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

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

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

PROFESSIONAL ORGANIZATIONS:

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

BOARD CERTIFICATION:

American Board of Radiology, December 1967

HONORS:

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

LICENSURE:

Texas
California
Iowa

PUBLICATIONS:

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

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

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

The American Board of Radiology

DEAR DOCTOR:

I am pleased to inform you that at its last meeting The American Board of Radiology voted to grant you its certificate in RADIOLOGY.

With personal congratulations, I am

Sincerely yours,

Secretary

Raoul O. Hagen, M.D.
Department of Radiology
Brooke General Hospital
Ft. Sam Houston, Texas 78234

CURRICULUM VITAE

September 1986

NAME: STOTLER, RICHARD ELMO

CITIZENSHIP: U.S.A.

PROFESSIONAL LICENSE: PHARMACIST - District of Columbia, Number 1999-C, July 1965

BOARD CERTIFICATION: Board Certified Nuclear Pharmacist, Nuclear Pharmacy Certification Exam, Board of Pharmaceutical Specialities, American Pharmaceutical Association. April 1982.

ACADEMIC AND PROFESSIONAL EDUCATION:

DEGREES:

INSTITUTION	DEGREE	GRADUATION
The University of Michigan Ann Arbor, Michigan	M.S. Hospital Pharmacy	August 1975
The Medical College of Virginia Richmond, Virginia	B.S. Pharmacy	June 1965
The George Washington University Washington, D.C.	A.A.	June 1964

OTHER:

June 1986	Society of Nuclear Medicine, 33rd Annual Meeting, Washington, D.C.
June 1985	Society of Nuclear Medicine, 32nd Annual Meeting Houston, TX.
June 1984	Society of Nuclear Medicine, 31st Annual Meeting, Los Angeles, CA.

OTHER:

June 1983	Society of Nuclear Medicine, 30th Annual Meeting, St. Louis, MO.
June 1982	Society of Nuclear Medicine, 29th Annual Meeting, Miami Beach, FL.
May 1982	Army Pharmaceutical Services Management Course, Academy of Health Sciences, U.S. Army, Ft. Sam Houston, TX.
August 1980	Army Pharmaceutical Management Course, Walter Reed Army Medical Center, Washington, D.C.
December 1978	Mid-Year Clinical Meeting, ASHP;, San Antonio, TX.
September 1977	ADP Orientation, U.S. Civil Service Commission, Honolulu, HA.
August 1977	Residency Preceptors Conference, ASHP, Bethesda, MD.
April 1976	Postgraduate Short Course, Nuclear Pharmacy Orientation, Letterman Army Medical Center, Presidio of S.F., CA.
March 1976	Institute on Hospital Pharmacy Management Technique, ASHP, San Francisco, CA.
April 1970	Organization Excellence Through Effective Communication, A Seminar for Executives. Augsburg, Germany.
July 1969	Institute on General Practice of Hospital Pharmacy, ASHP, New Haven, CT.
May 1969	Army Pharmaceutical Service Management Course, WRAIR, Washington, D.C.
September 1967	Institute on the Law of Drugs and Hospital Pharmacy Practice, ASHP, Miami, FL.
May 1967	Army Pharmaceutical Service Management Course, WRAIR, Washington, D.C.
November 1966	AMEDD Pharmacy Officers Orientation Course, Brooke General Hospital, BAMC, Ft. Sam Houston, TX.

ACADEMIC APPOINTMENT: Adjunct Professor in the University of the Pacific School of Pharmacy, Clinical Pharmacy Clerkship Program, December 1976.

PROFESSIONAL SOCIETIES:
American Society of Hospital Pharmacists
American Pharmaceutical Association
Society of Nuclear Medicine
Technology Section, Society of Nuclear Medicine

MILITARY SERVICE:

LTC, United States Army, Medical Service Corps, active duty Sept 1966 to present.

December 1982	U.S. Army Command and General Staff College graduate.
February 1982	Received Regular Army Commission, Medical Service Corps.
November 1980	Promoted to LTC, U.S. Army, Medical Service Corps.
June 1974	AMEDD Officer Advanced Course graduate.
November 1966	AMEDD Officer Basic Course graduate.

LECTURES:

"Radiopharmaceutical Quality Assurance," Nuclear Medicine Review Course conducted at the 33rd Annual Meeting of the Society of Nuclear Medicine, Washington, D.C. June 86.

"Functions of A Radiopharmacist in Nuclear Medicine" and "Misadministrations", Nuclear Medicine Course, National Naval Medical Center, Bethesda, MD.

PUBLICATIONS:

Van Nostrand, Douglas; Corley, James H.; Kyle, Ralph W.; and Stotler, Richard E., "Value of Selective Spleen Scintigraphy When Liver/Spleen Image Shows Equivocal Spleen Defects: Concise Communication." The Journal of Nuclear Medicine (vol.24, No7) pp.559-562, 1983.

Lucket, Larry W. and Stotler, Richard E. "Radioiodine Volatization from Reformulated Sodium Iodine I-131 Oral Solution." The Journal of Nuclear Medicine (Vol. 21) pp.477-479, 1980.

CURRENT RESEARCH PARTICIPATION:

Intravenous Administration of 131 I-6-B Iodomethylnorcholestrol (NP-59) for Adrenal Evaluation and Imaging.

Evaluation of Indium Oxine In-111 Labeled Cellular Blood Components in Detection of Inflammation.

PROFESSIONAL EXPERIENCE:

1985 - Present	Assigned as Chief, Nuclear Pharmacy Service and Director, Nuclear Pharmacy Residency Program, Letterman Army Medical Center, Presidio of S.F. CA.

1980 - 1985	Ch, Nuclear Pharmacy, Nuclear Medicine Service, Dept of Radiology, Walter Reed Army Medical Center, Washington, D.C. Responsible for the direction of the largest and busiest Nuclear Pharmacy Service in the Army. This service prepared over 10,000 radiopharmaceutical doses per year. This assignment involved participation in and support of clinical research involving diagnostic radiopharmaceuticals. In addition to these duties, there was active involvement in the education and training of nuclear medicine "fellows", radiology residents, hospital pharmacy residents, and nuclear medicine technology students.
1976 - 1980	Nuclear Pharmacist and Assistant Chief, Pharmacy Service, Tripler Army Medical Center, Honolulu, HA. Was responsible for establishment of Nuclear Pharmacy support for the Nuclear Medicine Service at Tripler. Duties included the procurement, receipt;, preparation (to include the compounding of radiolabeling kits), quality control, dispensing, disposition and and pharmacology of radioactive drugs. Assisted in the training of nuclear medicine technologists and radiology residents. Provided the medical staff with information as to dose, availability and pharmacology of related therapeutic agents available from the Pharmacy Service. Assisted in the management of the Medical Center Pharmacy Service with a staff of 45 and budgetary expenditures of over two million dollars.
1975 - 1976	Completed an American Society of Hospital Pharmacist's approved Hospital Pharmacy Residency at Letterman Army Medical Center, San Francisco, CA. This residency included rotations through all phases of the Pharmacy Service with added emphasis in the Nuclear Pharmacy operations. Nuclear Pharmacy training was taken under LTC George Dunson, MSC, and included completing and instructing in the AMEDD Nuclear Pharmacy Orientation Course. Upon departure, received competency certificate in the practice of Nuclear Pharmacy, and a Hospital Pharmacy residency certificate with specialization in Nuclear Pharmacy.
1974 - 1975	Completed requirements for a Master's Degree in Hospital Pharmacy from the University of Michigan. Completed courses in Nuclear Pharmacy and Advanced Nuclear Pharmacy.
1974 - 1975	Attended and graduated as an Honor Graduate from the AMEDD Officers Advanced Course.
1969 - 1973	Chief, Pharmacy Service, U.S. Army Hospital, Augsburg, Germany. Supervised all pharmacy services for a 150 bed hospital and six health clinics. Additional responsibility for one year as AMEDD Detachment Commander for 150 enlisted personnel.
1966 - 1969	Staff pharmacist and Chief, Pharmacy Service, DeWitt Army Hospital, Ft. Belvoir, VA. Directed inpatient and outpatient pharmacy operations for a 200 bed hospital.

1965 - 1966 Completed Pharmacy Internship requirements at The George Washington University Hospital. Passed the District of Columbia Board of Pharmacy examination and received license as a registered pharmacist. Worked as staff pharmacist at The George Washington University Hospital until entry on active duty. AMEDD Officers Basic Course completed November 1966.

Board of Pharmaceutical Specialties

Certification in Nuclear Pharmacy

The Board of Pharmaceutical Specialties attests that

Richard Elmo Stotler

having fulfilled all requirements, and having been recommended by the Specialty Council on Nuclear Pharmacy, is CERTIFIED in the specialty of Nuclear Pharmacy.

DEC 20 1988

Chairman Maureen M. Fink

Secretary Richard Remmers

Date August 25, 1982

American Pharmaceutical Association

U. S. Army Medical Department

This is to certify that

MAJOR RICHARD E. STOTLER, MSC

has successfully completed the

HOSPITAL PHARMACY RESIDENCY
WITH
SPECIALIZATION IN NUCLEAR PHARMACY

from 1 SEPTEMBER 1975 *to* 30 AUGUST 1976

given at LETTERMAN ARMY MEDICAL CENTER, PRESIDIO OF SAN FRANCISCO, CALIFORNIA

this 30TH *day of* AUGUST *1976*

George S. Woodard, Jr.

GEORGE S. WOODARD, JR., M. D.
BRIGADIER GENERAL, MC, COMMANDING

DEC 2 0 1988

SG FORM 227, 1 DEC 68

DEPARTMENT OF THE ARMY

Certificate of Training

This is to certify that

MAJOR RICHARD E. STOTLER

has successfully completed

THE POSTGRADUATE SHORT COURSE
NUCLEAR PHARMACY ORIENTATION
12 - 23 APRIL 1976

Given at LETTERMAN ARMY MEDICAL CENTER
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

DEC 2 0 1988

California Pharmaceutical Association Continuing Education
Accredited 15 Hours; Accepted 65 Hours

George L. Dunson

GEORGE L. DUNSON
MAJOR, MSC
COURSE DIRECTOR

DA FORM 87, 1 JUL 74 REPLACES DA FORM 87, 1 SEP 54, WHICH IS OBSOLETE.

☆U.S. GPO:1974-0-665-413/1008

Medical College of Virginia

School of Pharmacy

Richard Elmo Stotler

having fulfilled the requirements of the Faculty has been declared a graduate of the College with the degree of

Bachelor of Science

Richmond, Virginia

June 6, 1965

The University of Michigan

To all who may read these letters Greetings

Hereby it is certified that upon the recommendation of the

Horace H. Rackham School of Graduate Studies

the Regents of the University of Michigan have conferred on

Richard Elmo Stotler

the degree of

Master of Science in Pharmacy

in recognition of the satisfactory fulfillment of the requirements pertaining to this degree

Dated this twenty-third day of August, 1975.

DEC 20 1988

R. L. Kennedy

R. H. Fleming

NRC FORM 313M SUPPLEMENT A (9-81) U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
STOTLER, Richard E.	N/A

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Nuclear Pharmacy Board of Pharmaceutical Specialities American Pharmaceutical Association		August 1982

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING: LECTURE/ LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Letterman AMC (12-23 Apr 76) Univ. of Michigan (Sep 74-Sep 75) LAMC Pharmacy Residency (Sep 75-Aug 76)	20 30	120
b. RADIATION PROTECTION	" " "	24 30	120
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	" " "	7 20	80
d. RADIATION BIOLOGY	" " "	11 60	240
e. RADIOPHARMACEUTICAL CHEMISTRY	" " "	16 60	240

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Full Range of Medical Radioisotopes		Letterman Army Medical Center, PSF, CA	5 months	Radiopharmacy Resident
Full Range of Medical Radioisotopes		Tripler AMC, Honolulu, HI	Oct 76-Jul 80	Nuclear Pharmacist
Full Range of Medical Radioisotopes		Walter Reed AMC, Washington, D.C.	Aug 80 - Jul 85	Nuclear Pharmacist

DEC 2 0 1988

1. NAME OF AUTHORIZED USER (Last, First, MI)				2. STATE OR TERRITORY IN WHICH LICENSED:
STOTLER, RICHARD E.				District of Columbia Registered Pharmacist (MD, DDS, DVM, etc.)
RANK/GRADE	ORGANIZATION	ORGANIZATIONAL DIVISION	BLDG./ROOM NO.	WRAMC AUTHORIZATION NO.
LTC/05	Dept.of Radiology WRAMC	Nuclear Medicine	Bldg #2 Room 1G20	H274-E

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
NUCLEAR PHARMACY BOARD OF PHARMACEUTICAL SPECIALITIES AMERICAN PHARMACEUTICAL ASSOC.		AUGUST 1982

4. FORMAL EDUCATION — HIGHEST ACADEMIC DEGREE ATTAINED

	Higher Educational Institutions Attended	Type of Program Pursued and Dates of Attendance	Degree, Diploma or Certificate Received and Date
a.	Geo. Washington Univ.	Pharmacy	A.A. Jun 64
b.	Medical College of Va.	Pharmacy	B.S. Jun 65
c.	Univ. of Michigan	Hospital Pharmacy	M.S. June 75
d.			

5. TRAINING RECEIVED IN BASIS RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING (Include course title if known) B	TYPE AND LENGTH OF TRAINING: LECTURE/LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	1. Nuc.Pharmacy Orientation Crs + 80 hrs total 12-23Apr 76 2. Hospital Pharmacy Residency with Specialization in Nuclear Pharmacy 800 hrs in Nuclear Pharmacy Sept 75 to Aug 76	+14	+6
b. RADIATION PROTECTION	3. Nuclear Pharmacy 4 Semester hrs 4. Advanced Nuclear Pharmacy 4 Semester hrs (University of Michigan) Sept 74 to Sept 75	+7	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	+7	-
d. RADIATION BIOLOGY	"	+11	
e. RADIOPHARMACEUTICAL CHEMISTRY	"	+20	+15

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
99Mo 99mTc 131I 123I 125I 67Ga 201Tl	8 Ci 5 Ci 300 mCi 1 mCi 100 uCi 100 mCi 15 mCi	Nuclear Medicine Service Letterman AMC S.F. Ca.	800 hrs (5months)	Pharmacy Resident
59Fe 57Co 58Co 111In 133Xe 32P 51Cr 169Yb	1 mCi 10 uCi 16 uCi 5 mCi 200 mCi 20 mCi 2 mCi 2 mCi	Nuclear Medicine Service Tripler AMC Honolulu, HI.	Oct 76 - July 80	Nuclear Pharmacist
"	"	Nuclear Medicine Service Walter Reed AMC Washington, D.C.	Aug 80 - present	Nuclear Pharmacist

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

DEVICE	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
N/A			

8. CERTIFICATION:

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

29Jan 1982
(Date Signed)

Richard E. Stotts
(Signature of Applicant)

DEC 2 0 1982

For use of this form, see AR 40-400; the proponent agency is the Office of The Surgeon General.

THIS FORM IS AFFECTED BY THE PRIVACY ACT OF 1974

1. AUTHORITY: Title 5 U.S.C., Section 301; Title 44 U.S.C., Section 3101; and Title 10 U.S.C., Section 1071.

2. PRINCIPAL PURPOSES(S): To define the extent and limits of the practioners clinical privileges as a function of his/her training and experience.

3. ROUTINE USES: Determine and assess capability of practioner's clinical practice.

4. MANDATORY OR VOLUNTARY DISCLOSURE: Disclosure of the information is voluntary. Failure to provide information may result in the limitation or termination of your clinical privileges.

IDENTIFICATION

NAME (Last, first, middle)		SSN
STOTLER, RICHARD ELMO		
GRADE	**CORPS**	**DATE OF ASSIGNMENT (Day, month, year)**	**ASSIGNMENT LOCATION**
LTC	MSC	17 August 1980	Nuclear Medicine Service

PROFESSIONAL EDUCATION

PROFESSIONAL SCHOOL		YEARS ATTENDED		TYPE OF DEGREE	DEGREE COMPLD		
NAME	LOCATION	FROM	TO		DAY	MONTH	YEAR
George Wash. University	Washington, D.C.	1960	1964	A.A.		Jun	64
Medical College of Va.	Richmond, Va	1964	1965	B.S.	6	Jun	65
University of Michigan	Ann Arbor, Michigan	1974	1975	M.S.	23	Aug	75

POSTGRADUATE TRAINING

HOSPITAL OR INSTITUTION		TYPE PROGRAM (residency, etc.)	DURATION	DATE COMPLD		
NAME	LOCATION			DAY	MONTH	YEAR
Academy of Health Sc.	Ft Sam Houston Tx	Off. Adv Crs	6 mos.	13	Jun	74
Letterman AMC	P. S.F. Ca	Residency	12 months	31	Aug	76
Letterman AMC	P. S.F. Ca Nuc	Pharm Orient	2 Wks		Apr	76

PREVIOUS HOSPITAL ASSIGNMENTS

NAME OF HOSPITAL	LOCATION	CLINICAL SERVICE/ DEPT ASGD	INCLUSIVE DATES					
			FROM			TO		
			DAY	MONTH	YEAR	DAY	MONTH	YEAR
DeWitt Army Hospital	Ft Belvior, Va	Pharm		Nov	66		Sep	69
30th Field Hospital	Augsburg, Germany	Pharm		Sep	69		Sep	73
Brooke AMC	Ft Sam Houston, Tx	Pharm		Oct	73		Jan	74
Letterman AMC	P. S.F. Ca	Pharm		Sep	75		Sep	76
Tripler AMC	Honolulu, Hawaii	Nuc Med		Oct	76		Jul	80
Walter Reed AMC	Washington, D.C.	Nuc Med		Aug	80		present	

CERTIFICATION/PROFESSIONAL SOCIETY MEMBERSHIP

BOARD ELIGIBLE FROM (Date)

BOARD EXAMINATION TAKEN
DATE 5 Aug 1965 ☒ TOTAL ☐ PARTIAL

BOARD CERTIFIED
☒ YES (Give name of Board(s)) Registered Pharmacist by examination Washington, D.C. #1999C
☐ NO

MEMBERSHIP IN SPECIALTY SOCIETY(IES) (Specify)
Society of Nuclear Medicine; American Society of Hosp. Pharmacists; Am. Pharm Assoc.

CLINICAL PRIVILEGES APPLIED FOR

NUCLEAR PHARMACIST

SIGNATURE OF APPLICANT
Richard E. Stotler

DATE
27 March 1981

DA FORM 4691-R, 1 Apr 78

(Continue on reverse)

Fig. 1

DEC 2 0 1988

CLINICAL PRIVILEGES ANNUAL EVALUATION

For use of this form, see AR 40-66; the proponent agency is the Office of The Surgeon General.

	PRIVILEGES (List Below)	PERFORMS (Privilege)	ASSISTS (Privilege)	NO RESTRICTIONS	RESTRICTIONS/ EXCLUSIONS (See Remarks)	REQUIRES QUAL. SUPRV	DESIGNATED AS QUAL. SUPRV	PERFORMANCE: ACCEPTABLE	PERFORMANCE: BORDERLINE	PERFORMANCE: UNACCEPTABLE	DISCIPLINARY ACTION TAKEN	PRIVILEGE SELDOM EXERCISED	REQUIRES ADDITIONAL EDUCATION
1.	Practice of Nuclear Pharmacy to include procurement, receipt, preparation (to include compounding of radiolabeled kits), dispensing, disposition and pharmacology of radioactive drugs.	X		X				X					
2.	Preparation and administration of radiopharmaceuticals for oral administration: 131 I Sodium Iodide, 123 I Sodium Iodide, & 57Co & 58Co Vit B-12.	X		X				X					
3.	Preparation and direct assistance to a physician in the administration of 32P Sodium Phosphate Inj. (I.V.) and 32 P Chromic Phosphate Susp (I.P.)		X					X					

NAME: RICHARD ELMO STOTLER LTC, MSC

SPECIALTY: NUCLEAR PHARMACY

PERIOD: FROM MARCH 1981 TO AUGUST 1984

RATED BY: DOUGLAS VAN SUSTRAND, M.D. LTC, MC

TITLE: C, NUCLEAR MEDICINE SERVICE

MEDICAL TREATMENT FACILITY: WALTER REED ARMY MEDICAL CENTER

DA FORM 4692-R, 1 Apr 78

Figure 9-2. DA Form 4692-R

Incl 1

DEC 2 0 1988

CLINICAL PRIVILEGES ☐ RENEWED ☐ MODIFIED (Specify)

I HAVE OBSERVED THIS PRACTITIONER ON A REGULAR BASIS AND HE/~~SHE~~ DOES/~~DOES NOT~~ APPEAR TO BE MENTALLY AND PHYSICALLY COMPETENT.

REVIEWED BY

DEPT/SVC	DATE	CREDENTIALS COMMITTEE	DATE
DEPT OF RADIOLOGY	27 Aug 84		SEP 21 1984
SIGNATURE SHERRY D. BRAHMAN, COL, MC		SIGNATURE Daniel B Kimball Jr	

APPROVED

HOSPITAL COMMANDER (Signature)	DATE
Lewis A. Mologne	SEP 21 1984

REMARKS

CME CREDIT:

DATES OF COURSE	COURSE TITLE	NO OF CME HOURS
1		
4		
2		

(You may attach an additional page if necessary for CME information.)

LAST CPR CERTIFICATION MONTH SEPT YEAR 1983

MY LAST PHYSICAL EXAM WAS PERFORMED IN THE MONTH OF APRIL YEAR 1983

I AM LICENSED IN THE STATE(S) OF (1) D.C. Pharmacy License, (2) , (3)

EDUCATION/TRAINING UPDATE

BOARD ELIGIBLE FROM (Date)	BOARD EXAMINATION TAKEN DATE ☐ TOTAL ☐ PARTIAL
BOARD CERTIFIED XXX ☐ YES (Give name of Board(s)) ☐ NO CERTIFICATION IN NUCLEAR PHARMACY 25 AUG 1982	BOARD OF PHARMACEUTICAL SPECIALITIES AMERICAN PHARMACEUTICAL ASSOCIATION
RECERTIFICATION (Board and Date)	
UTILIZED IN PRIMARY SPECIALTY XXX ☐ YES ☐ NO	YEARS AND DATES OF SPECIALTY TRAINING (Specify only training since initial application)
MEMBERSHIP IN SPECIALTY SOCIETY(IES) (Specify) SOCIETY OF NUCLEAR MEDICINE	
TOTAL HOURS OF CONTINUING EDUCATION THIS PERIOD	TOTAL HOURS OF SUBSPECIALTY BOARD THIS PERIOD (Specify)

DEC 20 1988

GOVERNMENT OF THE DISTRICT OF COLUMBIA

OPLA-12C 10/81

Audit No. 150941

DEPARTMENT OF CONSUMER AND REGULATORY AFFAIRS
OCCUPATIONAL AND PROFESSIONAL LICENSING ADMINISTRATION
BOARD OF PHARMACY

This is to certify that

LICENSE

PHARMACIST
STOTLER RICHARD
2278 CENTER ROAD
NOVATO, CAL 94947

LICENSE# 1999
is duly licensed in the District of Columbia
03/01/87 for the period 02/28/89

David P. Murray
Acting Director, Department of
Consumer and Regulatory Affairs

Not valid unless stamped
By the D.C. Treasurer

Renewal No. 877

87-P9526

DEC 20 1988

CURRICULUM VITAE

NAME: CARL E. BERGSAGEL, MAJ, MSC

ADDRESS: Work: Letterman Army Medical Center
ATTN: HSHH-PM-HP
Presidio of San Francisco, CA 94129-6700

TELEPHONE: Work: (415) 561-2794
AUTOVON 586-2794

EDUCATION:

University of North Carolina at Chapel Hill, N.C., Master of Science in Public Health (MSPH) with major in Radiological Hygiene, 1985.

East Tennessee State University, Johnson City, TN, Bachelor of Science in Environmental Health (BSEH) (Cum Laude), 1975.

PROFESSIONAL/MILITARY EXPERIENCE:

September 1988-present	Assigned to Letterman Army Medical Center, Presidio of San Francisco, California, as Chief, Health Physics Section, Preventive Medicine Service.
June 1985-August 1988	Assigned to US Army 10th Medical Laboratory, Landstuhl, West Germany, as Health Physicist in Radiological Hygiene Branch.
January 1982-May 1985	Assigned to William Beaumont Army Medical Center, El Paso, Texas, as Chief, Health Physics Section, Preventive Medicine Service. Radiation Protection Officer for USNRC Broad Scope Medical License No. 42-05255-07 and USNRC Radiation Teletherapy License No. 42-05255-08.

July 1980-December 1981	Assigned to US Army Medical Department Student Detachment, AHS, Fort Sam Houston, Texas, with duty at The University of North Carolina at Chapel Hill, Chapel Hill, N.C. for graduate study in Radiological Hygiene.
January 1980-June 1980	Assigned to the Academy of Health Sciences, Fort Sam Houston, Texas. Completed the US Army Medical Department Officer Advanced Course.
November 1975-December 1979	Assigned to the US Army Medical Department Activity, Fort Stewart, Georgia, as Chief, Environmental Health Section, Preventive Medicine Service.

OTHER TRAINING/SHORT COURSES:

July 1987	Nuclear Hazards Training Course, Interservice Nuclear Weapons School, Kirtland Air Force Base, New Mexico (1 week).
October 1985	Medical Effects of Nuclear Weapons Course, Armed Forces Radiobiology Research Institute, and Medical Management of Chemical Casualties Course, US Army Medical Research Institute of Chemical Defense, Mannheim, West Germany (1 week).
April 1985	Radioactive Waste Packaging, Transportation and Disposal Course, Chem-Nuclear Systems, Inc., Columbia, South Carolina (1 week).
April 1984	Laser-Microwave Hazards Workshop, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland (1 week).
January 1984	Health Physics in Radiation Accidents Course, REAC/TS, Oak Ridge Associated Universities, Oak Ridge, Tennessee (1 week).

May 1982	Medical X-ray Survey Techniques Course, Academy of Health Sciences, Fort Sam Houston, Texas (2 weeks).
April 1982	Radiation Protection Officer Workshop, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland (1 week).
February 1979	Health Aspects of Design Review Course, Academy of Health Sciences, Fort Sam Houston, Texas (2 weeks).
January 1978	Community and Environmental Health Program Management Course (6A-F6), Academy of Health Sciences, Fort Sam Houston, Texas (2 weeks).
January 1977	Environmental Pollution Control Course, Academy of Health Sciences, Fort Sam Houston, Texas (2 weeks).
December 1976	Industrial Hygiene Workshop, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland (2 weeks).
May 1976	US Army Medical Service Corps Officer Basic Course, Academy of Health Sciences, Fort Sam Houston, Texas (4 weeks).
September-November 1975	Community Health and Environmental Science Course (6A-F5), Academy of Health Sciences, Fort Sam Houston, Texas (9 weeks).

PROFESSIONAL AFFILIATION:

American Association of Physicists in Medicine

Health Physics Society

The University of North Carolina
at Chapel Hill

To all to whom these presents shall come

Greeting

Be it known that

Carl Edwin Bergsagel

having completed the studies and fulfilled the requirements of the Faculty for the Professional Graduate Degree of

Master of Science in Public Health

has accordingly been admitted to that degree, with all the rights, honors, and privileges thereunto appertaining.

In witness whereof, the Seal of the University and the signatures of duly authorized officers are affixed to this diploma.

Given at Chapel Hill, in the State of North Carolina, this twelfth day of May in the year of Our Lord nineteen hundred and eighty-five and of this University the one hundred and ninety-sixth.

Philip G. Carson
Chairman of the Board of Governors
The University of North Carolina

W. Friday
President
The University of North Carolina

George K. Lanier
Chairman of the Board of Trustees
The University of North Carolina at Chapel Hill

Christopher L. Fordham, III
Chancellor
The University of North Carolina at Chapel Hill

J. P. Manire
Dean of the Graduate School

Michael A. Shadduck
Dean of the Professional School

DEC 20 1988

East Tennessee State University

Johnson City, Tennessee

The State Board of Regents for the State University and Community College System of Tennessee upon the recommendation of the Faculty has conferred on

Carl Edwin Bergsagel GRADUATE

the degree of

Bachelor of Science in Environmental Health

with all the rights, privileges and honors thereunto appertaining.

The State Board of Regents has issued this diploma on the fourteenth day of August in the year of our Lord nineteen hundred seventy-five.

Ray Blanton
Governor
Chairman, State Board of Regents

Roy S. Nicks
Chancellor, State Board of Regents

THE GREAT SEAL OF THE STATE OF TENNESSEE XVI AGRICULTURE COMMERCE 1796

Q. D. Crep
President of the University

LEC 20 1975

NRC FORM 313M SUPPLEMENT A
(9-81)

U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

Approved by OMB
3150-0041
Expires 9-30-86

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
Carl E. Bergsagel, MAJ, MS	

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	University of North Carolina at Chapel Hill, NC August 1980-December 1980	45 hrs.	45 hrs.
b. RADIATION PROTECTION	University of North Carolina at Chapel Hill, NC January 1981-December 1981	90 hrs.	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	University of North Carolina at Chapel Hill, NC August 1980-December 1980	45 hrs.	
d. RADIATION BIOLOGY	University of North Carolina at Chapel Hill, NC January 1981-May 1981	45 hrs.	
e. RADIOPHARMACEUTICAL CHEMISTRY	University of North Carolina at Chapel Hill, NC September 1981-November 1981	5 hrs.	

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Co-60	8,000 Ci (1)	WBAMC, El Paso, TX	3 years	Calibration
Cs-137	50 mCi (1)	WBAMC, El Paso, TX	3 years	Meas. & Calib.
I-125	100 μCi (2)	WBAMC, El Paso, TX	3 years	Measurement
I-131	150 mCi (2)	WBAMC, El Paso, TX	3 years	Measurement
Ir-192	50 mCi (1)	WBAMC, El Paso, TX	3 years	Measurement
Tc-99m	1 Ci (2)	WBAMC, El Paso, TX	3 years	Meas. & Calib.

Note: (1) = Sealed Source
(2) = Unsealed (liquid) Source

DEC 2 0 1988

19 May 1988

LAMC Reg 40-34

DATE: 24 Jun 88

FOR OFFICE USE ONLY

Review: 28 July 1988

RCC Approval: _____

SUMMARY OF RADIOLOGICAL QUALIFICATIONS

Name: Tonry, Louie L.
Dept: Health Physics
Phone: 561-2794/3994

Formal Radiological Safety Training

Course Title	Date	Location	Duration	Subjects Covered
Health Physics Training	Jun84-Sep84	Ft. Sam Houston	4 mo	All aspects of Radiation Prote
Health Physic Training	Sep84-Apr85	Ft. Gordon	7 mo	All aspects of Rad Protec
Nuclear Hazards Training	Nov 85	Kirkland AFB	1 wk	Emergency response
AMMED Offieer Basic	Feb-May86	Ft. Sam Houston	1wk	Instruments/Plume Calculations
Physics in Mil. Med	Oct 86	AEHA	1 wk	Rad Protec issues
Med Effects of Nuc Weapons	May 87	Xerox Tng Center	1 wk	Bio effects
Rad Packaging Course	Aug 87	Leesburg, VA	1 wk	Packaging/trans/disposal
Physics in Mil Med	Oct 87	AEHA	1 wk	Rad Protec issues

Radiological Instrument Experience

Instrument Type	Radionuclides Measured
Area monitors	Numerous
GM monitors	"
Scintillation Detectors	"
Ion Chambers	"
Lab counters	"

Radiological Safety Courses Instructed

Course Title	Date	Location	Level Audience (undergrad/grad)
Nuclear Pharmacy Orin	Mar 88	LAMC	Pharmiscists
Safe use and Handling	May 88	LAMC	MD thru tech
Safe use and Handling	May 87	LAMC	MD thru tech
Rad Safety Courses	Continual	LAMC	MD thru tech

Other Nuclear Material Licenses Authorized Under

Type License	Level of Auth.	Location
Broad Scope	Technician	Ft. Gordon, GA
Broad Scope	Alt RPO	LAMC, PSF, CA
Broad Scope	RPO	LAMC, PSF, CA

CURRICULUM VITAE

NAME: Louie L. Tonry, Lieutenant, U. S. Army, Medical Service Corp.

BUSINESS ADDRESS: Letterman Army Medical Center, ATTN: HSHH-PM-HP (Health Physics), Presidio of San Francisco, CA 94129-6700. (415) 561-2794

PRESENT POSITION: Radiation Protection Officer, Letterman Army Medical Center, Presidio of San Francisco, CA 94129-6700

EDUCATION: Bachelors Degree in Chemistry/Mathematics, Boston University, Boston, MA.

MILITARY SCHOOLS:

June 84 - Sep 84
Health Physics Technologist
Training Course (Didactic Phase)
Ft. Sam Houston, Tx

Sep 84 - Mar 85
Health Physics Technologist
Training Course (OJT Phase)
Eisenhower Army Medical Center
Augusta, GA

Mar 85 - Feb 86
Staff Health Physics Technician
Eisenhower Army Medical Center
Augusta, GA

Feb 86 - May 86
AMMED Officer Basic
Ft. Sam Houston, TX

May 86 - Aug 87
Alt. Rad. Protection Officer
Letterman Army Medical Center
Presidio of San Francisco, CA

Aug 87 - Present
Radiation Protection Officer
Letterman Army Medical Center
Presidio of San Francisco, CA

TRAINING COURSES:

Apr 83 - Jun 83 - Patient Administration Course
Jun 84 - Sep 84 - Medical X-Ray Survey Techniques Course
Jun 84 - Sep 84 - Microwave Survey Techniques Course
Jun 84 - Sep 84 - Health Physics Training Course (Didactic Phase)
Sep 84 - Apr 85 - Health Physics Training Course (OJT Phase)
Nov 85 - Nuclear Hazards Training Course
Feb 86 - May 86 - AMMED Officer Basic Course
Oct 86 - Physics in Military Medicine Conference
May 87 - Medical Effects of Nuclear Medicine Course
Aug 87 - Radioactive Waste Packaging Course
Oct 87 - Physics in Military Medicine Conference
Jul 88 - Health Physics Society Annual Conference
Oct 88 - Physics in Military Medicine Conference

Curriculum Vitae - Louie L. Tonry

EXPERIENCE:

Date: June 1984 - Sep 84

Description of Duties: Attended the four-month Army Health Physics training course at Ft. Sam Houston, TX. This course covered all aspects of Health Physics including such topics as radiation counters and instrumentation, smear survey techniques, physics, chemistry with emphasis on radioactivity, mathematics, biological effects of radiation, X-Ray survey techniques, microwave survey techniques, environmental contamination evaluation and surveys, and procedures associated with nuclear medicine operations. It also covered such diverse subjects as industrial hygiene, ventilation evalutaions, and downwind calculations for accidental release of radioactive materials. Many hours were spent on the review and interpretations of Title 10 and Title 49, Code of Federal Regulations and associated Regulatory Guides, record and report writing, and the methodology and support of a Nuclear Regulatory license.

Date: Sep 84 - Mar 85

Description of Duties: Assigned to Eisenhower Army Medical Center on a seven month on-the-job training program. Eisenhower AMC has a broad scope NRC license and a Ph.D. medical physicist as the Radiation Protection Officer. During this training period, I worked in all aspects of Health Physics associated with the support of a broad scope license. The training was conducted by an experienced instructor who has a masters degree in physics and was review and augmented by sessions given by the RPO on regulations and the operational aspects of maintaining a broad scope license. I spent many hours with the RPO questioning, exploring, and learning the requirements of the NRC and Department of the Army radioactive material license. Upon completion of this training I was awarded a certificate for being the distinguished honor graduate for the entire course.

Date: Apr 85 - Feb 86

Description of Duties: Served as a Health Physics technician at Eisenhower Army Medical Center. Performed all duties involving health physics including smear surveys, training, fume hood surveys, fetal dose calculations, calibration of equipment, record and report maintenance and submission, and processing of radioactive waste. I was the acting Radiation Protection Officer on occasion in the absence of the chief of Health Physics. During this period of time, I was awarded a commission in the United States Army as a Nuclear Medical Science Officer and assigned to Letterman Army Medical Center.

Curriculum Vitae - Louie L. Tonry

Date: May 86 - Aug 87

Description of Duties: Assigned as a Nuclear Medicine Science Officer to the Health Physics Office at Letterman Army Medical Center. I was appointed by the Radiation Control Committee as the Alternate Radiation Protection Officer. Performed all tasks associated with the day-to-day maintenance of this broad scope license. This facility, as well as being a broad scope license holder, has a large Nuclear Medicine Service, Radiation Therapy Service, and an on-going Clinical Investigation Program. It maintains the license for Letterman Army Institute of Research, a large research facility, and supports five smaller outlying clinics. Letterman Army Medical Center has a large Department of Radiology, which has both Cat scan and angiography, and a cardiology department that performs cardiac catheterization on a daily basis. Was the acting Radiation Protection Officer on many occasions when the chief of Health Physics was unavailable. Monitored and controlled radiation safety procedures during numerous nuclear medicine and brachytherapy procedures including initial room preparation, patient body burden evaluation, release of patient, room decontamination, and therapy completion. Performed audits of radioactive use areas and coordinated with all users of radioactive materials to ensure that isotopes were used safely and that the ALARA concept was understood and being followed. Worked closely with the department chiefs and the chairman of the Radiation Control Committee to modify certain procedures to improve the overall Radiation Safety Program.

Date: Aug 87 - to Present

Description of Duties: Assigned as the Radiation Protection Officer for Letterman Army Medical Center. Performed all the duties required to ensure compliance with applicable Federal, State and local regulations. This required daily communications with radioisotope users. Was responsible, as the Chief, Health Physics Branch, with the administrative tasks associated with supervising personnel, ordering supplies and equipment, and controlling budget expenditures. Directed and supervised the staff, giving instruction and training as required. Maintained all exposures to ionizing radiation ALARA through concerted efforts by not only the Radiation Protection staff but all the users also.

PROFESSIONAL ASSOCIATIONS:

a. Health Physics Society
b. American Association of Physicists in Medicine
c. American Chemical Society

Certificate of Completion

AWARDED TO

Louie L. Terry

for satisfactory completion of the
Radioactive Waste Guidance Course
presented to
U.S. Army — U.S. Air Force
by
Chem-Nuclear Systems

Given This fourteenth Day Of August 1987

CHEM
NUCLEAR
SYSTEMS
INC.

Roger W. Johnson
Manager, DoD Operations
Chem-Nuclear Systems, Inc.

DEC 2 0 1988

BOSTON UNIVERSITY

THE TRUSTEES UPON THE RECOMMENDATION OF THE FACULTY OF THE

COLLEGE OF LIBERAL ARTS

HEREBY CONFER UPON

Louie Landis Torry

THE DEGREE OF

BACHELOR OF ARTS

IN CHEMISTRY

with a Minor in Mathematics

WITH ALL THE HONORS, RIGHTS, PRIVILEGES AND OBLIGATIONS
PERTAINING TO THAT DEGREE.
IN TESTIMONY WHEREOF THIS DIPLOMA IS CONFERRED AT BOSTON,
MASSACHUSETTS, THIS EIGHTEENTH DAY OF MAY, 1980

Geoffrey Bannister
DEAN

UNIVERSITAS BOSTONIENSIS
1839

John R. Silber
PRESIDENT

DEC 20 1988

Academy of Health Sciences, US Army

This is to certify that

SPECIALIST FOUR LOUIE L. TONRY

is the

Distinguished Honor Graduate

HEALTH PHYSICS SPECIALIST COURSE
311-91X20

Given at Fort Sam Houston, Texas
this 8th day of May 19 85

WILLIAM P. WINKLER, JR., M.D.
MAJOR GENERAL, MEDICAL CORPS, COMMANDANT

DEC 20 1988

DEPARTMENT OF THE ARMY

CERTIFICATE OF TRAINING

This is to certify that

SPECIALIST FOUR LOUIE L. TONRY

has successfully completed

MEDICAL X-RAY SURVEY TECHNIQUES COURSE

Given at ACADEMY OF HEALTH SCIENCES
United States Army
For Sam Houston, Texas 78234
18 September 1984

John M. Sowell
JOHN M. SOWELL, M.D.
COL, MC
Course Director

DEC 20 1988

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

★ U.S. GPO: 1983—451-846/9083

The United States Air Force

CERTIFIES THAT.

SGT LOUIE L. TONRY

HAS SUCCESSFULLY COMPLETED THE

NUCLEAR HAZARDS TRAINING COURSE (G3OZP9124-000)
KIRTLAND AIR FORCE BASE, NEW MEXICO 87117
PDS CODE: KSX DURATION: 4 DAYS (32 HRS)

AND IS HEREWITH AWARDED THIS

Certificate of Training

JAMES A. MERCER, Lt Col, USAF
Commander,
Interservice Nuclear Weapons School

22 November 1985
DATE

DEC 2 0 1988

Armed Forces Radiobiology Research Institute

Defense Nuclear Agency

Certificate of Completion

This is to certify that

LOUIE L. TONRY

has completed 27 hours of

MEDICAL EFFECTS OF NUCLEAR WEAPONS

conducted by the
Armed Forces Radiobiology Research Institute,
Bethesda, Maryland.

11-14 May 1987
DATE

GEORGE W. IRVING, III
Colonel, USAF, BSC
Director

As an organization accredited for continuing medical education, the Naval Health Sciences Education and Training Command designates this continuing medical activity as meeting the criteria for 27 credit hours in Category I of the Physician's Recognition Award of the American Medical Association.

DEC 20 1988

AFRRI FORM 57
(MAY 87)

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
Louie L. Tonry	

3. CERTIFICATION

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

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	Univ. of Miami 1974-1976 Boston Univ. 1977-1980 Ft. Sam Houston Jun 84-Sep 84 Eisenhower AMC Sep 84-Feb 86	554	240
b. RADIATION PROTECTION	Nuc Hazards Trng Course 1985 AMMED Officer Basic Course 1986 Physics in Military Medicine 86 Med Effects of Nuc Weapons 1987	272	500
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Letterman AMC 1986-Present " " "	480	200
d. RADIATION BIOLOGY	" " "	93	65
e. RADIOPHARMACEUTICAL CHEMISTRY	" " "	220	120

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Group IV-V 10 CFR 35	As needed	Eisenhower AMC, Ft. Gordon, GA	1984-1986	Health Physics Tech
Xe-133	40 mCi	" " "	"	" "
Atomic No 3-83	25 mCi ea	" " "	"	" "
Gd-153	2 Ci	" " "	"	" "
Gd-153	5 Ci	Letterman AMC, PSF, CA	1986-Present	Radiation Prot. Officer
Atomic No 3-83	.5 Ci	" " "	"	" "

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(see reverse)

MATERIALS LICENSE

Amendment No. 39

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

CORRECTED COPY

Licensee	
1. Department of the Army Letterman Army Medical Center	In accordance with letter dated September 16, 1987 3. License number 04-01496-01 is amended in its entirety to read as follows:
2. ATTN: HSHH-WHP Presidio of San Francisco, California 94129	4. Expiration date February 28, 1989
	5. Docket or Reference No. 030-01220

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material with Atomic Nos. 3 - 83, inclusive	A. Any	A. 500 millicuries each except as noted in Subitems 8.B. - 8.M. below
B. Iodine 125	B. Any	B. 1 curie
C. Iodine 131	C. Any	C. 1 curie
D. Xenon 133	D. Any	D. 4 curies
E. Hydrogen 3	E. Any	E. 1.5 curies
F. Molybdenum 99	F. Any	F. 5 curies
G. Technetium 99m	G. Any	G. 5 curies
H. Cesium 137	H. Any	H. 2.5 curies
I. Strontium 90	I. Any	I. 500 millicuries
J. Strontium 90	J. Sealed sources	J. 100 millicuries
K. Iodine 129	K. Any	K. 100 millicuries
L. Any byproduct material identifed in 10 CFR 35.500	L. Sealed sources for diagnostic devices	L. 8 curies
M. Any byproduct material identified in 10 CFR 35.400	M. Any brachytherapy source identified in 10 CFR 35.400	M. 3 curies total for all sources authorized in Subitem 6.M.

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 04-01496-01

Docket or Reference number 030-01220

Amendment No. 39

6. BYPRODUCT, SOURCE, AND/OR SPECIAL NUCLEAR MATERIAL	7. CHEMICAL AND/OR PHYSICAL FORM	8. MAXIMUM AMOUNT THAT LICENSEE MAY POSSESS AT ANY ONE TIME UNDER THIS LICENSE
N. Uranium	N. Plated metal	N. 136.4 kilograms
O. Uranium	O. Any	O. 200 grams
P. Uranium (Depleted in U-235)	P. Plated metal	P. 70 kilograms

9. Authorized use

A. through L. Medical research, diagnosis, and therapy. Research and development as defined in Section 30.4(q) of 10 CFR Part 30.

M. Medical use described in 10 CFR 35.500.

N. For use as shielding material in an accelerator.

O. Filling for use in a glass column for gas separation.

P. Posession and use of shipping containers as shielding for molybdenum-99/technetium-99m generators.

CONDITIONS

10. Licensed material shall be used only at Letterman Army Medical Center and Letterman Army Institute of Research, Presidio of San Francisco, California.

11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Control Committee.

B. The licensee's Radiation Control Committee may permit any physician to use byproduct material for medical use, research, and development. The physician must meet the appropriate training and experience criteria in 10 CFR Part 35, Subpart J.

C. The use of licensed material in or on humans shall be by a physician as defined in 10 CFR 35.2.

D. The Radiation Protection Officer for the activities authorized by this license is Lt. Louie L. Tonry.

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CURRICULUM VITAE

Name: Donald Kenneth Green

Education:

Henry Ford Community College	1970-72
Pan American University	1972-73
Southwest Texas State University	1973-75
State University of New York 12 semester hours short of BS in Physics	1977-79
Prime Power Production Specialist Course Health Physics Specialty given by the Facility Engineer Support Agency, USA. Graduated 3rd in class.	1978-79
Internal Dosimetry Workshop	1981
RSO Basic Training Course	1982
Roosevelt University	1985-86

Certification: None

Licenses:

53-00458-04	TAMC
53-00458-05	TAMC
19-08330-02	USUHS/AFRRI
19-19669-01	USUHS

Experience:

Chief, Radiological Safety Division, Environmental Health and Occupational Safety, Uniformed Services.University of the Health Sciences. Was responsible for the radiological safety program for the DOD's only medical school. Received a great deal of experience in radiological research (non-human), in vivo and in vitro on micro and macro biological systems. Letter of Commendation (attached) details administrative experience. 1979-82

NCOIC, Radiation Protection Office, Tripler Army Medical Center 1982-87

Experience with Ionizing Radiation:

See NRC Form 313M

Professional Societies:

Baltimore Washington Chapter of the Health Physics Society 1981-82

Hawaii Chapter of the Health Physics Society (held offices of Secretary, Treasurer, President Elect and President) 1983-87

DATE:

FOR OFFICE USE ONLY

Review: _____

RCC Approval: _____

Name: Green Donald Kenneth

Dept: Radioisotopes Services Branch

Phone: 3318

SUMMARY OF RADIOLOGICAL QUALIFICATIONS

Formal Radiological Safety Training

Course Title	Date	Location	Duration	Subjects Covered
Prime Power Production Course-Health Physics.	78-79	Ft Belvoirva	52 weeks	Physics, Mathematics, Health Physics, N.P. Ensineerins,Radiation Biology, Instrument, Basic H.P.
RSO Basic Training Course.	Oct. '82	Bethesda Md.	2 weeks	Internal Dosimetry
Internal Dosmetry Workshop	1981	Harrisburg PA	3 days	

Radiological Instrument Experience

Instrument Type	Radionuclides Measured
Gas Flow Prop Counter	Am-241
SC	H-3, C-14, P-32, S-35, Ca-45, Sr-90
Gamma Well Counter	All On Licenses 19-08330-02, 19-19669-01, 53-00458-04, 53-00458-05, 04-01496-01.

Radiological Safety Course Instructed

Course Title	Date	Location	Level Audience (undergrad/grad)
Decontamination of radiation Casualties.	79-82	USUHS/AFRRI	Physicians/Senior Nurses
(Medical Effects of Nuclear Weapons Cause) (Continuing Nursing Education).	79-82	Bethesda	Grad Nurses
Inbriefing/Annual Training.	79-88	All Licenses Above	Trainee-Physician

Other Nuclear Material Licenses Authorized Under

Type License	Level of Auth.	Location
Broadscope Research	Principal User/Chief Radiological Safety	USUHS/AFRRI19-08330-02, 19-19669-01.
Broadscope Medical	Principal User/NCOTC Radiation Protection Office	TAMC 53-00458-04, 53-00458-05.
Broadscope Medical/Research	Principal User/RPO	LAMC/LAIR 04-01496-01

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RADIONUCLIDE EXPERIENCE

Indicate type of experience by completing the appropriate table entries below. See supplementary instructions.

Experiemental System	Isotopes Used	Typical uCi per Exp.	Location/ Date Supervisor	Level of Involvement** Frequency*	Describe Application
Whole Animal (type)	S-137	4,200 Ci	USUHS Aug '79-Nov '82 Self	U 2	Whole Animal Irradiation
Organ System					
Cell or bact. culture					
Cell free sys. (enzyme assay, etc.)					
Wet Chemistry (substrate syn or labeling)	I-125	10,000	USUHS 79-82 Self	U 2	Iodination of many Biochemicals
Other (specify)	1-83	varied	USUHS/TAMC 79-87	S 2	Health Physics Applications

* D=Daily 2=more than once a week W=Weekly M=Monthly I=Infrequently S=Single

** Enter following symbol(s) to show type of involvement in the indicated type of experiment performed:

U=Direct User P=Principal Investigator S=Supervisor O=Observer T=Student

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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
DONALD KENNETH GREEN	N/A

3. CERTIFICATION

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

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	(1) Southwest Texas State University, San Marcos, Texas 1973-1975 (2) Facility Engineer Support Agency. Fort Belvoir, VA Aug 78 - Aug 79	(1) 120 hrs (2) 520 hrs (3) 12 hrs	(5) 3 years (6) 4 years
b. RADIATION PROTECTION	(3) RSO Basic Training Course in The Control of Ionizing and Nonionizing Radiation Oct 82, Bethesda, Md presented by Applied Health Physics Inc	(2) 260 hrs (3) 20 hrs	(5) 3 years (6) 4 years
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	(4) Internal Dosimetry Workshop 1981, Harrisburg, PA (5) Uniformed Services University of the Health Sciences Bethesda, Md Aug 79-Nov 82	(1) 120 hrs (2) 80 hrs (3) 4 hrs (4) 8 hrs	(5) 3 years (6) 4 years
d. RADIATION BIOLOGY	(6) Tripler Army Medical Center Tripler AMC, HI Nov 82 - MAY 87	(2) 260 hrs (3) 4 hrs (4) 16 hrs	(5) 3 years (6) 4 years
e. RADIOPHARMACEUTICAL CHEMISTRY			(5) 3 years (6) 4 years

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Atomic Numbers 1-83	see attachment (Item 8, USUHS License)	Uniformed Services University of the Health Sciences	3 Years	Health Physics Use and Medical (Non-human) Research
Cs-137	4,200 Ci	Uniformed Services Univ	3 Years	Gamma Irradiation of animals for Medical Research
Atomic Numbers 1-83	50 mCi	Tripler Army Medical Center	4 Years	Health Physics Use
Co-60	9,000 Ci	Tripler Army Medical Center	4 Years	Health Physics Use

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DEFENSE NUCLEAR AGENCY
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
BETHESDA, MARYLAND 20014

1 August 1982

To Whom It May Concern:

SUBJECT: Letter of Commendation for SP6 Donald K. Green

I have been informed that Specialist D. K. Green will soon be departing the Uniformed Services University of the Health Sciences for duty elsewhere. I, therefore, would like to take this opportunity to express my gratitude for his exemplary performance as Chief, Radiological Safety Division, EHOS, USUHS.

Since the use of radioactive materials at the USUHS is governed by the NRC Byproduct License issued to the Armed Forces Radiobiology Research Institute (AFRRI), Defense Nuclear Agency, in my capacity as Head, Radiation Safety Department AFRRI, I have had obvious reasons for remaining abreast of his many accomplishments at USUHS. These accomplishments have been overwhelming, both in quantity and in quality.

His personal rapport with technical and professional personnel has been directly responsible for the maintaining of a safe working environment at the USUHS. This outstanding rapport coupled with his technical competence, his superior grasp of the principles of operational health physics, and his honest dedication to the ALARA Principle (As Low As Reasonably Achievable) has earned for him (and consequently for all of us) an immeasurable respect from civilian and military personnel alike at every level and in every scientific discipline.

I am continually impressed that during a period of great expansion, he was able to prepare the Byproduct License Application for the University. To have been able to maintain control of so rapidly expanding a program, in light of a critical manpower shortage, is in itself a monument to his managerial abilities. To have found the time (primarily evenings and weekends) to prepare an NRC Byproduct License Application is truly commendable.

Preparing an NRC Byproduct License Application is a staggering task for any professional health physicist. To have prepared so outstanding a document so quickly and efficiently while performing his normal duties is evidence of his exceptional dedication to duty. I have known few individuals who could have met that challange so well.

I cannot overstate my confidence in his abilities as an operational health physicist. In all my years in the public service, I have met few health

physicists with as complete a grasp of the operational aspects of the science, and have rarely seen an individual, at any level, with such total dedication to duty and detail.

The position of Chief, Radiological Safety Division, at any university, is one usually occupied by an individual many levels higher than Specialist Green's current grade. When I bring to mind his many outstanding accomplishments as a health physicist and then recall that he is a health physics technician, not a health physicist, I am again overwhelmed.

I feel compelled to list some of his duties and a few of his accomplishments here for the benefit of others who may not be familiar with them:

A. Duties

1. Specialist Green has been directly responsible for the operational health physics of the USUHS Radiation Safety Program. Briefly, he has been responsible for:
   a. Reviewing the safety aspects of all grant proposals in the USUHS
   b. Preparing hazard analysis of radionuclide experiment authorization requests
   c. Advising PhD level scientists of precautions and procedures required to minimize potential exposure to ionizing radiation
   d. Training all incoming personnel with respect to:
      1) Biological effects of ionizing radiation
      2) NRC rules and regulations
      3) NRC License requirements
      4) Safe handling techniques for radioactive materials
   e. Shield design for certain experiments
   f. Procurement and accountability of all radioactive materials entering the USUHS

2. Specialist Green has been responsible for overseeing:
   a. Environmental sample collection and analysis
   b. Radiological surveys of restricted areas
   c. Contamination control
   d. Radioactive waste collection, processing, packaging, and trasnsportation
   e. The dosimetry program
   f. The bioassay program
   g. Iodination procedure monitoring
   h. Records management
   i. Calibration and operation of a variety of health physics instruments

B. Accomplishments

1. From the time that Specialist Green arrived at the USUHS to the present, the University has undergone a tremendous expansion. There has been:

   a. A 120% increase in the number of radioactive materials in use

at USUHS

b. a 90% increase in the number of procedures requiring stringent monitoring and surveying,
c. a 300% increase in the number of active Radionuclide Experiment Authorizations,
d. a 250% increase in the number of personnel requiring dosimetry,
e. nearly a 500% increase in the volume of radioactive waste, and
f. a 700% increase in the number of restricted areas

At the same time, there has been no increase in the technical support staff.

2. Specialist Green completely computerized radioactive waste and source accountability. To a computer expert this may seem a minor task, but Specialist Green had never used a computer prior to attempting this rather complex job.

3. His modernization of the university's radioactive waste treatment procedures and facilities resulted in a tremendous savings in manpower and capital. Although the volume of radioactive waste has increased by nearly 500%, the time required to process it and prepare it for transportation has increased a mere 50%.

4. Although his lack of official professional status prevented his being appointed to the AFRRI/USUHS Radiation and X-Ray Safety Committee, his numerous invaluable contributions to that committee have been greatly appreciated. An example of this was his reorganization of the USUHS's Radionuclide Experiment Authorization Management System. This reorganization resulted in a much streamlined system which has led to greater control. The AFRRI is in the process of following his lead since it has proven to be a very efficient system.

5. Specialist Green has been continually sought to instruct portions of the "Medical Effects of Nuclear Weapons" Course given to physicians, as well as the "Operational Readiness Training Course" given to Navy Nurse Corps Officers.

6. Specialist Green's most outstanding accomplishment, to date, has been his preparation of the University's own NRC Byproduct License Application. The "creation" of a radiation safety program requires not only a great deal of labor and dedication, but a superior comprehension of the art and science of health physics. The license required by the USUHS is a Type A Broadscope Byproduct License. This type of license is the most complex of all Byproduct Licenses.

7. The type of accomplishments achieved by Specialist Green are examples of performance expected of a top-level professional commissioned officer health physicist. Specialist Green lacks only 12 credit hours towards his undergraduate degree in physics. Because of his personal and professional dedication, he was unable to complete his

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degree requirements during evenings and weekends. Instead, he chose to use his personal time to meet the strenuous professional demands of the radiological safety position at USUHS. I strongly recommend that he be allowed to complete his degree and admitted to the commissioned officer corps as soon as possible. He will be a great asset to the Commissioned Radiation Safety Officer Corps in the Army, which is a critical manpower shortage area.

In closing, I would like to express my deepest gratitude for the outstanding manner in which Specialist Green has completed each and every endeavor that he has undertaken here. His total dedication and patently obvious abilities has set him far above his peers.

He is leaving behind him a well thought out, well defined, outstanding radiation safety program, of his own creation, from which the USUHS will benefit greatly for many years to come.

He will be fondly remembered and sorely missed.

Naresh K. Chawla

Naresh K. Chawla, PhD
Head, Radiation Safety Department
Armed Forces Radiobiology Research Institute
Defense Nuclear Agency

cf: J.P. Sanford, M.D., President, USUHS
MILPERS, USUHS
K. Kinnamon, Associate Dean for Operations, USUHS

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ITEM 8

Training for Individuals Working in or Frequenting Restricted Areas

1. Training Program.

a. Training of Radiation Workers Involved in the Human Use of Radioisotopes.

1) Personnel will receive instructions:

a) Before assuming duties with radioactive materials

b) During annual refresher training

c) Whenever there is a significant change in assigned duties

d) Whenever there is a significant change in procedures, regulations, or terms of the License

2) Instructions for individuals will include:

a) Applicable regulations and License conditions

b) Areas where radioactive materials are used and stored that fall within the scope of the individual's duties

c) Potential hazards associated with radioactive material in each area where the employee will work

d) Appropriate radiation safety procedures

e) LAMC radiation safety work rules

f) Each individual's obligation to report unsafe conditions and suspected procedural, regulatory, or License condition violations to the Radiation Protection Officer

g) Appropriate responses to emergency or unsafe conditions

h) Worker's right to be informed of occupational radiation exposure and bioassay results

i) The location of pertinent regulations, License and License conditions that are available for employee's review

j) Audience specific problems that have occurred in the recent past

3) This training will be conducted by Health Physics staff, and will be in the form of a lecture with an appropriate question and answer period.

ITEM 8

Training for Individuals Working in or Frequenting Restricted Areas

b. Training of Ancillary Personnel Who May Be Occupationally Exposed to Ionizing Radiation and/or Radioactive Materials Involved in the Human Use of Radioisotopes. Personnel will receive instructions before assuming duties that will bring them into contact with radioactive materials, during annual refresher training, whenever there is a significant change in assigned duties, and whenever there is a significant change in procedures, regulations, or terms of the License.

1) Nursing staff caring for radiopharmaceutical therapy or implant patients will be instructed in the following subject areas. This training will be conducted by Health Physics staff, and will be in the form of a lecture with an appropriate question and answer period. The following topics will be covered:

a) Applicable regulations and License conditions

b) Areas where radioactive materials are used and stored that fall within the scope of the individual's duties

c) Potential hazards associated with radioactive material in each area where the employees will work

d) Appropriate radiation safety procedures

e) LAMC radiation safety work rules

f) Each individual's obligation to report unsafe conditions and suspected procedural, regulatory, or License condition violations to the Radiation Protection Officer

g) Appropriate responses to emergency or unsafe conditions

h) Worker's right to be informed of occupational radiation exposure and bioassay results

i) The location of pertinent regulations, License and License conditions that are available for employee's review

j) Audience specific problems that have occurred in the recent past. For example, problems associated with the specific type of patient that the individuals will be encountering.

2) Fire and security personnel will receive training. This training will consist of either a lecture provided by Health Physics staff or a video taped lecture. The following topics will be covered:

a) Areas where radioactive materials are used and stored that fall within the scopeof the individual's duties

b) Potential hazards associated with radioactive material in each area where the employees may work

c) Appropriate radiation safety procedures

d) Each individual's obligation to report unsafe conditions and suspected procedural, regulatory, or License condition violations to the Radiation Protection Officer

e) Appropriate responses to emergency or unsafe conditions

f) Worker's right to be informed of occupational radiation exposure and bioassay results

g) Audience specific problems that have occurred in the recent past

3) Housekeeping personnel whose duties will be in restricted areas will receive training. This training will consist of either a lecture provided by the Health Physics staff or a video taped lecture. The following topics will be covered:

a) Areas where radioactive materials are used and stored that fall within the scope of the individual's duties

b) Potential hazards associated with radioactive material in each area where the employees may work

c) Appropriate radiation safety procedures

d) Each individual's obligation to report unsafe conditions and suspected procedural,regulatory, or License condition violations to the Radiation Protection Officer

e) Appropriate responses to emergency or unsafe conditions

f) Worker's right to be informed of occupational radiation exposure and bioassay results

g) Audience specific problems that have occurred in the recent past

2. Other Training Program.

a. Training of Individuals Involved in the Non-Human Use of Radioactive Materials

1) Personnel will receive instructions:

a) Before assuming duties with radioactive materials

b) During annual refresher training

c) Whenever there is a significant change in assigned duties

d) Whenever there is a significant change in procedures, regulations, or terms of the License

2) Instructions for individuals will include:

a) Applicable regulations and License conditions

b) Areas where radioactive materials are used and stored that fall within the scope of the individual's duties

c) Potential hazards associated with radioactive material in each area where the employees will work

d) Appropriate radiation safety procedures

e) LAMC/LAIR radiation safety work rules

f) Each individual's obligation to report unsafe conditions and suspected procedural, regulatory, or License condition violations to the Radiation Protection Officer

g) Appropriate responses to emergency or unsafe conditions

h) Worker's right to be informed of occupational radiation exposure and bioassay results

i) The location of pertinent regulations, License and License conditions that are available for employee's review

j) Audience specific problems that have occurred in the recent past. For example, causes of radioactive contamination problems in the laboratory setting.

3) This training will be conducted by Health Physics staff, and will be in the form of a lecture with an appropriate question and answer period.

b. Training of Ancillary Personnel Who May Be Occupationally Exposed to Ionizing Radiation and/or Radioactive Materials Involved in the Non-Human Use of Radioisotopes will be the same as for human-use ancillary personnel.

ITEM 9

Facilities and Equipment

1. Annotated Drawings.

a. Radioactive material may be used and/or stored in areas approved by the RPO with the concurrence of the Radiation Control Committee within the confines of facilities which comprise Letterman Army Medical Center and Letterman Army Institute of Research. Due consideration will be given to the adequacy of the types and quantities of radioactive material to be used prior to approval. Radioactive material use areas will not be released for unrestricted use until approval of the RPO or Alternate RPO is obtained. Records of close-out surveys will be maintained for inspection.

b. Diagrams of Human Use Areas.

1) Diagram No. 1 - a site map of the Presidio of San Francisco with buildings marked which presently contain radioactive material use operations.

2) Diagram No. 2 - floor plans of the 1st, 2nd, and 3rd floors of Letterman Army Medical Center, Bldg 1100, with specific use areas indicated.

3) Diagram No. 3 - detailed diagram of the Radiation Therapy Clinic. Note that teletherapy is performed using a linear accelerator and an orthovoltage unit.

4) Diagram No. 4 - detailed diagram of the Nuclear Medicine Clinic, including the Nuclear Pharmacy.

5) Diagram No. 5 - detailed diagram of the room used for Xenon studies.

6) Diagram No. 6 - detailed diagram of the RIA laboratory.

2. Survey Instrument Calibration.

a. Primary calibration will be performed at least annually by the Metrology Division, U.S. Army Calibration and Repair Center, Sacramento Army Depot, Sacramento, CA 95813. The calibration procedures are on file with the NRC under license #4-4279-1.

b. Primary calibration may also be performed on site by the applicant using a ^{137}Cs calibration range, which is itself calibrated and verified periodically by a licensed contractor. When calibrations are performed on site, we will establish and implement the model procedure for calibrating survey instruments that was published in Appendix B to Regulatory Guide 10.8, Revision 2.

3. Dose Calibrator Calibration.

a. Frequency of tests.

1) Constancy at least once each day prior to the assay of patient dosages. This test should be within ± 5%.

2) Linearity at installation and at least quarterly thereafter. This test should be within ± 5%.

3) Accuracy at installation and at least annually thereafter. This test should be within ± 5%.

4) Geometry dependence will be done at installation.

b. A mathematical correction shall be made to any geometry or linearity error that exceeds 10% if the dosage is greater than 10 microcuries, and the dose calibrator shall be repaired or replaced if the accuracy or constancy error exceeds 10%. This test will be redone after repair, adjustment, or relocation of the dose calibrator, if appropriate.

c. The dose calibrator will be inspected on a quarterly basis to determine that the liner of the measurement chamber is in place and that the instrument is zeroed according to the manufacturers instructions.

d. Dose calibrator calibration procedure.

1) Constancy. At least one relatively long-lived reference source such as ^{137}Cs or ^{57}Co will be assayed using a reproducible geometry before each day's use of the dose calibrator. The procedure to be used is described below.

a) Assay each reference source using the applicable instrument setting.

b) Measure background level at the same instrument setting or check that the automatic background subtraction is operating properly when blanks are inserted in the calibrator.

c) Calculate net activity of each source by subtracting out background radiation and record the results on the daily constancy log sheet.

d) Using one of the sources, repeat the above procedure for the most commonly used setting.

e) Compare the reading with the calculated value. If the reading is outside the ± 5% range, immediately recheck steps a through d. If after reassay, the standard still reads outside the ± 5% range, notify the Chief, Nuclear Pharmacy Service, Nuclear Medicine Physician of the Day, or the Chief, Nuclear Medicine Service before using the calibrator for measuring doses.

2) Linearity. The following methods will be used to evaluate linearity of the dose calibrators. Either the Decay Method or the Shield Method will be used.

Shield Method

a) The shield method shall be done in accordance with the manufacturer's instructions.

b) The procedures provided by the manufacturer, and currently being used, are attached as Item 9, Annex 1, this application.

Decay Method

a) Assay the ^{99m}Tc syringe or vial in the dose calibrator, and subtract background to obtain the net activity in millicuries. Record the date, time to the nearest minute, and net activity on a Dose Calibrator Linearity Test Form. This first assay should be done in the morning at a regular time, for example, 8 a.m.

b) Repeat the assay at about noon, and again at about 4 p.m. Continue on subsequent days until the assayed activity is less than 10 microcuries. For dose calibrators on which you select a range with a switch, select the range you would normally use.

c) Convert the time and date information you recorded to hours elapsed since the first assay.

d) On a sheet of semilog graph paper, label the logarithmic vertical axis in millicuries and label the linear horizontal axis in hours elapsed. At the top of the graph, note the date and the manufacturer, model number, and serial number of the dose calibrator. Then plot the data.

e) Draw a "best fit" straight line through the data points. For the point farthest from the line, calculate its deviation from the value on the line.

$$\frac{\text{(A-observed - A-line)}}{\text{(A-line)}} = \text{deviation}$$

f) If the worst deviation is more than ± 0.05, the dose calibrator should be repaired or adjusted. If this cannot be done, it will be necessary to make a correction table or graph that will allow conversion from activity indicated by the dose calibrator to true activity.

3) Accuracy. Using at least two NBS traceable sources, instrument accuracy will be checked at least annually using the procedure below.

a) Using two of the following reference standards (^{57}Co, ^{137}Cs, ^{60}Co), assay the standard in the dose calibrator at the applicable setting, and subtract the background level to obtain the new activity

b) Repeat step a for a total of three determinations for each standard, and average the results.

c) The average activity determined in step b should agree with the certified activity of the reference source to within ±5% after the decay correction.

d) Record the average activity readings for each standard on the Accuracy Check Flow Chart.

e) Calibration checks that do not fall within the ±5% range indicate that a problem may exist with the instrument that may require repair or adjustment. Report any value outside the range to the Chief, Nuclear Pharmacy, the Nuclear Medicine Physician of the day or the Chief, Nuclear Medicine.

f) This test will be performed on installation and at least annually thereafter. The date when the next accuracy test is to be performed will be posted on or near the dose calibrator.

4) Geometry. The extent of geometrical variation will be ascertained using a common radionuclide, and correction factors will be computed if variations are greater than ± 5%. The procedure to make this determination is detailed below.

a) To measure the geometrical variation in a glass vial, due to increasing volume of liquid, a 20 or 30 ml vial containing approximately 2 mCi of ^{99m}Tc in a volume of approximately 1 ml will be used.

b) Increase the volume of liquid in the vial in the following sequence from 1 ml to 2, 4, 8, 10, 20, and 25 mls by adding the appropriate volume of water. After each addition, gently shake the vial to mix the contents and assay the vial at the appropriate setting, and subtract the background reading to obtain the net activity. Record the readings on the Instrument Geometrical Variation Flow Sheet for Glass Vials.

c) Select one volume as the standard (such as the volume of the 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 ratio represents the volume correction factor (CF).

d) If the correction factor is lower that 0.95 or higher than 1.05, then 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 the radionuclide.

e) To measure the geometrical variation of the volume of liquid in different size syringes, approximately 2 mCi of Tc-99m in a volume of approximately 1 ml will be used (except as noted for the 1 ml syringe).

f) Increase the volume of liquid in each syringe as outlined below by adding the appropriate amount of water. After each addition, gently invert and mix the contents and assay the syringe at the appropriate setting, and subtract the background level to obtain the net activity. Record the readings on the Instrument Geometrical Variation Flow Chart for Syringes.

Syringe Size ml	Initial Volume ml	Incremental Volume ml
1	0.5	0.5
3	1.0	1.0
5	1.0	1.0
10	1.0	2.0*
20	1.0	5.0**

* For the first increase bring the total volume to 2.0 ml
** For the first increase bring the total volume to 5.0 ml

g) The initial volume reading will be used as the reference standard for each syringe size. Calculate the ratio of measured activities for each volume to the reference activity. This represents the correction factor (CF).

h) If any correction factor is lower than 0.95 or higher than 1.05, 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 radionuclides.

ITEM 9

Facilities and Equipment

4. Personnel Monitoring Program.

a. External Exposure monitoring program:

1) All individuals occupationally exposed to ionizing radiation who receive, or are likely to receive, accumulated dose equivalents in excess of 10% (5% if under 18 years of age) of the quarterly occupational exposure standards specified in 10 CFR 20.101 (a), shall be issued appropriate film or TLD monitors that will be processed by a contract service on a monthly basis.

2) All individuals who are occupationally exposed to ionizing radiation on an occasional basis, such as nursing staff caring for radiopharmaceutical therapy or implant patients, will be issued a whole body monitor for use during the period(s) of exposure.

3) Other individuals who are exposed to radiation on an occasional basis, such as security personnel, administrative personnel who deliver packages, secretarial personnel who work in the Nuclear Medicine Clinic, but do not work with patients, and nursing staff who occasionally care for patients who have received diagnostic doses, will not normally be issued dosimetry.

4) The RPO will promptly review all exposure reports to look for workers, or groups of workers, whose exposure is unexpectedly high or low. This procedure does not apply to back-up monitor records, for example pocket ionization chambers, when the monitor of record is a film or TLD dosimeter.

b. Internal exposure monitoring program:

1) Individuals who work with, or in the vicinity of, unsealed ^{3}H, ^{125}I, or ^{131}I will be monitored by bioassay when directed by the RPO. Requirements for bioassay will be based on criteria published in Regulatory Guide 8.20, Revision 1, dated September 1979, and Regulatory Guide 8.32, dated July 1988.

2) The RPO will promptly review all bioassay results to look for workers whose internal dose or uptake is unexpectedly high.

5. Imaging Equipment. Mobile Nuclear Medicine services are not provided.

6. Other Equipment and Facilities.

a. Diagrams of Health Physics Office, Non-human Use, and Research areas.

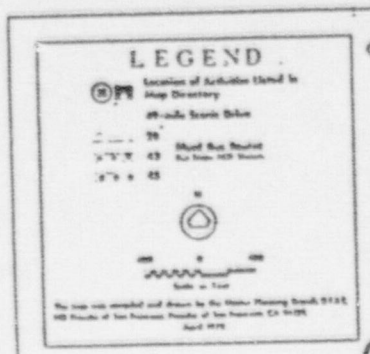
1) Diagram No. 7 - detailed diagram of the Health Physics Office, Building 1007.

2) Diagram No. 8 - floor plan of Department of Clinical Investigation, Letterman Army Medical Center, Building 1801. Radioactive materials are used only in approved rooms, in the area of the 6th floor designated on the diagram.

3) Diagram No. 9 through No. 13 - floor plans for Letterman Army Institute of Research, Building 1110. Radioactive materials are used in approved rooms throughout this facility.

4) Diagram No. 14 - detailed diagram of the rooms which make up the Radioisotope Branch of Letterman Army Institute of Research. These rooms comprise the central area where radioactive materials are received, stored, distributed to users, and where the radioactive waste is stored for decay and shipment.

DIAGRAM No. 1
LETTERMAN ARMY MEDICAL CENTER/INSTITUTE OF RESEARCH
SITE MAP



Letterman Army Medical Center
Annex Buildings
Bldg. 1007
Health Physics Service

Letterman Army
Institute of
Research, Bldg.
1110

SAN FRANCISCO BAY

PACIFIC OCEAN

Letterman Army Medical Center
Bldg. 1801
Dept of Clinical Investigati
6th (Top) Floor

Letterman Army Medical Cente
Bldg. 1100
Main Hospital Buildin

U.S. Army
Presidio of San Francisco
California

SAN FRANCISCO

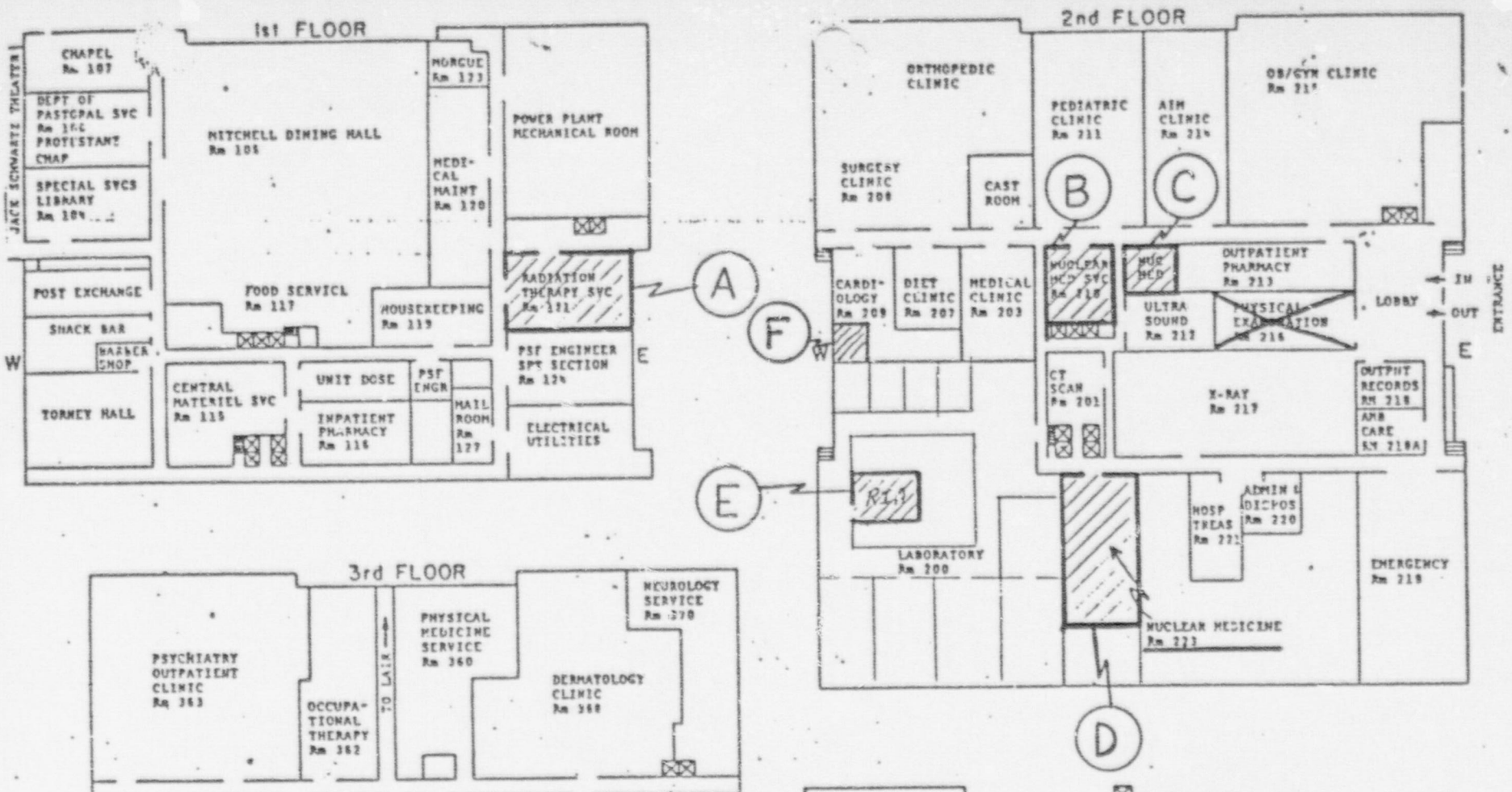


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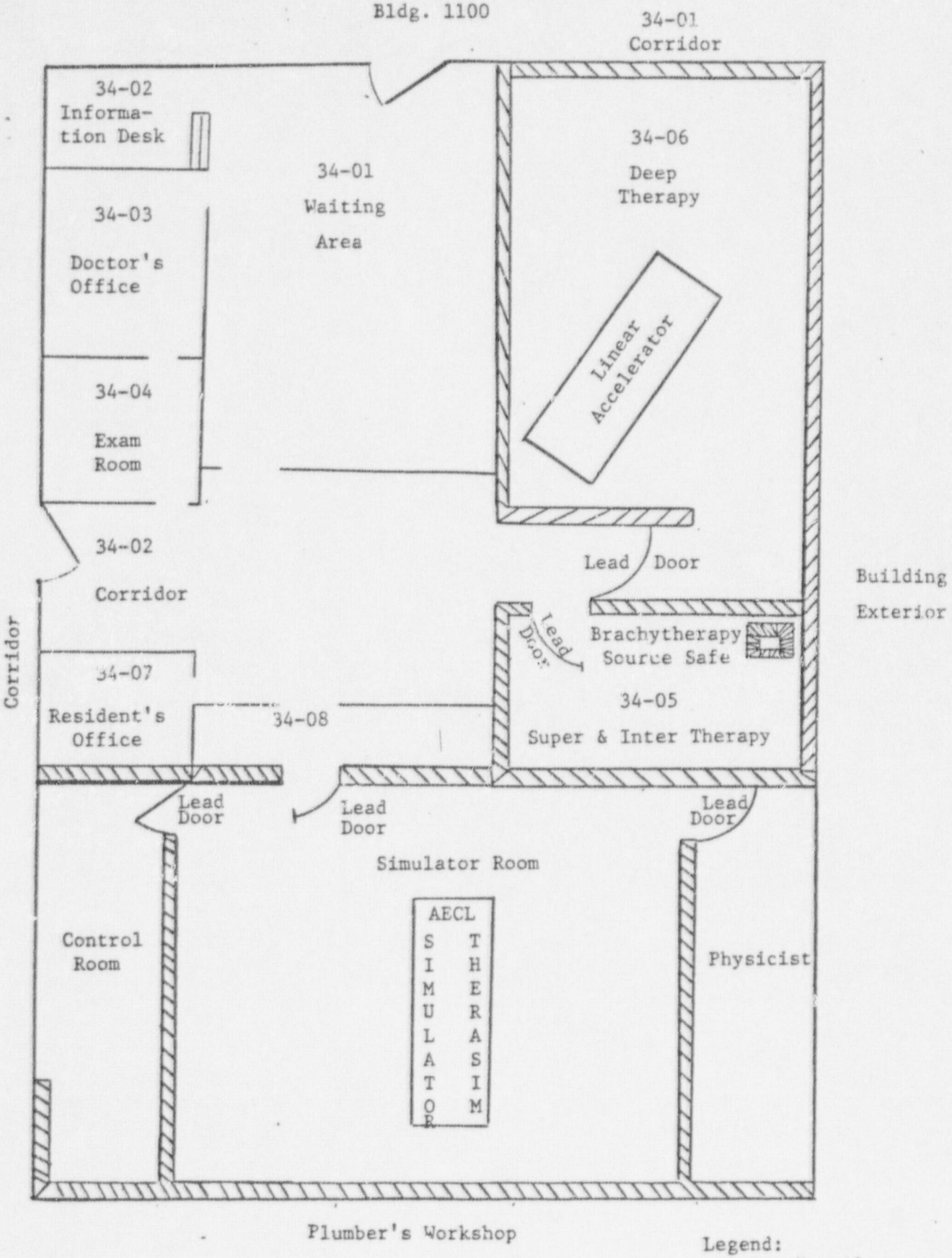
DIAGRAM No. 2

LETTERMAN ARMY MEDICAL CENTER - Bldg. 1100

FLOOR PLAN - 1st, 2nd, & 3rd Floors

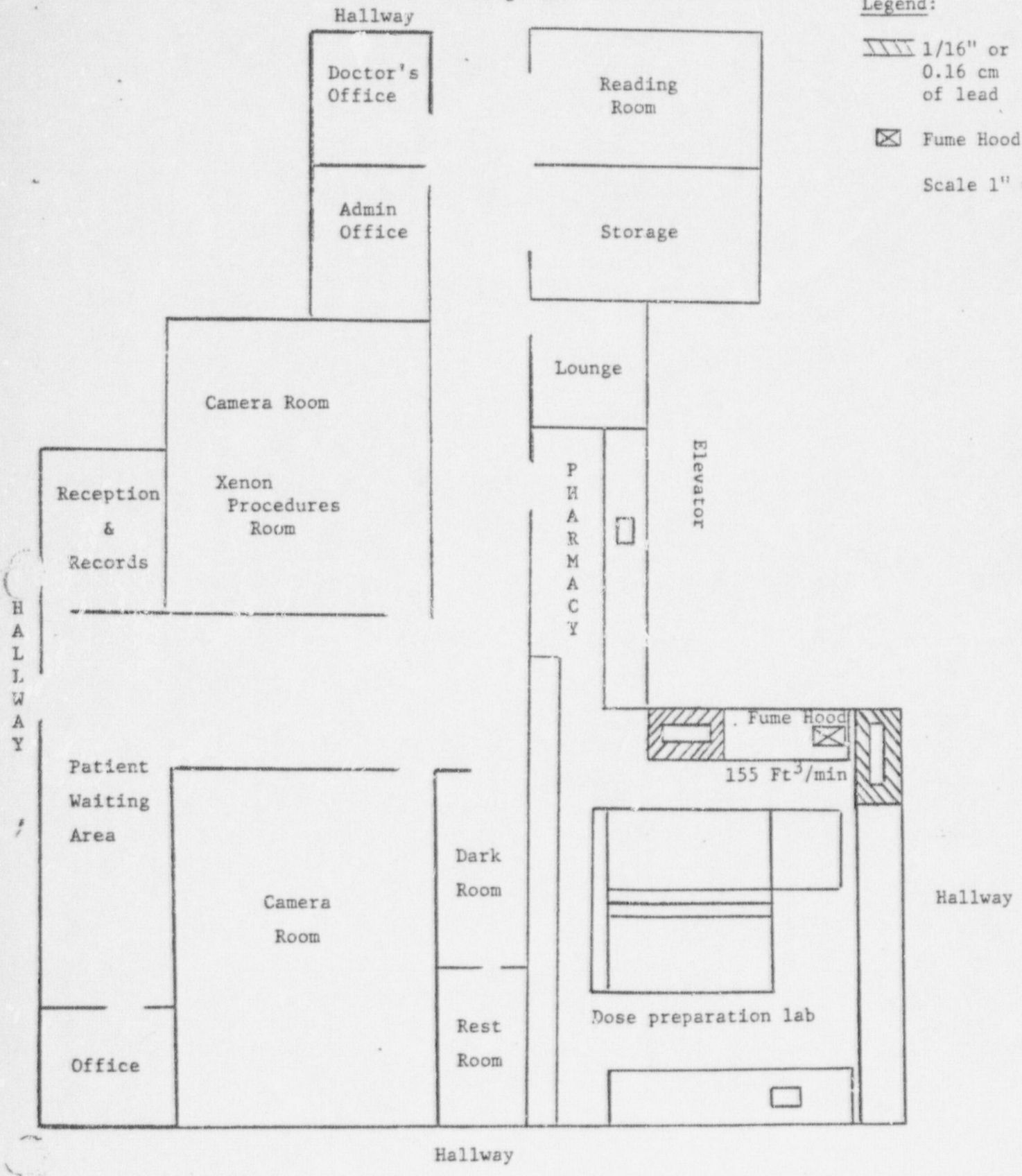
A - Radiation Therapy Service - 1st Floor
B - Nuclear Medicine Clinic Offices and Nuclear Pharmacy - 2nd Floo
C - Nuclear Medicine Imaging Area - 2nd Floor
D - Nuclear Medicine Imaging Area and Offices - 2nd Floor
E - Radioimmunoassay Laboratory - 2nd Floor
F - Cardiology Treadmill Room - 2nd Floor

DIAGRAM No. 3
LETTERMAN ARMY MEDICAL CENTER
RADIATION THERAPY CLINIC
Bldg. 1100



Legend:
Scale 1" = 4'
1/16-inch lead
(0.16 cm)

DIAGRAM No. 4
LETTERMAN ARMY MEDICAL CENTER
NUCLEAR MEDICINE CLINIC/RADIOPHARMACY
Bldg. 1100



Legend:

1/16" or 0.16 cm of lead

Fume Hood

Scale 1" = 5'

DEC 2 0 1988

DIAGRAM No. 5
LETTERMAN ARMY MEDICAL CENTER
XENON IMAGING ROOM
NUCLEAR MEDICINE SERVICE
Bldg. 1100

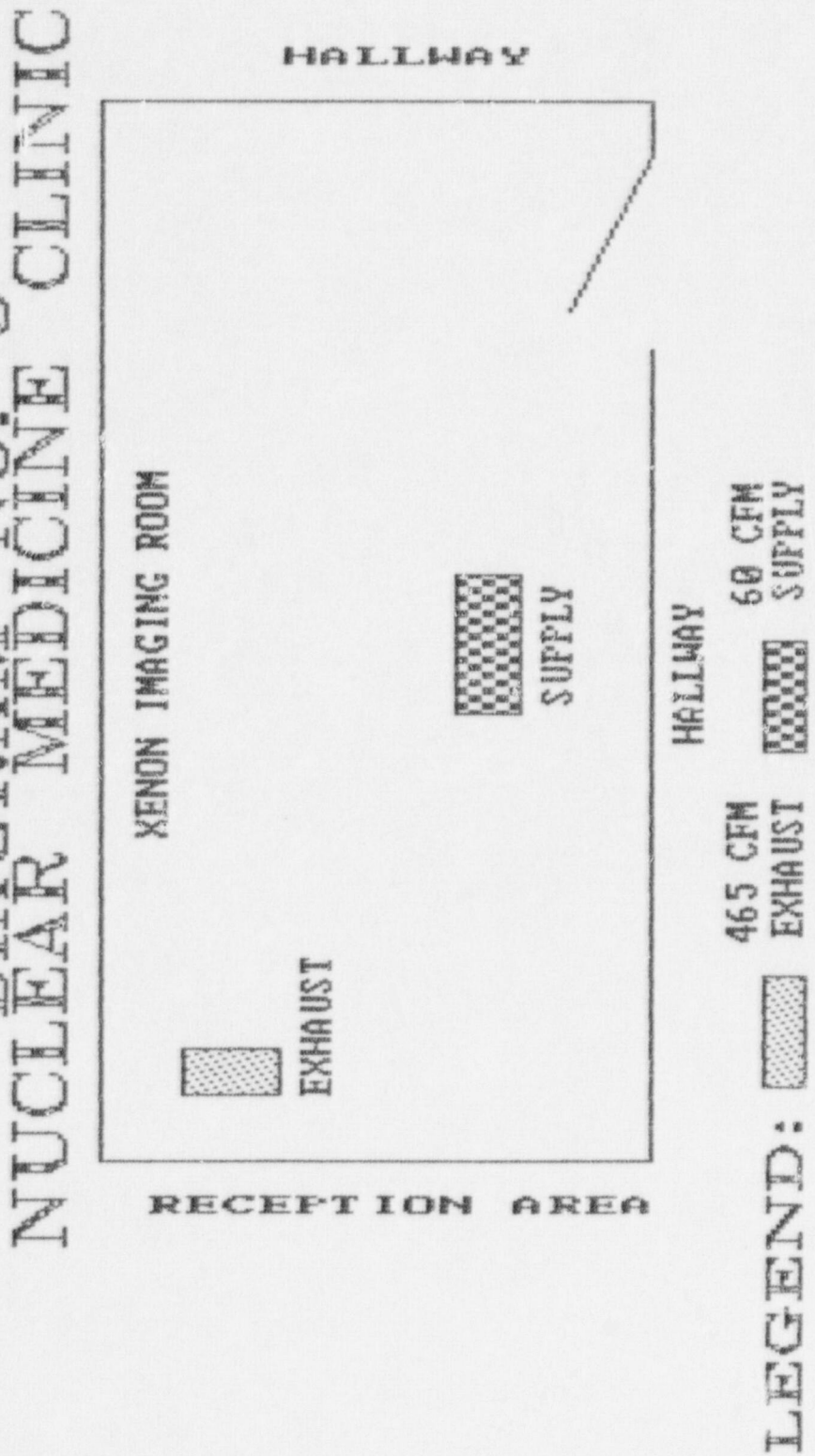
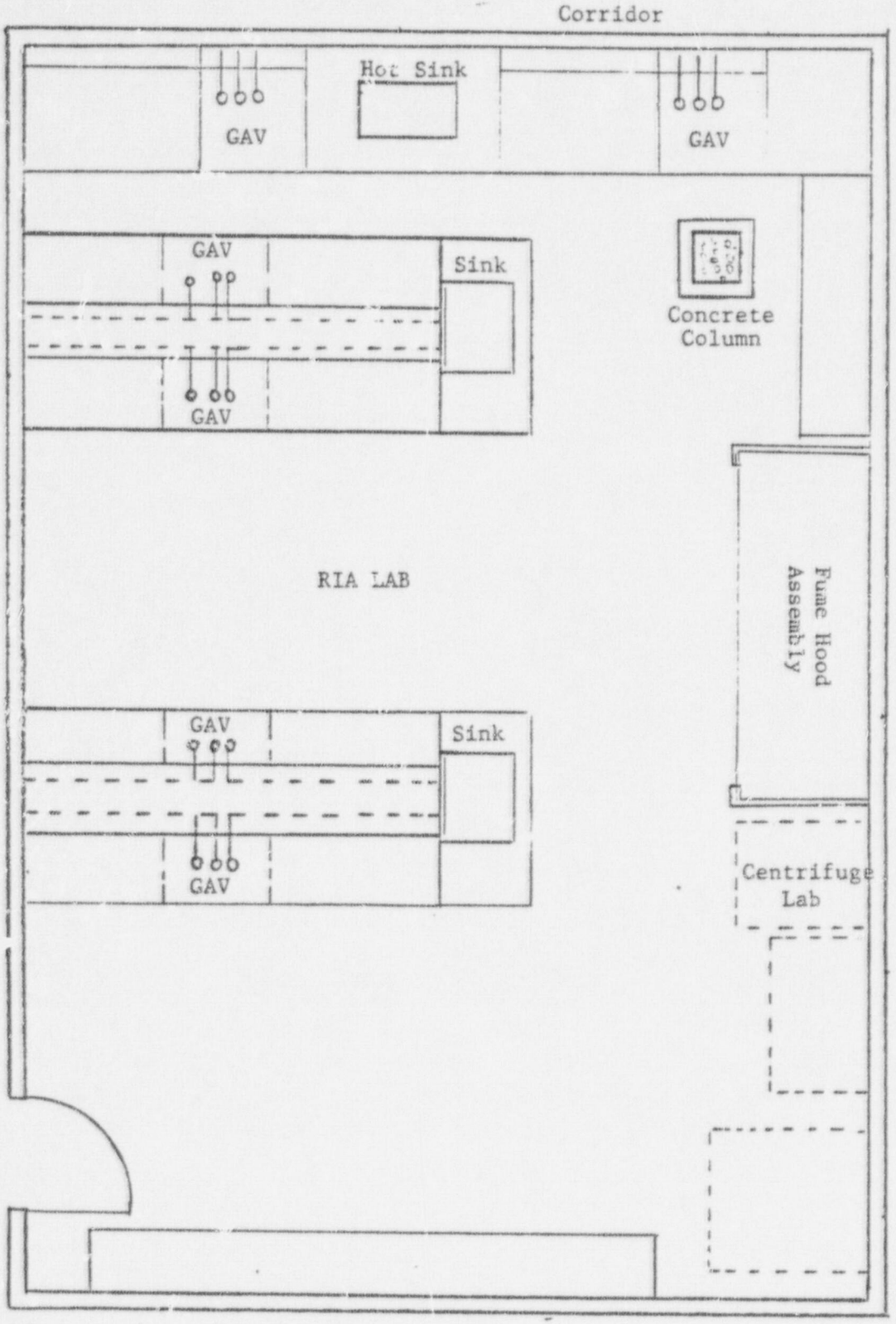


DIAGRAM No. 6
LETTERMAN ARMY MEDICAL CENTER
RIA LABORATORY
Bldg. 1100



Legend:

GAV - Gas, Air, Vacuum Outlets

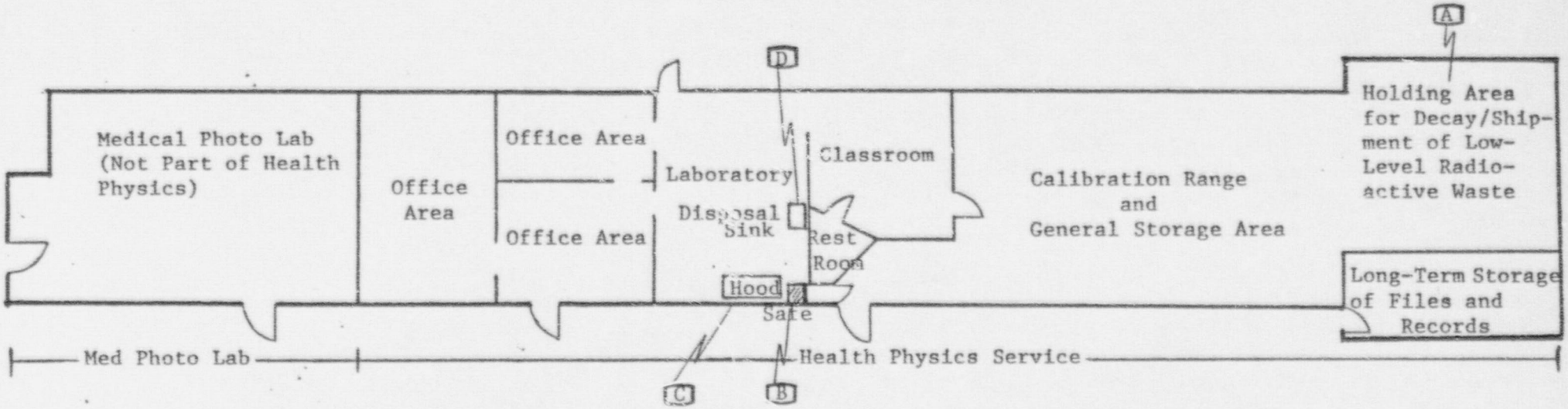
Scale: 1/4" = 1'

DEC 2 0 1988

DIAGRAM No. 7

HEALTH PHYSICS SERVICE

Bldg. 1007



A. Low-Level Radioactive Waste Storage--Awaiting Decay and/or Pickup For Disposal.

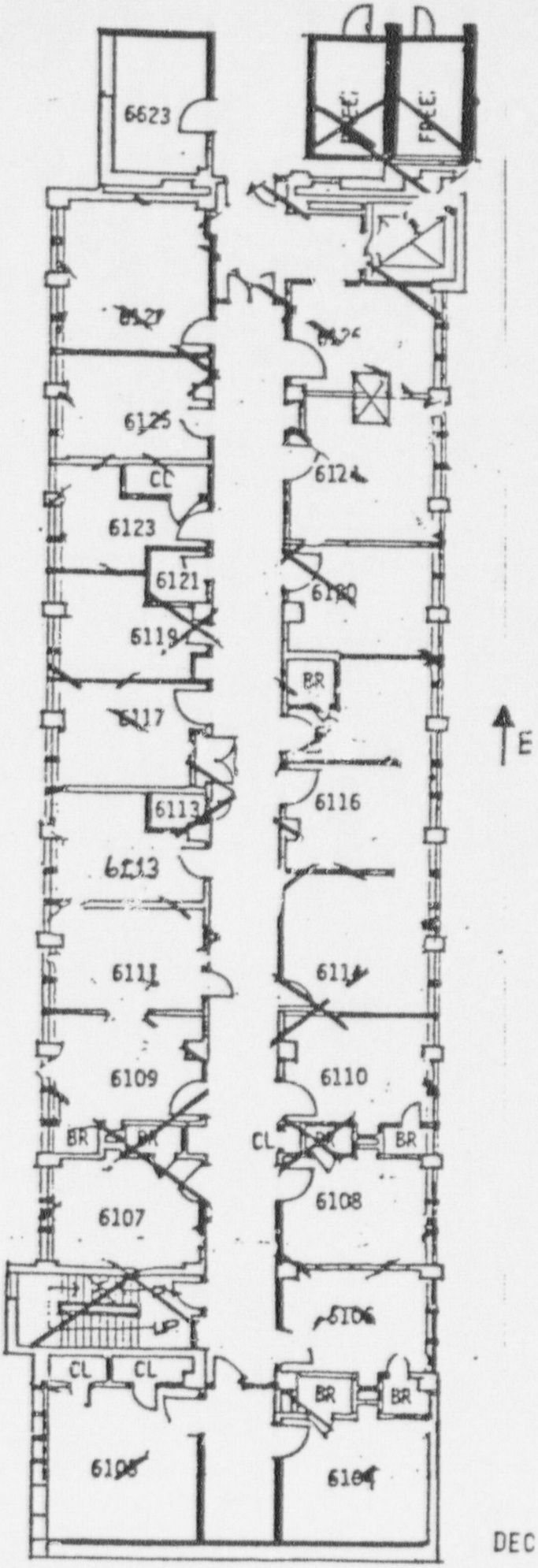
B. Safe Used For Storage of Radiation Sources.

C. Hood Vented to the Outside.

D. Sink Used For Disposal to Sanitary Sewer System.

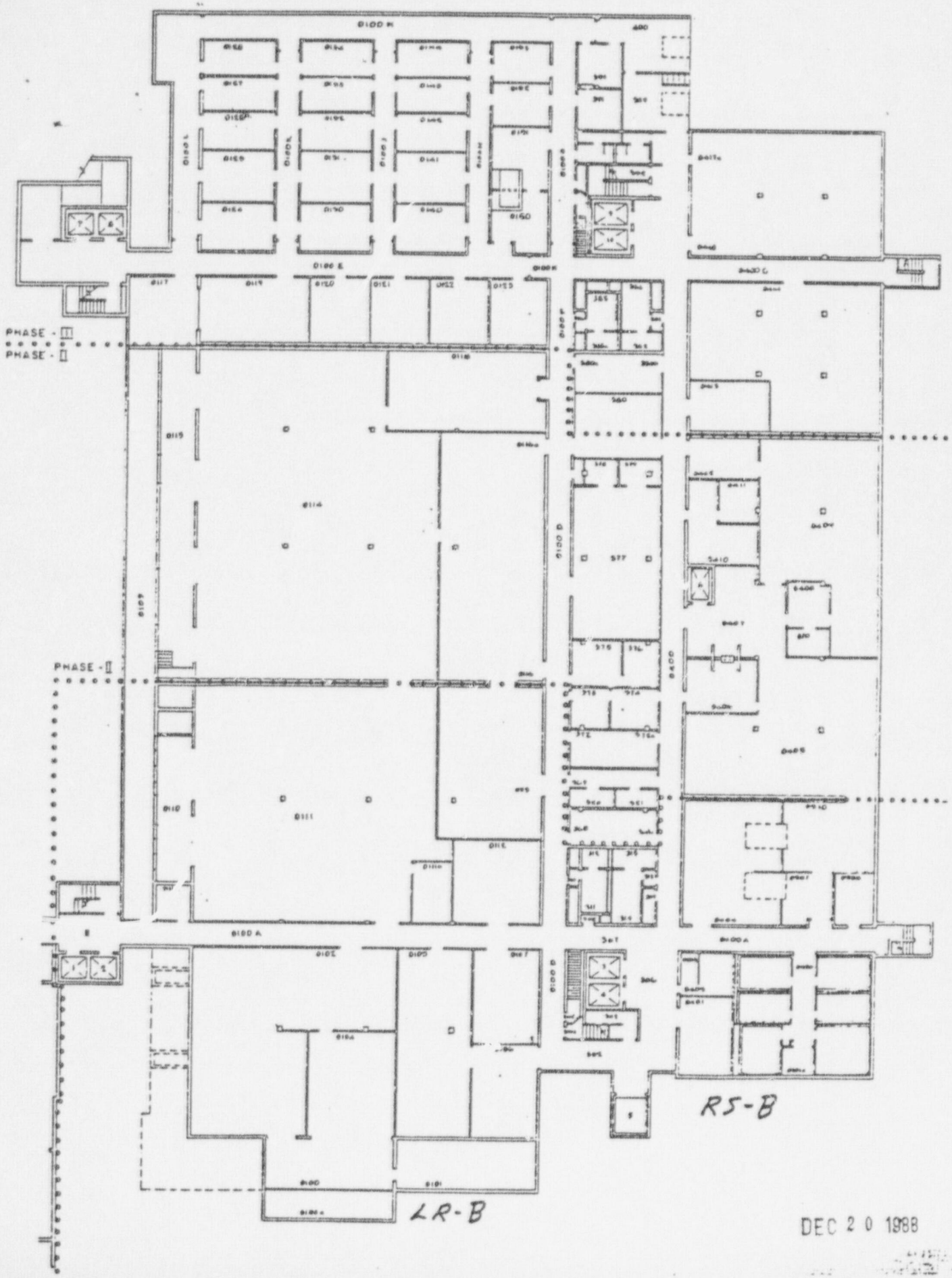
E. Windows Are Barred For Security of Radioactive Material.

Diagram # 8
Letterman Army Medical Center
Department of Clinical Investigation
Bldg. 1801, 6th Floor



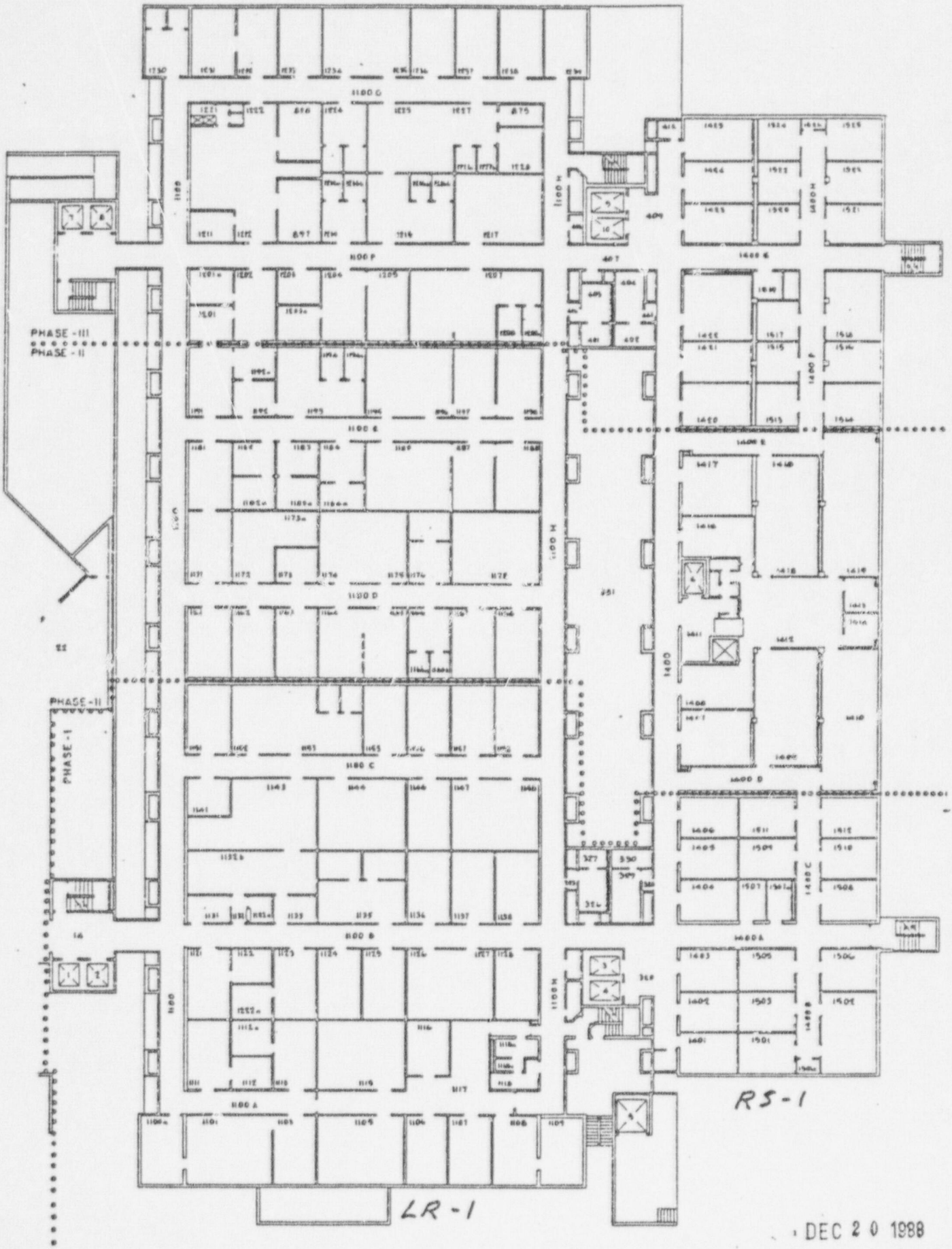
DEC 2 0 1988

DIAGRAM No. 9
LETTERMAN ARMY INSTITUTE OF RESEARCH
Bldg. 1110, Basement Floor



DEC 2 0 1988

DIAGRAM No. 10
LETTERMAN ARMY INSTITUTE OF RESEARCH
Bldg. 1110, First Floor

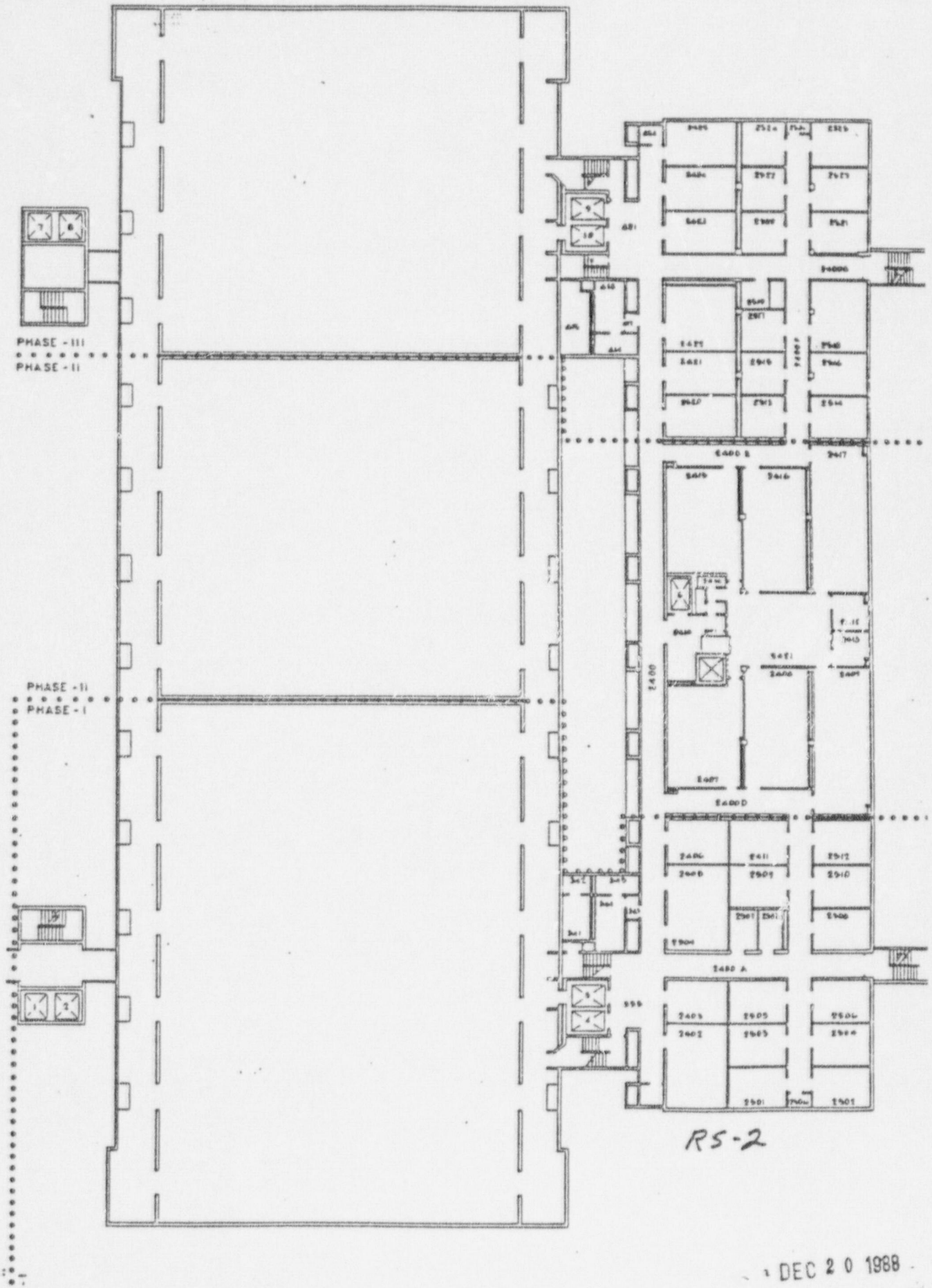


DEC 20 1988

DIAGRAM No. 11

LETTERMAN ARMY INSTITUTE OF RESEARCH

Bldg. 1110, 2nd Floor, RS Section

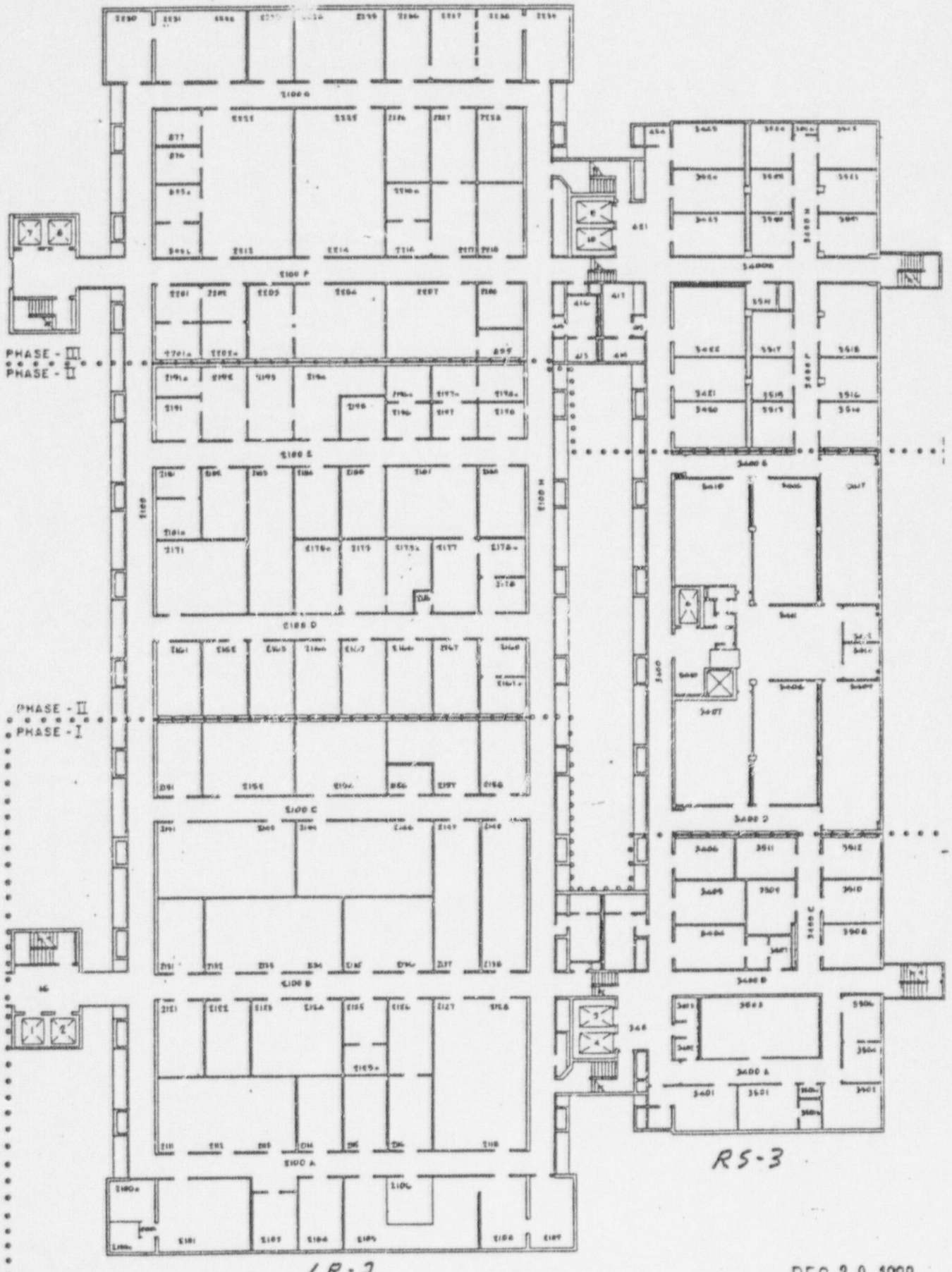


RS-2

DIAGRAM No. 12

LETTERMAN ARMY INSTITUTE OF RESEARCH

Bldg. 1110, 2nd Floor - LR Section/3rd Floor - RS Section

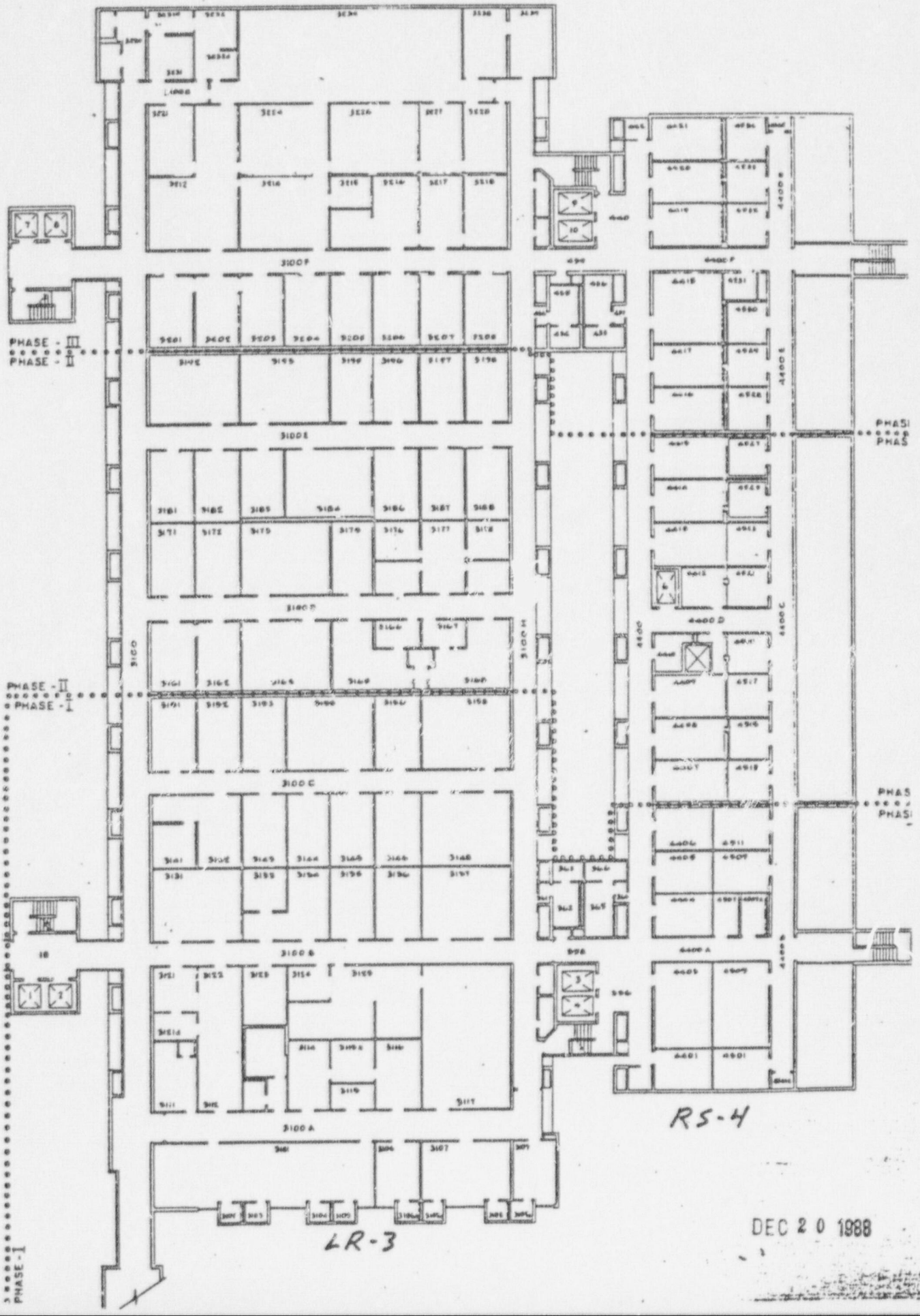


DEC 2 0 1988

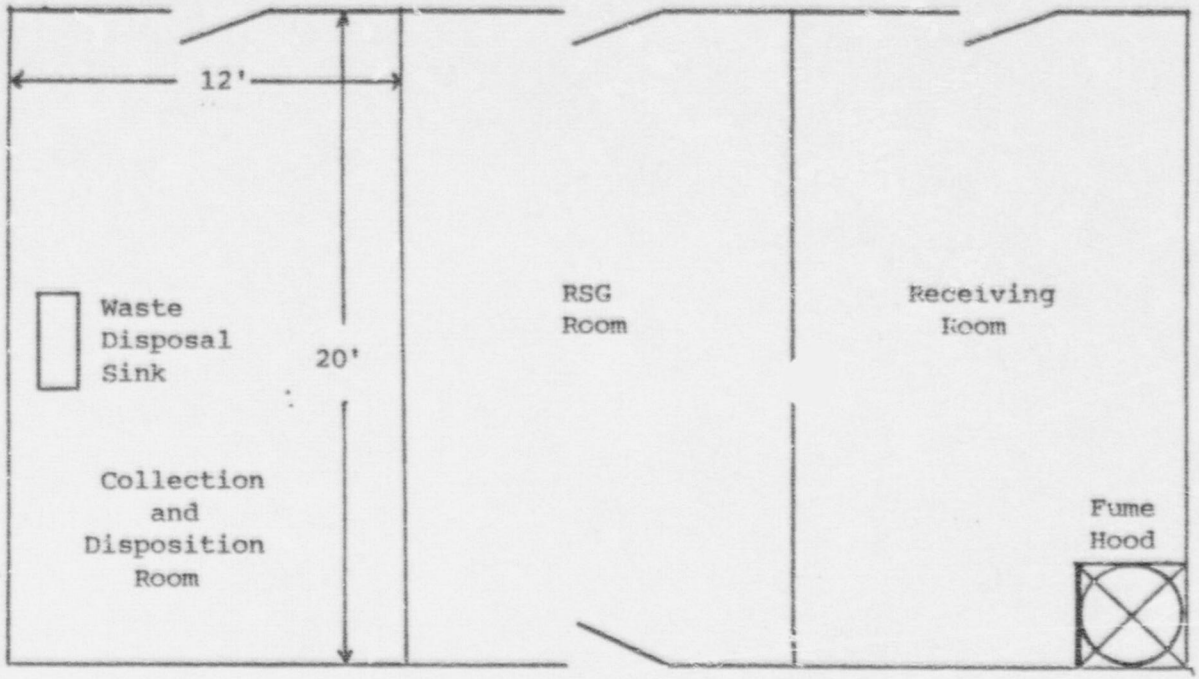
DIAGRAM No. 13

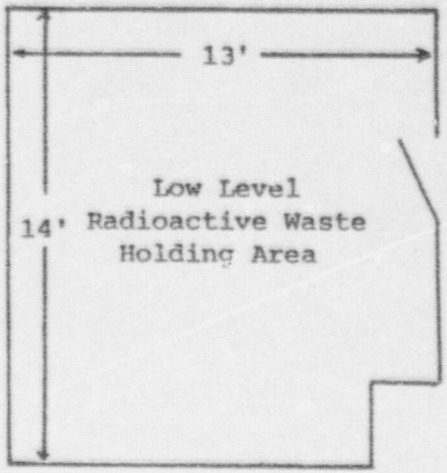
LETTERMAN ARMY INSTITUTE OF RESEARCH

Bldg. 1110, 3rd Floor-LR Section/4th Floor-RS Section



DEC 2 0 1988





R A D I O S O T O P E S E R V I C E S G R O U P (RSG)

DIAGRAM No. 14

LETTERMAN ARMY INSTITUTE OF RESEARCH
Bldg. 1110, Rooms LR2226, LR2227, LR2228, and RS3509

ITEM 9

Facilities and Equipment

ANNEX 1

Procedures for Dose Calibrator

Linearity Test

Using the Shield Method

INSTRUCTION MANUAL for CALICHECK

Calicheck

P.O. Box 25589
Cleveland, Ohio 44125-0589

1-15

Calicheck

If you have questions regarding the kit, the dircctions for its use, or the data generated, call (216) 467-8478 for assistance.

DEC 2 0 1988

This apparatus and method for it's use is covered by United States Letters Patent No. 4,333,010 issued on June 1, 1982. PATENTEE expressly withholds all license to use this apparatus to practice methods covered by this patent for calibrating equipment not owned by purchaser.

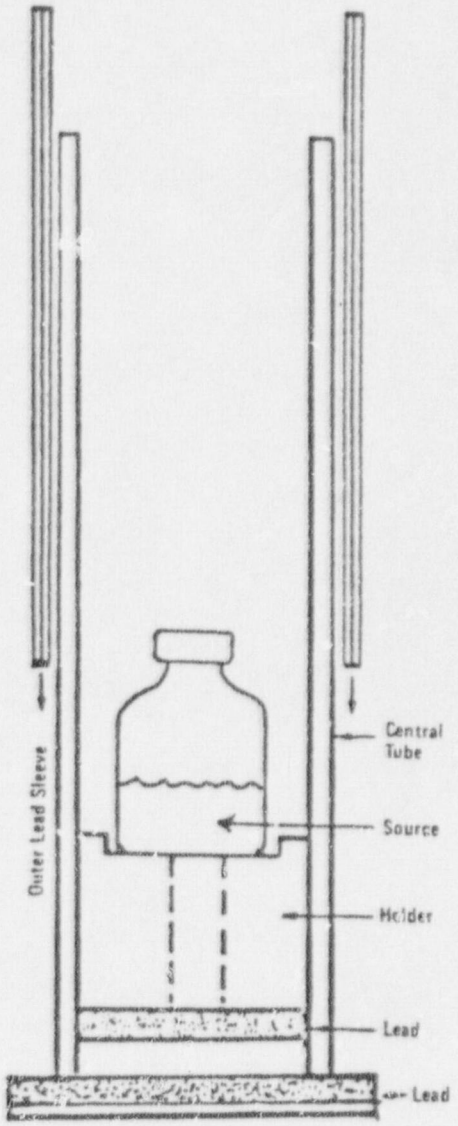
TABLE of CONTENTS

SECTION I

Product Description

Calicheck is a kit designed to perform the activity linearity test on a dose calibrator quickly and accurately. The kit consists of seven tubes, six of which are lead-lined to attenuate gamma radiation from radioactive sources, and a seventh, unlined tube. Each lead-lined tube varies in the thickness of lead so as to simulate various stages of radioactive decay. These tubes are sequentially placed over a source of radioactivity in the dose calibrator and, within minutes, seven successive measurements are acquired representing values that would have been obtained at approximately 0, 6, 12, 20, 30, 40 and 50 hours after the initial assay of Tc 99m. The need for determining linearity by fractionating eluants, or decaying the elution for several days while data is being collected, is eliminated -- and at greatly reduced radiation exposures to personnel.

Each tube is coded with a colored band for identification.



General Information

Several important points must be understood prior to using Calicheck. The points are as follows:

1. Calicheck performs thorough quality control on all kits. However, it is suggested that the kit be checked to ensure that the kit has not been damaged in shipment.
2. The components of the kit and/or the dose calibrator can be damaged if misused. It is especially important that damage does not occur to the ends of the tubes.
3. Should tubes become damaged or lost, replacement parts can be ordered with the form found on page 15 of this instruction manual.
4. Calicheck confirms activity linearity. It will not make your dose calibrator linear.
5. The dose calibrator must exhibit activity linearity prior to utilizing the Calicheck kit. This must be accomplished by performing an activity linearity test using standard techniques such as described in your license application. For NRC license holders, this test should be at a minimum equivalent to Appendix C of Regulatory Guide 10.8, August, 1987. If nonlinearity is demonstrated, the instrument should be repaired.
6. Calicheck must be specifically calibrated for each dose calibrator in the facility since variations between manufacturers (and sometimes, models) are known to exist. Similarly, kits should not be interchanged without first confirming calibration factors. Each tube in the Calicheck kit must be calibrated and each time a tube is replaced in the kit, the new tube must be calibrated. A procedure is enclosed that describes the calibration technique.
7. Readings obtained from Calicheck are not to be used for assay purposes.
8. The radionuclide used for testing must be Tc-99m, and it must be relatively free of Mo-99 contamination. The concentration of Mo-99 in the sample should be less than .15 uCi Mo-99/mCi Tc-99m. If a central radiopharmacy is used as the source of Tc-99m, ask the radiopharmacist for his assay results.

9. Do not use the tubes as shielding devices. The black center tube offers absolutely no radiation protection since it is plastic with no lead in its side wall. The other tubes do contain varying amounts of lead, but should never be regarded as a protective shield.
10. The entire kit should be stored in the mailing container in an upright position when not in use. The black center tube should be inserted upside down to avoid damage to the tubes.
11. Typically, regulatory agencies, such as the Nuclear Regulatory Commission or state licensing agencies, require that methods for activity linearity evaluations be filed with them in the form of a license amendment application. Enclosed (see page 14 of this instruction manual) is a model letter requesting authorization to use Calicheck, to be sent to the regulatory agency. Simply fill in the blanks, transfer entire letter to hospital stationary, have the application signed and forwarded to your licensing agency. Include amendment fees, where applicable. Upon receipt of the amendment, Calicheck can be put to use.

CAUTION: Calicheck should only be used by qualified personnel. Tubes should be carefully placed into the dose calibrator to avoid damage to the tube and/or chamber itself.

SECTION 1

Calibration of Calicheck

OBJECTIVE:
To generate calibration factors for each tube in the Calicheck Kit, thereby expressing the amount of attenuation by each tube.

PREPARATION:
All radiation sources in the vicinity of the dose calibrator should be shielded to avoid erroneous readings. Further, the instrument may be sensitive to dosed patients in the vicinity. Move the patients to another location before you start. Both the "Kit Calibration" and the "Activity Linearity Procedure" must be performed in an environmentally stable background.

Syringe hangers and vial holder assemblies supplied with Capintec, Nuclear Associates, and some Picker dose calibrators must be removed. Molded chamber liners as supplied by RadX and some Picker dose calibrators must be lifted out. Calicheck will not fit the Mediac dose calibrators because the chamber diameter is too small.

The calibration source that is used should be the largest activity measured in the dose calibrator. This would normally be the Monday morning elution in the case of the generator, or the largest dose obtained from your radiopharmacy.

In order to use Calicheck, a source of Tc-99m must be placed into the central black tube. If the source is in a top loading lead elution shield, use extension tongs to transfer the source. If the source is in a bottom loading elution shield, remove the base cover, put the open end of the black tube to the bottom of the lead shield and allow the source to slide down into the black tube by tilting the tube at an angle. The center tube accommodates vial sizes up to 20 ml. and syringes up to 10 ml. Proper technique dictates that when using a syringe, a clean needle be used and it should be no longer than 1-1/2" in length. When the black tube is inserted into the dose calibrator, it should be done carefully with the open end in the upward position. The black tube must remain in the dose calibrator throughout all steps in the calibration cycle. Once the source is placed in the dose calibrator, the source must be kept in exactly the same position throughout the test to insure consistent geometry.

If the unit has a manual range adjust, adjust the range as necessary to acquire three significant figures for each reading.

When the activities displayed are at the uCi level (e.g., when the purple and possibly blue tubes are in place), dose calibrator displays may "float" or vary on successive measurements. Be sure to record an average figure on your data sheets. Record all values on the data sheets in mCi units.

Once the procedure is started, do not stop. All readings should be recorded within a matter of minutes. Otherwise, the short half life of Tc-99m will introduce unacceptable error.

Calibration Procedure: (To be performed only once.)*

1. Remove any syringe hanger or chamber liner, if necessary, from dose calibrator.
2. Set dose calibrator to measure Tc-99m.
3. Adjust zero, background, etc., if applicable. Check zero on each range. If background is not "zero" on all ranges, zero on one range and record values on all other ranges, to add or subtract from final results when those ranges are used.
4. Place calibration source into black tube and insert black tube into dose calibrator CAREFULLY with the open end in the upward position. Read displayed activity.
5. Record reading in appropriate positions on Data Sheet #1 "Kit Calibration". (8 entries. See example on page 8.)

Carefully ensure that, in the following steps, each tube is firmly seated against the lead at the base of the black tube.

6. Place red tube in the dose calibrator over the black tube. Record reading as the appropriate denominator on Data Sheet #1, Kit Calibration Form.
7. Replace red tube with orange tube. Record.
8. Replace orange tube with yellow tube. Record.

* Or following repair of dose calibrator or Calicheck.

9. Replace yellow tube with green tube. Record.
10. Replace green tube with blue tube. Record.
11. Replace blue tube with purple tube. Record.
12. Remove the Calicheck assembly and place source in a shielded container. Place Calicheck in storage container provided.

NOTE: For each measurement, use the tube with the colored band "up".

DATA TREATMENT OF DATA SHEET #1:

1. Divide the numerator by the denominator in Column B to determine the Calibration Factor, and record in Column C. Retain these values for future reference. These factors will be used for all future activity linearity tests provided all conditions of the test are met (i.e., same dose calibrator, same kit, same radionuclide, same source configuration). Recalculation will be required following repair of dose calibrator or Calicheck.
2. Compare results to chart of "Typical Calibration Factors" on page 9. Differing values may be due to variations in geometry, in the response of the dose calibrator and/or in the kit manufacturing process itself.
3. Transfer determined Calibration Factors from Data Sheet #1 to appropriate place in Column C of Data Sheet #2. (See example on page 13.) To confirm the accuracy of the determined factors, complete Data Sheet #2. If no error has been made, all values in Column D (product of B x C) should be the same. If values differ, repeat the determination.

Kit Calibration

All readings must be taken at lowest range setting available and converted to mCi units.

TUBES A		DISPLAYED ACTIVITY B		CALIBRATION FACTORS C
Black Only / Black Only	=	_____ mCi / mCi	=	1.00
Black Only / Black & Red	=	_____ mCi / mCi	=	_____
Black Only / Black & Orange	=	_____ mCi / mCi	=	_____
Black Only / Black & Yellow	=	_____ mCi / mCi	=	_____
Black Only / Black & Green	=	_____ mCi / mCi	=	_____
Black Only / Black & Blue	=	_____ mCi / mCi	=	_____
Black Only / Black & Purple	=	_____ mCi / mCi	=	_____

SOURCE CONFIGURATION

_____ Syringe

_____ Vial

*Or following repair of dose calibrator or Calicheck Kit. In all instances these factors can only be determined following proof of activity linearity by standard techniques. KEEP THIS FORM FOR FUTURE REFERENCE!

Examp'

To determine the calibration factors for a Brand X dose calibrator, a source of Tc-99m was prepared. The source read 34.2 mCi in the black tube and generated the following data.

All readings were taken at the lowest range setting possible and converted to mCi units.

TUBES A		READINGS B		CALIBRATION FACTOR C
Black Only / Black Only	=	34.2 mCi / 34.2 mCi	=	1.00
Black Only / Black & Red	=	34.2 mCi / 19.9 mCi	=	1.72
Black Only / Black & Orange	=	34.2 mCi / 10.6 mCi	=	3.23
Black Only / Black & Yellow	=	34.2 mCi / 3.59 mCi	=	9.53
Black Only / Black & Green	=	34.2 mCi / 1.16 mCi	=	29.5
Black Only / Black & Blue	=	34.2 mCi / .354 mCi*	=	96.6
Black Only / Black & Purple	=	34.2 mCi / .112 mCi	=	305

*Read as 354 uCi and converted to .354 mCi. Similarly 112 uCi has been converted to .112 mCi and 92 uCi would be converted to .092 mCi.

Typical Calibration Factors

	CAPINTEC		RADX		PICKER	
	VIAL	SYRINGE	VIAL	SYRINGE	VIAL	SYRINGE
Black	1.00	1.00	1.00	1.00	1.00	1.00
Red	1.83	1.74	2.27	2.16	1.73	1.90
Orange	3.59	3.32	4.58	4.24	3.31	3.49
Yellow	10.9	9.74	14.4	12.9	9.71	9.96
Green	34.9	30.4	48.6	42.3	31.1	30.7
Blue	121	103	164	140	105	104
Purple	399	334	565	473	342	326

These factors were determined using Tc-99m in a 10 ml vial and a 3 ml syringe. They represent an average of several determinations using the same kit in different dose calibrators of the same type as well as different kits in the same dose calibrator. These factors are not to be used as a substitute for determined calibration factors. They are listed here for comparison purposes only.

Activity Linearity Procedure

OBJECTIVE:

To determine if a dose calibrator can respond linearly to a variety of levels of radioactivity via the Calicheck Technique.

PREPARATION:

Same as described under "Calibration of Calicheck". See page 4. Use the same source configuration as used in that calibration procedure.

PROCEDURE:

1. Remove any syringe hanger or chamber liner, if necessary, from dose calibrator.
2. Set dose calibrator to measure Tc-99m.
3. Adjust zero, background, etc., if applicable. Check zero on each range. If background is not "zero" on all ranges, zero on one range and record values on all other ranges to add or subtract from final results when those ranges are used.
4. Place source to be used for the activity linearity procedure into the black tube and insert tube into the dose calibrator CAREFULLY with the open end in the upward position.
5. Record "displayed activity" on "Black Only" on Data Sheet #2 "Dose Calibrator Activity Linearity Check", (see page 13).

Carefully ensure that, in the following steps, each tube is firmly seated against the lead at the base of the black tube.

6. Place red tube in the dose calibrator over the black tube. Record "displayed activity" on "Black & Red" blank on Data Sheet #2.
7. Replace red tube with orange tube. Record on "Black & Orange" blank.
8. Replace orange tube with yellow tube. Record on "Black & Yellow" blank.
9. Replace yellow tube with green tube. Record on "Black & Green" blank.
10. Replace green tube with blue tube. Record on "Black & Blue" blank.
11. Replace blue tube with purple tube. Record on "Black & Purple" blank.
12. Remove Calicheck assembly and place source in shielded container.

DATA TREATMENT OF DATA SHEET #2: (To be completed each calendar quarter or at a frequency required by your license conditions.)

1. Enter appropriate Calibration Factors from Data Sheet #1 for your dose calibrator in Column C.
2. Multiply the value in Column B by the corresponding value in Column C to determine product of each entry for Column D. Record values. (Ideally, these values will all be the same.)
3. Add all products in Column D and divide by 7 to determine the mean value. Multiply the mean by 1.05 and 0.95 as indicated. These define the upper and lower limits of ±5% variation.

If all values in column D fall between these two limits, your dose calibrator has acceptable activity linearity. The test is complete, unless additional readings are required to check the microcurie range. If so, continue the determination by withdrawing an aliquot containing 2-3 mCi more activity than the displayed activity in the last measurement. The test is then repeated (Data Sheet #2 only), using the same source configuration as that used in determining the calibration factor on Data Sheet #1.

If any values in Column D fall outside the limits, repeat the study to rule out possible variations in the initial data. Consistent results that are outside the limits indicate that the instrument is exhibiting non-linearity. Corrective action is indicated.

DATA SHE #2 *(to be completed each quarter)*

Dose Calibrator Activity Linearity Check

Dose Calibrator _____ Date _____

Model _____ Technologist _____

Source Configuration _____ *(must be same as on Data Sheet #1)*

All readings must be taken at lowest range setting available and converted to mCi units.

A TUBE COLOR	B DISPLAYED ACTIVITY		C CALIBRATION FACTOR		D PRODUCT OF B X C
Black Only:	_____ mCi	X	1.00	=	_____
Black & Red:	_____ mCi	X	_____	=	_____
Black & Orange:	_____ mCi	X	_____	=	_____
Black & Yellow:	_____ mCi	X	_____	=	_____
Black & Green:	_____ mCi	X	_____	=	_____
Black & Blue:	_____ mCi	X	_____	=	_____
Black & Purple:	_____ mCi	X	_____	=	_____
			SUM	=	_____

MEAN = $\frac{\text{SUM}}{7}$ = _____

MEAN X 1.05 = _____ = UPPER LIMIT*

MEAN X 0.95 = _____ = LOWER LIMIT*

Compare Column D data to upper and lower limits to confirm linearity.

*Instead of a variation in the Column D data of ±5%, your radioactive material license may allow a difference of ±10% in the test results. If so, multipliers of 1.10 and 0.90 can be used to determine the upper and lower limits.

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Example

A Mo/Tc generator is eluted and yields 342 mCi. The entire elution is placed in the dose calibrator inside the black tube. Subsequent readings generated the following data.

Dose Calibrator Activity Linearity Check

All readings were taken at lowest range setting available and converted to mCi units.

A TUBE COLOR	B DISPLAYED ACTIVITY		C CALIBRATION FACTOR		D PRODUCT OF B X C
Black Only:	342 mCi	X	1.00	=	342
Black & Red:	201 mCi	X	1.72	=	346
Black & Orange:	106 mCi	X	3.23	=	342
Black & Yellow:	34.1 mCi	X	9.53	=	325
Black & Green:	10.2 mCi	X	29.5	=	301
Black & Blue:	3.54 mCi	X	96.6	=	342
Black & Purple:	1.19 mCi	X	305	=	363
			SUM	=	2361

MEAN = $\frac{2361}{7}$ = 337

MEAN X 1.05 = 354 = UPPER LIMIT*

MEAN X 0.95 = 320 = LOWER LIMIT*

The readings for the green and purple tubes are outside the limits. The procedure should be repeated to confirm the data. Repair may be indicated. Failure to account for a re-zeroing problem between ranges *(see Procedure Step #3)* or an unstable background may also have produced this apparent non-linearity.

SECTION V

License Amendment Request

(To be placed on licensee's stationery)

NRC or State License Number _____

FACILITY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PERSON TO BE CONTACTED
REGARDING THIS APPLICATION:

_____ PHONE: _____

(RSO, Technologist, Consultant, Doctor, Admin.)

Gentlemen:

Please amend our license as follows:

As an alternative to our present procedure, the dose calibrator can be checked for activity linearity with the use of a device called Calicheck from Calicheck. The manufacturer's instructions for use as revised on March 2, 1982, will be followed. Test results will be recorded and retained for inspection. Corrective action as stated in our license application will be followed if unacceptable linearity is demonstrated.

Sincerely,

Administrator

DEC 20 1988

SECTION VI

Calicheck

P.O. BOX 14489
CLEVELAND OHIO 44124

Calicheck Parts Order Form

ITEM	PRICE* (ea.)	QUANTITY	PRICE
Black Center Tube	$60.00		
Lead Wrapped Tubes	$60.00		
Red			
Orange			
Yellow			
Green			
Blue			
Purple			
		TOTAL	
Storage Container	$ 6.00		
		TOTAL ENCLOSED	

BILL TO:
Name:
Address:

SHIP TO:
Name:
Address:

P.O. #

*Prices are subject to change without notice.

ITEM 10

Radiation Safety Program

1. The Radiation Control Committee/Radiation Protection Officer.

a. The Radiation Control Committee (RCC) shall:

1) Ensure that licensed material will be used safely. This includes review as necessary of training programs, equipment, facility, supplies, and procedures.

2) Ensure that licensed material is used in compliance with NRC regulations and the institutional license.

3) Ensure that the use of licensed material is consistent with the ALARA philosophy and program.

4) Establish a table of investigational levels for individual occupational radiation exposures.

5) Identify program problems and solutions.

6) Be familiar with all pertinent NRC regulations, the license application, the license, and amendments.

7) Review the training and experience of the proposed authorized users and the Radiation Protection Officer (RPO), to determine that their qualifications are sufficient to enable the individuals to perform their duties safely and are in accordance with the regulations and the license.

8) Review, on the basis of safety, and approve or deny, (consistent with the limitations of the regulations, the license, and the ALARA philosophy), all requests for authorization to use radioactive material within the institution.

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

10) Review quarterly the RPO's summary report of the occupational radiation exposure records of all personnel, giving attention to individuals or groups of workers whose occupational exposure appears excessive.

11) Establish a program to ensure that all persons whose duties may require them to work in or frequent areas where radioactive materials are used are appropriately instructed as required in para 19.12 of 10 CFR Part 19.

12) Review at least annually the RPO's summary report of the entire radiation safety program to determine that all activities are being conducted safely, in accordance with NRC regulations, the conditions of the license, and consistent with the ALARA philosophy. The review must include an examination of records, reports from the RPO, results of NRC inspections, written safety procedures, and the adequacy of the management control system.

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

14) Maintain written minutes of all Committee meetings, including members in attendance and members absent, discussions, actions, recommendations, decisions, and numerical results of all votes taken.

15) Ensure that the byproduct material license is amended, if required, prior to any changes in facilities, equipment, policies, procedures, and personnel.

16) Administrative Information:

a) The Committee shall meet as often as necessary to conduct its business but not less than once in each calendar quarter.

b) Membership will include one authorized user for each type of use authorized by the license, the RPO, a representative of the nursing service, and the Deputy Commander for Clinical Services, who represents management. Management may appoint alternate members to participate in meetings in the case of the absence of principal members.

c) To establish a quorum, one-half of the Committee's membership, including the RPO and the management representative, must be present.

d) The Radiation Control Committee has delegated authority to the RPO to implement and enforce the LAMC/LAIR ALARA commitment. The Radiation Control Committee will support the RPO in those instances where it is necessary for the RPO to assert this authority. If the RPO is overruled by the Radiation Control Committee the minutes will record the basis for its action.

b. The Radiation Protection Officer: See paragraph 2c, this item.

2. **ALARA Program.** (excerpt from the posted ALARA Commitment)

a. The Command:

1) This Command is committed to the program described in this paper for keeping radiation exposures (individual and collective) as low as reasonably achievable, ALARA. In accordance with this commitment, this Command has established an administrative organization for radiation safety, and has developed the necessary written policies, procedures, and instructions to foster the ALARA concept. The organization includes a Radiation Control Committee (RCC) and a Health Physics Officer/Radiation Protection Officer (RPO). This Command is committed to ensuring implementation of sound radiation safety practices.

2) A formal audit of the radiation protection program is conducted annually. A written record of this inspection, its recommendations, and required corrective action are maintained at the Health Physics Office. Additionally, personnel exposure records will be reviewed quarterly to ensure procedures are being conducted in the spirit of ALARA.

3) Modification of operating and maintenance procedures, and to equipment and facilities will be made when they will significantly reduce exposures at reasonable costs.

4) 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.

b. Radiation Control Committee (RCC):

1) Review of Proposed Users and Uses.

a) In accordance with LAMC Regulation 40-34, the RCC will thoroughly review the qualifications of each principal authorized user, authorized user, or technologist with respect to the radioactive material types, quantities, and uses for which applied, to assure that the user will be able to take appropriate measures to maintain exposure ALARA.

b) When considering a new use of byproduct material, the RCC will review the efforts of the authorized user to maintain exposures ALARA. The user should have systematized procedures to ensure ALARA, and will have incorporated the use of special equipment such as syringe shields, gloves, absorbent paper, *etc.*, in his proposed use.

c) The RCC will ensure that the user justifies his procedures and that all doses will be maintained ALARA.

2) Delegation of Authority.

a) The RCC has delegated authority to the Health Physics Officer/Radiation Protection Officer to implement and enforce the LAMC/LAIR ALARA commitment.

b) The RCC will support the RPO in those instances where it is necessary for the RPO to assert this authority. Where the RPO has been overruled, the RCC will record the basis for its action.

3) Review of ALARA Program.

a) The RCC encourages all users to review current procedures and develop new procedures as appropriate for ways to implement the ALARA concept.

b) The RCC will perform a quarterly review of occupational radiation exposures with particular attention to instances where investigational levels in Table 1 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.

c) The RCC will evaluate the overall efforts for maintaining exposures ALARA annually. This review will include the efforts of the RPO, authorized users and workers, as well as those of management.

c. Health Physics Officer/Radiation Protection Officer:

1) Annual and Quarterly Review.

a) The RPO will perform an annual review of the effectiveness of his own radiation protection program in maintaining doses ALARA. Reviews of specific procedures may be conducted on a more frequent basis.

b) The RPO will review exposures of authorized users and occupational workers quarterly to determine that their exposures are in keeping with the provisions of this commitment.

c) The RPO will perform quarterly reviews of the records of radiation surveys in unrestricted and restricted areas to determine that dose rates and amounts of contamination are ALARA.

2) Education Responsibilities for an ALARA Program.

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

b) The RPO will assure that authorized users, occupational workers, and ancillary personnel who may be exposed to radiation are instructed in the ALARA philosophy and informed that the Commander, the RCC, and the RPO are committed to implementing the ALARA concept.

3) Cooperative Efforts for Development of ALARA Procedures.

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

b) The RPO will maintain contact with all users and workers in order to develop ALARA procedures for working with radioactive materials.

c) The RPO will receive and evaluate the suggestions of individual workers for improving health physics practices and encourage the use of those procedures.

4) Reporting and Reviewing Instances of Deviation from Good ALARA Practices.

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

b) The RPO will report all significant instances of deviation from ALARA concepts to the RCC for review.

d. Authorized Users:

1) New Procedures Involving Potential Radiation Exposures.

a) Authorized users will consult with and receive the approval of the RPO and RCC during the planning stage of a new protocol before using radioactive materials.

b) 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.

2) Responsibility of the Authorized User to Supervised Personnel.

a) The authorized user will explain the ALARA concept and his commitment to maintain exposures ALARA to all supervised personnel.

b) The authorized user will ensure that those under his supervision who are subject to occupational radiation exposure are trained and educated in good health physics practices and in maintaining exposures ALARA.

e. Occupational Worker:

1) The worker will be instructed in the ALARA concept and its relationship to his working procedures and working conditions.

2) The worker will know what resources are available if he feels that ALARA is not being promoted on the job.

f. Establishment of Action Levels in Order to Achieve Reductions in Individual Occupational Exposures:

1) This Command hereby establishes Investigational Levels for occupational external radiation exposure which when exceeded will initiate investigation by the RPO and/or the RCC. 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 - (mrem 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
*Cardiac Cath Lab personnel - Head and neck; lens of eyes	625	937.5

2) The RPO will review and record on DD Form 1141, Record of Occupational Exposure to Ionizing Radiation, or an equivalent form, results of personnel monitoring, not less than once in any calendar quarter as is required by 10 CFR 20.401. 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 I:

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, Level I values.

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. He will report the results of his reviews at the first RCC meeting following the quarter when the exposure was recorded. If the exposure does not equal or exceed Investigational Level II, no action is required unless deemed appropriate by the RCC. The RCC 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 RCC 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 equaling or exceeding Investigational Level II and, if warranted, 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 at the first RCC meeting following completion of the investigation. The details of these reports will be recorded in the RCC minutes. The RCC minutes will be sent to the management of this institution for review.

d) Re-establishment of an individual occupational worker's Investigational Level II above that listed in Table 1:

In cases where an individual'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 consistent with good ALARA practices for that individual or group. Justification for a new Investigational Level II will be documented. The Radiation Control Committee will review the justification for, and will approve, all revisions of Investigational Levels II. In such cases, when the exposure equals or exceeds the newly established Investigational Level II, those actions listed in paragraph c above will be followed.

g. Signature of Certifying Officials:

This commitment to the ALARA program is signed by the Commanders of Letterman Army Medical Center and Letterman Army Institute of Research periodically. This document is kept on file in the Health Physics Office. I hereby certify that this institution is committed to the ALARA program set forth above.

3. Leak Test.

a. Make a list of all sources to be tested. This should include at least the isotope, the activity on a specified date, and the physical form.

b. If you will be testing sources stronger than a few millicuries, set out a survey meter, preferably with a speaker, so you can monitor your exposure rate.

c. Prepare a wipe sample for each source. A cotton swab, injection prep pad, filter paper, or tissue paper is suitable. Samples should be taken as follows:

1) For small sealed sources, it may be easier to wipe the entire accessible surface area. Pay particular attention to seams and joints. However, do not wipe the port of beta applicators.

2) For larger sealed sources and devices (survey meter calibrator, bone mineral analyzer source), take the wipe near the radiation port and on the activating mechanism.

d. The samples will be analyzed as follows:

1) An instrument that is sufficiently sensitive to detect 0.005 microcurie will be used. For beta sources either a gas flow proportional counter, or a liquid scintillation counter will be used. For gamma sources, a scintillation crystal with a ratemeter or scaler will be used.

2) To estimate the detection efficiency of the analyzer used to assay the wipe samples, a certified check source of the same isotope as the sealed source or a certified check source with a different isotope but that has a similar spectrum will be used. If calculations demonstrate that the instrument is not sufficiently sensitive to detect 0.005 microcurie, a different instrument must be used.

3) Assay the wipe sample. It must be in the same geometry relative to the detector as was the certified check source.

4) Record the wipe sample counts per minute. Then calculate and record the estimated activity in microcuries on the wipe sample.

5) If the wipe sample activity is 0.005 microcurie or greater, notify the RPO. The source must be withdrawn from use to be repaired or discarded. If it is a source distributed under an NRC or Agreement State license, the NRC must be notified. (See paragraph 21.21(b) of 10 CFR Part 21 and paragraph 35.59(e)(2) of 10 CFR Part 35.)

6) Sign and date the list of sources, data, and calculations.

4. Safe Use of Radiopharmaceuticals.

a. Individuals shall use disposable gloves and protective clothing at all times while handling unsealed radioactive material.

b. Individuals handling unsealed radioactive materials shall monitor themselves for radioactive contamination prior to leaving the Nuclear Medicine clinic.

c. Syringe shields shall be used whenever practicable.

d. Neither eating, drinking, smoking or applying cosmetics nor the storage of such items is permitted in any area where radioactive materials are used or stored.

e. Dosimetric devices shall be worn as prescribed by the Radiation Protection Officer.

f. Disposal of radioactive material or items suspected of being contaminated with radioactive material is to be accomplished utilizing the designated waste receptacles only.

g. Never pipette by mouth.

h. Area surveys, both meter and wipe, shall be accomplished in accordance with Item 10, paragraph 12, this application.

i. Radioactive materials should be kept in shielded containers whenever practicable.

j. Transportation of radioactive materials shall be accomplished by utilizing a cart or similar device whenever practicable. When the use of such devices is not practicable, care shall be taken to ensure that exposure to the extremities is maintained as low as reasonably achievable.

k. Confine radioactive solutions in shielded containers that are clearly labeled. Radiopharmaceutical vials should be labeled with the isotope, the name of the compound and either the LAMC Lot Number or the date and time of receipt or preparation. A record should be maintained containing the following information:

1) total prepared activity

2) specific activity (mCi/cc) at a specified time

3) total volume prepared

4) total volume remaining

5) the measured activity of each patient dosage

l. Syringes and unit dosages shall be labeled with the radiopharmaceutical name or abbreviation, type of study, or the patient's name.

m. Each patient dosage shall be assayed in the dose calibrator to ensure that it does not vary more than 10 percent from the prescribed dosage. Dosages varying more than 10 percent than the prescribed dosage shall not be used, except for prescribed dosages of less than 10 microcuries.

n. The following shall be checked prior to administering a dosage to a patient:

1) patient's name and identification number

2) prescribed radionuclide

3) prescribed radiopharmaceutical

5. Spill Procedures.

a. Should a minor spill of radioactive liquids or solids occur, the following actions shall be taken:

1) Notify other persons in the area that the spill has occurred

2) Contain the spill utilizing absorbent material

3) Decontaminate the area keeping the following procedures in mind:

a) Wear disposable gloves and protective clothing.

b) Use absorbent materials and small quantities of cleansing liquids as appropriate.

c) Ensure that the contamination is not spread.

d) Ensure that all materials used are placed in the appropriate radioactive waste receptacle.

e) Survey the area with a survey meter ensuring: that the meter does not become contaminated, that the area immediately around the spill is also surveyed, and that hands, clothing, and shoes of personnel involved in the spill, or in close proximity to the spill, are carefully surveyed.

f) Report the incident to the Radiation Protection Officer as soon as possible.

g) Radiation Protection staff will do a follow-up survey of the area to ensure adequate decontamination/containment of the spill. This will be documented as a "special" survey.

b. Should a major spill of radioactive liquids or solids occur, the following actions shall be taken:

1) Notify all persons in the area, not involved in the spill, to vacate the area.

2) Prevent the spread of contamination through use of absorbent materials, and limiting the movement of personnel involved in the spill.

3) If possible without further contamination or significant exposure, shield the spill.

4) Secure the area.

5) Notify the Radiation Protection Officer immediately.

6) Decontaminate personnel by removing contaminated clothing items, and washing contaminated skin with lukewarm water and a mild soap. Should this prove to be unsuccessful, induce sweating by covering the area with plastic then rewash the area as above. Further attempts to decontaminate, such as the use of progressively stronger cleaning agents, shall be accomplished only by qualified medical personnel, under the direction of Radiation Protection staff.

7) Radiation Protection staff will supervise the clean-up of the spill. Steps taken shall be recorded along with survey results. These shall be reported to the Radiation Control Committee.

6. Ordering and Receiving Radioactive Materials.

a. Ordering:

1) Purchase Requests for radioactive materials shall be approved by the RPO or Designee prior to submission for purchase.

2) The Radiation Protection Officer, or designee, prior to approving a purchase request, shall ensure that requested radioactive materials are:

a) permitted within the scope of the USNRC License or the Department of the Army Radioactive Material Authorization as appropriate

b) authorized by the Radiation Control Committee for use by the requestor

3) Radiation Protection staff will maintain records of each request containing at least the following information:

a) authorized user

b) isotope

c) activity

d) chemical form

e) supplier/manufacturer

b. Receipt of radioactive materials during normal duty hours shall be by:

1) Health Physics Office

2) Radioisotopes Services Branch (RSB), LAIR

3) Nuclear Medicine Service

c. Upon receipt of radioactive material, the following procedure shall be followed:

1) Inspect the package for signs of damage/leakage. Should a package appear to be leaking/damaged, the Radiation Protection Officer shall be notified immediately. Further in-processing of these packages will be accomplished by Radiation Protection staff only.

2) Ensure that the radioactive material received has been purchased in accordance with paragraph A above.

3) The package will then be opened and inprocessed in accordance with Paragraph 7, below.

d. Receipt of radioactive materials after normal duty hours shall be accomplished as follows:

1) LAMC

a) Materials will be received by the Administrative Officer of the Day, or by the Non-Commissioned Officer of the Day.

b) Packages will be inspected for indications of leakage. Should it appear that a package is leaking, the Radiation Protection Officer shall be notified immediately, and his instructions followed.

c) Packages will be transported on a cart or similar device to the shielded "holding" container in the Department of Radiology.

2) LAIR

a) Materials will be received by the LAIR Staff Duty Officer or Charge of Quarters.

b) Packages will be inspected for indications of leakage. Should it appear that a package is leaking, the Radiation Protection Officer shall be notified immediately, and his instructions

leaking, the Radiation Protection Officer shall be notified immediately, and his instructions followed.

c) The package will be transported to RSB and stored in the appropriate container (*e.g.* refrigerator, freezer, or ultra-cold freezer) in accordance with the package instructions.

7. Opening Packages.

a. Special requirements must be followed for packages containing quantities of radioactive material in excess of the Type A quantity limits specified in paragraph 20.205(b) of 10 CFR Part 20 (*e.g.* more than 20 curies of ^{99}Mo, ^{99m}Tc, uncompressed ^{133}Xe, or more than 3 curies of ^{133}Xe, ^{131}I, ^{137}Cs, ^{192}Ir, or ^{125}I). Such packages must be monitored for external radiation levels and surface contamination 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). The NRC Regional Office must be notified if removable contamination exceeds 0.01 microcurie (22,000 dpm)/100 cm^2.

b. For packages received under the specific license, the following procedures for opening each package will be followed:

1) Put on gloves to prevent hand contamination.

2) Visually inspect the package for any sign of damage (*e.g.* wet or crushed). If damage is noted, stop the procedure and notify the Radiation Protection Officer.

3) Measure the exposure rate from the package at 1 meter and at the package surface. If it is higher than expected, stop and notify the RPO. (The "transport index" noted on packages with "Yellow II" or "Yellow III" labels is the approximate dose rate, in milliroentgens per hour, at 1 meter form the package surface (see 10 CFR 71.4). The surface dose rate for such packages should not exceed 200 milliroentgens per hour. The dose rate from packages with "White I" labels should be less than 0.5 milliroentgens per hour at the package surface (see 49 CFR 172.403)).

4) Open the package with the following precautionary steps:

a) Remove the packing slip.

b) Open the outer package following the supplier's instructions, if provided.

c) Open the inner package and verify that the contents agree with the packing slip.

d) If anything is other than expected, stop and notify the RPO.

5) If there is any reason to suspect contamination, wipe the external surface of the final source container and remove the wipe sample to a low-background area. Assay the wipe sample to determine if there is any removable radioactivity. (Use the type of instrument specified in the SOP, for example, a thin-end-window GM survey meter, a NaI(Tl) crystal and ratemeter, a liquid scintillation counter, or a proportional flow counter, as indicated. The detection efficiency must be determined to convert wipe sample counts per minute to disintegrations per minute. Note that a dose calibrator is not sufficiently sensitive for this measurement.) Take precautions against the potential spread of contamination.

6) Check the user request to ensure that the material received is the material that was ordered.

7) Monitor the packing material and the empty packages for contamination with a radiation detection survey meter before discarding:

   a) If contaminated, treat this material as radioactive waste.

   b) If not contaminated, remove or obliterate the radiation labels before discarding in in-house trash.

8) Make a record of the receipt.

c. For packages received under the general license in 10 CFR 31.11, the following procedure for opening each package will be followed:

1) Visually inspect the package for any sign of damage (*e.g.*, wet or crushed). If damage is noted, stop the procedure and notify the RPO.

2) Check to ensure that the material received is the material that was ordered.

8. Unit Dose Records.

a. For each unit dosage received from a supplier, a record will be maintained with the information below:

1) Radionuclide

2) Generic name or its abbreviation or trade name

3) Date of receipt

4) Supplier

5) Lot number or control number, if assigned

6) Activity in millicuries or microcuries as recorded on the unit dosage or packing slip and its associated time

7) Date of administration or disposal

8) If administered, record the following information:

a) Prescribed dosage (unless already recorded in clinical procedure manual)

b) Measured activity in millicuries or microcuries and date and time of measurement

c) Patient name and identification number if one has been assigned

9) If discarded, record the date and method of disposal.

10) Record the initials of the individual who made the record.

9. Multidose Vial Records.

a. For each multidose vial received from a supplier or that is prepared at our facility, a record will be maintained with the information below:

1) Radionuclide

2) Generic name or its abbreviation or trade name

3) Date of receipt or preparation

4) Date and time of initial assay and amount in both millicuries and cubic centimeters (cc) or milliliters (ml)

5) Supplier or kit manufacturer

6) If administered, record the following:

a) Prescribed dosage (unless already recorded in clinical procedure manual)

b) Date and time dosage was drawn and measured

c) Calculated volume that is needed for prescribed dosage

d) Measured activity in millicuries or microcuries

e) Patient name and identification number, if one has been assigned

7) If discarded, record the method of disposal and date.

8) Record the initials of the individual who made the record.

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10. ^{99} Molybdenum Concentration Records.

a. The regulations require that each licensee who uses a technetium generator to prepare radiopharmaceuticals must test each elution or extraction for its molybdenum concentration. This measurement is usually made with a dose calibrator. Radiopharmaceuticals will not be administered if it is determined that they contain more than 0.15 microcurie of ^{99} Mo per millicurie of ^{99m} Tc at the time of administration. If an elution or extraction has a higher concentration, there may be a manufacturing defect that should be reported under paragraph 21.21(b) of 10 CFR Part 21.

b. The procedure for measuring molybdenum concentration is based on the use of a "molybdenum breakthrough pig."The dose calibrator manufacturer has supplied a molybdenum breakthrough pig made of lead. The pig is thick enough to shield all the technetium photons but only a fraction of the molybdenum photons. The manufacturer specifies the ^{99} Mo correction factor to convert from measured ^{99} Mo to total ^{99} Mo.

c. Each time a generator is eluted, a record with the following information will be maintained:

1) The manufacturer's lot number assigned to the generator

2) Date and time of elution

3) Product of the measured ^{99} Mo activity and the correction factor noted by the molybdenum breakthrough pig manufacturer

4) Measured ^{99m} Tc activity in millicuries

5) Ratio of the total ^{99} Mo microcuries per millicurie of ^{99m} Tc. The action level of 0.07 microcurie of ^{99} Mo per millicurie of ^{99m} Tc will be used. If this level is exceeded, the product will not be used and immediate notification will be made to the C, Nuclear Pharmacy, or the Nuclear Medicine Physician of the day. In conformance with paragraph 21.21(b) of 10 CFR Part 21, the NRC will be notified if a leaking generator is detected. [The 0.07 action level allows for the quicker decay of the Tc through the day of use. It is assumed that the material will be used within 6 hours, at which time the concentration of ^{99} Mo to ^{99m} Tc would have doubled.]

6) Initials of the person who made the record

11. Implant Source Use Records.

a. All long-lived sealed sources being used for implant therapy will be stored in a locking storage container.

b. A list of those individuals who are authorized to handle the sources will be located in a binder with the inventory log sheet near the storage safe.

c. On the front of the storage container, a map of the contents of each drawer will be posted. This map will include the number of sources per drawer, their position in the drawer, and their activity. Short-lived sources (*e.g.*, ^{192} Ir) will be stored in the manufacturers storage container when not in use and will be stored in a locked room when not attended.

d. Each time a source is removed, the inventory form will be annotated with the number and activity of the sources removed, the room number of the use or the patient's name, the time and date the sources were removed, and the name or initials of the person removing the sources.

e. Each time sources are returned to the storage area, they will be counted to ensure that every source originally removed is returned. The inventory form will be annotated with the number and activity of the sources returned, the room number or the name of the patient, the time and date of return and the name or initials of the person returning the sources.

f. If there is ever a real or perceived discrepancy between the record and the number of sources in use and in storage, the RPO will be immediately notified.

12. Area Survey Procedures.

a. Ambient Dose Rate Surveys:

1) Survey Areas:

a) In radiopharmaceutical elution, preparation, and administration areas, a survey will be conducted with a radiation detection survey meter at the end of each day of use. When diagnostic administrations are made in patients' rooms and special care is taken to remove all paraphernalia, the rooms need not be surveyed.

b) In laboratory areas where less than 200 microcuries of gamma emitting materials are used at a time, surveys will be conducted at least monthly with a radiation detection survey meter.

c) In radiopharmaceutical storage and radiopharmaceutical waste storage areas, a survey will be conducted weekly with a radiation detection survey meter or a radiation measurement survey meter.

d) In sealed source and brachytherapy storage areas, a survey will be conducted quarterly with a radiation measurement survey meter.

2) The RPO will be notified if any survey instrument fails the daily constancy test or unexpectedly high levels are recorded.

b. Removable Contamination Surveys:

1) Survey Areas:

a) In radiopharmaceutical elution, preparation, and administration areas, a survey will be conducted weekly for removable contamination. If diagnostic administrations are occasionally made in patients' rooms and special care is taken to remove all paraphernalia, those rooms need not be surveyed.

b) In laboratory areas where less than 200 microcuries of radioactive material is used at a time, a survey will be conducted at least monthly for removable contamination.

c) In radiopharmaceutical storage and radiopharmaceutical waste storage areas, a survey will be conducted weekly for removable contamination.

2) The wipe sample assay procedure should be sufficiently sensitive to detect the presence of 2000 dpm/100 cm^2 of removable contamination or 200 dpm/100 cm2 for isotopes of iodine. A radioactive source with a known amount of activity will be used to convert sample measurements to disintegrations per minute or dpm.

c. Records:

1) Records of dose rate and contamination survey results will contain the following information:

a) The date, area surveyed, and equipment used

b) The name or initials of the person who made the survey

c) A drawing of the areas surveyed with contamination and dose rate action levels as established by the RPO

d) Measured dose rates in mR/hr or contamination levels in dpm/100 cm^2, as appropriate

e) Actions taken in the case of excessive dose rates or contamination and follow-up survey information

2) The RPO will review and initial the record at least quarterly and promptly in those cases in which action levels were exceeded.

3) Radiation contamination levels and dose rate action levels will be established for different areas on a case-by-case basis. The levels for removable contamination will not exceed the limits published in Reg Guide 8.23, Revision 1, Table 2.

13. Air Concentration Control.

a. Worker Dose from Noble Gas:

1) Spent noble gas will be collected in a shielded trap and the effluent monitored in accordance with the model procedure for checking trap effluent published in Appendix O.3, Regulatory Guide 10.8, Revision 2. Or,

2) Spent nobel gasses will be vented to the atmosphere, and the model procedure in Appendix O.1, Regulatory Guide 10.8, Revision 2, shall be used to calculate worker doses from noble gases.

b. Worker Dose from Aerosols: Spent aerosols will be collected in a shielded trap. For reusable aerosol traps, the trap effluent will be monitored with an air contamination monitor which will be checked regularly according to the manufacturer's instructions.

c. Public Dose From Airborne Effluent: The model procedure in Appendix O.2, Regulatory Guide 10.8, Revision 2, will be used to calculate airborne effluent.

d. Spilled Gas Clearance Time: The model procedure in Appendix O.4, Regulatory Guide 10.8, Revision 2, will be used to calculate spilled gas clearance time.

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14. **Radiopharmaceutical Therapy.**

a. The patient's room will be as far as practicable from the nursing station and heavy traffic hallways as is feasible. It will be a private room with private sanitary facilities and will not be carpeted.

b. The room will be prepared, in the following manner:

1) Leak-proof absorbent paper will be used to cover large surfaces that are likely to be contaminated. Small items will be covered with protective material to prevent contamination and facilitate decontamination upon termination of the therapy.

2) Separate containers will be provided for linen and disposable items. These containers will be lined with a plastic bag.

3) Patient excreta will be disposed of through the sanitary sewer system and will not be collected unless medically indicated.

4) Disposable table service will be used for the duration of the therapy procedure.

5) Housekeeping will not be permitted in the therapy room until it is released for unrestricted use by the Radiation Protection Officer.

c. The nursing staff assigned to care for the patient will be provided with dosimetric devices. Individuals not provided dosimeters will not be permitted to enter the room or care for the patient.

d. The nursing staff will be briefed on the radiation safety precautions to be followed during the therapy. An instruction sheet detailing safety precautions will be made available to the staff and time will be allotted for questions during the briefing.

e. The patient will be briefed by the Radiation Protection Staff regarding the procedure to be conducted and safety procedures to be followed, including contamination control, visitor control, radioactive waste, and other items as applicable.

f. Only those persons necessary for radiation safety, medical and/or training purposes will be present during administration.

g. A visitor's safe line will be taped on the floor to indicate the 2 mR/hr line. Visitors will not be allowed to enter the room any further than the safe line.

h. Following the administration of the dosage, the exposure rates at the bedside, at one meter from the patient, at several areas within the room, at the door to the room, at the nurses station, and on the walls of the adjacent rooms will be measured with a radiation measurement survey meter. If the dose rates in the adjacent rooms exceed 2 mR/hr, access will be denied to those rooms for the duration of the therapy.

i. For patients treated with ^{131}I, the thyroid burden will be measured after 24 but before 72 hours on all personnel who helped prepare the dosage or were present during administration of the material to the patient. Other personnel may be measured for thyroid burden if, in the opinion of the Radiation Protection Officer, they might have had significant uptake.

j. Contaminated materials will be picked up and transferred to the Health Physics Office for decay-in-storage as needed.

k. The patient will not be released until either the exposure rate from the patient is less that 5 mR/hr at a meter or the retained activity of radionuclide is less than 30 millicuries.

l. The room will not be released for unrestricted use until the following actions have been completed:

1) All absorbent paper is removed form the room.

2) Containers of trash and linen is remo ed.

3) A radiation detection survey meter is used to check for contamination and any contaminated areas are cleaned until removable contamination is less than 200 dpm/100 cm^2.

m. Once the actions in item 12 above are completed, the room will be released for unrestricted use by the Radiation Protection Officer.

15. Implant Therapy.

a. The patient's room will be as far away from the nursing station and heavy traffic hallways as is feasible consistent with good medical care. It will be a private room unless the dose at one meter from the implant meets the requirements in paragraph 20.105(b) of 10 CFR Part 20.

b. The nursing staff responsible for providing patient care will be supplied film badges or other exposure monitoring devices.

c. The nursing staff will be briefed on radiation safety precautions. An instruction sheet detailing safety precautions will be made available to the staff, and time will be allotted for questions and answers during the briefing.

d. Brief the patient on radiation safety procedures for confinement to bed, visitor control, and other items as applicable, consistent with good medical care.

e. Only those persons needed for medical, safety, or training purposes should be present during the implant procedure.

f. A visitor's safe line will be taped on the floor to indicate the 2 mR/hr line. Visitors will not be allowed to enter the room any further than the safe line.

g. Following the implant, the exposure rates at the bedside, at one meter from the patient, at several areas within the room, at the door to the room, at the nurses station, and on the walls of the adjacent rooms will be measured with a radiation measurement survey meter. If the dose rates in the adjacent rooms exceed 2 mR/hr, access will be denied to those rooms for the duration of the therapy.

h. Do not release any patient from the hospital who has received a temporary implant until both a radiation survey of the patient and all sources have been removed from the patient and are accounted for. This check will be performed immediately after the removal of the sources. A record confirming the source count, and a radiation survey of the implant room will be maintained. For low-activity seeds, less than 1 millicurie, an individual seed will be used to check the survey meter to be sure it will easily detect a seed that has not been removed or has been lost.

i. No patient, who has received a permanent implant, will be released from the hospital until the exposure rate from the patient is less than 5mR/hr at 1 meter. This measurement will be made at a distance of 1 meter from the umbilicus with the patient standing.

16. Other Safety Procedures.

a. The radioactive materials to be used in non-human research are those identified in Item 5.

b. The use of radioactive materials for non-human research shall be approved by the Radiation Control Committee. The Radiation Protection Officer, or Alternate Radiation Protection Officer may grant interim approval for a specific radioactive material protocol. Prior to approval, the principal investigator shall submit to the RPO the following information:

1) Principal Authorized User

2) Authorized Users

3) Technologists

4) Trainees

5) Resident Users

6) Nuclide

7) Physical Form

8) Chemical Form

9) Maximum Quantity per Source Vial

10) Maximum On-Hand Quantity

11) Maximum Daily Use Quantity

12) Anticipated Monthly Use Quantity

13) Location of Proposed Use

14) Location of Storage of Radioactive Materials

15) Location of Interim Waste Storage

16) Species of Animal to be Used if Applicable

17) Procedures for the Handling of Animal Wastes and Tissues

18) A description of the Life-Cycle of the Radioisotope addressing the following:

a) Is the radioisotope gaseous, or volatile

b) Is heating or freezing of the radioactive material part of the procedure, and if so, will there be a phase change

c) Will strong chemical agents be utilized

d) Is there a possibility of airborne contamination

e) Does the protocol require that liquid radioactive waste materials be disposed of directly (*e.g.*, through the use of a radioactive material disposal sink) rather than being collected and transferred to the Health Physics Office or Radioisotope Services Branch for disposal

f) Due to the nature of the nuclide, are any special shields or remote handling devices indicated

g) Does the protocol involve the use of hazardous materials (other than radioactive) such as toxic or carcinogenic chemicals, flammables, *etc.*

h) Other safety precautions deemed necessary

i) A general description of the flow of the experiment. For example, material diluted to ____, injected into animal, urine and fecal samples collected for ___ hours for analysis, animal euthanized and disposed of in accordance with procedures, samples analyzed and disposed of in accordance with procedures

19) The Radiation Protection Officer will review the protocol and information and determine:

a) are the proposed facilities adequate

b) is a fume hood required

c) are shields or special handling equipment indicated

d) is dosimetry required

e) is bioassay required

f) is any special training required for personnel involved in the protocol

20) The Radiation Protection Officer will document this review and submit it to the RCC at the time of the approval process.

c. The Radiation Protection Officer for the non-human use of radioisotopes shall be in accordance with Item 7.3.

d. The Radiation Control Committee shall be in accordance with Item 7.1.

e. Authorized Users, and Technologists shall be credentialed in accordance with Item 7.1.

f. Training shall be conducted in accordance with Item 8.2.

g. Facilities for the non-human use of radioisotopes are described in Item 9.

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h. The policies and commitments of the RCC are in accordance with Item 10.1.

i. The commitment for the ALARA program for non-human use of radioisotopes is in accordance with Item 10.2.

j. Procedures for leak testing sealed sources are in accordance with Item 10.3.

k. The following general laboratory safety procedures shall apply to non-human radioisotope research facilities.

1) Never pipette by mouth.

2) Disposable gloves and protective clothing appropriate to the type and quantity of radioactive material being used shall be worn whenever radioactive contamination is possible.

3) Radiation workers shall monitor themselves for radioactive contamination prior to leaving the laboratory, with a survey instrument, when appropriate.

4) Neither eating, drinking, smoking or applying cosmetics nor the storage of such items is permitted in any area where radioactive materials are used or stored.

5) Dosimetric devices shall be worn as prescribed by the Radiation Protection Officer.

6) Disposal of radioactive material or items suspected of being contaminated with radioactive material is to be accomplished utilizing the designated waste receptacles only.

7) Area surveys, both meter and wipe, shall be accomplished in accordance with Paragraph 10.12.

8) Radioactive materials should be kept in shielded containers whenever practicable.

9) The area within the laboratory where radioactive materials are routinely utilized shall be clearly labeled as such.

10) Bench tops where radioactive materials are utilized shall be covered with absorbent material, and labeled as a use area.

11) Storage containers (*e.g.*, refrigerators, *etc.*) shall be clearly labeled.

12) Items of equipment routinely used for use with radioactive materials shall be labeled, and treated as contaminated, for safety purposes, unless shown otherwise by a wipe survey.

l. Spill procedures shall be in accordance with Item 10.5.

m. Ordering and Receiving radioactive materials shall be in accordance with Item 10.6.

n. Opening packages of radioactive material shall be accomplished in accordance with Item 10.7.

o. Area surveys of radioisotope use areas shall be in accordance with Item 10.12.

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p. Should gaseous, aerosol, or volatile radioactive materials be used the following procedures will be followed.

1) They shall be used in a fume hood approved by the RPO .

2) Air samples shall be taken as deemed appropriate by the RPO.

3) Bioassay will be performed , where appropriate, in accordance with Item 9.4.

q. Radioactive waste materials shall be handled/disposed of in accordance with Item 11.

ITEM 11

Waste Management

1. Waste Disposal.

a. The following procedures will be used when disposing of radioactive waste. There are four commonly used methods of waste disposal: release to the environment through the sanitary sewer system, decay-in-storage (DIS), transfer to a burial site or back to the manufacturer, and release to in-house waste. With the exception of the patient excreta (see 10 CFR 20.303(d)) and generally licensed *in vitro* kit exemptions (see 10 CFR 31.11(f)), records of disposal of licensed material will be maintained in accordance with 10 CFR 30.51(a) and 20.401(c)(3).

1) General Procedures

a) All radioactivity labels will be defaced or removed from containers and packages prior to disposal to in-house waste. If waste is compacted, all labels that are visible in the compacted mass will be defaced or removed.

b) Nonradioactive waste, such as leftover reagents, boxes, and packing material, will be kept to a minimum.

c) Procedures will be monitored occasionally to ensure that radioactive wasteis not created unnecessarily. New procedures will be reviewed to ensure that waste is handled in a manner consistent with established procedures.

2) Procedure for Disposal of Liquids and Gasses

Liquids may be disposed of by release to the sanitary sewer. A formal review will be conducted by the radiation protection officer of all requests for "hot sinks" to assure compliance with federal, state, local and license requirements. Due consideration will be given to the regulations regarding the toxic or hazardous properties of these materials.

a) Regulations for disposal in the sanitary sewer appear in 10 CFR 20.303. Material will be readily soluble or dispersible in the water. Daily and monthly limits based on the total sanitary sewerage release of our facility will be established. (Excreta from patients undergoing medical diagnosis or therapy is exempt from all the above limitations; see 10 CFR 20.303(d).) Records of the date, radionuclide, estimated activity that was released in millicuries or microcuries will be maintained.

b) Liquid scintillation-counting media containing not more than 0.05 microcurie per gram of H-3 or C-14 may be disposed of without regard to its radioactivity (10 CFR 20.306). A record of the date, radionuclide, estimated activity in millicuries or microcuries, calculated concentration in microcuries per gram, and how the material was disposed of will be maintained.

3) Procedure for Disposal by Decay in Storage (DIS)

Short-lived material with physical half-life less than 100 days will be disposed of by DIS. Material will be separated according to half-life.

a) When the container is full, it will be sealed with tape and marked with an identification number that relates back to the DIS logbook. The logbook will include the contents, the generator of the waste, the date put into storage, the date after which 10 half-lives of the longest isotope will have passed, the highest exposure rate on the surface of the box, and the initials of the person sealing the box.

b) All material will be decayed for a minimum of 10 half-lives except waste containing only microcurie quantities of I-125 which will be held for a minimum of 5 half-lives.

c) Prior to disposal as in-house waste, each container will be monitored as follows:

i) The radiation detection survey meter will be checked for proper operation

ii) Monitoring will be conducted in an area where background does not exceed 0.05 millirem per hour

iii) All shielding will be removed from around the container

iv) All surfaces will be monitored on each individual container

d) Only those containers that cannot be distinguished from background will be discarded as in-house waste. A record of the date on which the container was monitored, the instrument used, the background reading, the highest package reading, and the initials of the individual preforming the monitoring will be maintained. All visible labels will be removed or defaced.

e) Containers that can be distinguished from background radiation levels will be returned to the storage area for further decay or transferred for burial.

4) Procedure for Transfer for Burial

Except for material suitable for DIS and animal carcasses containing not more than 0.05 microcuries of H-3 or C-14 per gram, solids will be transferred to a burial site. Shipments will be done by a licensed contractor hired by the U.S. Army Munitions and Chemical Command (AMCCOM). Records of the disposal will be the maintained by AMCCOM at Rock Island, IL 61299-6000. A copy of the consignment sheet that the transfer agent completed on shipments will be maintained in the Health Physics Office.

5) Procedure for Release to In-House Waste

Waste from *in vitro* kits that are generally licensed pursuant to paragraph 31.11 is exempt from waste disposal regulations. Radioactive labels should be defaced or removed. There is no need to keep any record of release or make any measurement.

6) Procedure for Returning Generators to the Manufacturer

Used $^{99}Mo/^{99m}Tc$ generators may be returned to the manufacturer. These shipments will be in compliance with 10 CFR Part 71 and Department of Transportation (DOT) regulations.

a) Records will be maintained to demonstrate that the package qualifies as a DOT Specification 7A container if required (see DOT regulations, paragraph 173.415(a) of 49 CFR Part 173).

b) The package will be prepared in accordance with the manufacturer's instructions.

c) Dose rate and removable contamination measurements required by paragraph 173.475(i) of 49 CFR Part 173 will be made.

d) The package will be labeled and the shipping papers will be completed in accordance with the manufacturer's instructions.

2. **Other Waste Disposal Procedures.** All waste will be disposed of in accordance with paragraph 1, this item.