OCT 15 1979

FORM NRC-313M (8-78) 10 CFR 35	U.S. NUCLEAR REGULATORY COMMISSION APPLICATION FOR MATERIALS LICENSE – MEDICAL	Approved: GAO R0557

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

1.a. NAME AND MAILING ADDRESS OF APPLICANT *(Institution, firm, clinic, physician, etc.)* INCLUDE ZIP CODE

Columbia Regional Hospital
404 Keene Street
Columbia, Missouri 65201

TELEPHONE NO.: AREA CODE (314) 449 7226

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

Same

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Frank Bloe, Consultant
Nuclear Medicine Associates
TELEPHONE NO.: AREA CODE (216) 663 7000

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

a. ☐ NEW LICENSE
b. ☐ AMENDMENT TO LICENSE NO.
c. ☒ RENEWAL OF LICENSE NO. 24-16281-01
030-10721

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

Refer to p.4 of NRC 313M

5. RADIATION SAFETY OFFICER (RSO) *(Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.)*

George P. Wilson, M.D. with consultation from Nuclear Medicine Associates, Cleveland, Ohio 44125

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS (In millicuries)
10 CFR 31.11 FOR IN VITRO STUDIES	X	3.0
10 CFR 35.100, SCHEDULE A, GROUP I	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP II	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP III	X	2000
10 CFR 35.100, SCHEDULE A, GROUP IV	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V	X	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI	X	300

ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS (In millicuries)
IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM		
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES		10/21/79 4/10
PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA		
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.		

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

ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	MAXIMUM NUMBER OF MILLICURIES OF EACH FORM	DESCRIBE PURPOSE OF USE

RECEIVED BY LFMA
Date OCT 10 1979
Log Oct P6.10 III
By Brown
Orig. To
Action Compl. 10/10/79

Applicant
Check No. 1345
Amount/Fee Category H.150(7B)
Type of Fee Renewal
Date Check Rec'd OCT. 9 1979
Received By Brown

FORM NRC-313M (8-78)

OCT 1 [illegible] Control No. 02331

OCT 15 1979

B506040328 850515 PDR REG3 LIC30 24-16281-01

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

7. MEDICAL ISOTOPES COMMITTEE		15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL *(Check One)*	
X	Names and Specialties Attached; and		Appendix G Rules Followed; or
	Duties as in Appendix B; or *(Check One)*	X	Equivalent Rules Attached
X	Equivalent Duties Attached	16. EMERGENCY PROCEDURES *(Check One)*	
8. TRAINING AND EXPERIENCE			Appendix H Procedures Followed; or
X	Supplements A & B Attached for ~~Each Individual Xxxx~~ Nestor R. Conoy, M.D.	X	Equivalent Procedures Attached
	Supplement A Attached for RSO.	17. AREA SURVEY PROCEDURES *(Check One)*	
9. INSTRUMENTATION *(Check One)*			Appendix I Procedures Followed; or
	Appendix C Form Attached; or	X	Equivalent Procedures Attached
X	List by Name and Model Number	18. WASTE DISPOSAL *(Check One)*	
10. CALIBRATION OF INSTRUMENTS			Appendix J Form Attached; or
	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*	X	Equivalent Information Attached
X	Equivalent Procedures Attached; and	19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*		Appendix K Procedures Followed; or
X	Equivalent Procedures Attached	X	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT		20. THERAPEUTIC USE OF SEALED SOURCES	
X	Description and Diagram Attached		Detailed Information Attached; and
12. PERSONNEL TRAINING PROGRAM			Appendix L Procedures Followed; or *(Check One)*
X	Description of Training Attached	X	Equivalent Procedures Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL		21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
X	Detailed Information Attached		Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*		22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
			Detailed Information Attached
	Appendix F Procedures Followed; or	23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
X	Equivalent Procedures Attached		Detailed Information Attached

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY	X	FILM	R.S. Landauer	Monthly
		TLD		
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	R.S. Landauer	Monthly
		OTHER (Specify)		
c. WRIST		FILM		
		TLD		
		OTHER (Specify)		

d. OTHER (Specify)

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

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

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

26. CERTIFICATE

(This item must be completed by applicant)

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

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

(1) LICENSE FEE CATEGORY: 7B

(2) LICENSE FEE ENCLOSED: $ $150.00

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

Howard D. LeVant

(1) NAME *(Type or Print)*

Howard D. LeVant

(2) TITLE

Administrator

c. DATE

X 9-28-79

Prepared 9-26-79

FORM NRC-313M (8-78)

PRIVACY ACT STATEMENT

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

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

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

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

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

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

Refer to Item #4 on p. 1 of NRC 313M:

Physician	Authorized Uses
George P. Wilson, M.D.	Groups I, II, III, IV, V, I-125 seeds for Therapy, & In vitro studies
Lewis J. Garrotto, M.D.	Groups I, II, III, I-131 and soluble P-32 for therapy, I-125 seeds, & In vitro studies.
Joseph Soha, M.D.	Groups I, II, III, I-131 & soluble P-32 for therapy, and In vitro studies
Nestor R. Canoy, M.D.	Group VI

For training and experience, refer to previous applications for NRC license #24-16281-01 except for Dr. Canoy. For Dr. Canoy, refer to attached NRC 313M-Supplement A.

FORM NRC-313M
(8-78)

MEDICAL ISOTOPES COMMITTEE

Responsibility:

The Committee is responsible for:

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

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

Duties.

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

2. Review the training and experience of any individual who uses radioactive material (including physicians, technologists, physicists, and pharmacists) and determine that the qualifications are sufficient to ensure them to perform their duties safely and in accordance with NRC regulations and the conditions of the license.

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

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

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

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

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

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

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

Meeting Frequency:

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

MEDICAL ISOTOPES COMMITTEE

The following members compose the Medical Isotopes Committee of Columbia Regional Hospital.

Name	Medical Specialty
George P. Wilson, M.D.	Radiation Safety Officer, Radiologist
Howard D. LeVant	Administration Member
Joseph Soha, M.D.	Radiologist
Lewis Garrotto, M.D.	Radiologist
Curtis Bourgeois, M.D.	Pathologist
Sidle William Leeper, M.D.	Internist, Hematologist

Nuclear Medicine Associates' visiting consulting physicists available periodically and/or as required.

Qualification of the above members are outlined in the attached curriculum vitae.

Duties and responsibilities of the Medical Isotope Committee are attached.

Prepared 9-26-79
Lic #24-16281-01

CURRICULUM VITAE

FULL NAME: George P. Wilson, M.D.

BIRTHDATE: 1929

GRADUATED: Washington University in 1956

GRADUATE MEDICAL EXPERIENCE:

Fellowship in Radiology and Nuclear Medicine at University of Minnesota Hospital and Minneapolis V.A. Hospital in 1957-1960

Board certified in Radiology and Nuclear Medicine in 1961

Board certified in Nuclear Medicine in 1973

Present AEC license no. 24-00481-05

Member, Society of Nuclear Medicine

President, Missouri Radiological Society 1976-1977

Fellow, American College of Radiology 4-11-78

American Medical Assoc. Physician Recognition Award in continuing Medical Education (valid until Oct. '80)

Curriculum Vitae

HOWARD D. Le VANT

I. EDUCATION:

Tuley High School, Chicago, Illinois - 1960

Roosevelt University, Chicago, Illinois
Bachelor of Science in Business Administration - Accounting - 1965

Certified Public Accountant - Texas - 1973

II. EXPERIENCE:

Employer:	Mid-West Columbia Regional Hospital (A Medenco Subsidiary)
Location:	404 Keene Street Columbia, Missouri 65201
Type of Business:	Investor owned acute care hospital
Immediate Supervisor:	Ben Durr, Regional Vice President
Dates of Employment:	June, 1974 to present
Position Held:	Administrator
Major Duties:	Chief operating officer of 184-bed, full service, general acute care hospital which opened in December, 1974. Responsible for all departments including budgeting, staffing, purchasing, building renovating, etc.

Employer:	Southwestern General Hospital, Inc. (A Medenco Subsidiary)
Location:	2001 Murchison El Paso, Texas 79902
Type of Business:	Investor owned acute care hospital
Immediate Supervisor:	Bill Burton, President
Dates of Employment:	April, 1972 to June, 1974
Position Held:	Vice President - Controller
Major Duties:	Responsible for changing five continuous years of operating losses to a profit in a 121-bed, full service, general acute care hospital. Responsible for all departments including budgets, staffing, purchases, building renovation, etc.

Curriculum Vitae
Howard D. Le Vant

Employer:	Professional Services Consultants, Inc.
Location:	Denver, Colorado
Type of Business:	Physician and Clinic Consultants
Immediate Supervisor:	Donald Spong, President
Dates of Employment:	January, 1971 to April, 1972
Position Held:	Manager, Consulting Division
Major Duties:	Responsible for Clinic and physician management and consulting staff and accounts. Including accounting and taxes, personnel, business office operations, data processing, etc.

Employer:	Medical Management Consultants - Medical Consultants
Location:	Chicago, Illinois
Type of Business:	Management Consultants for Nursing Homes, Clinics and Physicians
Dates of Employment:	July, 1968 to January, 1971
Position Held:	Administrative and Managing Partner
Major Duties:	Responsible for nursing home, clinic and physician consulting staff and accounts. Including accounting, taxes, cost analysis, budgeting, staffing, etc.

Employer:	Spurgeon Mercantile Company
Location:	Chicago, Illinois
Type of Business:	Sixty-Store Department Store Chain
Immediate Supervisor:	J. Aukerman, Treasurer
Dates of Employment:	December, 1967 to July, 1968
Position Held:	Assistant Treasurer
Major Duties:	Responsible for accounting and tax preparation for five corporations. Including supervision of staff, budgeting, systems, etc.

Employer:	Internal Revenue Service
Location:	Chicago, Illinois
Type of Business:	Government Tax Agency
Immediate Supervisor:	Jim Hayes, Audit Supervisor
Dates of Employment:	January, 1965 to December, 1967
Position Held:	Field Agent
Major Duties:	Audited tax returns of individuals, partnerships, and corporations.

Curriculum Vitae
Howard D. Le Vant

III. PROFESSIONAL ORGANIZATIONS:

El Paso Hospital Association
Texas Hospital Association
Missouri Hospital Association
Central Missouri Hospital Association
American Institute of Certified Public Accountants
Texas State Society of Certified Public Accountants

Past President, Vice-President and Board Member of the Hospital Financial Management Association

IV. PERSONAL:

Place of Birth:	Chicago, Illinois
Date of Birth:	June 12, 1942
Married:	Avi (Horvath) Le Vant
Children:	Two - 9 and 11 years old
Health:	Excellent
Address:	2602 Summit Road Columbia, Missouri 65201
Telephone:	314+445-3559 (home)

CURRICULUM VITA
Curtis H. Bourgeois, Jr.

NAME:	Curtis H. Bourgeois, Jr.
SOCIAL SECURITY NUMBER:	436-44-1233
PLACE AND DATE OF BIRTH:	Natchez, Mississippi, December 18, 1934
HOME ADDRESS:	Route 1, Box 118, Rochport, Missouri
OFFICE ADDRESS:	Pathology Laboratories, Inc. Box 998 Columbia, Missouri 65201
MARITAL STATUS:	Married
MILITARY SERVICE:	Lieutenant Colonel, Medical Corps, U. S. Army

EDUCATION:

1960	B. S., Louisiana Polytechnic Institute
1962	M.D., Louisiana State University

LICENSE:	Louisiana State License R# 05475, L# 008966 Missouri State License #R4284 Narcotics #AB5452595 BNDD; #1161203, Missouri

SPECIALITY BOARD CERTIFICATION:

1962	Louisiana State Board of Medical Examiners
1966	American Board of Pathology (Anatomic and Clinical)

ACADEMIC AND PROFESSIONAL APPOINTMENTS:

1958-60	Fellow, Department of Anatomy, L.S.U., School of Medicine
1960-61	N.I.H. Research Trainee, Histochemistry, Department of Anatomy, Tulane University.
1961	First Lieutenant, Medical Corps, U. S. Army.
1961-62	Rotating Internship, Martin Army Hospital
1962	Captain, Medical Corps, U. S. Army
1962-66	Resident in Pathology, Letterman General Hospital.
1966	Major, Medical Corps, U. S. Army.
1966-68	Chief, Pathology Service, Dewitt Army Hospital.
1968-70	Chief, Department of Experimental Pathology, U. S. Army Component, SEATO Medical Laboratory (Bangkok).
1970	Lieutenant Colonel, Medical Corps, U.S. Army.
1970-71	Asst. Chief, Department of Pathology, Madigan General Hospital.
1971-73	Associate Professor, Department of Pathology, University of Missouri.
1972	Pathologist, Mid-American Bone Tumor Registry.
1973	Clinical Associate Professor, Department of Pathology, University of Missouri Medical Center.
1973-date	Associate, Pathology Laboratories Inc. Director of Laboratories, Columbia Regional Hospital Director of Laboratories, Cooper County Hospital
1977	Colonel, Medical Corps, U. S. Army Reserve.

BIBLIOGRAPHY
Curtis H. Bourgeois, Jr.

1. Bourgeois, C. Cytochemical Studies of Enzyme Distribution in the Kidney of the Ground Squirrel. Anat. Rec. 136:168, 1960 (Abstract).

2. Bourgeois, C. and Hack, M. H. Concerning the Specificity of the Controlled Chromation Technique for the Histochemical Detection of Phospholipids. Anat Rec. 139:209-10, 1961 (Abstract).

3. Zimny, M and Bourgeois, C. Histochemical localization of Some Enzymes in the Kidney of a Hibernator. J. Cell. & Comp. Physiol. 56:93-102, 1960.

4. Bourgeois, C. and Hack, M. H. Concerning the Specificity of the Dichromate-Haematoxylin, Dichromate Sudan Black B. Techniques for the Histochemical Detection of Phospholipids. Acta Histochem. (Gena) 14:297-306, December 31, 1962.

5. Stansifer, P. A. and Bourgeois, C. Pulmonary Alveolar Proteinosis - Histochemical Observations. Am. J. Clin. Path. 44:539-45, 1965.

6. Barrett, O., Bourgeois, C., and Plecha, F. R. Fluorouracil Toxicity Following Gastrointestinal Surgery. Arch. Surg. (Chicago) 91:1002-4, Dec. 1965.

7. Bourgeois, C. and Hubbard, B. A Method for the Simultaneous Demonstration of Choline Containing Phospholipids and Neutral Lipids in Tissue Sections. J. Histochem. Cytochem. 13:571-78, Oct. 1965.

8. Gall, S. H., Bourgeois, C., and Maquire, R. Histologic Changes in the Cervix Due to Oral Contraceptive Agents. J. A. M. A. 207-2243-47, No. 12, March 24, 1969.

9. Bourgeois, C. et al. Udorn Encephalopathy: Fatal Cerebral Edema and Fatty Degeneration of the Viscera in Thai Children. J. Med. Assn. of Thailand 52:553-65, July 1969.

10. Olson, L., Bourgeois, C., Keschamras, N., Harikul, S., Sanyakorn, C., Grossman, R., and Smith, T. Encephalopathy and Fatty Degeneration of the Viscera in Thai Children: Epidemiology, Am. J. Dis. Child. 120:1-2, July, 1970.

11. Morales, A., Bourgeois, C., Trapukdi, S., and Chulacharit, E. Encephalopathy and Fatty Degeneration of the Viscera. An Electron Microscopic Study. Am J. Clin. Path. 52:755, 1969 (Abstract).

12. Morales, A., Bourgeois, C., and Chulacharit, E. Pathology of the Heart in Reye's Syndrome. Am. J. Cardiology 27:314-17, 1971.

13. Morales, A., Vichitbandha, P., Chandruang, P., Evans, H., and Bourgeois, C. Pathology of Cardiac Conduction Disturbances in Diptheric Myocarditis. Arch. Path. 91:1-7, 1971.

BIBLIOGRAPHY (CONT.)
Curtis H. Bourgeois, Jr.

14. Bourgeois, C., Shank, R., Grossman, R., Johnsen, D., Wooding, W., Chandavimol, P. Acute Aflatoxin B_1 Toxicity in the Macaque and Its Similarities to Reye's Syndrome. Laboratory Investigation 24:206-16, 1971.

15. Evans, H., Bourgeois, C., and Comer, D. Brain Lesions in Reye's Syndrome. Arch. Path. 90:543, 1970.

16. Shank, R., Bourgeois, C., Keschamras, N., and Chandavimol, P. Aflatoxins in Autopsy Specimens from Thai Children with an Acute Disease of Unknown Etiology. Fd. Cosmet. Toxicol. 9:501-7, 1971.

17. Olson, L. C., Bourgeois, C. H., Cotton, R. B., Harikul, S., Grossman, R. A., and Smith, T. Encephalopathy and Fatty Degeneration of the Viscera in Northeastern Thailand - Clinical Syndrome and Epidemiology. Pediatrics 47:707-16, April 1971.

18. Shank, R., Johnsen, D., Tanticharoenyos, P., Wooding, W., and Bourgeois, C. Acute Toxicity of Aflatoxin B_1 in the Macaque Monkey. Toxicol. & Appl. Pharmacol. 20:227-31, 1971.

19. Johnsen, D., Wooding, W., Tanticharoenyos, P., and Bourgeois, C. Malignant Lymphoma in the Gibbon. J. A. C. M. A. 3:563-66, 197.

20. Bourgeois, C., Olson, L., Comer, D., Evans, H., Keschamras, N., Cotton, R., Grossman, R., and Smith T. Encephalopathy and Fatty Degeneration of the Viscera - A Clinico-pathologic Analysis of Forty Cases. Am. J. Clin. Path. 56(5):558, November 1971.

21. Evans, H., Bourgeois, C. H., Comer, D. S., Keschamras, N. Biliary Tract Changes in Opistorchiasis. Am. J. Trop. Med. & Hyg. 20-667-71, 1971.

22. Farrell, C. and Bourgeois, C. Bone Case of the Month - Parosteal Sarcoma. J. A. M. W. A. 28:4, 177-180, April 1973.

23. Bourgeois, C. and Farrell, C. Bone Case of the Month - Chondroblastoma. J. A. M. W. A. 28:5, 249-251, May 1973

24. Farrell, C. and Brougeois, C. Bone Case of the Month - Fibrosarcoma. J. A. M. W. A. 28:8, 395-396, August 1973.

25. Sirivastava, P. K., Sirivastava, A. K., Bourgeois, C., Lucas, F. Chromosome Preparations from Hepatocytes and Bone Marrow of Chinese Hamsters. Genetica, 44:608-614, 1973.

26. Bourgeois, C. and Farrell, C. Bone Case of the Month - Periosteal Chondroma. J. A. M. W. A. 29:2, 87-90, February 1974.

CURRICULUM VITAE

FULL NAME: Sidlee William Leeper M.D.

BIRTHDATE: 1929

GRADUATED: Harvard Medical School in 1955

GRADUATE MEDICAL EXPERIENCE

Internal Medicine- 3 years residency (1960-1963)

6 months special training in hematology at Houston V.A. Hospital, Baylor University

ended Armed Forces Special Weapons Project in 1958

11 months training in Radiobiology and Nuclear Weapons Effects

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
Nestor R. Canoy, M.D.	Missouri

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Board of Radiology	Radiology	6-9-56

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	See attached		
b. RADIATION PROTECTION	ABR Certificate		
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

Item #8
1 of 2 pgs.

Prepared 9-26-79
License #24-16281-01

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
and the Section on Radiology of the American Medical Association
Hereby certifies that

Nestor Rabe Canoy, 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, the 9th day of June 1956
Thereby demonstrating to the satisfaction of the
Board that he is qualified to practice the specialty of

Radiology

PRESIDENT

SECRETARY

Control No. 023334

Item #8
2 of 2 pages

Prepared 9-26-79

RADIATION DETECTION INSTRUMENTS

TYPE OF INSTRUMENTS	MANUFACTURER	MODEL #	NUMBER AVAILABLE	mR/hr. MAXIMUM RANGE MINIMUM RANGE
Gamma Camera	Picker	3C	1	N/A
Uptake probe	Picker	Omniprobe	1	N/A
Well detector	Picker	#2804-E	1	N/A
Scaler	Picker	Spectro-scaler IV	1	N/A
Lab Monitor	Picker	#642081	1	N/A
Dose calibrator	Picker	N/A	(Used as back-up)	N/A
Dose calibrator	Capintec	CRC-17	1	N/A
Venography detector	Technical Assoc.	FS-8M-Scat	1	N/A
Survey meter	Picker	655-186	1	0 - 0.2 0 - 2000
Survey meter	Victoreen	740-F	1	0 - 25 0 - 25000

Item #9
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CALIBRATION OF INSTRUMENTS

A. The survey meters will be checked for operability prior to each use. This will be accomplished by holding the detector against an instrument check source or the dose calibrator sealed constancy source depending on the instrument or range to be tested. The highest recording obtainable will be included on all recorded surveys.

The units will be calibrated at annual intervals by the Nuclear Medicine Associates, Cleveland, Ohio, in accordance with the procedure outlined in application for NRC license #34-16272-01. Records of these calibrations will be maintained and recommendations for repair will be followed. Records of repair or calibration by the Missouri Civil Defense authority will be maintained by that authority. Arrangements will be made for the availability of at least one survey meter while a unit is away for calibration or repair.

B. The dose calibrator will be calibrated as follows:

1. Sealed sources will be used to establish accuracy and contancy. They will consist of:

Nuclide	Manufacturer	Model #	Activity (mCi)
Cs-137	NEN	NES 356	0.250
Cs-137	Mallinckrodt	045	1.0
Ba-133	NEN	NES 358	0.2
Co-57	NEN	NES 352	1.0

2. The accuracy of the assay of the above standards will be at least ± 5% and traceable to National Bureau of Standards sources.

3. The calibration procedure will be as follows:

a) The dose calibrator will be checked for accuracy at annual intervals and following repair using sealed sources having energies which encompass that portion of the spectrum of energies for which the dose calibrator is used. Nuclides that will be used are listed in item 1 above.

The activity displayed by the dose calibrator must agree with the stated assay within ± 10%. This error may exceed ± 10% but correction factors will be determined. If the unit displays readings with an error greater than ± 10%, arrangements will be made for immediate repair or adjustment but the unit may be used in the interim using the predetermined correction factors.

b) The dose calibrator will be checked for constancy each day of use. This will be accomplished using the Cs-137 standard. The sealed source will be placed in the chamber and the unit set to measure that nuclide. The activity displayed with background and decay considered, must fall within ± 5% of the predicted activity based on the value obtained at the time of the original accuracy test.

The daily constancy check will be extended to include verification of displayed activities using the same standard but with the dose calibrator set to measure each of the different nuclides to be assayed on that day. With background and decay considered, variation in displayed activities must fall within ± 5% of the activity shown at the time of the most recent accuracy check.

The acceptable range of error for the constancy checks may be extended to ± 10%, however correction factors will be determined. If variation greater than ± 10% are noted, arrangements will be made for immediate repair or adjustment but the unit may be used in the interim using the predetermined correction factors.

c) The dose calibrator will be checked for activity linearity at quarterly intervals and following repair. This test will be performed using the maximum dose received from a Radiopharmacy or the first elution from a new Mo/Tc generator. After assay of the entire contents of a generator elution vial, the concentration will be determined and an aliquot containing 20mCi will be drawn. The aliquot will be assayed for agreement with the calculated activity. In this way, the accuracy of the unit will be assured in the measurement of activities from the maximum on hand to a quantity approximating the maximum dose used for a patient study.

To reduce personnel exposure from a whole vial measurement of activity, an alternate method of obtaining a source for the activity linearity check may be used. An aliquot such as 0.5 to 1.0ml will be withdrawn from the elution vial and assayed in a syringe. The concentration of the eluant can be determined by dividing the displayed activity by the volume in the syringe. A 20mCi aliquot contained in the proper volume can then be withdrawn from the elution vial and used for the linearity test. In this way, the accuracy of the dose calibrator will be assured in the measurement of activities approximating the maximum doses used for patient studies.

The linearity test will be continued by repeating the assay of the 20mCi aliquot several times a day over a two to three day period until a measurement is made in which the activity displayed is less than the minimum dose likely to be used in a patient study and also less than the activity displayed during the annual accuracy check utilizing the standard with the energy similar to that of Tc-99m. In this way, the accuracy of the dose calibrator will be assured in the measurement of individual doses throughout the entire ranges of doses drawn for patient studies. In the event Technetium generator systems are not used, the linearity test described above will be performed using a source (instant Technetium or Radiopharmacy supplied dose) with an activity equal to or exceeding the maximum anticipated activity received for the performance of clinical studies.

The above linearity test data will be plotted as a function of activity vs. time and compared to predicted activities vs. the same time. The acceptable range of error will be ± 10%. If test result error exceeds ± 10%, arrangements will be made for immediate repair or adjustment. The unit may be used in the interim using predetermined correction factors.

d) The dose calibrator will be tested for geometrical variation at the time of installation and following chamber or liner repair or replacement. This test will be performed using a sufficient amount of activity in a geometrical configuration approximating a point source. The source will be inserted into the chamber along its central axis until the maximum activity response is displayed. The source will then be moved in the chamber to points above and below the maximum response point until displayed readings of 90% of maximum are found. This will include peripheral measurements within the chamber as well. The zone of 90% isoresponse will be identified. In reoutine assays, measurements will be made with all the activity within the 90% isoresponse zone of the chamber.

For nuclides with gamma energies less than 100 Kev such as Xenon and I-125 and those which may be received contained in unusual configurations (i.e.: syringes, capsules, cartridges or ampules), initial geometrical corrections will be determined using the manufacturer's assay and appropriate decay factors. The correction factors will be determined using the displayed activity vs. the manufacturer's assay at the time of receipt.

Acceptable correction factors may be on the order of $\pm$ 50% due to the unusual responses associated with these geometries. The manufacturer's assay will be assumed to be correct, however, and the correction factor will be used only as a constancy value to be compared to future shipments of these nuclides. In the event the constancy value varies by greater than $\pm$ 10%, the dose calibrator will be adjusted or repaired.

In the event the dose calibrator should fail or if it is away for repairs, the nuclear medicine program will be continued through the implementation of the following procedure:

A substitute dose calibrator will be acquired. While awaiting its arrival, in order to provide for operation of the nuclear medicine program, one of the following procedures will be used.

Technetium eluents will be assayed and the Mo-99 contaminant will be determined using a dose calibrator located at the nearest cooperating institution having a functional and properly calibrated unit. If activities must be transported for this purpose, they will be shielded with sufficient lead to reduce levels to 2.0mR/hr or less on contact with the shield, wrapped in sufficient absorbant toweling to absorb ten times the liquid volume contained in the vial or syringe, marked with labels indicating the presence of radioactivity, and carried by one occupational person assigned to this task throughout the entire trip. This same person will perform the assay, record the data, and return the activity to the location of authorized use.

Alternatively, Technetium eluent and Molybdenum contaminant assays will be performed using a calibrated pulse height analyzer and detector system enabling the conversion of counts per minute to millicuries or microcuries. For this, equipment used will be the Picker well detector, using a Moly-Tech calibration system similar to the device marketed by Mallinckrodt, #775.

This pulse height analyzer will be calibrated with Cs-137 prior to each use. The method parameters (i.e., windows, filters, voltages, etc) will be determined annually. The standards used will be Tc-99m as assayed on the dose calibrator when it was determined to be functional. For the Mo-99m assay, a Cs-137 standard will be used with the Mo-99 equivalent assumed equal to five times the Cs-137 assay.

Mathematical calculations will be used to determine activity needed for patient doses.

The above assay techniques will enable the measurement of Technetium 99m and its Molybdenum 99 contaminant to within $\pm$ 10% of the true assay. Every effort will be made to expedite repair and return of the dose calibrator.

C. Diagnostic instrumentation will be calibrated as follows:

1. The camera pulse height analyzer will be calibrated using Tc-99m and uniform flood check will be performed each day of use.

2. The well uptake probe and venography detector systems will be calibrated using long lived radionuclides such as Cs-137, Ba-133 or I-129, each day of use.

FACILITIES & EQUIPMENT
DECRIPTION

All radioactive source are stored in such a manner (lead, concrete, or refrigerator) so as to not exceed 2mR/hr at the surface of the barrier.

Mo-99/Tc-99m generator when used will be stored and eluted in the designated area. It will be shielded with lead bricks such that levels from all avenues of approach do not exceed 2.0mR/hr. Spent generators will be stored in the location identified in the attached diagram.

During elution, the eluate will be collected, assayed, and stored in a vial held in a quarter inch lead pig except during brief periods of transfer. Transfer of the eluate or portions of the eluate will be made by the use of syringes retained in lead shields designed for this purpose.

Eluates and compounds made from eluates will be drawn, synthesized, assayed and stored in lead vials or syringes such that levels as measured at contact with a low level survey meter do not exceed 2.0mR/hr except for brief periods during the actual transfer.

Radioactive materials obtained from radiopharmacy suppliers will be stored in their original shipping containers. If necessary, the doses will be placed behind additional shielding to reduce activity levels emitted from the container to 2mR/hr or less.

Syringe shields will be used on all accessories requiring the transfer of radiopharmaceuticals from vial to vial and in drawing up patient doses. Syringe shields will also be used in the administration of doses to patients except when the patients well being may be compromised. Under these circumstances the dose containing syringes will be kept shielded up to the moment of injection.

Steps in the preparation of compounds requiring periods of heating, shaking, agitation or mixing will be performed utilizing lead shielding and/or mechanical or ultrasonic agitation equipment and/or remote handling devices (tongs, forceps, etc) such that levels during the above period as measured by a low level survey meter do not exceed 2.0mR/hr.

Protective outer garments, such as laboratory coats and rubber gloves will be worn while handling radioactivity in uncontained form.

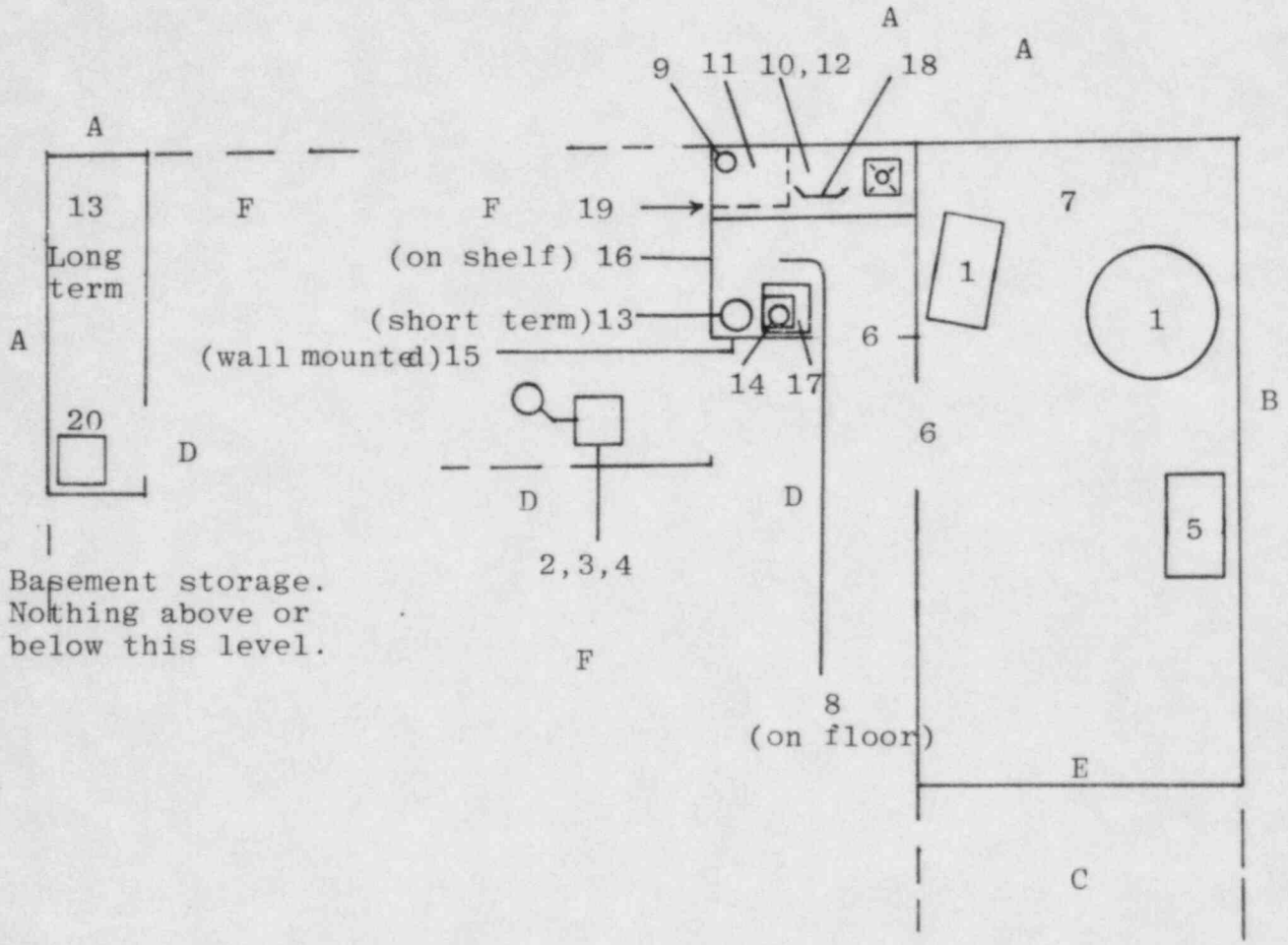
All possible set-ups will be made on easily cleanable trays. All trays and all other work surfaces will be covered with disposable absorbant paper.

A decontamination kit will be maintained in the department. It will include the following items:

DECONTAMINATION KIT

ITEM	PURPOSE
1. Warning tape, chalk, & signs.	posting of area
2. Plastic bags, small	shoe covers, wet containers
3. Disposable gloves	hand protection
4. Masking tape	fasten shoe covers, etc.
5. Forceps, tongs	safe handling
6. Large plastic bags	for contaminated material
7. Sponges, 4 x 4	sopping up
8. Paper towels	blotting & drying
9. Radiac wash or detergent	detergent
10. Scouring powder	friction
11. Tags	identification
12. Scissors	cut absorbent paper, etc.
13. Whatman #1 filter paper	taking swipes following decontamination.
14. Chux	cover area following decontamination
15. G-M survey meter	monitoring

Facilities and Equipment
Diagram



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KEY: L=Length, W=Width, H=Height, T=Thickness, N/A=Not Applicable

- Air Intake
- Air Exhaust
- Sink
- Lead Castle
- 1 Camera
- ___ Scanner
- 2 Uptake
- 3 Well
- 4 Scaler
- 5 Clerical/desk
- ___ File
- 6 Lockable Door
- ___ Exhaust Hood
- 8 Isotope Receipt Area
- 9 Generator
- 10 Kit Preparation
- 11 Isotope Storage
- 12 Dose Preparation
- 13 Waste Storage
- 14 Dose Calibrator
- 15 Monitoring Equipment
- 16 Decontamination Kit
- 17 Refrigerator
- ___ Ceiling Height ,
- 7 Ceiling Height = 8'

Adjacent Areas

- A Exterior
- B Med. Records
- C Dr's Office
- D Hall
- E Ultrasound Exam.
- F X-ray Booms
- ___
- ___

Shielding

18 Dose prep-lead shield
___L x 12"W x 36" H x ¼" T

19 Lead Castle
32"L x 32"W x 12"H x 2" T

* 20 Therapy storage safe
12"L x 12"W x 14"H x 3" T

*Radium Chemical ___
Model #470-3-H or ___L x ___W x ___H x ___T
equivalent.

PERSONNEL TRAINING PROGRAM

In accordance with Section 19.12 of 10 CFR, Part 19, the following is a description of the training required for all personnel who work with or in the vicinity of radioactive materials:

1. The nuclear medicine department will be staffed by individuals who will be classified as occupational employees. These individuals will perform their duties from the radiation safety viewpoint under the direction of the physician(s) named on the license application.

2. Every effort will be made to hire nuclear medicine technology registered or registry eligible personnel to work with radioactive material. Orientation of such personnel for a day or two by the physician(s) named on the license and/or by the supervising technologist will include the following:

   a. Indicate areas where radioactive materials are used or stored.
   b. Potential hazards associated with radioactive materials.
   c. Radiological safety procedures appropriate to their respective duties.
   d. Pertinent NRC regulations.
   e. The rules and regulations of the license.
   f. The pertinent terms of the license.
   g. Their obligation to report unsafe conditions.
   h. Appropriate response to emergencies or unsafe conditions.
   i. Their right to be informed of their radiation exposure and bioassay results.

If evaluation of the radiation handling techniques of a new technologist is found to be inadequate, arrangements will be made to send the employee for a 40 hour formal course from our consulting physicists, Nuclear Medicine Associates, Inc., Cleveland, Ohio. This course combines didactic and clinical training which will include points "b" through "i" listed above as well as quality control and patient procedures.

3. Our consulting physicists, mentioned in this application, will visit our facility quarterly to review all procedures, equipment and records. Personnel will receive refresher training relative to duties, regulations, or terms of the license during these visits or by the physician(s) named on this license application, or by supplementary training at least annually or more frequently, as needed.

4. Access into areas where radioactive material is stored or used will be restricted for nonoccupational personnel. When it is necessary for nonoccupational personnel to enter these areas, as in the case of certain patients who need special care, personnel so involved will be present under the direction of the nuclear medicine technologist, who will ensure that the exposure of these persons is held to the minimum required for the performance of the nuclear medicine procedure. Further, all nonoccupational personnel will receive instruction as to the location and potential hazards associated with radioactive material during their hospital orientation process and annually thereafter in the form of verbal instructions and/or hospital interdepartment memos.

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

1. The chief nuclear medicine technologist his/her designee will place all orders for radioactive material and will ensure that the requested materials and quantities are authorized by the license, and that possession limits are not exceeded. The receipt area identified in the Item #11 diagram is designed such that radiation levels in unrestricted areas do not exceed the limits specified in 10 CFR 20.105.

2. During normal working hours, carriers will be instructed to deliver radioactive packages directly to the nuclear medicine department. If this is not practical, responsible personnel (indicated in the memorandum below) will sign for packages containing radioactive materials and immediately take them to this location. Alternatively, trained nuclear medicine personnel will sign for and transport packages to the appropriate department.

3. During off-duty hours, supervisory personnel will arrange to have delivery of radioactive packages in accordance with the procedures outlined in the attached directive.

INTER-OFFICE CORRESPONDENCE

To HOUSE SUPERVISORS, ER PERSONNEL, SWITCHBOARD OPERATORS Date November 2, 1978

Subject NUCLEAR MEDICINE DURING OFF-DUTY HOURS

All radioactive shipments must be received personally by the House Supervisor. The House Supervisor will accompany the person delivering the radioactive material, making sure that it is placed in the designated storage area, and the door re-locked. Spent generators will be removed from this same room only if they are boxed, marked "for return", and placed on the floor. NO OTHER MATERIALS ARE TO BE REMOVED. The House Supervisor will log in all such receipts and removals.

Nancy Case

Nancy Case, R.T., N.M.T.
Nuclear Medicine

NC/mjm

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PROCEDURES FOR OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

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

2. Inspect the package for the presense of D.O.T. diamon-shaped radioactive White I, Yellow II, or Yellow III labels.

3. If no D.O.T. label or a White I label is present, go to step #7 below.

4. If a D.O.T. Yellow II or Yellow III radioactive label is affixed to the package, proceed to step #5 below.

5. Measure exposure rate at 3 feet from package surface and record. If greater than 10 mR/hr, stop procedure and notify the Radiation Safety Officer.

6. Measure surface exposure rate and record. If greater than 200 mR/hr, stop procedure and notify the Radiation Safety Officer.

7. Put on gloves.

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

9. Wipe external surface of final source container with moistened cotton swab or filter paper held with forceps, assay and record. (To be performed on all shipments specified in Part 10, CFR 20.205(b), and any others suspected of being externally contaminated).

10. Monitor the packing material and packages for contamination before discarding and record results.

    a. If contaminated, treat as radioactive waste.

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

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LABORATORY RULES FOR THE USE OF RADIOACTIVE MATERIAL

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

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

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

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

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

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

7. Wear personnel monitoring devices (film badge or TLD) at all times while in areas where radioactive materials are used or stored. These should be worn at chest or waist level.

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

9. Dispose of radioactive waste only in specially designated receptacles.

10. Never pipette by mouth.

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

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

13. Always transport radioactive material in shielded containers.

Item #15
Prepared 9-26-79
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EMERGENCY PROCEDURES

Minor Spills

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

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

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

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

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

Major Spills: Activity $>$ 1mCi and $T_{\frac{1}{2}} >$ 20 hrs or Activity $>$ 30mCi and $T_{\frac{1}{2}} <$ 20 hrs.

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

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

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

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

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

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

RADIATION SAFETY OFFICER: George P. Wilson, M.D.

OFFICE PHONE: (314) 449-7226 Ext. 519

HOME PHONE: (314) 449-6254

Item #16
Prepared 9-26-79
Lic #24-16281-01

Control No. 02331

SURVEY PROCEDURES

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

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

C. All other laboratory areas will be surveyed weekly.

D. The weekly and monthly survey will consist of:

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

2. A series of wipe tests to measure contamiantion levels. The method of analyzing wipe tests will be such that contamination from any nuclide used in the department will be recognized by the detector system. To accomplish this, the pulse height analyzer windows will be adjusted so that the lower level discriminator includes the energy level of the lowest energy nuclide utilized within the department, and the upper level discriminator includes the energy level of the highest energy nuclide used in the department. Counts from the wipe sample will be compared to background counts to determine the presence of contamination. (See Item F below)

E. A permanent record will be kept of the weekly or montly survey results, including negative results. The record will include:

1. Location, date and type of equipment used.

2. Name of person conducting the survey.

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

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

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

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

F. Areas will be cleaned if the contamination levels exceed the following limits. When background counts are 10 cpm or less, the action level will be set at five times background. If background counts are between 11 and 50 cpm, the action level will be set at three times background. If background counts exceed 50 cpm, the action level will be set at twice background counts. If wipe samples show cpm levels above those identified above, decontamination procedures will be performed and the area re-wipe tested to assure that levels have been brought down to less than the action level. To avoid personnel exposure, contamination resulting from Tc-99m may be shielded and/or covered and allowed to decay.

WASTE DISPOSAL PROCEDURES

1. Liquid Waste will be disposed of

Check as appropriate

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

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

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

____ Other (specify):_____

_____

_____

_____

_____

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

Check as appropriate

__X__ Returned to the manufacturer for disposal

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

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

____ Other (specify): _____

_____

_____

_____

_____

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Control No. 02331

3. Other Solid Waste will be:

Check as appropriate

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

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

____ Other (Specify): _____

_____

_____

_____

_____

4. The commercial waste disposal service used will be: _____

_____
(Name) (City, State)

NRC/Agreement State License No._____

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__2__ of __2__ pages
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Item 19-1

THERAPEUTIC USE OF RADIOPHARMACEUTICALS

Special precautions for patients treated with byproduct material listed in Groups IV or V, Schedule A, Section 35.100 of 10 CFR Part 35 are as follows:

a. Method for preparation and administration of therapeutic doses of Iodine-131. Therapeutic doses of I-131 will be ordered from reputable suppliers and received precalibrated, ready for dispensing to patients. These materials will be stored, until time for use, in the isotope storage area behind sufficient shielding to reduce the radiation levels to 2.0mR/hr at a distance where occupational workers can conveniently stand. All liquid sources will be opened in a fume hood with the fan activated. Patients requiring therapeutic amounts of I-131 less than 30mCi will be dosed in the hot lab, held for 30 minutes for observation and sent home or to their room. Hospitalized patients receiving greater than 30mCi will be dosed in their rooms. (* In the absence of a fume hood, doses will be ordered in capsular form).

b.(1). Patients treated with greater than 1mCi I-131* or 1mCi Au-198* who require hospitalization will be placed in a private room with a toilet. Attempts will be made to use a corner room in a low traffic section of hallway.

b.(2). Patients will use disposable items whenever possible (e.g., dishes, utensils, etc.).

c.(1). Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after adminstration of the treatment dose. Exposure rates will be measured at the patient's bedside, three feet away and the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these times in the patient's chart and on his door. The results of daily surveys will be used to recalculate permitted times which will be posted on the patient's chart and on his door. (Refer to Item #19, Form A). Radiation levels in unrestricted areas will be maintained less than the limits specified in Section 20.105(b), 10 CFR Part 20. (i.e., 2mrems in any one hour or 100mrems in any seven consecutive days) Refer to Item #19, Form A.

c.(2). All linens will be surveyed for contamination before being removed from the patient's room and will, if necessary, be held for decay. Disposable plates, cups, eating utensils, tissue, surgical dressings, and other similar waste items will be placed in a specially designated container. The material will be collected daily by the Radiation Safety Officer (or his designee), checked for contamination, and disposed of as normal or radioactive waste, as appropriate. Non-disposable items used for these patients will be held in plastic bags in the patient's room, and checked for contamination by the Radiation Safety Officer or his designate. Items may be returned for normal use, held for decay or decontaminated, as appropriate.

d. The form, Nursing Instructions for Patients Treated with Phosphorus-32 Gold-198, or Iodine-131, (Item #19, Form B) will be completed immediately after administration of the treatment dose. A copy will be posted in the patient's chart. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the precaution sheet in the patient's chart. Nurses should

*Table 2 of NCRP #37.

read these instructions before administering to the patients. Call the Nuclear Medicine Department if you have any questions about the care of these patients. Visitors will be limited to those 18 years of age or over, unless other instructions are noted on the precautions sheet in the patient's chart. Patients must remain in bed while visitors are in the room and visitors should remain at least three feet from the patient. Radioactive patients are to be confined to their rooms except for special medical or nursing purposes approved by the Nuclear Medicine Department. No nurse, visitor or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic amount of radioactivity until the patient no longer presents a radiation hazard. Female visitors should be asked whether they are pregnant. Attending personnel must wear rubber or disposable plastic gloves when handling urinals, bedpans, emesis basins or other containers having any material obtained from the body of the patient. Wash gloves before removing and then wash hands. The gloves must be left in the patient's room in the designated waste container. These gloves need not be sterile or surgical in type.

e.(1). Therapy patients will be allowed to use the toilet facilities since human excreta is exempt from waste disposal considerations. The patient will be instructed, however,to flush the toilet, urinal or bed pan several times after use. If the nurse helps to collect the excreta, she should wear disposable gloves. Afterwards she should wash her hands with the gloves on and again after the gloves are removed. The gloves should be placed in the designated waste container for disposal by the Nuclear Medicine Department. Vomiting within 24 hours after oral administration, urinary incontinence, or excessive sweating within the first 48 hours may result in contamination of linen and/or floor. If radioactive urine or feces is collected or spilled during collection, call the Nuclear Medicine Department, Ext. 519. Meanwhile, handle all contaminated material with disposable gloves and avoid spreading contamination. All vomitus must also be kept in the patient's room for disposal by the Nuclear Medicine Department. Urine or feces need not be routinely saved, unless ordered on the chart. The same toilet should be used by the patient at all times and it should be well flushed (3 times). Utmost precautions must be taken to see that no urine or vomitus, is spilled on the floor or the bed. If any part of the patient's room is suspected to be contaminated, notify the Nuclear Medicine Department. If a nurse, attendant or anyone else knows or suspects that his skin, or clothing, including shoes, is contaminated, notify the Nuclear Medicine Department immediately. This person should remain in the patient's room and not walk about the hospital. If the hands become contaminated, wash immediately with soap and water. If a therapy patient should need emergency surgery or should die, notify the Nuclear Medicine Department immediately. When the patient is discharged call the Nuclear Medicine Department and request that the room be surveyed for contamination before remaking the room.

e.(2) Surgical dressings should be changed only as directed by the physician. Gold-198 leaking from a puncture wound will stain the dressings dark red or purple. Such dressings should not be discarded but should be collected in plastic bags and turned over to the Nuclear Medicine Department. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

e.(3) Disposable items should be used in the care of these patients, whenever possible. These items should be placed in the designated waste container. Contact the Nuclear Medicine Department for proper disposal of the contents of the designated waste container. Disposable plates,

cups, and eating utensils will be used by patients who are treated with iodine-131. All clothes and bed linens used by the patient should be placed in the laundry bag provided and left in the patient's room to be checked by a member of the Nuclear Medicine Department. All non-disposable items should be placed in a plastic bag and left in the patient's room to be checked by a member of the Nuclear Medicine Department.

f. See attached GUIDELINES FOR EMERGENCY SURGERY OR DEATH OF THE RADIOACTIVE PATIENT *

g.(1) Before a therapy patient's room is reassigned to another patient, the room will be surveyed for contamination (and decontaminated if necessary) and all radioactive waste and waste containers will be removed.

g.(2) Instructions for Patient & Family - Patient will not be discharged until radioactivity reaches 30mCi. This will be determined by measuring the dose rate at time of administration from a distance of no less than 3 meters, allowing the patient to act as much like a point source as possible. Patient will be discharged when reading at identical location and circumstances reaches 30% of initial value, assuming 100mCi dose.

(i) In the event that all persons in the household of the radioactive patient, and hence all those persons with whom the patient will have appreciable contact, are over age of 45 years:

-The patient should be instructed to remain at distances greater than 3 feet from other people, except for brief periods for necessary procedures.

-Babies and young people (of ages less than 45 years) should not visit the patient, but if they do, the visits should be brief, and a distance of at least 9 feet from the patient should be maintained.

(ii) In the event that a person under the age of 45 years lives in the household of the patient:

-Stricter precautions shall be observed than when all contacts are with persons over 45 years of age.

-Children and persons under 45 years of age shall not be allowed in the same room, nor at a distance of less than 9 feet, for more than a few minutes a day. Observance of these conditions will insure that persons under 45 years of age will not be exposed to more than 0.5 R per year from the radioactive individual.

-Other restrictions may be specified by the physician.

All restrictions will be removed when the activity reduces to a point that will result in no greater than 0.5 R to persons in the family from that point until total decay. For I-131, that will be the time where radioactivity in the thyroid gland reaches 8mCi. or a reading of 1.8mR/hr @ 1 meter*. An effective half-life of six days will be used for this computation. For Au-198, those values will be 23mCi or 5.3mR/hr @ 1 meter. An effective half-life of 65 hours will be used for this computation.

Item #19, Form F will be used for the purpose of informing all.

* Table 2 of NCRP Report #37.

GUIDELINES FOR EMERGENCY SURGERY OR DEATH OF THE RADIOACTIVE PATIENT *

In most hospitals, deceased patients with large amounts of radionuclides will be encountered only rarely, since, in principle, radionuclide therapy is not given to moribund patients. If several days intervene between treatment and subsequent surgery or death, the radiation hazard is usually considerably reduced. In most hospitals, the number of patients receiving large internal doses of radionuclides in any one week is small. The need for emergency surgery would not be usual, nor would the death of one of these patients.

The identification of a particular patient as radioactive is the responsibility of the physician in charge of the case. The radioactive patient shall be properly identified at all times. If a radioactive patient dies in the hospital, the physician who pronounces him dead should be responsible for attaching a radioactivity precautions tag to the body. The physician in charge of the case and the Radiation Protection Officer shall be notified at once.

In general bodies containing less than 5mCi. need no precautions for any type of handling. Those containing between 5 and 30mCi may be buried or cremated with no preparation or embalmed according to standard injection procedures without special precautions. If the body is to be subjected to autopsy, the Radiation Safety Officer will designate any special precautions. The body containing more than 30mCi. can be buried or cremated with no preparation, but if embalming is to be carried out, it should be with the guidance of a Radiation Safety Officer. Among patients that die outside the hospital, the funeral director will seldom encounter bodies with hazardous exposure rates.

Preparation for Burial or Cremation Without Autopsy:

Consider first the cases in which no autopsy is to be performed and the body need not be opened. Embalming will be by the injection method, and the likelihood of contamination of the embalmer is small. Nevertheless, even in these cases, rubber gloves shall be worn by all who are involved in the procedures in order to avoid the possibility of contamination by radioactive fluids from the body. The exposure rate at about 25cm. from the center of the radioactive material should be measured; if this is less than 0.25 R/h, no further precautions are necessary as far as the gamma radiations are concerned. Item #19, Form C and D will be completed.

Radioactive Iodine, I-131, Administered Orally or Intravenously; No Autopsy:

The dose of I-131 administered in the treatment of thyroid disease rarely exceeds 100mCi. Within an hour after a patient has received this dose, measurements with an ionization chamber type survey meter may be expected to indicate a surface exposure rate over the abdomen on the order of 0.3 R/h. During the first 24 hours after administration of I-131, the blood and urine may contain considerable radioactivity. These fluids should accordingly be removed into closed systems and later flushed directly into the sewer, followed by an adequate volume of water.

The day after administration, the general distribution of radiation is

greatly modified, both by urinary excretion of a large part of the radionuclide and by concentration of the remaining part in functioning thyroid tissue. At this time only radiation from these regions of iodine storage need be considered. Any region of high activity which is not to be removed, should be marked by the Radiation Protection Officer so that it can be avoided.

Any Radionuclide Injected Interstitially or in Seeds: No Autopsy:

Various colloidal radioactive preparations may be injected interstitially into tumors. Radon seeds, radioactive gold wires, radium wires, and other preparations may be implanted in limited regions. If the nuclide emits only beta rays, it is unlikely that there will be any appreciable external irradiation. If it is a gamma emitter, the active tissues may be extirpated or the region can be identified and avoided.

Body to be Opened for Surgery or Autopsy:

The usual precautions for preventing the spread of an infectious material should aid in keeping the radioactive material localized. At autopsy the general principle is to remove the main source of radiation hazard as early as possible, without causing general contamination. At surgery this cannot be usually be done, hence regions of high activity should be avoided or shielded. Item #19, Form D and E will be completed.

As long as the body remains unopened, the radiation received by anyone near it, is due almost entirely to gamma rays. The change in emphasis when an operation or autopsy is to be performed is due to the possible exposure of the hands and face to relatively intense beta radiation. Beta radiation is readily absorbed by material interposed between its source and the operator. Even rubber gloves are useful in this regard. The gamma rays are not absorbed appreciably by rubber gloves.

Any radionuclide in a Body Cavity which is to be Opened:

The Radiation Protection Officer will evaluate the radiation hazard and suggest suitable procedures regarding the safety of personnel during the entire operation.

a. Autopsy -

As much body fluid as possible should be removed before the body is opened. The remaining radioactive material may be expected to be widely distributed over the surfaces of the cavity and of the organs within it. The use of bare hands will not be permitted because of the contamination of skin and nails that would result and the difficulty of complete removal of such contamination.

Monitoring the body after removal of the viscera may indicate a radiation level low enough so that subsequent procedures can be carried out without special precautions. Regions of high activity, if present, can be indicated and avoided or approached with precautions. If the removed organs are to be disected immediately, each one should be monitored and treated in accordance with the findings. After desired small samples have been taken, the radioactive tissues that are to be retained should immediately be placed in appropriately shielded vessels for storage, or for disposal according to procedures approved by the Radiation Protection Officer. Where adequate cold

storage facilities are available, the organs may be stored for several days without significant alteration, or the viscera may be fixed. This would allow for the natural decay of the radioactive reducing possible exposure.

b. Emergency Surgery -

If surgery must be carried out within a highly radioactive cavity, speed is desirable. Accordingly, an experienced surgeon should perform the operation. The surgeon and his assistants should wear gloves and glasses or goggles for the protection of the eyes from possible splashing of foreign material, as well as from beta radiation.

Radioactive Iodine 131 Orally or Intravenously Administered.

a. Autopsy - Urine should be drained away and blood disposed of, if possible, in the same manner as if no autopsy were to be performed.

b. Surgery - Precautions are essentially the same as for autopsy. During the first day after administration, the blood may be expected to contain considerable radioactivity, and care should be taken not to let it accumulate on gloves or gowns. After the first day, the circulating radioiodine has greatly decreased, and regions of high activity can be identified and usually avoided.

Interstitial Implants and Colloidal Interstitial Infiltration.

At surgery or autopsy, these regions can be readily identified, and avoided as far as possible. At autopsy, if the entire block of tissue containing the radionuclide can be removed readily, this should be done first. If only a sample of the treated region is to be taken, this part of the body should be avoided until the rest of the autopsy has been carried out.

Accident or Injury During Surgery or Autopsy

If an injury occurs during surgery or autopsy, where the rubber gloves are cut or torn, radioactivity may be introduced into the wound. In addition to ordinary treatment of the wound, the Radiation Protection Officer shall be consulted with regard to any possible radiation hazard.

SUMMARY

In general, most procedures performed in nuclear medicine involve the use of Technetium 99m. Due to this radionuclides short half-life, six hours, a period of 24 hours should reduce even the highest dose encountered in nuclear medicine to a safe level. Most other procedures generally encountered in nuclear medicine involving nuclides other than Technetium-99m require dose of 5mCi or less. As indicated in the opening paragraph, activities at this level require little or no special procedures. Those situations involving special precautions and procedures are generally limited to quantities of radioactivity introduced into the patient during therapy treatment. The Radiation Protection Officer should be consulted to establish proper precautions and procedures for each individual case.

*Summary of information found in NCRP Report #37.

Item #19, Form A
OR
Item #20, Form D
5 of 10 pages
Prepared 9-26-79
Lic #24-16281-01

RADIATION SURVEY FORM

Room Diagram

Film Badges Issued to:

	Time Limit
Nurse @ Bedside	min/hr
Visitor @ Chair	min/hr.
Pt. Bed #	hrs
Pt. Bed #	hrs
Pt. Bed #	hrs
Pt. Bed #	hrs

Name	Date	mRem

CERTIFIED BY_____ DATE/TIME_____

IMPORTANT: THIS RECORD MUST BE PERMANENTLY MAINTAINED

CALCULATIONS

Show line drawing of patients and neighboring rooms on other side of this form. Indicate location of patient and neighboring beds, patient orientation, visitors chair, hallways, doors, and outside walls. Room must be a private one, preferably with two outside walls and patients feet oriented to outside wall. Use G-M (low level) and ion (high level) chamber survey meter to determine radiation levels. Record obtained values on drawing at location of measured readings. Readings should be taken at (1) patients bedside, (2) visitors chair, and (3) mid-bed on all neighboring beds. Query for recently performed nuclear medicine procedures if elevated readings are obtained.

NURSES - limited to 2.0mRems/hr. (2.0 ÷ bedside reading) x 60 min. per hr = maximum minutes of bedside care each (but every) hour.

VISITORS - should be limited to 100mRems/total treatment time. If visitor's chair mr/hr x total treatment time is greater than 100mRems, limit visiting time as (100 ÷ (total treatment time x visitor's chair reading) x 60 min. per hr. = maximum minutes/hour for each hour.

NEIGHBORING PATIENTS - should be limited to 100mRems. Readings taken at mid-bed x total treatment time can usually be limited to less than 100mRems either through distance or shielding. Neighboring patients should be transferred if this is not possible when the total exposure approaches 100mRems.

ITEM #19 - FORM B

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

Patient's Name: _____

Room No.: _____ Physician's Name: _____

Radioisotpe Administered: _____

Date and Time of Administration: _____

Dose Received: _____ Method of Administration: _____

Exposure Rates in mR/hr

Date	3 feet from bed	10 feet from bed

(Comply with all Check Items)

_____1. Visiting time permitted: _____

_____2. Visitors must remain _____from patient.

_____3. Patient may not leave room.

_____4. Visitors under 18 not permitted.

_____5. Pregnant visitors not permitted.

_____6. Film badges must be worn.

_____7. Use and complete the following tags:

_____door

_____bed

_____chart

_____wrist

_____8. Gloves must be worn while attending patient.

_____9. Patient must use disposable utensils.

_____10. All items must remain in room until OK'd by Radiation Safety.

_____11. Smoking is not permitted.

_____12. Do not release room to admitting until OK'd by Radiation Safety.

_____13. Other instructions.

In case of Emergency Contact:

RSO_____ On/off duty telephone #_____/_____

ITEM #19 - FORM C

Specific Instructions to Reduce Radiation Exposure During Embalmment

(to be filled out by Radiation Safety Officer and forwarded to funeral director)

The following procedures should be implemented during the embalming of _____.

( ) This body does not contain significant amounts of radioactive material. No special precautions are necessary if standard embalming procedures are employed.

This body contains radioactive material. The following procedures should be observed:

( ) A closed system should be used to drain fluids. Use suction if necessary. Fluid can be disposed of via sewer, flush with copious amounts of water.

( ) Blood and urine should be removed via closed systems. Dispose via sewer with copious amounts of water.

( ) Other _____

_____

_____

Signed _____
Radiation Safety Officer

Date _____

Copy of this report is maintained in Radiation Safety Office files

Prepared 9-26-79
Lic #24-16281-01

ITEM #19, FORM D

Radiation Hazard Evaluation Form

(to be filled out by Radiation Safety Officer for his use)

Name _____ Date and _____

Time of Death _____

Radioisotope _____

Amount administered _____

Route of Administration _____

Amount present _____

Distribution within body _____

_____

_____

_____

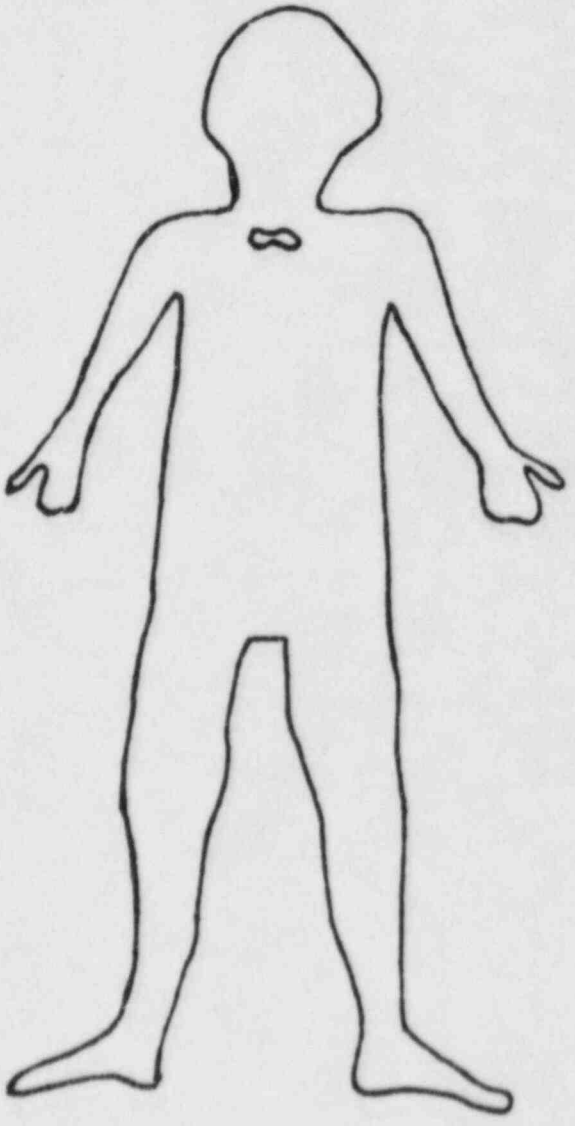
Indicate Distances _____

Suggest ring badges if exposure

0.25 R/hr @ 25 cm

See NCRP #37 p. 27.

Limit hand exposure to 1.5 Rems



Date of Survey _____

Instrument Used _____

Signed _____
Radiation Safety Officer

Date _____

Control No. 02331

Prepared 9-26-79
Lic #24-16281-01

ITEM #19, FORM E

Specific Instructions for Autopsy

(to be filled out by Radiation Safety Officer)

The following procedures should be followed if so indicated:

( ) Wear Safety Glasses.

( ) Wear Plastic (non absorbant) Gown.

( ) Cover Floor with Bench Liner.

( ) Wear Double Thickness Autopsy Gloves.

( ) Wear Whole Body Film Badge.

( ) Wear Ring Badge.

( ) Remove the _____area or tissue first before proceeding further. Identify it as radioactive.

( ) Leave the _____area or tissue untouched until last.

( ) Cover the _____area or tissue with shielding as provided.

( ) Use only long instruments --8" or greater.

( ) Fluids, Blood, Urine should be removed via closed system. Flush with copious amounts of water.

( ) Small Specimens need -- need not -- be handled with special precautions.

( ) Waste Container needs to be provided for contaminated sponges, gowns, and instruments.

( ) Organs are to be kept in storage for _____days before fixation.

Autopsy Performed by _____Patient Name_____

Whole Body or Ringer Badge No. _____ Exposure _____

Signed _____
Radiation Safety Officer

Date:_____

THIS REPORT MUST BE SAVED !

ITEM #19, Form F

INSTRUCTIONS FOR FAMILY OF RELEASED PATIENT

Name of Patient_____
Name of Hospital _____Address_____Tel.No._____
For further information contact_____Tel.No._____

Please show this form to every physician consulted concerning the patient until _____
(date)

_____ was treated on _____, 19____.
(Name of Patient)
with _____millicures of _____in the form of _____.

NO SPECIAL RADIATION SAFETY PRECAUTIONS ARE NECESSARY AFTER _____.
(date)

UNTIL THAT DATE:

Persons under 45 years of age should not remain closer than the following distances from the patient, for the time period indicated:

a) _____to _____
(Date) (Date)

Permissible distance _____feet or more, for _____hours/week.
(At other times remain farther than 6 feet).

Note: During the above times brief periods of closer contact (for example while shaking hands, or kissing the patient) are permissible.

SPECIAL PRECAUTIONS:

a) Spouse or other person caring for patient.

_____
_____
_____

b) Children or pregnant women: _____

_____
_____

c) Sleeping Arrangements:_____

_____
_____.

IF THE PATIENT IS TO BE HOSPITALIZED, OR IF DEATH SHOULD OCCUR, NOTIFY THE FOLLOWING INDIVIDUAL(S) IMMEDIATELY:

_____

_____

A COPY OF THIS FORM SHOULD BE KEPT WITH THE PATIENT'S RECORD.

Item #20

THERAPEUTIC USE OF SEALED SOURCES

Special procedures for patients treated with byproduct material listed in Group VI, Schedule A, Section 35.100 of 10 CFR Part 35, are as follows:

a. Areas where sealed sources will be stored will be found in map accompanying this item. #11.

b. See "Safety Precautions in Clinical Applications". (Item #20, Form E).

c. The form, Nursing instructions for Patients Treated with Radioactive Sources, (Item #20, Form A), will be completed immediately after sources are implanted and placed in the patient's chart. Nurses will be instructed via Item #20, Form F).

d. Nurses caring for brachytherapy patients will be assigned film badges. TLD finger badges will also be assigned to nurses who must provide extended personal care to the patient and to personnel handling sealed sources.

e. Sources will be transported from the storage site to place of use via the original shipping container or an equivalent lead container which is at least 1" thick.

f. At the initiation of treatment, an inventory will be performed on all therapy sources to insure total accountability. At the conclusion of treatment, another inventory will be performed to insure that all sources have been returned. (Refer to Item #20, Form B). In addition, a survey will be performed to ensure that all sources have been removed from the patient and that no sources remain in the patient's room or any other area occupied by the patient. At the same time, all radiation signs will be removed and all film and TLD badges assigned to nurses will be collected. Item #20, Form C will be used as a check-off procedure.

g. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after sources are implanted. Exposure rate measurements will be taken at the patient's bedside, three feet away and at the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these times in the patient's chart. Refer to Item #20, Form D. Radiation levels in unrestricted areas will be maintained less than the limits specified in Section 20.105(b), 10 CFR Part 20. (i.e., 2mrems in any one hour or 100mrems in any seven consecutive days).

Prepared 9-26-79

ITEM 20, FORM A

Lic #24-16281-01

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH RADIOACTIVE SOURCES

Patient's Name: _____

Room Number: _____ Physician's Name: _____

Isotope Activity: _____

Date and Time of Administration: _____

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

Exposure Rates in mR/hr

Bedside	3 feet from bed	10 feet from bed

(Complete checked items)

_____1. Wear film badge.

_____2. Wear rubber gloves

_____3. Place laundry in linen bag and save.

_____4. Housekeeping may not enter the room.

_____5. Patient may not have visitors.

_____6. No pregnant visitors.

_____7. No visitors under 18 years of age.

_____8. A dismissal survey must be performed <u>before</u> patient is discharged.

_____9. Patient must have a private room.

_____10. Other Instructions.

RSO _____, _____/_____
(Name) on duty/off duty telephone number

FORM B

RECEIPT/SHIPMENT RECORD
RADIATION SOURCE THERAPY APPLICATIONS

Patient _____ _____ ID# _____ RM _____

PRE-TREATMENT INVENTORY

			Subtotal
_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____

Applicator(s) _____ Total _____ mg.

POST TREATMENT INVENTORY

_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____
_____	sources of	_____ mg	_____

Applicator(s) _____ Total _____ mg.

COMMENTS:

Certified by: _____ Date _____

IMPORTANT: THIS RECORD MUST BE PERMANENTLY MAINTAINED

Form C

RADIATION THERAPY SOURCE USAGE RECORD

Patient_____ I.D._____ Rm_____

Ordering Physician_____

Applicator(s) used_____ Sources_____
mR/hr at 1 meter from applicator (not after loading)_____mR/hr
Date and time of insertion_____a.m./p.m. _____

	Yes	See Comments
Lead aprons not worn during insertion?	( )	( )
X-ray techs informed prior to obtaining localizing films?	( )	( )
Recovery room nurses instructed to use time/distance?	( )	( )
Patient assigned private room?	( )	( )
Film Badges issued to nursing personnel?	( )	( )
Safety instruction given to nurses?	( )	( )
Safety procedures placed in patients chart?	( )	( )
Caution sign placed on patients chart?	( )	( )
Caution signs placed on patients room door?	( )	( )
Nursing care rotated?	( )	( )
Known pregnant nurses not attending patient ?	( )	( )
Pregnant visitors prohibited?	( )	( )
Visitors under 18 prohibited?	( )	( )
Safety survey performed and recorded?	( )	( )
Limits of nursing care time posted?	( )	( )
Removal notice posted in patients chart prior to removal of all posted signs?	( )	( )
All signs removed?	( )	( )
Room surveyed and background rad. levels present?	( )	( )

Date/Time of Removal_____ a.m./p.m. _____
Applicator_____ Sources_____

COMMENTS:

CERTIFIED BY_____ Date_____

IMPORTANT: THIS RECORD MUST BE PERMANENTLY MAINTAINED

SAFETY PRECAUTIONS IN CLINICAL APPLICATIONS

I. Transfer and Preparation of Sources

a. Forms will be used to record pre and post-use inventory.(Item #20,FormB)
b. Sources will be dispensed with suitable protective devices and techniques, to include long forceps & TLD finger badges.

II. Application of Sources to the Patient

a. Distance, time, and when possible shielding, will be used to reduce radiation exposure to personnel attending the patient.
b. Appropriate signs will be used to indicate levels of radiation exposure.
c. Consideration will be given to the proximity of patients in adjoining rooms.
d. A patient being treated with brachytherapy sources will wear suitable identification.
e. Patient will not be allowed to leave his room unless accompanied by a hospital attendant.
f. Persons who have short-lived sources which are not removable from their bodies will be allowed to leave the hospital provided precautions necessary to prevent other persons from receiving more than the permissible dose of radiation are observed.

III. Removal of Sources from Patient

a. Sources will be removed with same safety precautions as those used in their application.
b. No linens, dressings, clothing or equipment will be removed from room until all sources are accounted for.
c. Assurance of complete removal of all sources will be obtained using a G-M survey meter held in the treatment area of the patient.
d. Should the patient die before brachytherapy is complete, the sources will be removed at once.

IV. Return of Sources to Storage

a. Following cleaning, sources will be returned immediately to their storage place.
b. Post-use inventory forms will be completed to insure complete return of all sources to storage.
c. Inventory of all sealed sources will be performed on a quarterly basis and recorded.

ITEM #20, FORM F

INSTRUCTIONS TO NURSES

1. Special restricts may be noted on the precaution sheet in the patients chart. Nurses should read these instructions before administering to the patient. Call the Nuclear Medicine Department if you have any questions about the care of these patients.

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

3. When a nurse receives an assignment to a therapy patient, a film or TLD badge should be obtained immediately from the Nuclear Medicine Department. The badge shall be worn only by the nurse to whom it is issued and shall not be exchanged between nurses.

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

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

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

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

8. Surgical dressings and bandages used to cover the area of needle insertion may be changed only by the attending physician or radiologist, and MAY NOT BE DISCARDED until directed by the radiologist. Dressings should be kept in a basin until checked by the radiologist or member of the Nuclear Medicine Department.

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

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

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

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

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

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

14. Emergency Procedures:

a. If an implanted source becomes loose or separated from the patient, or

ITEM #20, FORM F (continued)

b. If the patient dies, or

c. If the patient requires emergency surgery, immediately call

Dr. Wilson . Phone NO. (days) Ext. 519 (nights) 449-6254 .

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