

APPLICATION FOR MATERIALS LICENSE - MEDICAL

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

Charter Hospital of St. Louis, Inc.
5535 Delmar Boulevard
St. Louis, Missouri 63112

TELEPHONE NO.: AREA CODE (314) 361-1212

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

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Sumner Holtz, M. D.

TELEPHONE NO.: AREA CODE (314) 361-1212

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

a. ☒ NEW LICENSE

b. ☐ AMENDMENT TO LICENSE NO. _____

c. ☐ RENEWAL OF LICENSE NO. _____

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

Sumner Holtz, M. D. All

Thomas F. Egan, M. D. All

Naris Rujanavech, M. D. Groups I-III and 133

Delia Garcia, M. D., Group IV only & Patrick Thomas, M. D., Group IV only

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.)

Sumner Holtz, M. D.

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS (In millicuries)	ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS (In millicuries)
10 CFR 31.11 FOR IN VITRO STUDIES	X	1.0	IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM	X	100.
10 CFR 35.100, SCHEDULE A, GROUP I	X	AS NEEDED	PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES		
10 CFR 35.100, SCHEDULE A, GROUP II	X	AS NEEDED	PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
10 CFR 35.100, SCHEDULE A, GROUP III	X	2000.	GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
10 CFR 35.100, SCHEDULE A, GROUP IV	X	AS NEEDED	IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA		
10 CFR 35.100, SCHEDULE A, GROUP V		AS NEEDED	XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.	X	2000.
10 CFR 35.100, SCHEDULE A, GROUP VI					

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
B507240251 B50702 REG3 LIC30 24-24518-01 PDR		Applicant <i>June 3rd</i> Check No. <i>002601</i> Amount/Fee Category <i>\$580</i> Type of <i>7C appl</i> Date Check Rec'd <i>6/5/85</i> Received By <i>[Signature]</i>	

79054

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. 7, Date: October 1980

7. MEDICAL ISOTOPES COMMITTEE		15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL (Check One)	
<input checked="" type="checkbox"/>	Names and Specialties Attached; and	<input checked="" type="checkbox"/>	Appendix G Rules Followed; or
<input checked="" type="checkbox"/>	Duties as in Appendix B; or (Check One)		Equivalent Rules Attached
	Equivalent Duties Attached	16. EMERGENCY PROCEDURES (Check One)	
8. TRAINING AND EXPERIENCE SEE ATTACHMENTS		<input checked="" type="checkbox"/>	Appendix H Procedures Followed; or
	Supplements A & B Attached for Each Individual User; and		Equivalent Procedures Attached
<input checked="" type="checkbox"/>	Supplement A Attached for RSO.	17. AREA SURVEY PROCEDURES (Check One)	
9. INSTRUMENTATION (Check One)		<input checked="" type="checkbox"/>	Appendix I Procedures Followed; or
<input checked="" type="checkbox"/>	Appendix C Form Attached; or		Equivalent Procedures Attached
	List by Name and Model Number	18. WASTE DISPOSAL (Check One)	
10. CALIBRATION OF INSTRUMENTS		<input checked="" type="checkbox"/>	Appendix J Form Attached; or
<input checked="" type="checkbox"/>	Appendix D Procedures Followed for Survey Instruments; or (Check One)		Equivalent Information Attached
	Equivalent Procedures Attached; and	19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS (Check One)	
<input checked="" type="checkbox"/>	Appendix D Procedures Followed for Dose Calibrator; or (Check One)		Appendix K Procedures Followed; or N/A
	Equivalent Procedures Attached		Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT		20. THERAPEUTIC USE OF SEALED SOURCES	
<input checked="" type="checkbox"/>	Description and Diagram Attached		Detailed Information Attached; and N/A
12. PERSONNEL TRAINING PROGRAM			Appendix L Procedures Followed; or (Check One)
<input checked="" type="checkbox"/>	Description of Training Attached		Equivalent Procedures Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL		21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon - 133)	
<input checked="" type="checkbox"/>	Detailed Information Attached	<input checked="" type="checkbox"/>	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 N/A
<input checked="" type="checkbox"/>	Appendix F Procedures Followed; or	23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
	Equivalent Procedures Attached		Detailed Information Attached N/A

24. PERSONNEL MONITORING DEVICES

	TYPE <small>(Check appropriate box)</small>	SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY	FILM	R. S. Landauer, Jr. & Company	Bi-Weekly
	TLD		
	OTHER (Specify)		
b. FINGER	FILM		
	TLD	R. S. Landauer, Jr. & Company	Bi-Weekly
	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		b. ATTACH A COPY OF THE AGREEMENT LETTER SIGNED BY THE HOSPITAL ADMINISTRATOR.	
MAILING ADDRESS		c. WHEN REQUESTING THERAPY PROCEDURES, ATTACH A COPY OF RADIATION SAFETY PRECAUTIONS TO BE TAKEN AND LIST AVAILABLE RADIATION DETECTION INSTRUMENTS.	
CITY	STATE	ZIP CODE	

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 <i>(See Section 170.31, 10 CFR 170)</i>	b. APPLICANT OR CERTIFYING OFFICIAL (Signature) (1) NAME (Type of Print) Harold Small
(1) LICENSE FEE CATEGORY: Medical Human Use	(2) TITLE Administrator
(2) LICENSE FEE ENCLOSED: \$ 580.00	c. DATE 5-22-85

RECEIVED
MAY 28 1985
REGION III

PRIVACY ACT STATEMENT

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

1. **AUTHORITY** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).
2. **PRINCIPAL PURPOSE(S)** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30-36 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.
3. **ROUTINE USES** The information may be used: (a) to provide records to State health departments for their information and use; and (b) to provide information to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for a NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you. A copy of the license issued will routinely be placed in the NRC's Public Document Room, 1717 H Street, N.W., Washington, D.C.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed.
5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

U. S. Nuclear Regulatory Commission
License Application

Item 1

See Page One.

Item 2

See Page One.

Item 3

See Page One

Item 4

Sumner Holtz, M. D., Thomas Egan, M. D. and Naris Rujanavech, M. D. Licensed users under license #24-01570-03, Control #77392. Renewal application submitted August 20, 1984.

Delia M. Garcia, M. D. and Patrick Thomas, M. D. Curriculum vitae attached, labeled Item 4.

Item 5

Sumner Holtz, M. D., licensed user under license #24-01570-03, Control #77392. Renewal application submitted August 20, 1984.

Michel M. TerPogossian, Ph.D. Professor of Radiation Science at Washington University, will serve as Physics Consultant and as member of the Radiation Safety Committee. Curriculum vitae attached, labeled Item 7.

Item 6

6A See Page One.

6B Not Applicable.

Item 7

Medical Isotopes Committee:

Naris Rujanavech, M. D., Chairman - Licensed user #24-01570-03, Control #77392.

Thomas Lyles, M. D. - C.V. labeled Item 7

Marshall Poger, M. D. - C.V. labeled Item 7

Gary H. Omell, M. D. - C.V. labeled Item 7

Daniel Whitehead, M. D. - C.V. labeled Item 7

Joan D'Ambrose, Administrator - C.V. labeled Item 7

William Miller, R. T. - C.V. labeled Item 7

Radiation Safety Committee:

Sumner Holtz, M. D., R.S.O., Chairman - Licensed user #24-01570-03, Control #7392

U. S. Nuclear Regulatory Commission
License Application

Radiation Safety Committee continued:

Michel M. TerPogossian, Ph.D., Radiation Physicist - C.V. labeled Item 7
Marshall Poger, M. D., Pathologist - C.V. labeled Item 7
Patrick, R. M. Thomas, M. D., Radiation Oncologist - C.V. labeled Item 4
Naris Rujanavech, M. D., Radiologist - Licensed user #24-01570-03,
Control #77392.
Joan D'Ambrose, Administrator - C.V. labeled Item 7
Betty Blaise, R.N., Director of Nursing Service - C.V. labeled Item 7
John Golden, R.T., Radiology Director - C.V. labeled Item 7
William R. Miller, R.T., Radiation Safety Technologist - C.V. labeled Item 7

Item 8

8A Sumner Holtz, M. D., licensed user under license #24-01570-03
Thomas F. Egan, M. D., licensed user under license #24-01570-03
Naris Rujanavech, M. D., licensed user under license #24-01570-03
Delia Garcia, M. D., Certification in Therapeutic Radiology by
American Board of Radiology - C.V. labeled Item 4.
Patrick R.M. Thomas, M. D., Certification in Therapeutic Radiology
by American Board of Radiology - C.V. labeled Item 4.

8B Sumner Holtz, M. D., licensed user under license #24-01570-03
Michel M. TerPogossian, Ph.D., Professor of Radiation Sciences
at Washington University, will serve as Physics Consultant and
a member of the Radiation Safety Committee - C.V. labeled Item 7.

Item 9

See attachments labeled Item 9

Item 10

Section 1 See attachments labeled Item 10

Section 2 Will follow appendix D. Will employ "calicheck" device
for instrument linearity checks. See attachments labeled
Item 10.

Item 11

See attachments labeled Item 11

Item 12

See attachments labeled Item 12

Item 13

See attachments labeled Item 13

Item 14

Appendix F

U. S. Nuclear Regulatory Commission
License Application

Item 15

Appendix G

Item 16

Appendix H

Item 17

Appendix I

Item 18

See attachment labeled Item 18

Item 19

No applicable

Item 20

Not applicable

Item 21

See attachments labeled Item 21

Item 22

Not applicable

Item 23

Not applicable

Item 24

See Page Three

Item 25

No applicable

Item 26

See Page Three

CURRICULUM VITAE

Delia M. Garcia, M.D.

PERSONAL:

BIRTHDATE: January 8, 1954
BIRTHPLACE: Spring Valley, Illinois
MARITAL STATUS: Single

EDUCATION:

1972 - 1976 Western Illinois University, Macomb, Illinois
B.S. Biology, Summa Cum Laude
Phi Kappa Phi Honor Society
Elk's Club National Foundation
Scholarship, Most Valuable Stud. (4 yrs)
Batiste Freshman Women's Honorary Society

TRAINING:

Graduate Training:

1976 - 1979 Southern Illinois University School of
Medicine, Carbondale, Illinois
Illinois General Assembly Scholarship
(3 yrs)

Post Graduate Training:

1979 - 1980 Internship, University of Wisconsin Hospital
and Clinics, Madison, Wisconsin

1980 - 1983 Resident, Mallinckrodt Institute of
Radiology, Washington University School of
Medicine, St. Louis, Missouri

1981 - 1982 American Cancer Society Clinical Fellowship,
Mallinckrodt Institute of Radiology,
Washington University School of Medicine,
St. Louis, Missouri

1981 - 1982 Assistant Chief Resident, Mallinckrodt
Institute of Radiology, Washington University
School of Medicine, St. Louis, Missouri

1982 - 1983 Chief Resident, Mallinckrodt Institute of
Radiology, Washington University School of
Medicine, St. Louis, Missouri

CONTROL NO. 7 9 0 5 4

Item 4

May 8, 1985

1982 - 1983

NCI Tumor Biology Grant, Mallinckrodt
Institute of Radiology, Washington University
School of Medicine, St. Louis, Missouri

CERTIFICATION:

June 1983

American Board of Radiology, Therapeutic
Radiology

ACADEMIC APPOINTMENTS:

July 1983 - June 1984

Assistant Professor, Radiation Therapy and
Oncology, Medical College of Virginia,
Richmond, Virginia

July 1984 -

Assistant Professor of Radiology (Radiation
Oncology) Washington University School of
Medicine, St. Louis, Missouri

HOSPITAL APPOINTMENTS:

1983 - 1984

Assistant Radiologist, Medical College of
Virginia, Richmond, Virginia

1984 -

Assistant Radiologist, Barnes Hospital,
St. Louis, Missouri

1984 -

Active Staff, St. Luke's Hospital, St. Louis,
Missouri

1984 -

Consulting Staff, St. Louis Children's
Hospital, St. Louis, Missouri

LICENSURE:

Wisconsin	1980
Missouri	1981
Virginia	1983

PROFESSIONAL SOCIETIES:

American Society of Therapeutic Radiologists
Radiological Society of North America
American College of Radiology

INVITED PRESENTATIONS

1. The role of radiation therapy in the management of cerebral astrocytomas in adults. Radiation Oncology Section of Greater St. Louis Radiological Society. November 16, 1982.
2. Current therapeutic approaches to carcinoma of the ovary: Radiotherapy techniques and results. Medical College of Virginia, Fourth Annual Radiation Oncology Course, Williamsburg, Virginia. May 26, 1984.
3. Tumor excision and primary irradiation as an alternative to mastectomy in the treatment of early breast cancer. OB-GYN Grand Rounds, Medical College of Virginia. May 31, 1984.

BIBLIOGRAPHYPUBLICATIONS:

1. Garcia DM, Fulling KH, Marks JE: The value of radiation therapy in addition to surgery for astrocytomas of the adult cerebrum. Cancer (in press).
2. Fulling KH and Garcia DM: Prognostic value of histologic features in cerebral astrocytomas in adults. Cancer (in press).
3. Garcia DM and Fulling KH: Juvenile pilocytic astrocytoma of the cerebrum in adults: A distinctive neoplasm with favorable prognosis. Submitted to Journal of Neurosurgery, July, 1984
4. Garcia DM: Primary tumors of the spinal cord treated with surgery and postoperative irradiation. In preparation.
5. Garcia DM: Does radiation therapy play a role in the management of meningiomas? In preparation.

ABSTRACTS:

1. Garcia DM, Fulling KH, Marks JE: The value of radiation therapy in addition to surgery for low grade astrocytomas of the adult cerebrum. Int J Radiat Oncol Biol Phys 8 (Suppl 1):91, 1982. Presented at the 24th Annual American Society of Therapeutic Radiologists Meeting in Miami, Florida. October 25, 1982.
2. Fulling KH and Garcia DM: Prognostic value of histologic features in cerebral astrocytomas in adults. Lab Invest 48:28A, 1983. Presented at the International Academy of Pathology. March 1, 1983.
3. Garcia DM: Primary tumors of the spinal cord treated with surgery and postoperative irradiation. Presented at the Mid-Atlantic Oncology Program Meeting in Baltimore, Maryland. November 19, 1983. Accepted for presentation at the 66th annual meeting of The American Radium Society in Coronado, California. March 19, 1984.

(Updated 7/23/84)

CURRICULUM VITAE

NAME: Patrick Robert Maxwell Thomas

DATE OF BIRTH: February 23, 1943

NATIONALITY: British (Permanent Resident Alien in U.S.)

SOCIAL SECURITY NO.: 089-58-5908

PRESENT POSITION: Associate Radiation Oncologist, Division of Radiation Oncology, Mallinckrodt Institute of Radiology, Assistant Professor of Radiology, Washington University School of Medicine, St. Louis, Missouri since July 1979

EDUCATION: Winchester College, Winchester, U.K.
1956 - 1961

London University, Middlesex Hospital Medical School
1961 - 1968

QUALIFICATIONS: 1965 - Dip Biochemistry, London University
1968 - M.B., B.S., London University (Medical Qualifying Examination)
1968 - ECFMG, Council for Foreign Medical Graduates
1969 - G.M.C., United Kingdom License to practice medicine
1971 - MRCP, Royal Colleges of Physicians of United Kingdom (Internal Medicine Boards)
1974 - FRCR, Royal College of Radiologists (Therapeutic Radiology Boards)
1976 - New York State License by Reciprocity
1977 - American Board Radiology, Therapeutic Radiology Certificate
1978 - Michigan License by Examination (Flex weighted average 81.8)
1979 - Missouri License by Reciprocity

PREVIOUS POSITIONS: 1969 - House Surgeon and House Physician, Middlesex and Central Middlesex Hospitals, London

1970 - House Physician and Locum Registrar in Endocrinology, Royal Free Hospital, London

1970 - 1972 Senior House Physician and Registrar in Radiotherapy, Hammersmith Hospital, London

1972 - 1974 Senior Registrar in Radiotherapy, Middlesex Hospital, London

-2-

- 1974 - 1976 Lecturer in Radiotherapy, Royal Marsden Hospital and Institute of Cancer Research University of London, London
- 1976 - 1979 Associate Chief, Department of Radiation Medicine, Roswell Park Memorial Institute, Buffalo, New York
- 1976 - 1979 Clinical Assistant Professor of Radiology, State University of New York at Buffalo
- 1978 - 1979 Consulting Physician, Buffalo Children's Hospital
- PRIZES:
- 1966 Middlesex Hospital Bursary in Biochemistry
- 1974 British Institute of Radiology Travelling Fellowship to Paris, Radiation Therapy Centers
- COMMITTEES:
- 1977 - 1979 Member at Large, Quality Assurance Program Cancer and Acute Leukemia Group B (CALGB), Providence, Rhode Island and New York, New York
- 1978 - 1979 Overseers Committee (CALGB)
- 1978 - Member, Cranial Prophylaxis Study Group, (CALGB)
- 1979 Principal Investigator for Radiotherapy at Roswell Park Memorial Institute (CALGB)
- 1979 - Associate Chairman, Radiotherapy Committee, Gastrointestinal Tumor Study Group (GITSG)
- 1979 - Member National Wilms' Tumor Study Committee (NWTs)
- PROTOCOLS:
- GI 7175 (Adjuvant Rectum) Quality Control of Radiotherapy (Funded for Secretary)
- GI 9277 (Unresectable Pancreas) Co-Chairman
- SWOG 7712 Radiotherapy Chairman
- SOCIETIES:
- ASCO
- ASTR

PUBLICATIONS:

1. Choroidal metastases from breast carcinoma: A survey of 42 patients and the use of radiation therapy. Thatcher, N. and Thomas, P.R.M. Clin. Radiol. 26:549 (1975).
2. Report on the B.I.R. Sponsored visit to Paris. September 1974. Thomas, P.R.M. British Institute of Radiology Bulletin, 1(2):6 (1975).
3. Therapeutic irradiation of the CNS using intrathecal ⁹⁰Y-DTPA. Smith, P.H.S., Thomas, P.R.M., Steere, H.A., Beatty, H.E., Dawson, K.B., and Peckham, M.J. Brit. J. Radiol. 49:141 (1976).
4. Reproductive and endocrine function in patients with Hodgkin's disease: Effects of oophoropexy and irradiation. Thomas, P.R.M., Winstanly, D., Peckham, M.J., Austin, D.E., Murray, M.A.F., and Jacobs, H.S. Brit. J. Cancer 33:226 (1976).
5. Radiosensitivity of the acute leukemic infiltrate. Atkinson, M.K., Thomas, P.R.M., Peckham, M.J., McElwain, T.J. Eur. J. Cancer 12:535 (1976).
6. The investigation and management of Hodgkin's disease in the pregnant patient. Thomas, P.R.M. and Peckham, M.J. Cancer 38:1443 (1976).
7. Hypertrophic pulmonary osteopathy in Hodgkin's disease - reversal with chemotherapy. Atkinson, M.K., McElwain, T.J., Peckham, M.J., and Thomas, P.R.M. Cancer 38:1729 (1976).
8. Effects of scrotal incision on spermatogenesis following radiotherapy for testicular tumors. Thomas, P.R.M., Mansfield, M.D., Hendry, W.F., Peckham, M.J. Brit. J. Surg. 64:352 (1977).
9. Encephalopathy following bone marrow transplantation. Atkinson, K., Clink, H., Lawler, S., Lawson, D., McElwain, T.J., Thomas, P.R.M., Peckham, M.J., Powles, R., Mann, J.R., Cameron, A.M., and Arthur, K. Europ. J. Cancer 13:623 (1977).
10. Monotrophic increase of follicle-stimulating hormone in women with damaged ovaries - evidence for inhibin in women?. Thomas, P.R.M., Murray, M.A.F., and Jacobs, H.J. J. Endocrinol. 73:24 (1977).
11. Non-surgical treatment of pelvic rhabdomyosarcoma - a case report. Brecher, M.L., Freeman, A.I., Thomas, P.R.M., and Sinks, L.F. J. Surg. Oncol. 9:603 (1977).
12. Chemotherapy in recurrent non-cystic low grade astrocytomas of cerebrum in children. Sumer, T., Freeman, A.I., Cohen, M., Bremer, A., Thomas, P.R.M., and Sinks, L.F. J. Surg. Oncol. 10(1):45 (1978).
13. Non-Hodgkin's lymphoma in children. Brecher, M.L., Sinks, L.F., Thomas, P.R.M., and Freeman, A.I. Cancer 41(5):1197 (1978).

14. The elemental diet as an adjuvant for patients with locally advanced gastrointestinal cancer receiving radiation therapy: A prospectively randomized study. Douglass, H.O., Milliron, S., Nava, H., Eriksson, B., Thomas, P.R.M., Novick, A., and Holyoke, E.D. J. Parenteral and Enteral Nutrition 2(5) 682 (1978).
15. Combination chemotherapy in recurrent medulloblastoma. Duffner, P.K., Cohen, M., Thomas, P.R.M., Sinks, L.F., and Freeman, A.I. Cancer 43(1):41 (1979).
16. Blurring of vision: A previously undescribed complication of cyclophosphamide therapy. Kende, G., Sirkin, S.R., Thomas, P.R.M., and Freeman, A.I. Cancer 44(1):69 (1979).
17. Autoimmune disorders complicating adolescent Hodgkin's disease. Kedar, A., Khan, A.B., Mattern, J.Q.A., Thomas, P.R.M., and Freeman, A.I. Cancer 44(1):112 (1979).
18. Chronic hematuria and localized bladder damage following combined cyclophosphamide and local radiotherapy. Kende, G., Wajzman, Z., Thomas, P.R.M., and Freeman, A.I. J. Surg. Oncol. (in press).
19. Multimodality management of medulloblastoma. Thomas, P.R.M., Duffner, P.K., Cohen, M.E., Sinks, L.F., Tebbi, C.K., and Freeman, A.I. Cancer (in press).

LETTERS AND ABSTRACTS:

1. Immunochemotherapy of colon cancer. Thomas, P.R.M., George, R.J., Gazet, J.C., and Peckham, M.J. *Lancet* 1:1349 (1976).
2. Long term hematuria following Cytosan and radiation therapy. Kende, G., Thomas, P.R.M., Wajsman, Z., Wang, J.J., and Freeman, A.I. *Proc.AACR* 18:110 (1977).
3. Combination chemotherapy for recurrent medulloblastoma. Thomas, P.R.M., Duffner, P.K., Cohen, M.E., Sinks, L.F., and Freeman, A.I. *Proc. ASCO* 18:311 (1978).
4. Multimodality therapy for medulloblastoma. Thomas, P.R.M., Sinks, L.F., Duffner, P.K., and Freeman, A.I. *Proc. UICC, Buenos Aires* (1978) W. 60.
5. Autoimmune disorders complicating adolescent Hodgkin's disease. Kedar, A., Khan, A.B., Mattern, J.Q.A., Fisher, J., Thomas, P.R.M., and Freeman, A.I. *Proc. ASH, Blood* 52(5):Suppl. 1:545, pp.256 (1978).
6. Multimodality therapy for medulloblastoma. Thomas, P.R.M., Duffner, P.K., Cohen, M.E., Sinks, L.F., and Freeman, A.I. *Proc.ASCO* C-142 (1979).
7. Updated results on the treatment of childhood non-Hodgkin's lymphoma (NHL). Brecher, M.L., Thomas, P.R.M., Sinks, L.F., and Freeman, A.I. *Proc. ASCO* C613 (1979).
8. Toxicity of chemotherapy with radiotherapy for brain tumors. Thomas, P.R.M. and Freeman, A.I. *Proc. SIOP Lisbon* (1979).

GARY H. OMELL, M.D.

CURRICULUM VITAE

Born: November 1, 1942
Memphis, Tennessee

Education:
1960-1964 Memphis State University
Memphis, Tennessee

1964-1967 University of Tennessee Medical School
Memphis, Tennessee

Fellowship:
1966-1967 NIH Training Fellowship -
University of Tennessee Medical Unit
Dr. I. Frank Tullis, Preceptor
Clinical Research Center

Internship:
1968-1969 City of Memphis Hospitals
Mixed Medicine - Surgery Internship

Residency:
1969-1971 The Edward Mallinckrodt Institute of
Radiology, General Diagnostic Radiology

Subspecialty Training:
1971-1972 Fellowship in Pulmonary Radiology
Mallinckrodt Institute of Radiology
Dr. Jack Forrest, Preceptor

Appointments:
1972-1973 Instructor of Radiology, Washington
University School of Medicine

1976- Assistant Radiologist, Barnes Hospital
St. Louis, Missouri

Certification:
1973 Diplomate of the American Board of
Radiology

Military:
1973-1975 Major, USAF, MC
Diagnostic Radiologist, USAF
Scott Medical Center, Scott AFB, Illinois

CONTROL NO. 9054

Item 7
May 8, 1985

Societies:

American College of Radiology
The Radiological Society of North America
Missouri State Medical Society
Missouri State Radiological Society
St. Louis Metropolitan Medical Society
Greater St. Louis Society of Radiologists

Present Position:

Radiologist, St. Luke's Hospitals,
St. Louis, Missouri
Clinical Instructor of Radiology,
Washington University School of Medicine

BIBLIOGRAPHY:

1. Malter, I.J., Omell, G.H.: Pelvic Lipomatosis in a Woman. Obst. Gyne. 37:63-66, 1971.
2. Omell, G.H., Bramson, R., Anderson, L.: Chest Wall Tumors. Radiol. Clinics, N.A. Vol. XI, No. 1, April 1973.
3. Byrd, R., Omell, G.H., Viner, N., Trunk, G.: Leukoplakia Associated with Renal Tuberculosis in Chemotherapeutic Era. Brit. Jnl. of Urology 48:377-381, October 1976.
4. Forrest, J.V., Sagel, S.S., Omell, G.H.: Bronchography in Patients with Hemptysis. Amer. Jnl. of Roentgenology 126:597-600, 1976
5. Omell, G.H., Kingensmith, W.C.: Visualization of Hepatic Veins in Excretory Urography. Jnl. of the Canadian Association of Radiologists 29:1, p.64, March 1978.

PRESENTATIONS:

Scientific Exhibit "Chest Wall Tumors". Radiologic Society of North America's 59th Scientific Assembly and Annual Meeting, November 1973.

Scientific Exhibit "Chest Wall Tumors". 40th Annual Scientific Assembly, American College of Chest Physicians, November 1974.

Seminar in the Practical Management of Pulmonary Disease, "The Pulmonary Nodule". USAF Medical Center, Scott AFB, Illinois, November 1974.

Current Concepts in Chest Radiology. "Chest Wall Tumors". The American College of Radiology and the Department of Radiology. University of Arkansas, Little Rock, Arkansas, September 1975.

Featured Presentation "Non-vascular Special Procedures of the Lungs". Arkansas Chapter of ACR, September 1975.

First Annual St. Luke's Hospital Symposium on Newer Concepts in Diagnosis and Treatment. "Needle Aspiration as a Diagnostic Aid in Diseases of the Lung" Office of Continuing Education, Washington University School of Medicine, February 1976.

CURRICULUM VITAE

THOMAS ORVAN LYLES, M.D.

BIRTHDATE: October 24, 1946

PLACE OF BIRTH: Carrier Mills, Illinois

PRESENT ADDRESS: 11240 Tureen Drive
St. Louis, Missouri 63141

SOCIAL SECURITY NUMBER: 353-38-9482

MARITAL STATUS: Married - Linda Diane

CHILDREN: Son - Terrence Elliot
Daughter - Danielle Renee

MEDICAL EDUCATION: Pre Medical - Southern Illinois University
Carbondale, Illinois - B.A. - 1969

Washington University - St. Louis, Missouri
M.D. - 1975

INTERNSHIP AND RESIDENCIES: The Jewish Hospital of St. Louis - St. Louis, Missouri
Internship - Internal Medicine
July 1975 - June 1976

The Jewish Hospital of St. Louis - St. Louis, Missouri
Resident - General Surgery
July 1976 - July 1977

UROLOGICAL TRAINING: University of Chicago Hospitals and Clinics -
Chicago, Illinois
Resident - Urology - July 1977 - June 1978

Washington University School of Medicine
St. Louis, Missouri
Resident - Urology - July 1978 - June 1981

BOARD CERTIFICATIONS: American Board of Urology - February 1983

LICENSURES: Illinois 036-055052
Via National Board Medical Examiners - July 1977

Missouri R8742
Via Reciprocity - July 1978

HONORS AND MEDICAL SOCIETIES: American Medical Association
Saint Louis Metropolitan Medical Society
Saint Louis Urological Society
Saint Clair County Medical Society

FACULTY AND STAFF APPOINTMENTS: Clinical Instructor, Washington University -
St. Louis, Missouri
The Jewish Hospital of St. Louis - St. Louis, Missouri
Deaconess Hospital - St. Louis, Missouri
St. Elizabeth's Hospital - Belleville, Illinois
Memorial Hospital - Belleville, Illinois

CURRICULUM VITAE

Name: Marshall E. Poger
Place of Birth: St. Louis, Missouri
Date of Birth: September 18, 1939
Citizenship: U.S.A.
Family Status: Married, one child
Education: B.A., Washington University, St. Louis, Mo. 1961
M.A., (Chemistry), Brandeis University, 1963
M.D., University of Tennessee, 1969

Positions:

1970 - 1971 Intern (Medicine and Pathology), New York University
Medical Center
1971 - 1975 Resident in Pathology, New York University Medical Center
1975 - 1980 Assistant Professor of Pathology, Washington University
School of Medicine, St. Louis, Missouri
1975 - 1980 Associate Pathologist and Director, Immunopathology
Laboratory, Jewish Hospital, St. Louis, Missouri
1980 - present Associate Pathologist, Director of Immunopathology and
Medical Director of Clinical Chemistry, St. Luke's
Hospitals, St. Louis, Missouri
1984 Director of Laboratories, Charter Hospital of St. Louis,
St. Louis, Missouri

Board Certifications and Professional Associations

1974 American Board of Pathology (Anatomic and Clinical
Pathology)
1980 - to present Fellow, College of American Pathologists

Item 7
May 8, 1985

Bibliography:

- Reger, J.F., Barnett, A. and Poger, M.E.: Observations on an unusual membrane complex found in gregarines parasitic in the barnacle Balanus tintinnabulum. J. Ultrastructure Research 18: 422-427, 1967.
- Patrizi, G. and Poger, M.: The ultrastructure of the nuclear periphery. J. Ultrastructure Research 17: 127-136, 1967.
- Poger, M.E. and Lamm, M.E.: Immunofluorescent studies of human secretory component. Am. J. Pathol. (Abstracts) 74: 61a, 1974.
- Poger, M.E. and Lamm, M.E.: Localization of free and bound secretory component in human intestinal epithelial cells. A model for the assembly of secretory IgA. J. Exp. Med. 139: 629-642, 1974.
- Poger, M.E., Hirsch, B.R. and Lamm, M.E.: Synthesis of secretory component by colonic neoplasms. Am. J. Pathol. 82: 327-338, 1976.
- Weisz-Carrington, P., Poger, M.E. and Lamm, M.E.: Secretory immunoglobulins in normal and neoplastic colonic mucosa. Fed. Proc. Abstracts. 35: 394, 1976.
- Weisz-Carrington, P., Poger, M.E. and Lamm, M.E.: Secretory immunoglobulins in colonic neoplasms. Am. J. Pathol. 85: 303, 1976

CURRICULUM VITAE

Daniel William Whitehead, Jr.

Address: 8309 Amherst Avenue
University City, MO. 63132

Birthdate: November 23, 1952

Marital Status: Married, no children

Professional Status: M. D., Internal Medicine

Internship and Residency: St. Luke's Hospital
5535 Delmar Boulevard
St. Louis, MO. 63112

Specialized Schools and Universities: Drexel University
32nd and Chestnut Streets
Philadelphia, PA. 19104
Bachelor of Science, Biological Sciences-May 31, 1975

Washington University School of Medicine
660 South Euclid Avenue
St. Louis, MO. 63108
Medicinae Doctoris-May 16, 1980

Membership in Professional Societies: American Medical Association
American College of Physicians
American Cancer Society
Mound City Medical Forum

Community Organizations: Medical Director-Community
Advisory Board, UpJohn Home
Health Agency
2nd Vice President-Board of
Directors, Archway, Inc.

Professional Affiliations: Medical Staff, St. Luke's
Hospital
Medical Staff, Charter Hospital
of St. Louis
Member, Isotope Committee
Instructor, Residency Training
Program, St. Luke's Hospitals
Preceptor, Department of
Community Medicine, St. Louis
University

Work Experience: People's Clinic, Inc.
5701 Delmar Boulevard
St. Louis, MO. 63112
(Medical Director)
August, 1983-Present

St. Luke's Hospital
5535 Delmar Boulevard
St. Louis, MO. 63112
(Resident, Internal Medicine)
July, 1980-August, 1983

Darby TWP School District
Glenolden, PA. 19036
(Substitute Teacher)
September, 1974-June, 1975

References:

Available Upon Request

PROFESSIONAL RESUME

JOAN D'AMBROSE

HOME ADDRESS: 1330 Autumnwood Circle
Manchester, Missouri 63011

HOME TELEPHONE: (314) 391-0895

BUSINESS ADDRESS: Charter Hospital of St. Louis
5535 Delmar Boulevard
St. Louis, Missouri 63112

BUSINESS TELEPHONE: (314) 361-1212, extension 3100

CAREER OBJECTIVE: Administrator in a progressive facility
with an atmosphere enhancing effective
communication, learning opportunities
and personal responsibilities. Prefer
St. Louis area due to family commitments.

EDUCATION: 1962: Diploma, St. Luke's School of Nursing,
St. Louis, Missouri

1980: B.A. Nursing, Webster University,
St. Louis, Missouri

1982: M.A. Health Services Management,
Webster University, St. Louis,
Missouri

PRESENT POSITION: Associate Administrator - Chief Operating
Officer, Charter Hospital of St. Louis,
1984 to present

Administrative responsibility for the
day-to-day management operations of the
total facility. Work closely with
Department Heads in establishing and
achieving goals. Relate with Chief
Executive Officer and assist in develop-
ing and maintaining rapport with medical
staff.

PREVIOUS POSITIONS: Associate Administrator/Director of
Nursing, St. Luke's Hospital-East,
1983 to 1984

Responsibilities included Nursing Service,
Emergency Department, Ambulatory Care
Center, Cardiac Rehabilitation, Electro-
encephalography, Renal Dialysis, Behavior
Modification, and Pediatric Services.

Joan D'Ambrose

Page Two

PREVIOUS POSITIONS: Associate Administrator/Director of Nursing (Continued)

Participated in development, design, construction, legislation, site visits and operation of new programs. Worked closely with physicians and staff in these areas. Strived to develop mutual respect in professional relationships through trust, competence and credibility.

Director of Nursing, St. Luke's Hospital East, 1980 to 1983

Utilized enthusiasm and initiative to assemble and build a nursing management team. Emphasized education and inservice programs to assist staff development and patient teaching.

Dual Director: Supply, Processing and Distribution, St. Luke's Hospital-West and Laundry-Linen Services, St. Luke's Hospital East and West, 1979 to 1980

Accepted the added responsibility of the Laundry and Linen Service, as well as, the design, construction and operation of a new laundry facility. Established programs for all equipment, inventory control and quality assurance programs in a fifty-two year old laundry with sporadic linen production, no production standards and high level of equipment "down time."

Director: Supply Processing and Distribution, St. Luke's Hospital-West, 1976 to 1980

Initiated meaningful improvements in activities surrounding operating room instrument preparation, central sterilization, exchange cart supply system, surgical stock inventory control and preventive maintenance programs.

Joan D'Ambrose

Page Three

PREVIOUS POSITIONS: Nursing Service Clinical Supervisor,
St. Luke's Hospital-West, 1975 to
1976

Supervised activity and served as resource person for obstetrical, gynecological, medical, surgical and newborn nursing.

Head Nurse, St. Luke's Hospital-East,
1964 to 1975

Responsible for patient care activities in post-partum obstetrical, gynecological and oncological nursing.

Clinical Instructor, St. Luke's Hospital
School of Nursing, 1963 to 1964

Learned while teaching first level nursing students in the medical-surgical setting.

Staff Nurse, St. Luke's Hospital-East,
1962 to 1963

Evening charge nurse on a medical-surgical unit.

CURRENT AFFILIA-
TIONS:

American College of Hospital Administrators
Nominee

American Management Association

St. Luke's Hospital School of Nursing
Alumni Association

Webster University Alumni Association

SPECIAL PROJECTS
AND INTERESTS:

Webster University Adjunct Faculty: Teach classes, such as Health Care Administration Overview, in Management Program.

Hospital Information System: Served on committee to gather data, interview, complete site visits and present recommendation for Board of Directors.

Joan D'Ambrose

Page Four

SPECIAL PROJECTS
AND INTERESTS:

Inservice Education: Present information to staff, such as, Regulations and Legislation.

Bachelor of Science in Nursing Program
Advisory Committee Member

COMMUNITY ACTIVITIES AND HOBBIES:

Church Worship Committee Chairperson

Church Choir Member

Active in sports, such as racquetball, tennis and bicycling. Enjoy sailing and hiking. Learning golf.

REFERENCES:

Will be furnished upon request.

CURRICULUM VITAE

William R. Miller, R. T.

PERSONAL DATA

Date of Birth: December 25, 1928

Place of Birth: Jerseyville, Illinois

EDUCATION

Jersey Township High School, Jerseyville, Illinois.

Dates of Attendance: September 1943 - June 1947

Washington University/Mallinckrodt Institute of Radiology, St. Louis, Missouri.

Dates of Attendance: September 1950 - September 1952

PROFESSIONAL EXPERIENCE

Employed as Special Procedure Technologist at Mallinckrodt Institute of Radiology.

Dates of Employment: September 1, 1952 - January 15, 1953.

U. S. Army - Active Duty

Dates of Duty: January 1953 - January 1955.

Employed as Chief Technologist at St. Luke's Hospital under H. W. Frerking, M. D.

Dates of Employment: 1955 - 1974

Program Director and Instructor for St. Luke's Hospital Based Training Program.

Dates of Employment: 1957 - 1973.

Employed as Administrative Technologist at St. Luke's Hospitals under Sumner Holtz, M. D., Chief Radiologist.

Dates of Employment: 1974 - 1977.

Technical Education Coordinator at St. Luke's Hospitals.

Dates of Employment: 1977 - Present.

CERTIFICATION

Certificate in Radiologic Technology.

Registry with ARRT - October 1952. R.T. #012208

POST-CERTIFICATION CONTINUED EDUCATION

Washington University Evening School: General Physics - 6 credit hours. Management and Supervision - 6 credit hours.

On-the-job training in Nuclear Medicine at St. Luke's Hospital, St. Louis, Missouri under the supervision of H. W. Frerking, M. D., Chief Radiologist - 1956 - 1965.

Mallinckrodt Institute of Radiology/Washington University, St. Louis, Missouri. One week introductory course in Nuclear Medicine under M. M. Ter-Pogossian, Ph.D. and Douglas Lilly, M. D. - June 1965.

On-the-job training in Nuclear Medicine under M. D. Ter-Pogossian, Ph.D. and H. W. Frerking, M. D. - 1965 - 1974.

Certification for U. S. Department of Health, Education and Welfare course "Radiologic Health for X-Ray Technologist"- 1969.

Certificate in "Management Training" - 6 week course at St. Luke's Hospital presented by Washington University School of Business Administration.

"Seminar for Educators in Radiologic Technology" presented by University of Missouri Columbia at St. Louis, Missouri - 1978.

R.S.N.A. Convention - Chicago, Illinois - 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1970, 1972, 1975, 1976, 1977, 1978, 1981.

Oklahoma State University certificate in Radiation Safety Specialist Certification Program 1979.

CURRICULUM VITAE

Betty J. Blase, R.N., B.S.
No. 4 Conway Cove
Chesterfield, Missouri 63017
(314) 532-9673

Missouri R.N. License: 22711
Social Security #: 490-22-0627

Education:

Jewish Hospital School of Nursing
St. Louis, Missouri
R.N. Diploma: 1947

College of St. Francis
Joliet, Illinois
Bachelor of Science, Health Care: 1982

Webster University
St. Louis, Missouri
Pursuing M.A. in Health Services Management
1983-present (scheduled completion date, March, 1986)

Professional Employment:

1947, Jewish Hospital of St. Louis, staff nurse
1948-49, Jewish Hospital of St. Louis, Asst. Head Nurse.
Worked cooperatively with the Head Nurse in planning
and directing the patient care activities, as well as
the management of the unit.
1949-51, Jewish Hospital of St. Louis, Head Nurse.
Directed and coordinated the activities of the unit
to provide optimal patient care. Responsible for
planning and evaluating of patient care and personnel
performance.

1961, St. Luke's Hospital, St. Louis, Staff Nurse. Part-time
(float) Responsible for delivery of total nursing care to
assigned group of patients.

October, 1963, St. Luke's Hospital, St. Louis, Part-time
Assistant Supervisor of Nursing. Assumed relief duties
for nursing supervisors on a regular basis in directing,
coordinating and supervising the nursing activities.

October, 1970, St. Luke's Hospital, St. Louis, Full time
Assistant Supervisor of Nursing. Assumed additional
responsibilities for orientation and continuing education
of professional nurses.

CONTROL NO. 79054

Item 7
May 8, 1985

Curriculum Vitae

page 2

Betty J. Blase

Professional

Employment: (continued)

February, 1974, St. Luke's Hospital, St. Louis, Missouri,
Nursing Supervisor.

June, 1974, St. Luke's Hospital-West, St. Louis County,
Missouri, Assistant Director of Nursing-Evenings.

Supervised the activities of the Nursing Department
on the evening shift and assumed responsibility for
management of the hospital in consultation with the
Director of Nursing or Administrator on call.

December, 1980, St. Luke's Hospital-East, St. Louis,
Associate Director of Nursing.

Assisted the Director of Nursing with the planning,
organizing, directing and evaluating of the Nursing
Department.

October, 1984, Charter Hospital of St. Louis, Missouri,
Director of Nursing.

Plan and direct the activities of the Nursing Department.
Provide support for Department managers in defining
goals, interpretation of policies and procedures, and
budgeting process.

January, 1985, Charter Hospital of St. Louis, Missouri,
Assistant Administrator/Director of Nursing.

In addition to Nursing Services, assumed management
responsibility for: Emergency Services; Surgery and
Recovery; Electroencephalography and Electronography;
Electrocardiography; and the Gastrointestinal
Laboratory.

February, 1985

JOHN GOLDEN, R. T.
600 St. Louis Road
Collinsville, Illinois 63343
(618) 345-1166

CURRICULUM VITAE

Business Address:

Charter Hospital of St. Louis
Radiology Department
5535 Delmar Boulevard
St. Louis, Missouri 63112
(314) 361-1212

Education:

High School: Belle High School, Belle, Missouri - 1958-1962.
Radiology Training: St. Luke's Hospital School of Radiologic
Technology, St. Louis, Missouri - 1963-1965.

Certification:

Certification and Registry with A.R.R.T. - November 1965.
Registration #050264

Employment History:

October 1984-present: Charter Hospital of St. Louis, St. Louis,
Missouri.

Position: Director of Radiology

Responsibilities: Administrative responsibility of the day to
day management of the radiology department with includes
Diagnostic Radiology, Computerized Tomography, Nuclear Medicine,
and Ultrasonography.

June 1975-September 1984: St. Luke's Hospital, St. Louis, Missouri.

Position: Chief Radiologic Technologist

Responsibilities: Supervised the activities of the staff and
patient examinations to assure efficiency and safety.

August 1973-June 1975: St. Luke's Hospital, St. Louis, Missouri.

Position: Assistant Chief Technologist

Responsibilities: Assisted in the coordination the performance
of radiographic examinations.

November 1965-August 1973: St. Luke's Hospital, St. Louis, Missouri.

Position: Staff Radiologic Technologist

Responsibilities: Performed radiographic procedures at a technical
level not requiring constant supervision of technical detail.

CURRICULUM VITAE

MICHEL M. TER-POGOSSIAN, Ph.D.

Birthdate: April 21, 1925, Berlin, Germany

Naturalized: February, 1954

EDUCATION

1943	University of Paris Paris, France	B.A.
1943-1945	University of Paris Paris, France	
1945-1946	Institute of Radium Paris, France	
1947-1948	Washington University St. Louis, Missouri	M.S.
1950	Washington University St. Louis, Missouri	Ph.D.

ACADEMIC APPOINTMENTS

1950-1951	Instructor in Radiation Physics Washington University School of Medicine
1951-1956	Assistant Professor of Radiation Physics Washington University School of Medicine
1956-1961	Associate Professor of Radiation Physics Washington University School of Medicine
1961-1973	Professor of Radiation Physics Washington University School of Medicine
1964-present	Professor of Biophysics in Physiology Washington University School of Medicine
1973-present	Professor of Radiation Sciences Washington University School of Medicine

SOCIETIES

American Nuclear Society; American Radium Society; American Physics Society (Fellow); Radiation Research Society; Radiological Society of North America

CONTROL NO. 79054
Item 7
May 8, 1985

HONORS

New Horizons Lecturer, Radiological Society of North America, 1968
Wendell Scott Lecturer, Washington University, 1973
Benedict Cassen Lecturer, 1976
Honorary Fellow, American College of Radiology
Paul C. Aebersold Award, The Society of Nuclear Medicine, 1976
David Gould Lecturer, Johns Hopkins University School of Medicine, 1977
Honorary Member, Society Belge de Medecine Nucleaire
R.S. Landauer Memorial Lecturer, 1981
Hans Hecht Lecturer, University of Chicago, 1981
Herrman L. Blumgart, M.D. Pioneer Award, 1984

EDITORIAL BOARDS

IEEE Transactions on Medical Imaging, Editor 1982 - 1983
American Journal of Roentgenology
Postgraduate Radiology, A Journal of Continuing Education
Journal of Computer Assisted Tomography
Journal of Nuclear Medicine
Journal de Biophysique & Medecine Nucleaire

ADVISORY COMMITTEE

Various DOE Committees
Various NIH Committees

Diagnostic Radiology and Nuclear Medicine Study Section 1979 - 1981

BIBLIOGRAPHY

Michel M. Ter-Pogossian, Ph.D.

PUBLISHED PAPERS

1. Some measurements of gamma-ray energies. F.N.D. Kurie and M.M. Ter-Pogossian, Phys. Rev. 74:677-678, 1948.
2. The disintegration of Se-75. M. Ter-Pogossian, J.E. Robinson, and C.S. Cook, Phys. Rev. 75:995-998, 1949.
3. Pressure regulated thin window Geiger-Muller counter. M. Ter-Pogossian, J.E. Robinson, and J. Townsend, Rev. Sci. Instr. 20:289-290, 1949.
4. Gamma-rays from Na-24 and V-48. J.E. Robinson, M. Ter-Pogossian, and C.S. Cook, Phys. Rev. 75:1099, 1949.
5. The disintegration of Ce-141. M. Ter-Pogossian, C.S. Cook, C.H. Goddard, and J.E. Robinson, Phys. Rev. 76:909-913, 1949.
6. Energy of an excited state of Li-7. M. Ter-Pogossian, J.E. Robinson, and C.H. Goddard, Phys. Rev. 76:1407-1408, 1949.
7. The disintegration of Ti-45. M. Ter-Pogossian, C.S. Cook, F.T. Porter, K.H. Morganstern, and J. Hudis, Phys. Rev. 80:360-365, 1950.
8. On the transport of aluminum atoms by a gas. M. Ter-Pogossian, F. Porter, and C.S. Cook, Phys. Rev. 80:294-295, 1950.
9. Radioactive strontium produced by deuteron bombardment of rubidium. M. Ter-Pogossian, and F. Porter, Phys. Rev. 81:1057-1058, 1951.
10. Auxiliary equipment to be used with a beta-ray spectrometer for the study of radioactive gases. M. Ter-Pogossian, F. Porter, and C.S. Cook, Rev. Sci. Instr. 22:389-392, 1951.
11. Scintillation detector for the localization of radioactive concentrations in vivo. W.B. Ittner and M. Ter-Pogossian, Rev. Sci. Instr. 22:638-641, 1951.
12. A scintillation counter for the relative determination of x-ray intensities in radiological work. M. Ter-Pogossian and W.B. Ittner, Rev. Sci. Instr. 22:646-648, 1951.
13. Addendum: The disintegration of Ti-45. M. Ter-Pogossian, C.S. Cook, F.T. Porter, K.H. Morganstern and J. Hudis, Phys. Rev. 81:285, 1951.
14. Comparison of air and tissue doses for radium gamma-rays. M. Ter-Pogossian, W.B. Ittner, and S.M. Aly, Nucleonics 10:50-52, 1952.
15. Handling of radioactive gold for therapeutic purposes. M. Ter-Pogossian, and A.I. Sherman, Nucleonics 10:23-27, 1952.
16. Air equivalence of scintillation materials. W.B. Ittner and M. Ter-Pogossian, Nucleonics 10:48-53, 1952.

17. An expanding fixed tandem-ovoids colpostat for the treatment of carcinoma of the cervix. M. Ter-Pogossian, A.E. Sherman and A. Arneson, Amer. J. Obstet. Gyn. 64:937-941, 1952.
18. Clinical results following different methods of radium application used in the treatment of cervical cancer from 1921 to 1947. M. Bonebrake, A.I. Sherman, M. Ter-Pogossian and A.R. Arneson, Amer. J. Roentgen. 68:925-934, 1952.
19. A scintillation counter for the diagnosis and localization of intracranial neoplasms. M. Ter-Pogossian, W.B. Ittner, W.B. Seaman and H.G. Schwartz, Amer. J. Roentgen. 67:351-357, 1952.
20. Lymph node concentration of radioactive colloidal gold following interstitial injection. A.I. Sherman and M. Ter-Pogossian, Cancer 6:1238-1240, 1953.
21. Radiocardiography in congenital heart disease. D. Goldring, H. Rogers, M. Ter-Pogossian, and W.B. Seaman, J. Pediat. 44:392-406, 1954.
22. Localization of intracranial neoplasms with radioactive isotopes. W.B. Seaman, M. Ter-Pogossian, and H.G. Schwartz, Radiol. 62:30-36, 1954.
23. Scintillation counter probe for determining the relative beta-ray intensities. W.B. Ittner and M. Ter-Pogossian, Nucleonics 12:56-57, 1954.
24. Radiation dosimetry in the treatment of carcinoma of the cervix uteri by intraparametrial radioactive gold and radium. M. Ter-Pogossian and A.I. Sherman, Amer. J. Roentgen., Rad. Ther. and Nucl. Med. 74:116-122, 1955.
25. Radioactive gold for the intra-cavitary treatment of carcinoma of the cervix. M. Ter-Pogossian, and A.I. Sherman, Radiol. 65:779-783, 1955.
26. The relative biologic effects of x-rays and beta-rays. W.B. Seaman, M. Ter-Pogossian, and W.B. Ittner, Radiol. 65:260-264, 1955.
27. Monochromatic roentgen rays in contrast media roentgenography. Acta Radiologica 45:313-322, 1956.
28. The effects of moderate doses of x-ray irradiation on ocular tissue. B. Becker, M.A. Constant, P.A. Cibis, and M. Ter-Pogossian, Amer. J. Ophth. 42:51, 1956.
- ~~29. Intercomparison of x-ray exposure dose using Victoreen dose meters at various energies, particularly 22 MeV. W.K. Sinclair, J.S. Laughlin, H.H. Rossi, M. Ter-Pogossian, W.S. Moos, Radiol. 70:736-744, 1958.~~
30. Uranium x-ray grids. M. Ter-Pogossian, Radiol. 75:797-801, 1960.

31. Acute median dose for guinea pigs for CO-60 radiation. W. Newton and M. Ter-Pogossian, Rad. Res. 13:298-304, 1960.
32. The physical aspects of radiation therapy of carcinoma of the cervix uteri. M. Ter-Pogossian, Clin. Obstet. Gyn. 4:466, 1961.
33. Radioactive oxygen-15 for the study of the kinetics of the oxygen of respiration. M. Ter-Pogossian, J.S. Spratt, Jr, S. Rudman, and A. Spencer, Amer. J. Physiol. 201:582-586, 1961.
34. Radioactive oxygen-15 in the tracer study of oxygen transport. J.S. Spratt, Jr., Michel Ter-Pogossian, Sanford Rudman, and Andrew Spencer, Surg. Forum 12:7-9, 1961.
35. The measurement of the pulmonary venous cross circulation through the conjugated heart of thoracopagus twins using radioactive oxygen-15. J.S. Spratt, M. Ter-Pogossian, S. Rudman, and A. Spencer, Surgery 50: 941-946, 1961.
36. The lower limits of radiographic distinction, the antemortum size, the duration, and the pattern of growth of intrathoracic neoplasms of man as determined by direct mensuration of tumor diameters from random thoracic roentgenograms. J.S. Spratt, Jr., M. Ter-Pogossian, and Robert T. Long, Arch. Surg. 86:283-288, 1963.
37. Double isotope labeling to measure renal blood flow and filtration rate without urine collection. J.M. Stokes and Michel Ter-Pogossian, JAMA 184:201, 1963.
38. Autofluorography of the thyroid gland by means of image amplification. M. Ter-Pogossian, J. Kastner, and T.B. Vest, Radiol. 81:984-988, 1963.
39. Brain scanning with mercury-197 and mercury-203 neohydrin. A.L. Rhoton, Jr., A.M. Carlsson, and M. Ter-Pogossian, Arch. Neurol. 10:369-375, 1964.
40. Localization of posterior fossi tumors with radioactive mercury (Hg-197 or Hg-203) labelled chlormerodrin. A.L. Rhoton, Jr., A.M. Carlsson, and M. Ter-Pogossian, Arch. Neurol. 10:521-526, 1964.
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APPENDIX C
INSTRUMENTATION

1. Survey meters

- a. Manufacturer's name: Victoreen
 Manufacturer's model number: 491 with Probes 491-30 and 489-35
 Number of instruments available: One
 Minimum range: 0 mR/hr to 0.1 mR/hr
 Maximum range: 0 mR/hr to 100.0 mR/hr
- b. Manufacturer's name: Texas Nuclear
 Manufacturer's model number: 9113
 Number of instruments available: One
 Minimum range: 0.2 mR/hr to 2000 mR/hr
 Maximum range: 2000 mR/hr to 2000 mR/hr

2. Dose calibrator

Manufacturer's name: RadX
 Manufacturer's model number: Mark V
 Number of instruments available: One

3. Instruments used for diagnostic procedures

Type of Instrument	Manufacturer's Name	Model No.
Camera	Technicare	410
Camera	Searle	HP
Uptake/Well Counter	Picker	Spectoscaler 3A

4. Other (e.g., liquid scintillation counter, area monitor, velometer)

Victoreen Xenogard Mod. 36-751

APPENDIX C
INSTRUMENTATION

1. Survey meters

- a. Manufacturer's name: Victoreen Instrument Company
 Manufacturer's model number: 6-B
 Number of instruments available: One
 Minimum range: 0 mR/hr to 0.5 mR/hr
 Maximum range: 0 mR/hr to 50 mR/hr
- b. Manufacturer's name: _____
 Manufacturer's model number: _____
 Number of instruments available: _____
 Minimum range: _____ mR/hr to _____ mR/hr
 Maximum range: _____ mR/hr to _____ mR/hr

2. Dose calibrator

Manufacturer's name: _____
 Manufacturer's model number: _____
 Number of instruments available: _____

3. Instruments used for diagnostic procedures

Type of Instrument	Manufacturer's Name	Model No.
Sample Counter	Capintec Abbott	CAP-RIA 16 AUTO LOGIC

4. Other (e.g., liquid scintillation counter, area monitor, velometer)

CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items.

- ☐ 1. Survey instruments will be calibrated at least annually and following repair.
- ☐ 2. Calibration will be performed at two points on each scale used for radiation protection purposes, i.e., at least up to 1 R/hr.

The two points will be approximately 1/3 and 2/3 of full scale. A survey instrument may be considered properly calibrated when the instrument readings are within ± 10 percent of the calculated or known values for each point checked. Readings within ± 20 percent are considered acceptable if a calibration chart, graph, or response factor is prepared, attached to the instrument, and used to interpret readings to within ± 10 percent. Also, when higher scales are not checked or calibrated, an appropriate precautionary note will be posted on the instrument.

- ☐ 3. Survey instruments will be calibrated

- ☐ a. By the manufacturer
- ☐ b. At the licensee's facility

- (1) Calibration source

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

- ☐ (2) The calibration procedures in Section I of Appendix D will be used
or
☐ (3) The step-by-step procedures, including radiation safety procedures, are attached.

- ☒ c. By a consultant or outside firm

- (1) Name Syncor International Corporation Health Physics Group

- (2) Location Post Office Box 6900 Kansas City, Missouri 64130

- (3) Procedures and sources

☒ have been approved by NRC and are on file in License No. 24-16617-01 MD

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

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

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

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

CERTIFICATE OF INSTRUMENT CALIBRATION

For:

Instrument:

Manufacturer _____

Type _____

Model No. _____

Serial No. _____

Calibration Data:

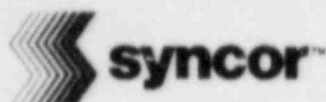
Scale	Exposure rate (mR/hr)	Instrument reading (mR/hr)	Exposure rate (mR/hr)	Instrument reading (mR/hr)	Exposure rate (mR/hr)	Instrument reading (mR/hr)

Comments:

	Activity or	Calibration
<u>Nuclide</u>	<u>Exposure Rate at Specified Distance</u>	<u>Accuracy</u>

Calibration Source:

Calibrated by _____ Date _____



SURVEY METER CALIBRATION

Institution Charter Hospital Mfr. & Mod. Victoreen 491

Address 5535 Del Mar St. Louis Mo Serial No. 229 1M

Scale Range mR/hr	Distance cm	Actual Reading mR/hr	Calculated Value mR/hr	% Variation
100	59.1*	74.0	75.0	1.3
100	102.4*	25.0	25.0	0.0
30	114.5*	20.0	20.0	0.0
30	51.2	5.0	5.0	0.0
10	187.0*	7.5	7.5	0.0
10	72.5	2.5	2.5	0.0
3	81.0	1.9 (Average swing)	2.0	5.0
3	135.7	0.70 (Average swing)	0.7	0.0
1	135.7	0.70 (Average swing)	0.7	0.0
1	273.0	0.20 (Average swing)	0.20	0.0
0.3	273.0	0.18 (Average swing)	0.2	10.0
0.3	283.3	0.15 (Average swing)	0.16	6.3

Note: Be sure probe cord is making a good connection as the cord jack does not fit tight on the meter jack.

The above instrument was calibrated with a Tec/Opr Model 726, 96.1 mCi Cs-137 Survey Instrument Calibrator. Serial #6268. Calibrated 1/25/78. Present Activity 81.5 mCi

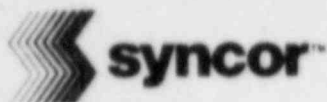
*Without Attenuator

Syncor International Corporation
Health Physics Group
Post Office Box 6900
Kansas City, Missouri 64130
(816) 523-4014

CALIBRATED BY P. J. Horner

DATE 1/28/85

NRC License No. 24-16617-01 MD



SURVEY METER CALIBRATION

Relative Intercomparison

Tc-99m

Institution Charter Hospital Mfr & Mod No Victoreen-491

Address St Louis MO Serial No 2291M

	Scale Range mR/hr	Reading mR/hr
Victoreen 740-F	0 - 25	10
Victoreen 491		
Probe #2605M	0 - 30	19
Probe #3825M	0 - 100	30

Reference Check Source

	Reading mR/hr	Geometry
--	------------------	----------

Probe S.N. 2605M. Divide by a factor of 1.9 when measuring Tc-99m products, i.e.
 $\text{actual mR/hr} = \text{scale mR/hr} \div 1.9$

Probe S.N. 3825M. Divide by a factor of 3.0 when measuring Tc-99m products, i.e.
 $\text{actual mR/hr} = \text{scale mR/hr} \div 3.0$

Calibrated by R. J. Horner

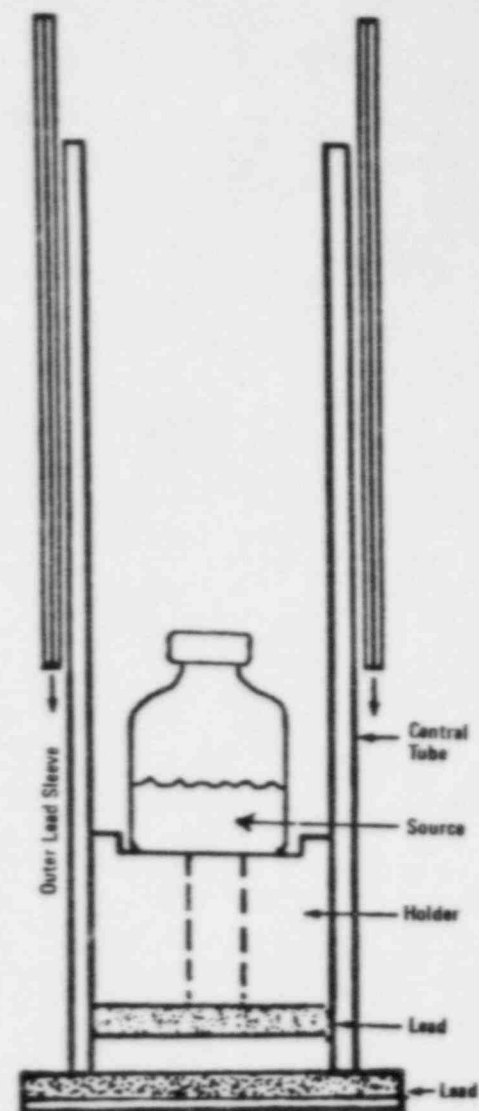
Date 1/28/85

NRC License no 24-16617-01 MD

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.



Item 10
May 8, 1985

SECTION II

General Information

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

1. Calcorp 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 D of Regulatory Guide 10.8, October, 1980. 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 μCi 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.
12. If you have questions regarding the kit, the directions for its use, or the data generated, call (216) 663-1773 for assistance.

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.

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.

Kit Calibration

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

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.

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.

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

Example

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

*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	1.70
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.

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	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	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	=

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

$$\text{MEAN} \times 1.05 = \text{UPPER LIMIT}^*$$

$$\text{MEAN} \times 0.95 = \text{LOWER LIMIT}^*$$

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

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

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	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	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

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

$$\text{MEAN} \times 1.05 = 354 = \text{UPPER LIMIT}^*$$

$$\text{MEAN} \times 0.95 = 320 = \text{LOWER LIMIT}^*$$

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.

DATA SHEET #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	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	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	=

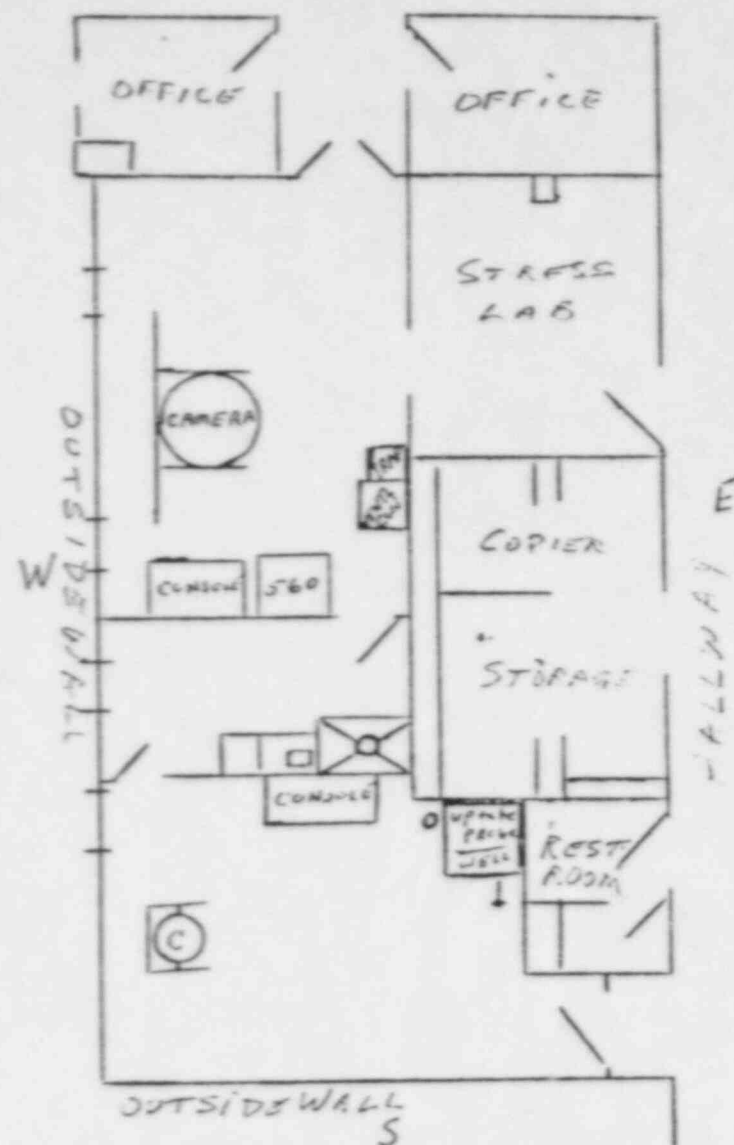
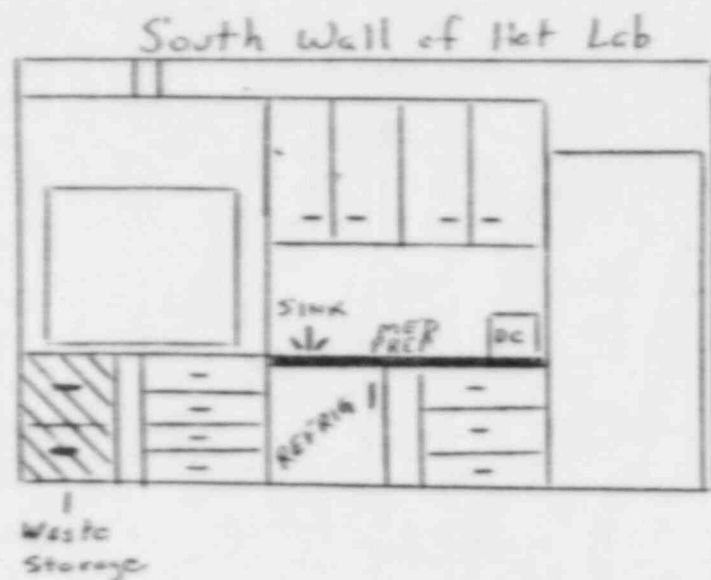
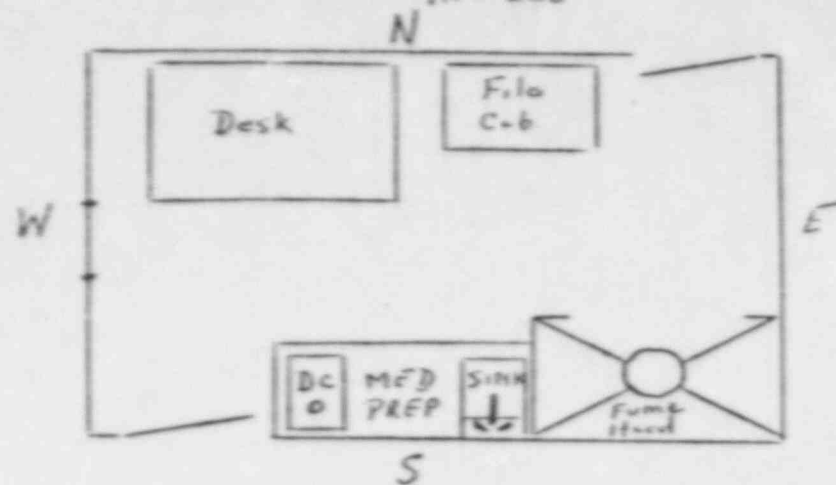
$$\text{MEAN} = \frac{\text{SUM}}{7} =$$

$$\text{MEAN} \times 1.05 = \text{UPPER LIMIT}^*$$

$$\text{MEAN} \times 0.95 = \text{LOWER LIMIT}^*$$

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

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



All technologists who work with radioactive materials shall either be registered nuclear medicine technologists or have on-the-job training as determined by the Isotope Committee. On-the-job training shall include formal course work as presented by the Radiation Safety Officer and his designates. The course shall be of one year minimum duration and shall include supervised clinical training in an institutional nuclear medicine program and shall include lectures and laboratory sessions on radiation physics and instrumentation, radiation protection, mathematics pertaining to use and measurement of radioactivity, radiation biology, radiopharmaceutical chemistry. All technologists receiving on-the-job training shall be registered radiologic technologists (ARRT) and shall only be permitted to work under the direct supervision of a registered nuclear medicine technologist.

An in-service training session shall be given at least annually for all clerical, nursing, housekeeping, security personnel and others who might work in the vicinity of radioactive materials. This in-service training shall cover paragraphs "a" through "i" in Item 12.

All personnel will be properly instructed:

- a. Before assuming their duties with or in the vicinity of radioactive materials.
- b. During annual refresher training.
- c. Whenever there is a significant change in duties, regulations, or the terms of the license.

PAUL CREECH, R.T.

Curriculum Vitae

PERSONAL DATA

Date of Birth: 06/21/60
Place of Birth: Xenia, Ohio

EDUCATION

High School: McCluer North, Waterford Drive, Florissant, Mo
September 1976 - May 1978

R. T. Training: Forest Park College, Oakland Avenue, St. Louis, MO.
June 1978 - June 1980

CERTIFICATION

Certificate in Radiologic Technology: June 1980 A.A.S.
Registry with ARRT: June 1980 R. T. #163136
N.M.R.T.# Eligible for N.M.T. Certification Board as of June 1984
with four years on the job training. Registry to be
taken in 1985.

WORK EXPERIENCE AND POST CERTIFICATION EDUCATION

Charter Hospital of St. Louis (Former St. Luke's Hospital-East)
5535 Delmar Boulevard
St. Louis, Missouri 63112

X-Ray Technologist May 1979 - present
Nuclear Medicine Technologist June 1980 - present

Item 12
May 8, 1985

RESUME

Providence L. Tucker III
9659 Jacobi Apt. 1
St. Louis, Mo. 63136

PERSONAL: Single 5'8" 160 lbs. 23 years old

PROFESSIONAL
OBJECTIVE: A job in Nuclear Medicine which will
expose me to all areas of diagnostic
procedures.

EDUCATION: Graduate from Mallinckrodt Institute of
Radiology-Nuclear Medicine, Washington
University, June 30, 1983.
Registered Radiologic Technologist, 1982,
Mallinckrodt Institute of Radiology.

WORK
EXPERIENCE: 7/83-10/83 Christian Hospital Northeast
staff nuclear medicine technologist
11/80-5/82 worked at Mallinckrodt Inst.
of Radiology as a undergraduate Radiologic
Technologist
6/78-12/78 Red Lobster; Cook
6/77-9/77 Contemporary Building Maintenance
Co.; Maintenance.

EXTRA-CURRICULAR
ACTIVITIES: 1982 Elected as student advisor to the
Missouri Society of Radiologic Technologists
4th district.
6/82-6/83 Elected as treasurer of the
Missouri Society of Radiologic Technologists,
4th district.
Now a member of the Society of Nuclear
Medicine. Body Building.

Item 12
May 8, 1985

CONTROL NO. 29054



THE AMERICAN REGISTRY OF
RADIOLOGIC TECHNOLOGISTS
HEREBY CERTIFIES THE GOOD STANDING OF

ID Number

Category

Valid Thru

491-64-5827

177563 R A SEP 1985

PROVIDENCE L TUCKER III R T

9659 JACOBI #1

ST LOUIS MO 63136



THE AMERICAN REGISTRY OF
RADIOLOGIC TECHNOLOGISTS
HEREBY CERTIFIES THE GOOD STANDING OF

ID Number

Category

Valid Thru

491-64-5827

177563 N A SEP 1985

PROVIDENCE L TUCKER III R T

9659 JACOBI #1

ST LOUIS MO 63136

APPENDIX E

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

The Nuclear Medicine Technologist will place 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.

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

During off-duty hours registered radiologic technologist on 24 hour emergency duty in the Department of Radiology will accept delivery of radioactive packages in accordance with the procedures outlined in Dr. Holtz's memorandum (attached).

Item 13
May 8, 1985

MEMORANDUM FOR: Radiologic Technologists on Emergency Duty
FROM: Sumner Holtz, M. D., Chief Radiologist
SUBJECT: Receipt of packages containing radioactive material

Any packages containing radioactive material that arrives between 5:00 p.m. and 7:00 a.m. or on Sundays shall be signed for by the registered radiologic technologist on 24 hour emergency duty and taken immediately to the Nuclear Medicine Department. Unlock the door, place the package on top of the counter immediately to the right of the door. Relock the door.

If the package is wet or appears to be damaged, immediately contact the Chief Nuclear Medicine Technologist or the Administrative Technologist or the Radiation Safety Officer. Ask the carrier to remain at the hospital until it can be determined that neither he nor the delivery vehicle is contaminated.

NUCLEAR MEDICINE TECHNOLOGISTS

Paul Creech, R.T., N.M.T.
office phone: 314/361-1212 ext 3580
home phone: 314/752-3289

Providence Tucker, R. T., C.N.M.T.
office phone: 314/361-1212 ext 3580
home phone: 314/388-2199

ADMINISTRATIVE TECHNOLOGIST

John Golden, R.T., Director of Radiology
office phone: 314/361-1212 ext 3580
home phone: 618/345-1166

RADIATION SAFETY OFFICER

M. M. TerPogossian, Ph.D.
office phone: 314/362-7117
home phone: 314/863-3949

William R. Miller, R. T., Safety Technologist
office phone: 314/434-1500 ext 4250
home phone: 314/837-9440

CHARTER HOSPITAL OF ST. LOUIS

TO: Materials Management/Purchasing
Nursing Supervisors
Switchboard
Security Personnel

FROM: Harold Small
Administrator

SUBJECT: Receipt of Packages Containing Radioactive Material

Any packages containing radioactive material that arrives between 5:00 p.m. and 7:00 a.m. or on Sundays shall be delivered by the carrier to the registered radiologic technologist on 24 hour duty in the Radiology Department. It will be signed for by that technologist only. No other personnel should accept delivery or sign for the packages. The radiologic technologist will inspect the package and immediately lock it up in the Nuclear Medicine storage area.



Item 13
May 8, 1985

APPENDIX J
WASTE DISPOSAL

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

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

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

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

☒ Other (specify): Returned to Nuclear Pharmacy

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

☒ Returned to the manufacturer for disposal.

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

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

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

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

☐ Other (specify): _____

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

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

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

☐ Other (specify): _____

4. The commercial waste disposal service used will be

N/A

(Name) _____ (City, State) _____

NRC/Agreement State License No. N/A

CONTROL NO. 79054

Radiation Hazards Considerations Resulting from Xenon-133 Escape
During Nuclear Medicine Pulmonary Studies

The following study of the possible hazards resulting from the escape of xenon-133 was carried out for a room located at Charter Hospital. The room which is approximately 3300 cu ft in volume is provided with air circulation by means of a duct system (see attached illustration).

Two specific sources of radiation hazards were considered in the study. 1) The possible escape of xenon-133 from the commercially supplied xenon trap; and 2) the accidental expiration of xenon by the patient into the room rather than into the filter.

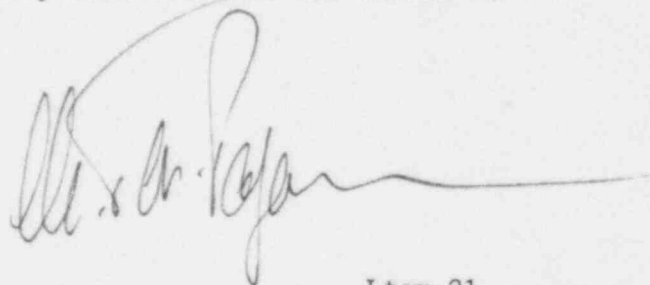
It was assumed that the amount of xenon-133 typically administered for a diagnostic procedure is 15 mCi per patient and the maximum permissible concentration of xenon-133 in air were obtained from "Radiation Protection" by Shapiro, Harvard Press, 1972.

Hazards From the Escape of Xenon-133 from the Xenon Trap

The manufacturers of xenon traps claim that "a negligible amount of xenon" escapes the trap. If we assume that this amount is, in fact, less than approximately 1% then the amount of xenon-133 released from the trap per patient will be less than 150 μ Ci/patient (assuming an administered dose of 15 mCi of xenon-133/patient) and a total daily release of less than 300 μ Ci, assuming two patients per day. The volume of the room at the hospital is approximately 93×10^6 cm³ and the release of 300 μ Ci into that room would result in a specific activity of $300 \div 93 \times 10^6 = 3.22$ pico curies of xenon-133 which is less than the maximum permissible concentration for a restricted area (10 pico curies per cc). It is therefore apparent from these calculations that a leak of 1% of the xenon-133 from the trap will not result in exceeding the permissible levels for a restricted area for a rate of utilization of two patients/day. It is assumed that by the time the air from the restricted area reaches the nonrestricted areas the dilution of the activity would be sufficient to achieve a level of 0.3 pico curies/cc.

Accidental Release of Activity

In the case of accidental release of 15 mCi of xenon-133 by a patient rebreathing into the room, the following situation will result. The volume of the room is 93×10^6 cm³ and therefore the maximum permissible amount of xenon-133 in this restricted area is 0.93 mCi. Therefore in the the case of an accidental release of 15 mCi of activity, a rapid dilution of this air by a factor of 16 must be accomplished by means of the duct system. The total rate of ventilation in this area (see attached figure) is a total of 135 cu ft/min, therefore a dilution by a factor of 16 will be accomplished in about 400 min. During the period of evacuation of the air, no personnel should remain in the area until the level of activity achieved does not exceed 10 pico curies/cm³



OFFICE

OFFICE

STRESS LAB

OUTSIDE WALL

55 FT³/MIN

CAMERA

VENTIL-
CON

37 FT³/MIN

CONSOLE

560
COMPUTER

80 FT³/MIN

CONSOLE

UPTAKE
PROBE/WELL

CAMERA

HALLWAY

1/4" = 1'-0"

CONTROL NO. 79054