

|   |   |   |
|---|---|---|
| <b>NRC FORM 313M</b><br>(9-81)<br>10 CFR 35 | <b>U.S. NUCLEAR REGULATORY COMMISSION</b><br><b>APPLICATION FOR MATERIALS LICENSE – MEDICAL</b> | Approved by OMB<br>3150-0041<br>Expires 9-30-86 |
|---|---|---|

**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.

|  |  |
|--|--|
| <b>1.a. NAME AND MAILING ADDRESS OF APPLICANT</b> (institution, firm, clinic, physician, etc.) INCLUDE ZIP CODE<br><br>St. Vincent's Medical Center<br>2800 Main Street<br>Bridgeport, CT 06606<br><br>TELEPHONE NO.: AREA CODE <u>203</u> <u>576-6000</u> | <b>1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED</b> (If different from 1.a.) INCLUDE ZIP CODE<br><br><div style="text-align: right; font-size: 1.2em;">30-01245</div> <div style="text-align: center; border: 1px solid black; padding: 2px; margin: 5px auto; width: 100px;">RECEIVED</div>                           |
| <b>2. PERSON TO CONTACT REGARDING THIS APPLICATION</b><br><br>Robert C. Lange, Ph.D.<br><br>TELEPHONE NO.: AREA CODE <u>203</u> <u>785</u> <u>6147</u>   | <b>3. THIS IS AN APPLICATION FOR:</b> (Check appropriate item)<br>a. <input type="checkbox"/> NEW LICENSE<br>b. <input type="checkbox"/> AMENDMENT TO LICENSE NO. _____<br>c. <input checked="" type="checkbox"/> RENEWAL OF LICENSE NO. <u>06-00843-03</u><br><div style="text-align: center; font-size: 0.8em;">1.0 FEE MUST BE PAID</div> |
| <b>4. INDIVIDUAL USERS</b> (Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)<br><br>See attached sheet  | <b>5. RADIATION SAFETY OFFICER (RSO)</b> (Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.)<br><br>Norman R. Vincent, M. D.  |

**6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE**

| RADIOACTIVE MATERIAL LISTED IN:      | ITEMS DESIRED<br>"X" | MAXIMUM POSSESSION LIMITS<br>(In millicuries) | ADDITIONAL ITEMS:   | MARK ITEMS DESIRED<br>"X" | MAXIMUM POSSESSION LIMITS<br>(In millicuries) |
|--------------------------------------|----------------------|---|---|---------------------------|---|
| 10 CFR 31.11 FOR IN VITRO STUDIES    | X                    |   | IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM   | X                         | 30 mCi  |
| 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 | X                         | 30 mCi  |
| 10 CFR 35.100, SCHEDULE A, GROUP II  | X                    | AS NEEDED                                     | PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.    | X                         | 30 mCi  |
| 10 CFR 35.100, SCHEDULE A, GROUP III | X                    | 2 Curies                                      | GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.                             | X                         | 30 mCi  |
| 10 CFR 35.100, SCHEDULE A, GROUP IV  | X                    | AS NEEDED                                     | IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA   | X                         | 200mCi  |
| 10 CFR 35.100, SCHEDULE A, GROUP V   | X                    | AS NEEDED                                     | XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES             | X                         | 200mCi  |
| 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.)

|  |  |   |  |   |   |
|--|--|---|--|---|---|
| <b>8801280642 870821</b><br><b>REG1 LIC30</b><br><b>06-00843-03 PDR</b>  | <b>CHEMICAL AND/OR PHYSICAL FORM</b><br><br>None | <b>MAXIMUM NUMBER OF MILLICURIES OF EACH FORM</b><br><br>None | <b>DESCRIBE PURPOSE OF USE</b><br><br><div style="text-align: right; font-size: 1.5em;">120054</div> <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto; width: 100px;">ML1B</div> |   |   |
| <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">           Log <u>Feb 57</u><br/>           Remitter _____<br/>           Check No. <u>228940</u><br/>           Amount <u>\$ 580</u><br/>           Fee Category <u>7C</u><br/>           Type of fee <u>Renewal</u><br/>           Date Check cashed <u>2/6/87</u><br/>           Date Deposited <u>2/6/87</u><br/>           By: <u>J. Kimberly</u> </td> <td style="width:50%; vertical-align: bottom; text-align: center;"> <div style="font-size: 1.5em;">120054</div> </td> </tr> </table> |  |   |  | Log <u>Feb 57</u><br>Remitter _____<br>Check No. <u>228940</u><br>Amount <u>\$ 580</u><br>Fee Category <u>7C</u><br>Type of fee <u>Renewal</u><br>Date Check cashed <u>2/6/87</u><br>Date Deposited <u>2/6/87</u><br>By: <u>J. Kimberly</u> | <div style="font-size: 1.5em;">120054</div> |
| Log <u>Feb 57</u><br>Remitter _____<br>Check No. <u>228940</u><br>Amount <u>\$ 580</u><br>Fee Category <u>7C</u><br>Type of fee <u>Renewal</u><br>Date Check cashed <u>2/6/87</u><br>Date Deposited <u>2/6/87</u><br>By: <u>J. Kimberly</u>  | <div style="font-size: 1.5em;">120054</div>      |   |  |   |   |

**INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23**

For Items 7 through 23, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the medical licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10.8, Rev. 1 Date: 10.8

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

## 24. PERSONNEL MONITORING DEVICES

| TYPE<br>(Check appropriate box) |  | SUPPLIER             | EXCHANGE FREQUENCY |
|---------------------------------|--|----------------------|--------------------|
| a. WHOLE BODY                   | <input checked="" type="checkbox"/> FILM | R. S. Landauer, Inc. | Monthly            |
|                                 | <input type="checkbox"/> TLD             |                      |                    |
|                                 | <input type="checkbox"/> OTHER (Specify) |                      |                    |
| b. FINGER                       | <input type="checkbox"/> FILM            |                      |                    |
|                                 | <input checked="" type="checkbox"/> TLD  | R. S. Landauer, Inc. | Monthly            |
|                                 | <input type="checkbox"/> OTHER (Specify) |                      |                    |
| c. WRIST                        | <input type="checkbox"/> FILM            |                      |                    |
|                                 | <input type="checkbox"/> TLD             |                      |                    |
|                                 | <input type="checkbox"/> OTHER (Specify) |                      |                    |

d. OTHER (Specify)

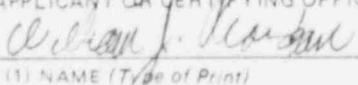
## 25. FOR PRIVATE PRACTICE APPLICANTS ONLY

|  |       |  |
|--|-------|--|
| 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  |       |  |
| CITY   | STATE | ZIP CODE   |
| 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<br>(See Section 170.31, 10 CFR 170)   | b. APPLICANT OR CERTIFYING OFFICIAL (Signature)<br> |
|   | (1) NAME (Type of Print)<br>William J. Riordan  |
| (1) LICENSE FEE CATEGORY: 6C: Human Use of ByProduct Material | (2) TITLE<br>President/CEO  |
| (2) LICENSE FEE ENCLOSED: \$ 580.00                           | c. DATE<br>January 27, 1987   |

## PRIVACY ACT STATEMENT

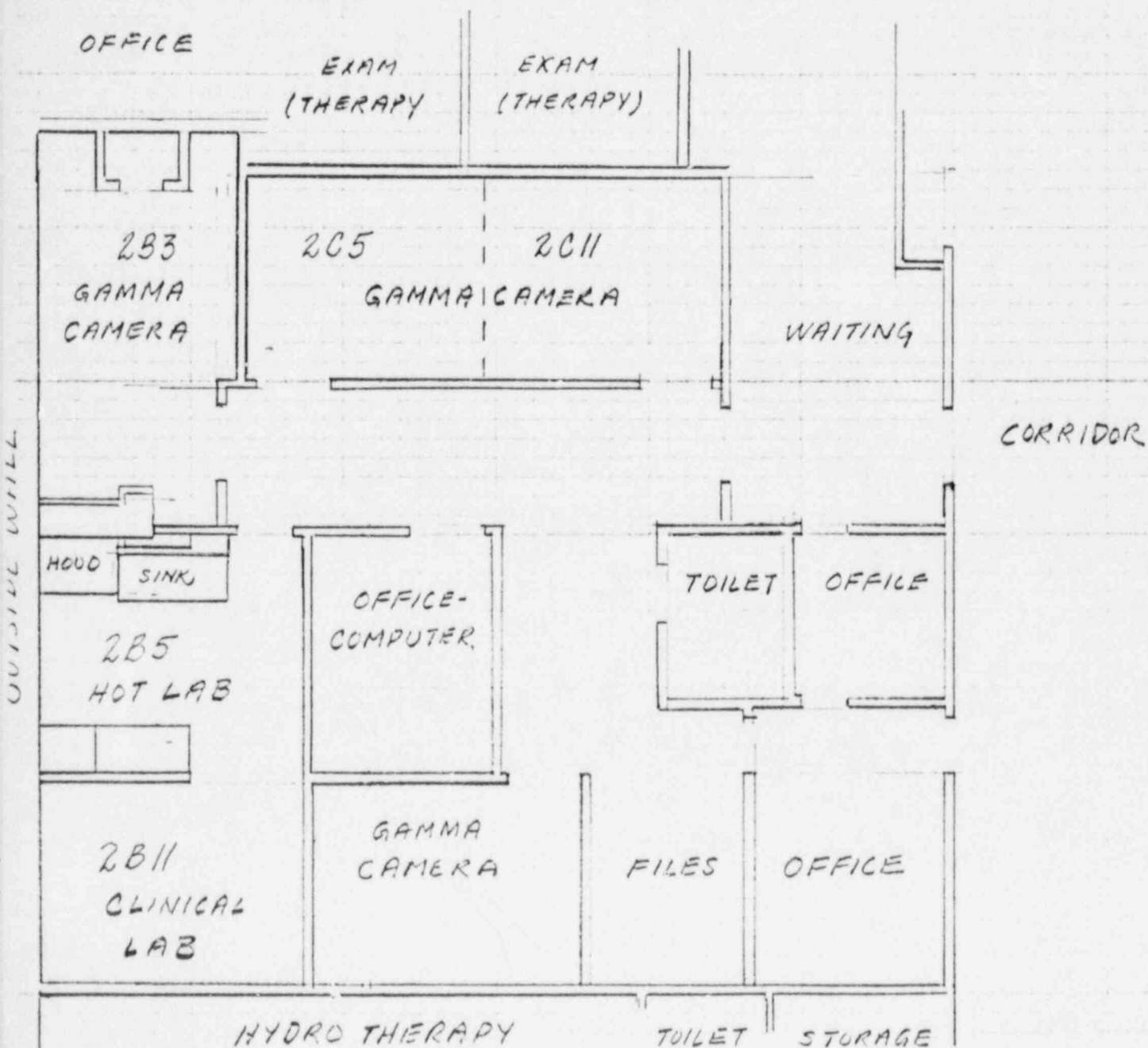
Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313M. This information is maintained in a system of records designated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

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

Item. 11

Part 1.

ST. VINCENT'S MEDICAL CENTER  
NUCLEAR MEDICINE CLINIC  
LEVEL 2 (NORTHEAST)



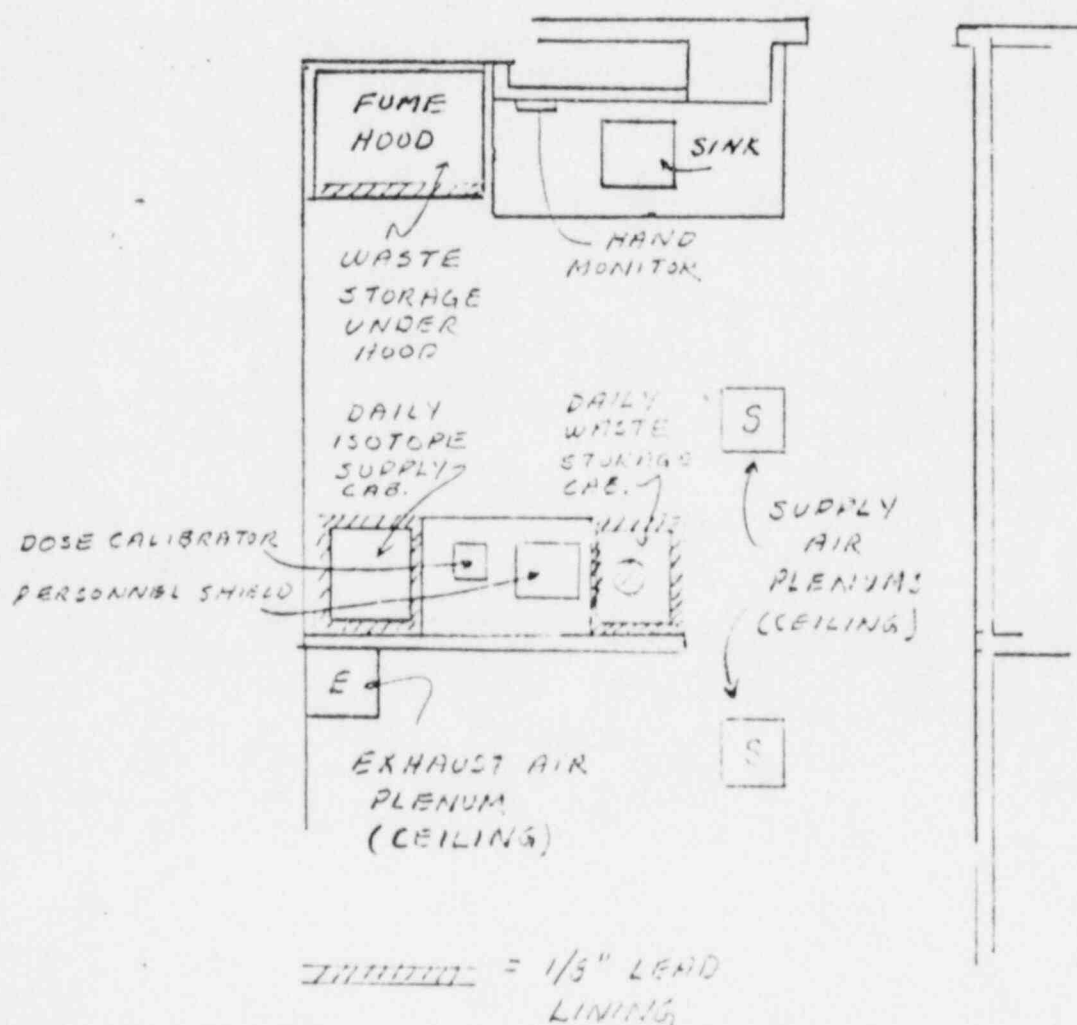
$\frac{1}{8}'' = 1 \text{ FT}$

RCL

Item 11, Part 2

ST. VINCENT'S MEDICAL CENTER  
NUCLEAR MEDICINE HOT LAB

(ROOM 2B5)



Jerome A. Meli - Radiation Physicist

Ralph W. Romano - Radiation Therapist

Robert C. Lange - Radiation Physicist - ALARA

Mary E. Campbell - Nuclear Medicine Supervisor

Norman R. Vincent - Radiation Safety Officer  
Medical Director, Nuclear Medicine

Leonard P. Rosati - Radiology Administrator

Robert D. Russo - Chairman, Department of Radiology  
Chairman, Radiation Safety Committee

George L. VanDerAue - Pathologist

Susan Jamroz - Radiology Nurse

Robert D. Russo Sr. - certified 1947

John C. Olsavsky - certified 1960

Norman R. Vincent - certified Am. Board of Rad - 1966  
certified Am Board of Nuc. Med. - 1973

Robert D. Russo Jr. - certified 1977

Henry J. Fox - certified 1955

## Curriculum Vitae

Jerome A. Meli  
4 Dell Circle  
Trumbull, Connecticut 06611  
Phone: Home (203) 261-9384  
Bus. (203) 785-2953

Date of birth: June 3, 1941

Place of birth: Brooklyn, New York

Citizenship: USA

Soc. Sec No.: 080-34-8497

### Education

1963-69            University of Connecticut  
                  Ph.D., Atomic Physics

1958-62            Manhattan College  
                  B.S., Physics

### Ph.D. Dissertation

Widths of Autoionizing States of Helium (unpublished)

### Employment History

1982-present      Radiological Physicist, Yale-New Haven Medical Center  
                  Department of Therapeutic Radiology, New Haven, Connecticut

#### Responsibilities include:

- Calibration of external beam therapy machines and updating computer data files used for treatment planning
- Teaching radiological physics to medical residents and radiation therapy technology and dosimetry students
- Acting as resource person for clinical brachytherapy
- Calibration of high activity Ir-192 sources for brachytherapy procedures using a Gamma-Med III remote afterloader
- Quality assurance and treatment planning for the Gamma-Med III

#### Research activities include:

- The physics of dosimetry and its clinical applications
- Dose enhancement from internal eye shields used in whole body electron irradiation
- Dose under blocks and blocking for optimal protection of critical organs
- Measurement of dose distributions around Fletcher-Suit-Delclos afterloading applicators used for intracavitary gynecological treatments
- Collection efficiency of ionization chambers

|         |                     |                        |
|---------|---------------------|------------------------|
| 1974-81 | Associate Professor | Fairfield University   |
| 1968-74 | Assistant Professor | Department of Physics  |
| 1966-68 | Instructor          | Fairfield, Connecticut |
| 1972    | Tenure granted      |                        |

Responsibilities included:

- Teaching lecture and laboratory courses to undergraduate physics and non-science majors. Courses taught were Atomic Physics, Thermodynamics, Quantum Theory, Classical Mechanics, Cosmology, Biophysics
- Conducting a research seminar for physics and biology majors
- Membership on and chairing of several academic and search committees

Fellowships

|         |                                |   |
|---------|--------------------------------|---|
| 1980-81 | Post-doctoral Fellow           | Yale University   |
| 1979-80 | Mellon Visiting Faculty Fellow | Department of Therapeutic Radiology<br>New Haven, Connecticut |

Professional Societies

Sigma Pi Sigma Honors Society  
American Association of Physicists in Medicine  
Health Physics Society

Publications

1. Angular Distribution of Autoionized Electrons from an Excited State of Argon, Abstracts of Papers, VIIIth International Conference on the Physics of Electronic and Atomic Collisions, J. Meli, edited by B.C. Cobic and M.V. Kurepa, 519 (1970).
2. Ionization Phenomena in High Energy Atomic Collisions, A. Russek and J. Meli, Physica, 46, 222 (1970).
3. Transition Rates of Autoionizing  $3S3p^6$  np ( $n=4,5,6$ ) State of Argon, J. Meli, Physics Letters, 46A, 323 (1974).
4. Determining  $P_{ion}$ , the Correction Factor for Recombination Losses in an Ionization Chamber, M.S. Weinhaus and J.A. Meli, Med. Phys., 11, 846 (1984).
5. Choice of Material for HVL Measurements in Megavoltage X-Ray Beams, J.A. Meli and R. Nath, Med. Phys., 12, 108 (1985).
6. Collection Efficiency of an Ionization chamber in a Pulsed-Swept Beam: Chamber and Field Size Effects, J.A. Meli and M.S. Weinhaus, submitted to Phys. Med. Biol.
7. Collection Efficiency of an Ionization Chamber in a Pulsed-Swept Beam: Collimator Scatter Effects, M.S. Weinhaus and J.A. Meli, submitted to Phys. Med. Biol.
8. Output Factors and Dose Calculations for Blocked X-Ray Fields, J.A. Meli, submitted to Med. Phys.

9. Modification of a Treatment Planning System for Determination of Dose Distributions Around Shielded Fletcher-Suit-Delclos Applications, R. Nath, J. Meli, E. Taube, submitted to Int. J. Rad. Onc. Biol. and Phys.

#### Papers Delivered

1. Coulomb Disintegration of Low Energy Deuterons, Annual Meeting of the American Physical Society, February, 1971. Abstract published in the Bulletin of the American Physical Society, January, 1971.
2. Invited to the International Symposium of Ion-Atom Collisions, Amsterdam, July, 1971. Since the symposium was informal, there were no published proceedings or abstracts.
3. A Dosimetry System for Whole-Body Electron Beam Therapy, A.G. Agostinelli, L. Berman, P. Vitali, J. Meli and R. J. Schulz, AAPM Annual Meeting, July 1983.
4. Intracavitary Scintillation Probe, J.A. Meli and R.J. Schulz, AAPM Annual Meeting, July, 1983.
5. Determining  $P_{ion}$ , The Correction Factor for Recombination Losses in an Ionization Chamber, M.S. Weinhaus and J.A. Meli, AAPM Annual Meeting, July, 1984.
6. Collection Efficiency of an Ionization Chamber in a Pulsed-Swept Beam: Collimator Scatter Effects, M.S. Weinhaus and J.A. Meli, AAPM Annual Meeting, August, 1985.

#### Other Recent Professional Activities

1. Guest lecturer, Senior Honors Seminar, Fairfield University. Title: Reality: What It Is Not, April, 1982.
2. Invited speaker at the annual meeting of the New England Chapter of the AAPM. Clinical Applications of an Intracavitary Scintillation Probe, June, 1983.
3. Panelist, Connecticut Chapter of the American Cancer Society. Topic: Treatment of Breast Cancer, March, 1984.

## CURRICULUM VITAE

### PERSONAL

Ralph W. Romano, Jr.  
450 Ellsworth Avenue  
New Haven, CT

Telephone (203) 562-6497 (home)  
(203) 576-5085 (work)

Date of Birth: July 10, 1941

### EDUCATION

College of the Holy Cross, Worcester, Massachusetts  
Degree - A.B. Premedicine, Graduated June, 1962.

S.U.N.Y., Downstate Medical Center, Brooklyn, New York.  
Degree - M.D., Graduated June, 1966.

St. Vincent's Hospital, New York, New York  
Straight Surgical Internship, July 1, 1966 to June 30, 1967.

U.S. Army, Bangkok, Thailand  
1967 to 1969

Memorial-Sloan Kettering Cancer Center, New York, New York  
Residency - Radiation Therapy  
Completed three year residency August 30, 1972.

Memorial-Sloan Kettering Cancer Center, New York, New York  
Chief Resident - Radiation Therapy, February 1 to August 30, 1972.

Memorial-Sloan Kettering Cancer Center, New York, New York  
Career Fellow, American Cancer Society, July 1, 1970 to  
June 30, 1972.

Royal Marsden Hospital, London, England  
Fourth year Residency in London, England, 1972 to 1973.

### EXPERIENCE

Certified as Diplomate of American Board of Radiology in Radiation  
Therapy, June, 1974.

St. Vincent's Medical Center, Bridgeport, Connecticut  
Director, Division of Radiation Therapy  
November, 1973 to present.

### ORGANIZATIONS

President of Bridgeport Chapter of American Cancer Society

Co-Chairman, Hospital Committee on Cancer, St. Vincent's Medical  
Center, Bridgeport, Connecticut.

Co-Chairman, Public Education Committee, Bridgeport Chapter,  
American Cancer Society.

ORGANIZATIONS CONTINUED

Delegate Director to Connecticut State Division of American Cancer Society

Member, Professional Education Committee, Bridgeport Chapter, American Cancer Society.

Member, American Society of Therapeutic Radiology

Member, Connecticut Radiology Society

Member, Fairfield County Medical Society

Liaison Associate to the Commission on Cancer of the American College of Surgeons

Medical Advisor to Greater Bridgeport Area Hospice Program

July, 1978

mag

Revised May, 1982

Reviewed 1986

Curriculum Vitae

ROBERT C. LANGE

Home Address: 5 Hughes Place  
New Haven, CT 06511  
Telephone: (203) 776-1885

Business Address: Yale University School of Medicine  
Department of Diagnostic Radiology  
333 Cedar Street  
New Haven, CT 06510  
Telephone: (203) 785-4909

Born: August 26, 1935

EDUCATION:

Northeastern University, Boston, Massachusetts  
B.S. Chemistry, 1957

Massachusetts Institute of Technology, Cambridge, Massachusetts  
Ph.D., Inorganic/Nuclear Chemistry, 1962

Thesis title: The Chemistry of Polonium

PROFESSIONAL EXPERIENCE:

- 1a. Technical Director, Section of Nuclear Medicine, Department of Diagnostic Radiology, Yale-New Haven Hospital, New Haven, Connecticut  
April, 1969 - Present
- 1b. Associate Professor of Diagnostic Radiology (Radiological Physics), Yale University School of Medicine, New Haven, Connecticut  
September, 1971 - Present
2. Group Leader, Physics, Monsanto Research Corporation, Mound Laboratory, Miamisburg, Ohio.  
May, 1968 - April, 1969  
  
Prior to May, 1968 - Research Specialist and Senior Research Chemist  
January, 1962 - May, 1968
3. Teaching and Research Assistant, MIT  
September, 1957 - January, 1962

PROFESSIONAL ACTIVITIES:

Society of Nuclear Medicine, New York Chapter, Education Committee  
 Yale-New Haven Hospital Radioisotope Committee

PROFESSIONAL SOCIETIES:

American Physical Society  
 American Chemical Society  
 Sigma Xi  
 Society of Nuclear Medicine

PUBLICATIONS:

1. Lange, R.C., Hagee, G.R., McCarthy, J.T.: The half life of the 0.305 MeV level in  $^{75}\text{As}$ . J. Inorg. Nucl. Chem., 28, 651, 1966.
2. Desando, R.J., Lange, R.C.: The structure of polonium and its compounds. I.  $\alpha$ - and  $\beta$ -polonium metal. J. Inorg. Nucl. Chem., 28, 1837, 1966.
3. Hagee, G.R., Lange, R.C., McCarthy, J.T.: Weak alpha and electron-capture decay in  $^{208}\text{Po}$  and  $^{209}\text{Po}$ . Nuclear Physics, 84, 62, 1966.
4. Lange, R.C.: The analytical chemistry of polonium. A chapter contributed to progress in Nuclear Chemistry, series IX, Vol. 6. Pergamon Press, 1966.
5. Lange, R.C., Hagee, G.R., McCarthy, J.T.: The ground state parity of  $^{227}\text{Ac}$ . Nuclear Physics. A115, 157, 1968.
6. Desando, R.J., Lange, R.C.: Levels, transitions and rotational structure in  $^{227}\text{Ac}$ . Nuclear Physics. A124, 412, 1969.
7. Lange, R.C., Hagee, G.R., Campbell, A.R.: The alpha decays of  $^{210}\text{Bi}$  and  $^{210\text{m}}\text{Bi}$  to levels in  $^{206}\text{Tl}$ . Nuclear Physics. A133, 273-288, 1969 (August).
8. Lange, R.C., Hagee, G.R.: The half life of  $^{210\text{m}}\text{Bi}$ . J. Inorg. Nucl. Chem., 31, 2297-2301, 1969 (August).
9. Spencer, R.P., Lange, R.C., Treves, S.:  $^{131}\text{Ba}$ : An intermediate-lived radionuclide for bone scanning. J. Inorg. Nucl. Med., 11, 95-96, 1970 (February).

PUBLICATIONS (cont'd):

10. Cothorn, C.R., Hennecke, H.J., Manthuruthil, J.C., Lange, R.C.: Beta decays of  $^{193}\text{Os}$  levels in  $^{193}\text{Ir}$ . Phys. Rev., 182, 1286-1303, 1969 (July).
11. Lange, R.C., Spencer, R.P.:  $^{144}\text{Ce}$  to  $^{144}\text{Pr}$  generator: possible use in blood flow studies. J. Inorg. Nucl. Med., 11, 340, 1970 (June).
12. Hagee, G.R., Lange, R.C., Campbell, A.R.: Levels and transitions in  $^{208}\text{Bi}$ . Nuclear Physics. A135, 225-30, 1969 (August).
13. Antar, M.A., Spencer, R.P., Lange, R.C., Kligerman, M.M., Radionuclide studies on effects of different doses of focal radiation on the function of the liver. J. Nucl. Med., 11, 296, 1970 (June).
14. Lange, R.C., Freedman, G.S., Treves, S.: An analysis of the maximum useful frame rate for Anger type scintillation cameras. J. Nucl. Med., 11, 340, 1970 (June).
15. Lange, R.C., Treves, S., Spencer, R.P.:  $^{135\text{m}}\text{Ba}$  and  $^{131}\text{Ba}$  as bone scanning agents. J. Nucl. Med., 11, 340-41, 1970 (June).
16. Treves, S., Lange, R.C., Freedman, G.S.: Study of cardiopulmonary hemodynamics using a gamma camera and a computer. J. Nucl. Med., 11, 369-70, 1970.
17. Freedman, G.S., Treves, S., Lange, R.C., Cornelius, E.A., Brown, R.: Renal transplant evaluation using technetium-DTPA, a gamma camera, and a small computer. J. Nucl. Med., 11, 320-21, 1970.
18. Pearson, H.A., Spencer, R.P., Cornelius, E.A., Treves, S., Lange, R.C.: Functional asplenia in sickle cell anemia - a reversible defect. J. Nucl. Med., 11, 349-50, 1970.
19. Spencer, R.P., Lange, R.C., Treves, S.: Utilization of  $^{135\text{m}}\text{Ba}$  and  $^{131}\text{Ba}$  as bone scanning agents. J. Nucl. Med., 12, 216-221, 1971.
20. Lange, R.C., Spencer, R.P.: The  $^{128}\text{Ba} - ^{128}\text{Cs}$  system. An in vitro and in vivo radionuclide generator. J. Nucl. Med., 12, 1971 (June).
21. Spencer, R.P., Lange, R.C.: A radionuclide approach to the study of blood flow in varicosities. J. Nucl. Med., 12, 1971 (June).
22. Spencer, R.P., Pearson, H.A., Lange, R.C.: Human spleen: Scan studies on growth and response to medications. J. Nucl. Med., 12, 1971 (June).

PUBLICATIONS (cont'd):

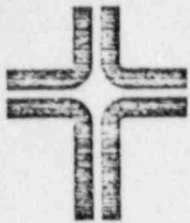
23. Lange, R.C., Spencer, R.P.: Beryllium 7: A bone scanning agent with urinary tract excretion. *J. Nucl. Med.*, 12, 4, 1970.
24. Spencer, R.P., Touloukian, R.J., Lange, R.C., Nuland, S.B., Fischer, D.S.: Effects of vascular lesions on hepato-splenic accumulation of radiocolloid. *J. Nucl. Med.*, 12, 397-8, 1971.
25. Spencer, R.P., Lange, R.C.: Radioisotopic approaches to the estimation of intestinal blood flow. A chapter in: Boley, S.J. (ed.) Vascular Disorders of the Gastrointestinal Canal. Appleton-Century-Crofts (1971).
26. Touloukian, R.J., Rickert, R., Lange, R.C., Spencer, R.P.: The microvascular circulation of lymph angiomas: A study of  $^{133}\text{Xe}$  clearance and pathology. *Pediatrics*, 48, 36-40, 1971.
27. Hagee, G.R., John, G., Holton, R.L., Lange, R.C.: Levels in  $^{219}\text{Rn}$  populated by alpha decay of  $^{223}\text{Ra}$ . *Bull. Am. Phys. Soc.* 16, 493, 1971.
28. Lange, R.C., Touloukian, R.J., Spencer, R.P.: Hepatic artery and portal vein contribution to extraction of radiocolloid by canine liver. *J. Nucl. Med.*, 13, 390-1, 1972.
29. Freedman, G.S., Schiff, M., Lange, R.C., Brown, R.S., Weiss, R.M., Treves, S., Lytton, B: Functional assessment of renal nomografts by means of  $^{99\text{m}}\text{Tc}$ -DTPA and a gamma scintillation camera. *Investigative Urology*, 9, 490-495, 1972.
30. Lange, R.C.: A simpler method for optimizing the window of the Anger camera for  $^{99\text{m}}\text{Tc}$ . *J. Nucl. Med.*, 13, 342, 1972.
31. Lange, R.C., Spencer, R.P., Harder H.C.: Synthesis and distribution of a radiolabeled antitumor agent: cis-diamminedichloroplatinum (II). *J. Nucl. Med.*, 13, 328-330, 1972.
32. Lange, R.C., Spencer, R.P.: Feasibility of  $^{133\text{m}}\text{Ba}$  as a bone scanning agent. *J. Nucl. Med.*, 13, 342 (1972).
33. Lange, R.C., Freedman, G.S., Treves, S.: Analysis of maximum frame rates for gamma camera-computer systems. *Phys. Med. Biol.*, 17, 624-629, 1972 (September).
34. Effman, E.L., Freedman, G.S., Lange, R.C.:  $^{133}\text{Xe}$  studies of collateral ventilation and air trapping following endobronchial occlusion. *Radiology*, 105, 85-91, 1972 (October).

PUBLICATIONS (cont'd):

35. DeConti, R.C., Lange, R.C., Harder, H.C., Creasy, W.A.: Clinical and pharmacological studies with cis-diammedichloroplatinum (II) (Cis-Pt). Proc. Amer. Assoc. Cancer Res., 13, 96, 1972.
36. Lange, R.C., Spencer, R.P., Harder, H.C.: The antitumor agent cis-Pt (NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>: Distribution studies and dose calculations for <sup>193</sup>mPt and <sup>195</sup>mPt. J. Nucl. Med., 14, 191-195, 1973 (April).
37. Packer, S., Lange R.C.: Radioactive phosphorus for the detection of ocular melanomas - a critical review. Arch. Opthamol., 90, 17-20, 1973 (July).
38. Lange, R.C.: Nuclear Medicine for Technicians. Chicago: Yearbook Medical Publishers. 1973 (July).
39. Forbes, G.S., Glenn, W.W.L., Lange, R.C.: Xenon-133 radiospirometry in electrophrenic respiration: Diaphragm Pacing. Surgery, 75, 398-407, 1974.
40. Ravin, C.E., McCloud, T., Putman, C., Greenspan, R., Lange, R.C., Langou, R.: Redistribution of pulmonary blood flow secondary to pulmonary arterial hypertension. RSNA, November, 1975.
41. Lange, R.C., Gottschalk, A.: The Stripe Sign - associated with the breast artifact on liver scan. RSNA, November 1975.
42. Caride, V., Puri, S., Slavin, J., Lange, R.C., Gottschalk, A.: The usefulness of posterior oblique views in perfusion lung imaging. Radiology, 121, 669-671, 1976.
43. Makhija, M.C., Bronfman, H.J., Lange, R.C., Glenn, W.L., Gottschalk, A.: Ventilation patterns mimicking COPD in patients with diaphragmatic pacing for Ondine's curse. Radiology, 129, 111-116, 1978.
44. Lange, R.C.: "Introductory Physics and Instrumentation" in Schneider, P.B., Treves, S., (eds.), Nuclear Medicine in Clinical Practice. Elsevier/North Holland Biomedical Press, 1978.
45. Ravin, C.E., Greenspan, R.H., McCloud, T.C., Lange, R.C., Langou, R.A., Putman, C.E.: Redistribution of pulmonary blood flow secondary to pulmonary arterial hypertension. Investigative Radiology, Vol. 15, 29-33, 1980.
46. Caride, V.J., Touloukian, R.J., Ablow, R.C., Lange, R.C., Matthews, T.: Abdominal and hepatic uptake of <sup>99m</sup>Tc-pyrophosphate in neonatal necrotizing enterocolitis. Radiology, 139, 205-211, 1981.

PUBLICATIONS (cont'd):

47. Hillemeier, A.C., Lange, R.C., McCallum, R., Seashore, J., Gryboski, J.: Delayed gastric emptying in infants with gastroesophageal reflux. *Journal of Pediatrics*, Vol. 98, No. 2, 190-193, 1981.
48. Ment, L.R., Ehrenkranz, R.A., Lange, R.C., Rothstein, P.T., Duncan, C.E.: Alterations in cerebral blood flow in preterm infants with intraventricular hemorrhage. *Pediatrics*, 68, 763-769, 1981.
49. Wackers, F.J., Giles, R.W., Hoffer, P.B., Lange, R.C., Berger, H.J., Zaret, B.L.: Gold-195m, a new generator-produced short-lived radionuclide for sequential assessment of ventricular performance by first pass radionuclide angiocardiology. *Am. J. Cardiol.*, Vol. 50, 89-94, 1982.
50. Holloway, R.H., Krosin, G., Lange, R.C., Baue, A.E., McCallum, R.W.: Radionuclide esophageal emptying of a solid meal to quantitate results of therapy in achalasia. *Gastroenterology*, 84, 771-776, 1983.
51. Ment, L.R., Ehrenkranz, R.A., Duncan, C.C., Lange, R.C.: Delayed hemorrhagic infarction: A cause of late neonatal germinal matrix and intraventricular hemorrhage. *Arch. Neurol.*, Vol. 41, 1036-1039, 1984.
52. Ment, L.R., Duncan, C.C., Ehrenkranz, R.A., Lange, R.C., Taylor, K.J., Kleinman, C.S., Scott, D.T., Sivo, J., Gettner, P.: Intraventricular hemorrhage of the preterm neonate timing and cerebral blood flow changes. *J. Pediatr.* 104, 419-425, 1984.
53. Williams, H.C., Pope, C.F., Siskind, B.N., Lange, R.C., Flye, M.W.: Vascular thrombosis in acute hepatic allograft rejection: scintigraphic appearance. *J. Nucl. Med.* 26:478-481, 1985.
54. McCallum, R.W., Grill, B.R., Lange, R., Planky, M., Glass, E.E., Greenfield, D.G.: Definition of a gastric emptying abnormality in patients with anorexia nervosa. *Digestive Diseases and Sciences* 30(8):713-722, 1985 (August).
55. Traube, M., Lange, R.C., McAllister, R.G., Jr., McCallum, R.W.: Effect of Nifedipine on gastric emptying in normal subjects. *Digestive Diseases and Sciences* 30(8):710-712, 1985 (August).
56. Wackers, F.J.Th., Berger, H.J., Hoffer, P.B., Lange, R.C., Zaret, B.L.: <sup>195m</sup>Gold for Assessment of Cardiac Function. [IN] Radioisotope Studies in Cardiology, eds. H.J. Biersack, P.H. Cox. (Martinus Nijhoff Publishers, 1985), p. 197.



# St. Vincent's Medical Center

2800 Main Street, Bridgeport, Connecticut 06606 / Phone (203) 576-6000

## CURRICULUM VITAE

NAME: Mary E. Campbell, R.T.N.M.  
44 Country Place  
Shelton, Connecticut 06484  
Phone: 929-5592

POSITION: Supervisor, Division of Nuclear Medicine  
Educational Coordinator, School of Nuclear Medicine  
Technology  
St. Vincent's Medical Center  
2800 Main Street  
Bridgeport, Connecticut 06606

PERSONAL DATA: Place & Date of Birth - Waterbury, Connecticut  
February 1, 1946

EDUCATION: X-Ray Technology - 1963-1965  
St. Mary's Hospital  
Waterbury, Connecticut

Nuclear Medicine Technology - 1965-1967  
St. Mary's Hospital  
Waterbury, Connecticut

CERTIFICATION: A.R.R.T. in X-Ray - 1965  
A.R.R.T. in Nuclear Medicine - 1971

EXPERIENCE: (1) X-Ray, St. Mary's Hospital - 1965  
(2) Nuclear Medicine  
(a) Staff Technologist - 1966-1970  
(b) Chief Technologist - 1970-1973  
(c) Instructor for X-Ray  
orientation in Nuclear  
Medicine - 1970-1973  
(d) Instructor for on-the job  
training - 1970-1973  
(e) Taught seminars in Nuclear  
Medicine for Mattatuck  
Community College - 1972-1973

(3) Chief Technologist St. Vincent's  
Medical Center - 1973-present  
(4) Instructor, St. Vincent's  
Medical Center for Nuclear  
Medicine student technologists  
(5) Instructor for X-Ray student  
orientation in Nuclear Medicine

EXPERIENCE:

- (6) Educational Coordinator  
School of Nuclear Medicine Technology  
St. Vincent's Medical Center  
1977 to present

SOCIETIES:

- (1) Member of Society of Nuclear Medicine 1975 to pres.
- (2) Member of Greater New York Chapter,  
Society of Nuclear Medicine 1975 to pres.  
Technologist Section
- (3) Member of New England Chapter,  
Society of Nuclear Medicine 1978 to 1982  
Technologist Section
- (4) Member of V.O.I.C.E. - Verification  
of Involvement in Continuing  
Education 1978 to pres.

OFFICES:

Area Council for Connecticut - Greater New York  
Chapter, Society of Nuclear Medicine  
1976-1978, 1978-1980, 1980-1982, 1982-1984

Chairman, Grievance Committee  
Greater New York Chapter, Society of Nuclear Medicine  
Technologist Section - 1977-1978.  
Member, Spring Symposium Committee,  
New England Chapter, Spring 1978.  
Member, Regulatory Agency Committee

LECTURES:

"Cardiovascular Nuclear Medicine"  
Connecticut Nuclear Medicine Club - March 1978  
  
"MUGA" - Fall Meeting, Society of Nuclear Medicine  
New England Chapter

## CURRICULUM VITAE

NAME: Norman R. Vincent, M. D.  
HOME ADDRESS: 62 High Noon Road, Weston, CT 06883  
Phone: 227-0756  
BUSINESS ADDRESS: 10 Washington Avenue, Bridgeport, CT 06604  
Phone: 368-0277  
PLACE & DATE OF BIRTH: Sydney, Australia - 3/13/32

## EDUCATION

Primary: Sydney Tech High School, NSW Australia  
Graduated 1948

University: University of British Columbia, Canada 1955-1957  
School of Medicine, University of British Columbia,  
1957-1961, M.D. degree 1961.

Post-Graduate: Internship - St. Vincent's Hospital, Bridgeport, CT,  
7/1/61 to 6/30/62.

Residency - Resident in Radiology, St. Vincent's  
Hospital, Bridgeport, CT 7/1/62 to 6/30/65, except  
resident in Radiology, Bellevue Hospital Medical  
Center, NYC, 1/63 to 6/30/63 fulltime Nuclear  
Medicine and Radiation Therapy under supervision of  
Dr. Sidney Rubenfeld.

Formal training at Yale New Haven Medical Center  
during residency in Radiology at St. Vincent's  
Hospital - includes: Introduction to X-rays and  
Radioisotopes (Radiology 302) 12 hours; Clinical and  
Laboratory Applications of Radioisotopes (Radiology  
304) 24 hours; Physics (Radiology 303) 20 hours.

## RESEARCH EXPERIENCE

University of British Columbia School of Medicine, Canada, Department  
of Physiology. Research in parathyroid function and calcium metabolism,  
Director Harold Copp, M.D. (Summer, 1958)

University of British Columbia Medical School, Canada, Department of  
Surgery. Research in Gastric Secretions in animals with Heidenhaim  
pouches. Director F.R.C. Johnstone, M.D. (Summer, 1959)

University of British Columbia, Department of Surgery Research on  
Effects of Gastric Mucosal Stripping on gastric sections. Director  
F.C.R. Johnstone, M.D. (Summer, 1960)

## MEDICAL PRACTICE

1965 to present: Attending Radiologist, Department of Radiology,  
St. Vincent's Hospital.

1970 to present: Director, Division of Nuclear Medicine, St. Vincent's  
Hospital.

LITERATURE

Vincent, N.R.: The Value of the Radioactive Liver Scan in Cancer Patients.

St. Vincent's Hospital Medical Bulletin 7:17, 1965.

CERTIFICATION

American Board of Radiology (Roentgenology) June 1966.  
American Board of Nuclear Medicine, June 1973.  
Medical Council of Canada - 1961.  
Canadian Society of X-ray Technologists - 1954.  
Member Institute of Radiography (Australia) - 1950.

SOCIETIES

Alpha Omega Alpha (1960)  
American College of Radiology  
Society of Nuclear Medicine  
American College of Nuclear Medicine  
Radiological Society of Connecticut  
Connecticut State Medical Society  
Fairfield County Medical Association  
College of Physicians and Surgeons of British Columbia

APPOINTMENTS

Assistant Clinical Professor, Diagnostic Radiology, Yale-New Haven Hospital.

LEONARD P. ROSATI, R. T.

CURRICULUM VITAE

PERSONAL

Leonard P. Rosati, R. T.  
103 Chambrook Road  
Stratford, CT 06497

DOB: August 9, 1940  
Bridgeport, CT

EDUCATION

St. Vincent's Hospital School of Radiologic Technology  
University of Bridgeport, 1962/63

Numerous Management Seminars and Short Courses taken  
from 1963 to present

EMPLOYMENT

Norwalk Hospital, Norwalk, CT, 1961 - 1962, Staff Technologist

St. Vincent's Hospital, Bridgeport, CT, 1963 - 1972, Chief  
Technologist for the Department of Radiology and Educational  
Coordinator for the School of Radiologic Technology;  
Supervisor, Department of Radiology, 1972 - 1974;  
Administrative Coordinator, Department of Radiology, 1974 -  
1977; Director, Department of Radiology, 1977 to present

CERTIFICATIONS

American Registry of Radiologic Technologists, 1961

ORGANIZATIONS

Connecticut Society of Radiologic Technologists

American Society of Radiologic Technologists

Connecticut Hospital Association (Radiology Managers  
Conference Group)

## CURRICULUM VITAE

### PERSONAL:

Robert Dante Russo, M. D. Home Address: 208 Brooklawn Avenue  
Bridgeport, CT 06604

Office Address: 10 Washington Avenue  
Bridgeport, CT 06604

### Family:

Wife - Wanda

Children - Arlyne Russo, Speech Pathologist  
Robert D. Russo, Jr., M. D., Radiologist  
Richard Russo, Secondary Education Teacher

### EDUCATION:

Fordham University, B.S. Degree  
Georgetown University, M.D. Degree

### Residency:

Intern and Chief Resident at St. Vincent's Hospital.  
Resident and Fellow Radiology, Georgetown Medical School Hospital and  
Doctors Hospital, Washington, D.C.  
Fellow and Associate Radiologist, Garfield Hospital and Warwick Tumor  
Clinic, Washington, D.C.

Certification American Board of Radiology

### CHAIRMANSHIPS:

Chairman, Department of Radiology, St. Vincent's Medical Center,  
Bridgeport, CT  
Chairman, St. Joseph's Manor, Trumbull, CT

### TEACHING POSITIONS AND CLINICAL PROFESSORSHIP:

Instructor and Clinical Professor of Radiology, Georgetown University  
Medical School.  
Clinical Professor of Radiology, New York University Medical School  
and Bellvue Hospital.

### ASSOCIATIONS AND SOCIETIES:

Fellow - American College of Radiology  
Fellow - American College of Geriatrics  
Member - American College of Nuclear Medicine  
Member - New England Council of Physicians  
Past-President - Connecticut Chapter of American College of Radiology

ASSOCIATIONS AND SOCIETIES; Continued

Councillor - Connecticut Chapter of American College of Radiology  
Delegate - Connecticut State Medical Society  
Member - Radiological Society of North America  
Member - Conference of Radiologists  
Member - American Society of Ultrasound  
Member - Foundation of American College of Radiology  
Member - American Society of Nuclear Medicine  
Member - New York Roentgen Society  
Member - Radiological Society of Connecticut  
Member - American Medical Association  
Member - Connecticut Medical Society  
Served as Director and Advisor - American Cancer Society  
Board of Directors of Connecticut TB Society

SOCIAL ORGANIZATIONS:

Member - Patterson Country Club  
Member - Algonquin Club  
Member - New York Athletic Club  
Member - Mill River Country Club  
Member - Boca Raton Country Club  
Member - Lions Club  
Member - Fairfield Chamber of Commerce

BUSINESS AFFILIATIONS:

Director and Founder - Lafayette Bank & Trust  
Former Director and Advisor - Beacon Fund Inc.  
Former Director and Advisor - All State S.B.I.C.  
Director - United Illuminating Company

CURRICULUM VITAE

PARTIAL - FOR NUCLEAR REGULATORY COMMISSION

NAME: George Lane VanDerAue, M.D.

PERSONAL DATA: Birth: May 24, 1940, Portsmouth, Virginia  
Married, three sons ages 8-18

ACADEMIC TRAINING, CERTIFICATES:

Princeton University, 1962 B.A. Biology Major  
University of Pennsylvania, School of Medicine 1966 M.D.  
Hartford Hospital 1966-1967 Rotating Internship  
1967-1971 Anatomic and Clinical Pathology Residency  
1970-1971 Chief Resident, Pathology

Physicians Licensure, Medical and Surgery, State of  
Connecticut 1969

American Board of Pathology, Anatomic and Clinical 1972  
St. Vincent's Medical Center, Bridgeport, Connecticut -  
1973 - present

Subspecialty Board, Radioisotopic Pathology, American  
Board of Pathology - American Board of Nuclear  
Medicine 1974

SPECIFIC RADIOISOTOPIC DATA:

Subspecialty Board, 1974 (see above)  
Medical Director, Clinical Chemistry, Department of  
Laboratories, St. Vincent's Medical Center  
(includes Radionuclide Division - In Vitro  
Radioisotopic tests)

Clinical Radioassay Society, N.Y., N.Y., 1974  
Preceptor Statement, USAEC, Form 313 Page 3 & 4  
January 1974. Under License 08-00625-01

User, Institutional License 06-00843-03 St. Vincent's  
Medical Center, Amendment No. 08 February 1974

Revised 6/1981  
Reviewed 1986

CURRICULUM VITAE

NAME: Susan Jamroz, R.N.  
2 Friers Drive  
Ansonia, Connecticut 06401  
Phone: (203) 735-9630

DATE/PLACE  
OF BIRTH: August 12, 1948  
Derby, Connecticut

EDUCATION:

1966 - Graduated from Amity Senior High School  
Woodbridge, Connecticut

1969 - Graduated from St. Vincent's Hospital School of  
Nursing - Diploma

1972 - 1974 Attended University of Bridgeport to attain credits  
toward B.S.N.

June 1969 -  
Oct. 1972 Worked as staff nurse on Medical/Surgical Unit  
Also worked six weeks in CCU  
  
8 week course - "Cardiac Arrhythmias"  
1 week course - administer I/V Therapy

Oct. 1972 -  
March 1973 Promoted to Head Nurse of Report Personnel and Patient  
Assistants working in all areas of hospital including  
specialty areas (ER, ICU, CCU, Pediatrics, Post-Partum)

March 1973 -  
August 1974 Head Nurse position expanded to cover SSC, hemodialysis,  
panendoscopy suite and Radiology Nurse

Sept. 1974 -  
May 1976 Head Nurse position changed to Director Special Nursing  
Care

May 1976 -  
April 1977 Worked as Staff Nurse post-CCU

April 1977 -  
Present Radiology R.N.

1979 - 1981 CPR Instructor for Radiology Department

1980 - 1982 Member of American Radiology Nurse Association and  
Connecticut Chapter ARNA

1982 to pres. In-House Neuroradiology Instructor

1986.

APPENDIX C  
INSTRUMENTATION

1. Survey meters

a. Manufacturer's name: Victoreen Instrument Company

Manufacturer's model number: 6

Number of instruments available: 2

Minimum range: 0 mR/hr to 0.5 mR/hr

Maximum range: 0 mR/hr to 50 mR/hr

b. Manufacturer's name: Victoreen Instrument Company

Manufacturer's model number: 1 A

Number of instruments available: 1

Minimum range: 0 mR/hr to 500 mR/hr

Maximum range: 0 mR/hr to 500,000 mR/hr

2. Dose calibrator

Manufacturer's name: Capintec

Manufacturer's model number: CRC - 6A

Number of instruments available: 1

3. Instruments used for diagnostic procedures

| Type of Instrument | Manufacturer's Name | Model No. |
|--------------------|---------------------|-----------|
| Gamma Camera       | Siemens             | LFOV      |
| Gamma Camera       | Siemens             | ELC 370S  |
| Gamma Camera       | Technicare          | MOBILF    |

4. Other

Item 4: Authorized Users: The following physicians are currently authorized users on the license:

Robert D. Russo, M. D.

John C. Olsavsky M. D.

Norman R. Vincent, M. D.

Henry J. Fox, M. D.

Robert D. Russo, Jr., M. D.

Item 10: Calibration Procedures for Dose Calibrator

Calibration procedure for dose calibrator will be as in Appendix D, except that data will not be plotted for Linearity test. (Section E 4)

Attachment page for Byproduct Materials License

Item 10.

1. Survey instruments will be calibrated annually, and following repair.
2. The calibration will be performed at two points on each scale used for radiation protection purposes, up to a scale reading of 1R/h.
- 3.c. The survey instruments will be calibrated by Robert C. Lange, Ph.D., a physics consultant. The calibrations will be performed at the Yale-New Haven Hospital, where Dr. Lange is the Technical Director of Nuclear Medicine. Yale-New Haven Hospital (Y-NHH) holds a Broad License No. 06-00819-03, for the use of the radioisotopes in the quantities used for calibration.

(5) The procedures are as follows:

For G-M survey Meters up to 50 mR/h, the source used is Tc-99m, calibrated against NBS-traceable sources in the Y-NHH Nuclear Medicine Service Dose Calibrator. Corrections for Tc-99m decay between the time of activity measurement and the calibration are applied, using a half life of 6.02 h. The Gamma factor used for Tc-99m is  $0.72\text{R-cm}^2/\text{mCi-h}$ . The source consists of approximately 20 mCi, contained in a volume of 0.1 ml in a plastic syringe.

For Portable Ionization Chamber Meters up to 1 R/h, the source used is Tc-99m, calibrated against NBS-traceable sources in the Y-NHH Nuclear Medicine Service Dose Calibrator. Corrections for Tc-99m decay between the time of activity measurement and the calibration are applied, using a half life of 6.02 h. The Gamma factor used for Tc-99m is  $0.72\text{R-cm}^2/\text{mCi-h}$ . The source consists of approximately 1000 mCi, contained in a volume of approximately 5.0 ml in a glass vial.

Calibration measurements are made at two points on each scale, at approximately 1/3 and 2/3 of the scale maximum for each range of the meter, by varying the distance between the source and detector. The radiation measurements are carried out to a range of 1R/h. Where higher ranges exist on the meter, the calibration report and the meter itself are labeled to indicate that these ranges are uncalibrated.

The direction of the radiation with respect to the G-M tube, or to the main axis of the meter is noted on the report.

Check source readings, when an operational check source is present on the calibrated instrument, are also noted on the reporting form.

Radiation exposure to personnel during the calibrations is minimized by providing a 2.54 cm thick lead L-block shield between the source and personnel.

## CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items.

- X 1. Survey instruments will be calibrated at least annually and following repair.
- X 2. Calibration will be performed at two points on each scale 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  $\pm 10$  percent of the calculated or known values for each point checked. Readings within  $\pm 70$  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  $\pm 10$  percent. Also, when higher scales are not checked or calibrated, an appropriate precautionary note will be posted on the instrument.

3. Survey instruments will be calibrated

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

- (1) Calibration source

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

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

- X           c. By a consultant or outside firm

- (1) Name Robert D. Lange, Ph.D.
- (2) Location Yale-New Haven Hospital
- (3) Procedures and sources

\_\_\_\_\_ have been approved by NRC and are on file in License No. \_\_\_\_\_

\_\_\_\_\_ 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

X 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<br>rate<br>(mR/hr) | Instrument<br>reading<br>(mR/hr) | Exposure<br>rate<br>(mR/hr) | Instrument<br>reading<br>(mR/hr) | Exposure<br>rate<br>(mR/hr) | Instrument<br>reading<br>(mR/hr) |
|-------|-----------------------------|----------------------------------|-----------------------------|----------------------------------|-----------------------------|----------------------------------|
|       |                             |                                  |                             |                                  |                             |                                  |
|       |                             |                                  |                             |                                  |                             |                                  |
|       |                             |                                  |                             |                                  |                             |                                  |
|       |                             |                                  |                             |                                  |                             |                                  |
|       |                             |                                  |                             |                                  |                             |                                  |
|       |                             |                                  |                             |                                  |                             |                                  |

Comments:

|                     |  |                 |
|---------------------|--|-----------------|
|                     | Activity<br>or                             | Calibration     |
| <u>Nuclide</u>      | <u>Exposure Rate at Specified Distance</u> | <u>Accuracy</u> |
| Calibration Source: |  |                 |

Calibrated by \_\_\_\_\_ Date \_\_\_\_\_

**YALE-NEW HAVEN HOSPITAL**

**NEW HAVEN, CT 06510**

SURVEY METER CALIBRATION REPORT

SURVEY METER IDENTIFICATION

MANUFACTURER: Atomic Products Corp.

MODEL: 069-701

INSTRUMENT TYPE: Geiger-Müller Detector

SERIAL NUMBER: NONE

OWNER: ST. VINCENT'S MEDICAL CENTER

MAIN STREET

BRIDGEPORT, CT. 06604

CALIBRATION SOURCE: 11.28 mCi Tc-99m, calibrated against NBS-traceable sources.

SOURCE-DETECTOR

RADIATION EXPOSURE, mR/hr

| <u>DISTANCE, cm</u> | <u>SCALE</u> | <u>MEASURED*</u> | <u>CALCULATED</u> |
|---------------------|--------------|------------------|-------------------|
| 200                 | x 1          | 0.20             | 0.203             |
| 140                 | x 1          | 0.41             | 0.414             |
| 80                  | x 10         | 1.3              | 1.27              |
| 50                  | x 10         | 3.2              | 3.25              |
| 30                  | x 100        | 9                | 9.02              |
| 20                  | x 100        | 34               | 36.1              |

\*Measurements made with tube perpendicular to radiation direction.

Check source reading: No check source available with instrument.

Robert C. Lange, Ph.D.

30 September, 1986

Item 12

Personnel Training Program

1. Nuclear Medicine Technologists

All Nuclear Medicine Technologists are registered or Registry-eligible. They will be instructed according to the requirements of section 19.12 of 10CFR19 at the start of employment. They will also be provided with in-service lectures on radiation safety and the requirements of the license. The technologists will also be given the opportunity to attend local and national meetings of the Society of Nuclear Medicine to maintain their currency in the field.

2. Ancillary Personnel

All ancillary personnel such as secretaries, nurses and housekeeping staff will be given formal instruction regarding radiation safety as it pertains to their job duties. This instruction will be provided at the start of employment, and annually thereafter, as the need for further instruction arises.

Item 13

Procedures for Ordering and Receiving Radioactive Materials.

1. The Supervisory Nuclear Medicine Technologist will place all orders for radioactive materials and will ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.
2. A system for ordering and receiving radioactive materials is established and maintained, consisting of the following:
  - a. Ordering of routinely used materials:
    1. Written records that identify the isotope, compound, activity levels, and supplier will be maintained.
    2. The written record will be referred to when opening or storing radioactive materials.
  - b. Ordering of therapeutic isotopes:
    1. A written requisition will be required of the attending physician. The isotope, compound and activity will be specified.
    2. The requisition will be referenced when ordering, receiving and storing the material.
    3. All therapeutic doses will be assayed before administration.
3. All radioactive materials are delivered to the locked Nuclear Medicine Hot Lab, without exception. Vendors are supplied with keys to the facility to ensure direct access to the Hot Lab at all hours.

## 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): \_\_\_\_\_

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 radiolabeled 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

(Name) \_\_\_\_\_ (City, State) \_\_\_\_\_

NRC/Agreement State License No. \_\_\_\_\_

APPENDIX O  
PROGRAM FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES ALARA  
AT ST. VINCENT'S MEDICAL CENTER  
1/20/87

1. Management Commitment

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

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

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

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

2. Radiation Safety Committee (RSC)

a. Review of Proposed Users and Uses

1. The RSC will thoroughly review the qualifications of each applicant with respect to the types and quantities of materials and uses for which he has applied to ensure that the applicant will be able to take appropriate measures to maintain exposure ALARA.

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

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

b. Delegation of Authority

1. The RSC will delegate authority to the RSO for enforcement of the ALARA concept.

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

c. Review of ALARA Program

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

2. The RSC will perform a quarterly review of occupational radiation exposure with particular attention to instances where Investigational Levels in Table 0-1 below are exceeded. The principal purpose of this review is to assess trends in occupational exposure as an index of the ALARA program quality and to decide if action is warranted when Investigational Levels are exceeded (see Section 6).

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

3. Radiation Safety Officer (RSO)

a. Annual and Quarterly Review

1. Annual review of the radiation safety program. The RSO will perform an annual review of the radiation safety program for adherence to ALARA concepts. Reviews of specific procedures may be conducted on a more frequent basis.

2. Quarterly review of occupational exposures. The RSO will review at least quarterly the external radiation exposures of authorized users and workers to determine that their exposures are ALARA in accordance with the provisions of Section 6 of this program.

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

b. Education Responsibilities for ALARA Program

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

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

c. Cooperative Efforts for Development of ALARA Procedures

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

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

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

d. Reviewing Instances of Deviation from Good ALARA Practices

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

4. Authorized Users

a. New Procedures Involving Potential Radiation Exposures

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

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

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

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

2. The authorized user will ensure that persons under his/her

APPENDIX O CONTINUED

supervision who are subject to occupational radiation exposure are trained and educated in good health physics practices and in maintaining exposures ALARA.

5. Persons Who Receive Occupational Radiation Exposure

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

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

6. Establishment of Investigational Levels In Order to Monitor Individual Occupational External Radiation Exposures

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

TABLE 1

INVESTIGATIONAL LEVELS  
(mrems per calendar quarter)

|   | Level I | Level II |
|---|---------|----------|
| 1. Whole body; head and trunk; 125<br>active blood-forming organs;<br>lens of eyes; or gonads |         | 375      |
| 2. Hands and forearms; feet 1875<br>and ankles  |         | 5625     |
| 3. Skin of whole body 750   |         | 2250     |

The Radiation Safety Officer will review and record on Form NRC-5, "Current Occupational External Radiation Exposures," or an equivalent form (e.g., dosimeter processor's report), results of personnel monitoring not less than once in any calendar quarter as required by 20.401 of 10 CFR Part 20. The following actions will be taken at the Investigational Levels as stated in Table 1.

a. Quarterly exposure of individuals to less than Investigational Level I.

b. Personnel exposures equal to or greater than Investigational Level I, but less than Investigational Level II.

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

c. Exposure equal to or greater than Investigational Level II.

The RSO will investigate in a timely manner the cause(s) of all personnel exposures equaling or exceeding Investigational Level II and, if warranted, will take action. A report of the investigation, actions taken, if any, and a copy of the individual's Form NRC-5 or its equivalent will be presented to the RSC at the first RSC meeting following completion of the investigation. The details of these reports will be recorded in the RSC minutes. Committee minutes will be sent to the management of this institution for review. The minutes, containing details of the investigation, will be made available to NRC inspectors for review at the time of the next inspection.

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

In cases where a worker's or a group of workers' exposures need to exceed Investigational Level II, a new, higher Investigational Level II may be established on the basis that it is consistent with good ALARA practices for that individual or group. Justification for a new Investigational Level II will be documented.

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

#### 7. Signature of Certifying Official

I hereby certify that this institution has implemented the ALARA

APPENDIX O CONTINUED

Program set forth above.

William J. Riordan  
Signature

Mr. William J. Riordan  
Name

President/Chief Executive Officer  
Title

St. Vincent's Medical Center  
2800 Main Street  
Bridgeport, CT

ST. VINCENT'S MEDICAL CENTER

US NRC LICENSE 06-00843-03

SUPPLEMENTAL INFORMATION FOR USE OF Xe-133 GAS

PAGE 1

1. Quantities to be used

a. Patient Information:

Maximum of 8 patients per week.

Average activity per patient: 20 mCi (mCi).

Xe-133 gas is received from New England Nuclear (NEN), in unit dose glass vials containing a nominal 20 mCi of Xe-133, calibrated for Wednesday of week of use.

The Xe-133 is contained in rubber-sealed glass vials at less than atmospheric pressure.

2. Use and Storage Areas

a. The Xe-133 is received and stored in the HOT LAB FUME HOOD, room 2B5 in the accompanying diagram.

The Xe-133 gas is used in Rooms 2C11-2C5 and 2B3 in the accompanying diagram.

b. Air supply and exhaust plenums are located in each room, with supply and exhaust rates in cubic feet per minute (CFM) as given in the accompanying table.

Exhaust air from the Nuclear medicine area is not recirculated. The total exhaust airflow from these rooms is 2400 CFM.

3. Procedure for Routine Use

Procedure will be as described in previous license application. Briefly, the 20 mCi of Xe-133 gas is injected into a closed breathing system into which the patient breathes. At the end of the study, expired air is passed through a charcoal trap designed to remove the radioactive gas.

4. Accidental release

In case of accidental release of Xe-133 gas, the following procedures will be followed:

a. Storage room: Evacuate personnel from room, close door. Allow 11 minutes for reduction of Xe-133 concentrations to MPC (see calculations below).

b. Use rooms:

Room 2C5-2C11

Evacuate patient and personnel from room, close door. Allow 20 minutes for reduction of Xe-133 concentrations to MPC (see calculations below).

Room 2B3

Evacuate patient and personnel from room, close door. Allow 20 minutes for reduction of Xe-133 concentrations to MPC (see calculations below).

ST. VINCENT'S MEDICAL CENTER

SUPPLEMENTAL INFORMATION FOR USE OF Xe-133 GAS

PAGE 2

5. Xe Concentrations in Restricted Area

a. Storage area (fume hood):

120 mCi stored per week. Estimated loss 10% = 12 mCi. Exhaust airflow = 75 cubic feet per minute (CFM).

Maximum Xe-133 release to reach weekly MPC = 50.9 mCi.

b. Use areas:

1. SCAN ROOM 2C11 AND 2C5:

120 mCi used per week. Estimated loss = 20% = 24 mCi. Exhaust airflow = 400 CFM.

Maximum Xe-133 release to reach weekly MPC = 271.6 mCi.

2. SCAN ROOM 2B3:

120 mCi used per week. Estimated loss = 20% = 24 mCi. Exhaust airflow = 400 CFM.

Maximum Xe-133 release to reach weekly MPC = 276.1 mCi.

6. Xe Concentrations in Unrestricted Area

Maximum use per year = 6240 mCi. Estimated loss = 20% = 24 mCi per week or 1248 mCi per year. Total exhaust airflow = 2400 CFM.

Maximum Xe-133 release to reach weekly MPC = 205 mCi.

7. Xe Trap

The Xe-133 trap has been described in previous license applications. The trap is Atomic Products Model 127-313.

8. Calculations for Accidental Release of Xe-133 Gas

a. Storage area (HOT LAB ROOM 2B5 AND 2B11)

Room volume = 3220 cu ft; exhaust rate = 930 CFM.

Accidental release of 20 mCi Xe-133 gas through vial breakage would produce an initial concentration of  $2.19 \times 10^{-4}$  microcuries/cc.

Fractional exhaust rate =  $930 \text{ CFM} / 3220 \text{ CF} = 0.289/\text{min}$ .

Time to reach MPC of  $1 \times 10^{-5}$  microcurie/cc = 10.7 min.

b. Use areas:

1. Room 2C11-2C5

Room Volume = 2200 cu ft; exhaust rate = 400 CFM.

Accidental release of 20 mCi Xe-133 gas through vial breakage, equipment failure, or patient non-compliance would produce an initial concentration of  $3.21 \times 10^{-4}$  microcuries/cc.

Fractional exhaust rate =  $400 \text{ CFM} / 2200 \text{ CF} = 0.182/\text{min}$ .

Time to reach MPC of  $1 \times 10^{-5}$  microcurie/cc = 19.0 min.

ST. VINCENT'S MEDICAL CENTER

SUPPLEMENTAL INFORMATION FOR USE OF XE-133 GAS

PAGE 3

2. Room 2B3

Room volume = 1800 cu ft; exhaust rate = 400 CFM.

Accidental release of 20 mCi Xe-133 gas through vial breakage, equipment failure, or patient non-compliance would produce an initial concentration of  $3.92 \times 10^{-4}$  microcuries/cc.

Fractional exhaust rate =  $400 \text{ CFM} / 1800 \text{ CF} = 0.222/\text{min}$ .

Time to reach MPC of  $1 \times 10^{-5}$  microcurie/cc = 16.5min.

9. Xenon Trap Information.

a. Leakage from charcoal trap is vented through exhaust system at 2400 CFM. The maximum amount of Xe-133 which can be released to reach the unrestricted MPC is 205 mCi per week. Only 120 mCi are used per week.

b. Monthly monitoring of the charcoal trap will be carried out according to the attached memo. Records of these monitoring results will be maintained.

c. Charcoal trap canisters have integral 1/8 inch lead shielding. Saturated traps will be sealed with rubber stoppers and stored for at least 60 days (12 half lives) before disposal in ordinary trash.

10. Nuclear Medicine Room volumes and airflow values.

| ROOM OR FACILITY                | VOLUME  | SUPPLY CFM | EXHAUST CFM |
|---------------------------------|---------|------------|-------------|
| FUME HOOD                       |         |            | 75          |
| ROOM 2B5-2B11                   | 3220 CF | 775        | 930         |
| ROOM 2C5-2C11                   | 2200 CF | 380        | 400         |
| ROOM 2B3                        | 1800 CF | 380        | 400         |
| NUCLEAR MEDICINE<br>CLINIC AREA |         | 2300       | 2400        |